SHARED HERITAGE • SHARED RESPONSIBILITY •

Sabah

BIODIVERSITY STRATEGY 2012-2022

SABAH BIODIVERSITY STRATEGY

Biodiversity is our shared heritage; it must also be our shared responsibility

The Sabah Biodiversity Strategy was developed under the Bornean Biodiversity & Ecosystems Conservation Programme Phase II, a joint programme of the Sabah State Government, Universiti Malaysia Sabah, and Japan International Cooperation Agency

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1. Mangroves along Salut Bay, Kota Kinabalu (Fong Chuen Far)
2. Porter at Mount Kinabalu (V. Sathyabama)
3. Girls from Kg. Buayan (Inanc Tekguc)
4. Grouper from the waters of Sipadan Island (Derrick Low Wooi Sun)
5. Pitcher Plants at Mount Kinabalu (V. Sathyabama)
6. The Borneo Pygmy Elephant (Randolph S. Jeremiah)

PREFACE

At the 1992 United Nations Conference on Environment and Development or the Rio Summit, Malaysia was among the signatories to the Convention on Biological Diversity (CBD). The Convention outlines three main objectives: (1) the conservation of biological diversity; (2) the sustainable use of the components of biological diversity, and (3) the fair and equitable sharing of the benefits arising from the utilization of genetic resources.

In 2010, in view of the continued decline of global biodiversity, parties to the CBD, in Nagoya, Japan, adopted the *Strategic Plan for Biodiversity 2011-2020* with the purpose of inspiring broad-based action in support of biodiversity over the next decade by all countries and stakeholders. The Strategic Plan has 20 headline targets termed the "Aichi Biodiversity Targets", organised under five strategic goals that address the underlying causes of biodiversity loss, reduce the pressures on biodiversity, safeguard biodiversity at all levels, enhance the benefits provided by biodiversity, and provide for capacity-building.

The ***Sabah Biodiversity Strategy 2012-2022*** is a 10-year strategy that charts Sabah's commitment and contributions to fulfil the pledge made by Malaysia to implement the CBD. The Strategy seeks to conserve Sabah's biological diversity and to ensure that its components are utilised in a sustainable manner for the continued progress and socio-economic development of the state. It builds upon *the Sabah Conservation Strategy 1992* and takes into account the state's aspirations to uplift the socioeconomic status and well-being of the people in Sabah.

The Strategy puts emphasis on engaging the people of Sabah – i.e. harnessing the collective reach, creativity and commitment of all stakeholders to safeguard our biodiversity. It highlights the need to reduce pressures from economic activities and to integrate biodiversity considerations into the economic sphere. The Strategy identifies the importance of enhancing the resilience of our ecosystems as well as the urgent need to improve our understanding and knowledge. Finally, the Strategy stresses on the necessity to strengthen the capacities of all stakeholders to manage biodiversity. The framework for implementation, coordination, monitoring and information sharing are also described.

It is hoped that the Sabah Biodiversity Strategy 2012 – 2022 will be embraced by all the people of Sabah. Biodiversity is our shared heritage; it must also be our shared responsibility.

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LIST OF ABBREVIATIONS

ABS	Access and Benefit-Sharing
ASEAN	Association of Southeast Asian Nations
BBEC	Bornean Biodiversity and Ecosystem Conservation
BIMP-EAGA	Brunei Darussalam-Indonesia-Malaysia-The Philippines East ASEAN Growth Area
BORA	Borneo Rhino Alliance
BSBCC	Bornean Sun Bear Conservation Centre
CBD	Convention on Biological Diversity
CBNRM	Community-Based Natural Resources Management
CCA	Community Conserved Area
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRP	Crocker Range Park
CSR	Corporate Social Responsibility
CTI	Coral Triangle Initiative
CTI-CFF	Coral Triangle Initiative on Coral Reefs, Fisheries, & Food Security
CSO	Civil Society Organisation
CUZ	Community Use Zones
DBKK	*Dewan Bandaraya Kota Kinabalu*
DID	Department of Irrigation and Drainage
DOA	Department of Agriculture
DOE	Department of Environment
DOF	Department of Fisheries
EAC	Environmental Action Centre
EAFM	Ecosystem Approach to Fisheries Management
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EPD	Environment Protection Department
FiT	Feed-in Tariff
FMU	Forest Management Unit
FPIC	Free, Prior and Informed Consent
FR	Forest Reserve
FRIM	Forest Research Institute Malaysia
FSC	Forest Stewardship Council
GDF	Global Diversity Foundation
GDP	Gross Domestic Product
GIS	Geographic Information System
HCVA	High Conservation Value Area
HCVF	High Conservation Value Forest
HoB	Heart of Borneo
IBA	Important Bird Area
ICCA	Indigenous and Community Conserved Areas
IUCN	International Union for Conservation of Nature
KFR	Kelawat Forest Reserve
KK	Kota Kinabalu

KOCP	Kinabatangan Orang-Utan Conservation Programme
KWH	Kilowatt Hour
LEAP	Land Empowerment Animals People
LKSW	Lower Kinabatangan – Segama Wetlands
LSD	Land and Survey Department
MAB	Man and the Biosphere
MMEA	Malaysian Maritime Enforcement Agency
MNS	Malaysian Nature Society
MPOB	Malaysian Palm Oil Board
MTCE	Ministry of Tourism, Culture and Environment
NGO	Non-Governmental Organisation
NPS	Non-Point Source
NRO	Natural Resources Office
PA	Protected Area
PACOS	Partners of Community Organisation
PRF	Protection Forest Reserve
PWD	Public Works Department
R&D	Research and Development
REDD	Reduced Emissions from deforestation and Degradation
RSPO	Roundtable on Sustainable Oil Palm
SaBC	Sabah Biodiversity Centre
SALM	*Skim Amalan Ladang Malaysia*
SBCSD	Sabah Business Council for Sustainable Development
SBS	Sabah Biodiversity Strategy
SDC	Sabah Development Corridor
SEDIA	Sabah Economic Development and Investment Authority
SEEN	Sabah Environmental Education Network
SFD	Sabah Forestry Department
SFM	Sustainable Forest Management
SFMLA	Sustainable Forest Management License Agreements
SIMCA	Sugut Islands Marine Conservation Area
SP	Sabah Parks
SPA	Strategic Plan of Action
SWD	Sabah Wildlife Department
TED	Turtle Exclusion Device
TEK	Traditional Ecological Knowledge
TRPD	Town and Regional Planning Department
UMS	Universiti Malaysia Sabah
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UPEN	*Unit Perancang Economi Negeri*
USM	Ulu-Segama Malua
WEN	Wildlife Enforcement Network
WWF	World Wide Fund for Nature
YS	Yayasan Sabah

PART A
BACKGROUND

Section A1
Introduction

A1.1 SABAH'S BIODIVERSITY – OUR SHARED RESPONSIBILITY

Sabah is renowned internationally for its remarkable biodiversity

The biodiversity of Sabah emerged over millions of years. Over this time, an astounding diversity of plants, animals and micro-organisms emerged in a range of distinctive ecosystems. The state with its diverse habitats from mist-covered mountain forests, to meandering rivers and floodplains and vibrant underwater kingdoms has become synonymous with nature. Within these ecosystems, we find dynamic assemblages of plants and animals which are delicately inter-connected. Many of these are found nowhere else in the world. If they are lost, they are lost for good. Some of these species have become cherished symbols of Sabah and draw millions of domestic and international visitors each year.

An exceptional element of biodiversity in Sabah is its long association with the indigenous communities. Over generations, people have accumulated knowledge of plant and animal diversity, ecological relationships and seasonal rhythms. Indigenous communities draw upon this knowledge to extract food, materials and medicines from their surrounds, and retain a remarkable living archive of knowledge. This close connection to nature has also richly influenced cultural traditions and spiritual beliefs, and for this reason this unique biocultural diversity has become inextricably linked to the identity of its people.

Our biodiversity provides essential services to the people of Sabah

Our biodiversity also provides essential services to enable the people of Sabah to enjoy clean air and water supply, and partake of the bounty of productive ecosystems. It also enables us to sustain our economy.

It is therefore vital that all of us be engaged in the protection of the state's biodiversity. This Strategy is designed to engage Sabah society as a whole as it will take the collective effort of everyone to protect the biodiversity and reverse trends in environmental degradation. Biodiversity is our shared heritage; it must also be our shared responsibility.

A1.2 BIODIVERSITY AT THE BRINK - THE CHALLENGE BEFORE US

At the turn of the last century, Sabah was covered with dense forests teaming with wildlife. In a matter of decades, human activities have been so extensive that we are in danger of wiping out biodiversity formed over millennia. Large forest areas were cleared to make way for agriculture. Wildlife species are now more vulnerable to capture and there is a flourishing illegal trade. Some species have been poached to the point of extinction. This pressure is particularly evident in coastal areas where the fisheries are showing signs of collapse due to overfishing, pollution and the prevalence of bad fishing practices.

The call to address this legacy of environmental damage weighs heavily on us all today. Though we may not personally have directly caused or benefitted from the loss of biodiversity, we are at a historic turning point where urgent and decisive actions taken now can restore the state's biodiversity. In so doing we may yet establish a stronger foundation for achieving the state's vision of leveraging off Sabah's geographical location, natural resources, cultural heritage and biodiversity for balanced growth, as outlined in the Sabah Development Corridor Blueprint (2008-2025).

For these reasons, the *Sabah Biodiversity Strategy 2012-2022* is expected to influence all aspects of our lives. Everyone has a part to play, and we all need to make conservation our business for the sake of our future generations and to fulfil our responsibility as part of a global community.

A1.3 KEEPING OUR PROMISES

At the 1992 United Nations Conference on Environment and Development or the Rio Summit, Malaysia was among the signatories to the Convention on Biological Diversity (CBD). The Convention outlines three main objectives: (1) the conservation of biological diversity; (2) the sustainable use of the components of biological diversity, and (3) the fair and equitable sharing of the benefits arising from the utilization of genetic resources. The Convention recognises that biological diversity is more than just about plants, animals and micro-organisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live. In 1998, Malaysia launched its own National Policy on Biological Diversity designed to "Conserve Malaysia's biological diversity and to ensure that it's components are utilised in a sustainable manner for the continued progress and socio-economic development of the nation".

In 2010, in view of the continued decline of global biodiversity, parties to the CBD, in Nagoya, Japan, adopted the *Strategic Plan for Biodiversity 2011-2020* with the purpose of inspiring broad-based action in support of biodiversity over the next decade by all countries and stakeholders (Box A1-1). The Strategic Plan has 20 headline targets termed the "Aichi Biodiversity Targets", organized under five strategic goals that address the underlying causes of biodiversity loss, reduce the pressures on biodiversity, safeguard biodiversity at all levels, enhance the benefits provided by biodiversity, and provide for capacity-building. The parties also adopted The Nagoya Protocol to Access to Genetic Resources and the Fair and Equitable Sharing of Resources (Nagoya Protocol). The United Nations General Assembly declared 2011-2020 as the *United Nations Decade on Biodiversity* in recognition of the gravity of the situation.

Box A1-1 : The CBD Strategic Plan For Biodiversity 2011-2020

The Vision: "By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people."

The Mission: "Take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human well-being, and poverty eradication. To ensure this, pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are effectively implemented, and decision-making is based on sound science and the precautionary approach."

As responsible members of the international community, we need to work hand in hand with the rest of humanity to protect the biodiversity on this planet. Sabah has taken a proactive step by formulating its own strategy for biodiversity – to compliment efforts at the national and international levels. The *Sabah Biodiversity Strategy 2012-2022* is a Ten-Year Strategy that charts Sabah's commitment and contributions to fulfil the pledge made by Malaysia to implement the CBD.

A1.4 THE FIVE GOALS

The *Sabah Biodiversity Strategy 2012-2022* takes cognisance of the National Policy on Biological Diversity that seeks to conserve Malaysia's biological diversity and to ensure that its components are utilised in a sustainable manner for the continued progress and socio-economic development of the nation (Box A1-2). It builds upon

the Sabah Conservation Strategy 1992 which provided an overview of biodiversity rich areas in the state and proposed conservation actions. In keeping with Malaysia's commitment to CBD, the *Sabah Biodiversity Strategy 2012-2022* closely parallels the *CBD Strategic Plan for Biodiversity 2011-2020* and has adopted all the key goals which provide a comprehensive framework for strategic intervention.

Box A1-2 : National Policy On Biological Diversity - Malaysia

Vision: To transform Malaysia into a world centre of excellence in conservation research and utilisation of tropical biological diversity by the year 2020.

Policy Statement: To conserve Malaysia's biological diversity and to ensure that its components are utilised in a sustainable manner for the continued progress and socio-economic development of the nation.

Guided by the National Policy on Biodiversity, the nation's commitment to CBD as well as Sabah's own aspirations, we have identified five goals that we need to work towards. These goals will provide the focus for our efforts over the next 10 years:

Goal 1: By 2022, we would have engaged with and harnessed the commitment of all stakeholder groups to ensure our biodiversity is protected

Engaging the people of Sabah is fundamental if we are to succeed in conserving the state's biodiversity effectively. We need to focus on harnessing the collective reach, creativity and commitment of all stakeholders, and building robust partnerships in order to safeguard our shared heritage.

Goal 2: By 2022, we would have significantly reduced direct and indirect pressures on biodiversity

Reducing the pressures exerted on biodiversity by economic activities will involve integrating biodiversity fully into the economic sphere to reconcile public and private interests, and encouraging mainstreaming. Stakeholders need to be encouraged to invest in ecological capital and play a greater role in developing this common asset. This includes improved planning and adopting better management practices.

Goal 3: By 2022, all of our key ecosystems, species and genetic diversity are protected and well managed

We need to enhance the resilience of our ecosystems. We need to strengthen the protection of natural habitats across the landscape including areas within and outside the protected area network through initiatives to restore habitat connectivity and engage with local communities and community-conserved areas.

Goal 4: By 2022, our understanding of biodiversity and ecosystem services have significantly improved to enable a more effective management of our resources

Enhancing research and long-term monitoring are essential to achieving our goals. This includes expanding our understanding of traditional ecological knowledge.

Goal 5: By 2022, all stakeholder groups will have the necessary capacity to conserve biodiversity

We need to strengthen the capacities of all stakeholders to manage biodiversity. Support should be provided to government institutions, indigenous communities, and civil society organisations to enhance their capabilities. We also need to streamline legislation, develop sustainable financing, and enhance national and international cooperation.

These five goals form the basis of the *Sabah Biodiversity Strategy 2012-2022*. All the strategies, actions and activities (described in Part B of this document) are designed to enable us achieve these five goals.

A1.5 READING AND USING THE STRATEGY

The document has three Parts: Part A, which comprises Sections A1 to A4, provides essential background to understanding the current status of biodiversity in Sabah. Specifically, Section A2 provides an overview of biodiversity found in Sabah and the status of current conservation efforts. Section A3 deals with the challenges that we face in protecting our biodiversity. Section A4 provides an analysis of socio-economic drivers which are contributing to the current situation and have a major bearing on future conservation efforts.

Part B, which comprises Sections B1 – B5, is the main content of the Strategy. Section B1 describes the actions and activities of Strategy 1 that focus on engaging with and harnessing the commitment of all stakeholder groups. Section B2 outlines the actions and activities of Strategy 2 which aim at reducing external pressures on biodiversity. Section B3 documents the actions and activities of Strategy 3 that aim towards enhancing ecosystem resilience and ensuring our key ecosystems, species and genetic diversity are protected. Section B4 describes the actions and activities of Strategy 4 that focus on enhancing our knowledge about biodiversity. Finally, Section B5 outlines the actions and activities of Strategy 5 which aim at strengthening the capacity of all stakeholders.

Part C describes how the strategy will be implemented and outlines the framework for coordination, monitoring and information sharing. Implementing agencies and organisations taking on lead roles and partners are also identified.

Section A2
Status of Biodiversity in Sabah

A2.1 SABAH – THE CENTRE OF MEGABIODIVERSITY

Sabah is renowned internationally for its remarkable biodiversity and iconic wildlife species. It is the only Malaysian state to have significant populations of orang-utan, Asian elephant, Malayan sun bear and proboscis monkey, all species that are under pressure throughout their natural range in Southeast Asia. Sabah represents the best hope for these species to continue to survive and thrive. The Sumatran rhinoceros which is critically endangered also occurs within the forests of Sabah. An astounding array of birdlife, fish, reptiles, amphibians and invertebrates occupy Sabah's diverse tropical ecosystems on land and sea. The diversity of plants and fungi is no less impressive and many of these are found nowhere else in the world. Many parts of Sabah have hardly been explored and we anticipate that many more new species stand to be discovered in the future. This is our heritage.

A2.2 TERRESTRIAL WILDLIFE

The diversity of mammal and bird species in Sabah is relatively well documented (Table A2-1). Reptiles, amphibians and fishes are less thoroughly inventoried and new species continue to be discovered. Other than insects such as butterflies, moths, beetles and social insects, invertebrates have not been extensively studied. The vast majority of invertebrates in Sabah remain largely undescribed.

Table A2-1: Diversity of Major Fauna Groups in Sabah

	Total Number of Species	Total Number of Families
Mammals	206	31
Birds	352	65
Reptiles	215	28
Amphibians	112	6
Freshwater Fishes	155	?
Invertebrates	150,000?	?

Sources: Payne and Francis, 2007; Phillipps and Phillipps, 2009; IOC, 2011; Das and Yaakob, 2007, Chin 1990; IUCN, 2011

A2.2.1 Mammals

There are 206 species of terrestrial mammals in Sabah classified into 104 genera and 31 families (Table A2-2). The most species-rich groups of Sabah's mammals are the bats (86 species) and rodents (58 species). Three mammalian orders are each only represented by a single local species, i.e. the pangolin, the elephant and the flying lemur, making these orders more vulnerable to local extinction. A previously

thought extinct species - the hairy-nosed otter – was recently recorded in Sabah after an absence of more than 100 years.

Table A2-2: Mammals in Sabah

Order & Representants	No. of species	Species
Eulipotyphla: Shrews and gymnures	9	Includes the moonrat, lesser gymnure, house shrew, black shrew, Savi's pigmy shrew, Sunda shrew, South-East Asian white-toothed shrew. Kinabalu shrew (VU) and the Bornean Water Shrew (EN).
Scandentia: Treeshrews	8	Includes the pentail treeshrew, common treeshrew, Mountain treeshrew, lesser treeshrew, slender treeshrew, large treeshrew, striped treeshrew and smooth-tailed treeshrew.
Dermoptera: Flying lemur	1	Only one representative, the flying lemur (or colugo).
Chiroptera: Bats	86	The most species-rich order in Sabah. Threatened species include the bare backed rousette (VU), Ridley's roundleaf bat (VU) and Tomes' false serotine (VU) and the Flores woolly bat (VU).
Primates: Prosimians, monkeys and apes	10	Includes the Bornean slow loris (VU), Western tarsier (VU), Hose's langur (VU), maroon langur, silvered langur, proboscis monkey (EN), long-tailed macaque, pig-tailed macaque (VU), Müller's Bornean gibbon (EN) and Bornean orang-utan (EN).
Pholidota: Pangolin	1	Only one representative, the Malayan pangolin (EN).
Rodentia: Squirrels, rats and porcupines	58	Threatened species include the ear-spot Squirrel (VU), whiskered flying squirrel (VU), Vordermann's flying squirrel (VU), smoky flying squirrel (EN) and tufted ground squirrel (VU).
Carnivora: Civets, otters, mustelids, cats mongooses and bear	24	Threatened species include the Hose's civet, otter civet, banded civet (VU), binturong (VU), hairy-nosed otter, Bornean ferret badger, Bornean bay cat (EN), flat-headed cat (EN), Sunda clouded leopard (VU), marbled cat (VU), collared mongoose and sun bear.
Proboscidea: Elephant	1	Only one representative, the Asian elephant (EN).
Perissodactyla: Odd-toed Ungulates	1	Only one representative, the Sumatran rhinoceros (CR).
Artiodactyla: Even-toed Ungulates	7	Includes the bearded pig (VU), lesser mouse-deer, greater mouse-deer, red muntjac, Bornean yellow muntjac, sambar deer and tembadau (or banteng) (EN).

CR: Critically endangered, EN: Endangered, VU: Vulnerable (IUCN, 2011)

The Sabah orang-utan population is one of the largest in the world

Sabah harbours some mammal populations of global significance. Sha *et al.* (2011) estimated that Sabah's population of about 6,000 proboscis monkeys (*Nasalis larvatus*) may represent a third of the world population of this Bornean endemic. It is estimated that there are about 11,000 Orang-utans (*Pongo pygmaeus morio*) in Sabah, one of the largest in the world and of exceptional conservation importance. Sabah is also home to the Bornean population of Asian elephant (*Elephas maximus*) with an estimated population of 2,000. This represents about 5 percent of the world Asian elephant population. Moreover, the Bornean population is a genetically distinctive sub-species which is found nowhere else. The critically endangered Sumatran rhinoceros (*Dicerorhinus sumatrensis*) occurs in the eastern lowlands of Sabah, although it is likely to number only 40 individuals.

Eighty-six (about 40 percent) of all Sabah mammals have been given some sort of conservation risk status. Six mammal species are totally protected in Sabah (under the Schedule 1, Part I of the Wildlife Conservation Enactment 1997), i.e. the Sumatran rhinoceros, the orang-utan, the sun bear, the proboscis monkey, the clouded leopard, the dugong and the Asian Elephant. Seven species of mammal are considered endemic to Sabah. These include two species of shrew, two species of bat, two rat species and one species of badger (Table A2-3).

Table A2-3: Endemic Mammals of Sabah

Common Name	Scientific Name	Habitat
Black Shrew	*Suncus ater*	Montane (Kinabalu)
Kinabalu Shrew	*Crocidura baluensis*	Montane (Kinabalu)
Gomantong Myotis	*Myotis gomantongensis*	Lowland
Coppery Pipistrelle	*Pipistrellus cuprosus*	Lowland
Mountain spiny rat	*Maxomys alticola*	Montane
Bornean pithecheirops	*Pithecheirops otion*	Lowland (Danum Valley)
Bornean ferret badger	*Melogale everetti*	Montane

A2.2.2 Birds

352 bird species from 65 families have been recorded in Sabah (IOC, 2011). Three species are considered endemic to Sabah (Phillipps and Phillipps, 2009). Two of these - the Bornean falconet, the world's smallest bird of prey, and the black-headed pitta - are mostly found in lowland forests. The third endemic species, the friendly bush warbler, has only been recorded in montane habitats.

Lowland forests of Sabah harbour the greatest diversity of bird species. Lowland specialists include the Bornean ground cuckoo, great slaty woodpecker, blue-headed pitta, Bonaparte's nightjar and bristlehead. Characteristic residents of hill and submontane forests include the Bulwer's pheasant, orange-breasted trogon, Hose's broadbill, banded and blue-banded pitas. As altitude increases, the number of bird species decrease but endemism increases. Characteristic upper montane birds include the island thrush, friendly bush warbler, pale-faced bulbul and fruit hunter.

Freshwater swamps and mangroves are important habitats for waterbirds.

Characteristic birds of peat swamps include the wrinkled hornbill, hooked-billed bulbul, grey-chested jungle flycatcher, scarlet-breasted flowerpecker and fiery minivet. Kerangas or heath forests are rare habitats that typically harbour species such as the white-chested babbler, hooked-billed bulbul and thick-billed flowerpecker.

The birds of freshwater swamps, rivers and lakes include herons, egrets, bitterns, stork, darters and other waterbirds. Specialised and rare species include the Storm's stork and the oriental darter. Typical mangrove birds include the ruddy kingfisher, great tit, mangrove blue flycatcher, mangrove whistler, lesser adjutant, herons and migrant waders.

Over 240 bird species are migrants or vagrants to Borneo. It is estimated that about 15 million birds reach Borneo each winter from Siberia and North East Asia and a smaller number from Australia and Java. The corridor through which these waterbirds migrate is known as the 'East Asian-Australasian Flyway'. Stretching across 22 countries, it is one of eight major waterbird flyways recognised around the globe. Forest migrants to Sabah include the Asian brown and mugimaki flycatchers, grey nightjar, Siberian blue robin and brown hawk-owl. Migrants are most common in coastal habitats. Pulau Mantanani, Pulau Tiga, Klias wetlands, the Kota Kinabalu area and Pulau Layang-Layang are important stopover sites for migrant waterbirds. The Lower Kinabatangan-Segama Ramsar Site is also an important stop-over site along the East Asian-Australasian Flyway, particularly for the Chinese egret (Lackman and Manokaran, 2010). In total, Sabah has 14 Important Bird Areas (IBAs). These are areas being globally important habitat for the conservation of birds (Aik *et al.*, 2005) (Table A2-4).

Table A2-4: Important Bird Areas for Sabah

Important Bird Areas	Forest types
Crocker Range Park	Hill forest, sub-montane forest, montane forest
Kinabalu National Park	Hill forest, sub-montane forest, montane forest
Trus Madi Range	Hill forest, sub-montane forest, montane forest
Kinabatangan Floodplain	Mangrove forest, intertidal habitat, peat swamp forest, freshwater swamp forest, floodplain lakes, lowland forest, karst/caves
Danum Valley	Lowland forest, hill forest, sub-montane forest
Maliau Basin	Lowland forest, hill forest, sub-montane forest, montane forest, tropical heath forest
Tawau Hills Park	Lowland forest, hill forest, sub-montane forest
Tabin Wildlife Reserve	Lowland forest, hill forest
Klias Peninsula	Mangrove forest, intertidal habitat, peat swamp forest, freshwater swamp forest, lowland forest, tropical heath forest
Kabili-Sepilok Forest Reserve	Mangrove forest, lowland forest, hill forest, tropical heath forest
Kulamba Wildlife Reserve	Freshwater swamp forest, lowland forest
Sipadan Islands	Offshore islands, coral reefs, beach forest
Mantanani Islands	Offshore islands, open sea, beach forest, karst/ caves
Tempasuk Plain	Mangrove forest, freshwater swamp forest, lowland forest, open sea, secondary forest, farmland

Source: Aik *et al*., 2005.

A2.2.3 Amphibians and Reptiles

112 species of amphibians and 215 species of reptiles have been recorded in Sabah (Table A2-5). A relatively high number of species have been discovered or recognised as new only in the last half a decade and the figures are expected to increase as more field surveys and detailed molecular examinations are undertaken. There are 111 species of frogs described from Sabah. It is thought that this represents only a fraction of actual species diversity, particularly as montane areas remain incompletely explored. To date, only one species of caecilian (a group of amphibians that superficially resemble earthworms or snakes) has been recorded in Sabah - *Ichthyophis monochrous* (Malkmus *et al.*, 2002). A total of 123 snake species (28 families) and 76 lizard species (10 families) have also been recorded in Sabah (Das and Yaakob, 2007).

Table A2-5: Amphibians and Reptiles in Sabah

Taxonomic Groups	Total Number of Species Described	Total Number of Families
Amphibians	112	6
Frogs	111	5
Caecilians	1	1
Reptiles	215	28
Snakes	123	11
Lizards	76	10
Crocodiles	1	1
Turtles, terrapins and tortoises	14	6

Source: Das and Yaakob, 2007 ; Malkmus *et al*., 2002; Graeme Gillespie, pers. comm.

The estuarine crocodile (*Crocodylus porosus*) is widely distributed in Sabah, inhabiting mangroves, river basins, freshwater swamps and oxbow lakes. It has also been encountered more than 20km off Sabah's east coast. The population of estuarine crocodiles in Sabah was on the verge of collapse in the mid-80s due to overexploitation but has recovered since then. The population is now estimated to be between 13,000 to 15,000 (SWD, 2002). The estuarine crocodile has been listed as a Protected Species under the Sabah Wildlife Conservation Enactment 1997.

A2.2.4 Invertebrates

The diversity of Sabah's invertebrates is extremely high. However only a fraction of the state's invertebrate populations have been studied and this vast group of animals remains substantially unknown. The few studies on insect taxonomy that have been conducted in Sabah have primarily focused on charismatic insect groups such as the butterflies and moths, beetles, wasps, termites, ants and bees.

An estimated 936 species of butterfly are found in Borneo, 94 of which are endemics. Moths are particularly species-rich and are commonly divided into the bigger macromoths and the smaller micromoths. Just over 4,000 species of macromoths are known from Borneo (Chey, 2007). The Sabah Forest Insect Museum in Sepilok houses more than 2,400 species of macromoths with 18,000 pinned specimens. A total of 106 families of beetles have been recorded in Borneo. There are about 1,700 species of beetles from 89 families in the collection at the Forest Research Centre in Sepilok, Sandakan (Chung, 2003).

A2.3 TERRESTRIAL ECOSYSTEMS AND PLANTS

A2.3.1 Forest Ecosystems

Forests cover more than 50% of the land area of Sabah (Figure A2-1). Almost all of Sabah's natural forests can be classified as evergreen tropical rainforests, as the state is located in the equatorial region and experiences a wet tropical climate. Sabah's rainforests are extremely diverse with many pockets of different floristic assemblages present across the State (Table A2-6). The high floristic diversity is closely correlated with variation in topography and soil conditions. The existence of a significant elevation range (0 to 4097 m) influences altitudinal zonation within the ecosystems.

Table A2-6: Natural ecosystems in Sabah

Ecosystem	Status	Remarks
Sub-alpine	Not threatened	Only found on Mt Kinabalu. Human threat is negligible, although threatened by prolonged periods of drought. Climate change may pose a threat in the future.
Montane	Not threatened	Large extents of this ecosystem are gazetted as state Parks and Class I Protection Forest. Threatened by prolonged periods of drought. Climate change may pose a threat in the future.
Dipterocarp	Threatened	The most productive ecosystem. Harbours high diversity of flora and fauna. Formerly the most widespread ecosystem in Sabah. The coverage of pristine dipterocarp forest is however limited. Almost all of the dipterocarp forests on State Land have been converted to plantations. In the permanent forest estates, especially Class II Commercial Reserve, much of these have been damaged due to repeated logging in short cutting cycles.
Kerangas (Heath)	Threatened	This ecosystem, known for high levels of plant endemism, is confined to small locations characterised by distinctive sandy soils. Most of the coastal heath forests are gone. There are pockets of inland heath forests in the Sook and Pendawan plains and scattered in the Upper Padas. Highly vulnerable to wild fires
Ultramafic	Not threatened	Steep and mountainous ranges dominate this ecosystem. Most of these ecosystems are protected in state parks, Class I Protection Forest, Class VI Virgin Jungle Reserve, as well as conservation areas within FMUs. Although not threatened, ultramafic forests are extremely important for conservation, as they are globally rare – Sabah has the largest extent of ultramafic outcrops in Malaysia and the third largest extent in the world. They harbour a high number of endemic plant species.
Limestone	Threatened*	Of limited extent in the state. Important for the in situ conservation of plant species that are endemic to limestone. Large limestone outcrops in Sabah are protected under Class I

Ecosystem	Status	Remarks
		Protection Forest and Class VI Virgin Jungle Reserve. However, they are still vulnerable to quarrying.
Beach forest	Threatened	This ecosystem is mostly found on State land, has largely been converted for urban development and settlements. In particular, most of the beach forests on the west coast of Sabah have been lost to development. The only protected beach forest is at Pulau Tiga. There is a need to protect endemic plant species found on Pulau Semporna.
Mangroves	Not threatened	Almost all of Sabah's mangroves are protected under Class V Mangrove Reserve.
Peat swamp	Threatened	This unique and fragile ecosystem was estimated to have once covered about 100,000 ha. However to date about 80 percent have been lost due to peat fires, logging and urbanisation.
Freshwater swamp	Threatened	Virtually, the entire ecosystem has been disturbed and converted into secondary forest as well as oil palm estates.

Source: Based on data by Sabah Forestry Department

The most extensive terrestrial ecosystems in Sabah are disturbed forests, which have undergone one or more logging cycles, or have been previously cleared for shifting agriculture. Remnants of primary forest are now confined to a number of protected areas and mainly steep slopes or remote locations within the Forest Reserves.

Almost half of Sabah's land area falls within the State's Permanent Forest Estate (Table A2-7), which comprises a network of Forest Reserves (covering 48.2% of the Sabah's land area). Forest Reserves in Sabah fall within seven functional classes for both productive and conservation purposes. Areas designated as Commercial Forest (Class II) encompass over 70 percent of the Permanent Forest Estate. These areas are responsible for the continued production of timber.

Table A2-7: Permanent Forest Estate in Sabah, 2010

Forest Reserve Classes		Area (Ha)
Class I	Protection Forest	466,757
Class II	Commercial Forest	2,550,022
Class III	Domestic Forest	6,919
Class IV	Amenity Forest	16,359
Class V	Mangrove Forest	326,487
Class VI	Virgin Jungle Forest	103,038
Class VII	Wildlife Reserves	137,065
Total		**3,606,647**

Source: Sabah Forestry Department

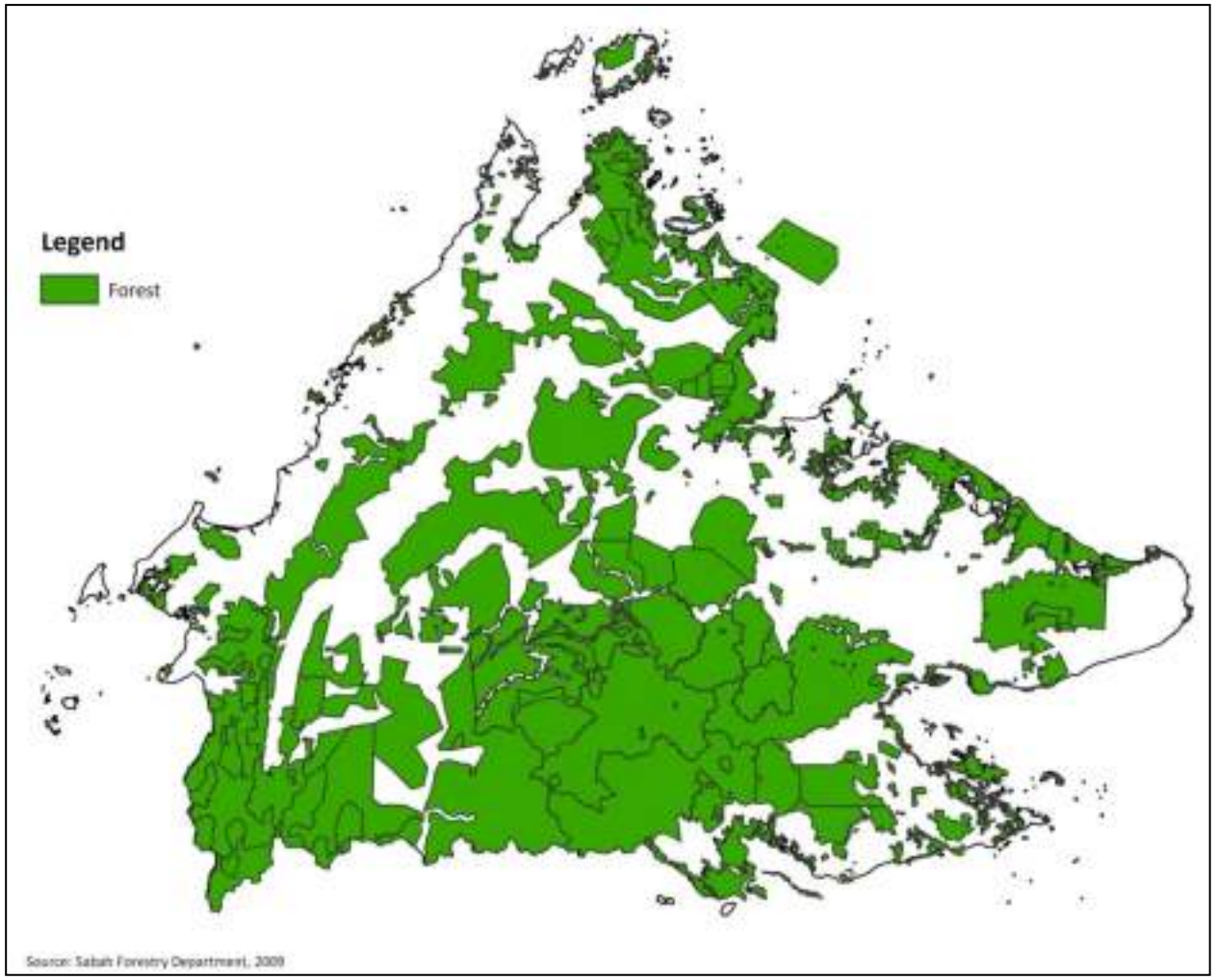


Figure A2-1: Forest Cover in Sabah

A2.3.2 Plants

The diversity of wild plants in Sabah has yet to be fully inventoried. The Tree Flora of Sabah and Sarawak project initiated in 1992 though collaboration between the Sabah and Sarawak Forestry Departments and the Forest Research Institute of Malaysia (FRIM) is the most important taxonomic project and the first systematic modern attempt to document the important tree families of these two States. The project, which has since published six volumes containing 72 families, is expected to produce seven volumes in total to document the estimated 4,000 tree species found in the two states. So far, the project has listed 432 species endemic to Sabah and Sarawak. The Flora of Sabah and Sarawak project, which will record an estimated 12,000 non-tree species, is expected to commence in 2015 (Saw and Chung, 2005).

Certain plant groups such as the orchids, gingers, hoyas, rhododendrons and nepenthes have attracted sustained interest among enthusiasts. A number of monographs produced in recent times such as the *Nepenthes of Borneo* (Clarke, 1997), the *Orchids of Borneo* (Beaman *et al*., 2001), the *Rhododendrons of Sabah* (Argent *et al*., 2007) and *the Etlingera (Zingiberaceae) of Borneo* (Poulsen, 2006). In addition, detailed checklists have been collated for specific areas where floristic expeditions or collections have been conducted; these generally involve areas within the State Parks, Forest Reserves and other proposed protected areas. Mount Kinabalu, which is recognised as one of 234 primary centres of plant diversity in the world (Martin *et al.*, 2002) is probably the most studied site in the state.

Over 30 genus of nepenthes were recorded in Sabah

Legal protection for wild plants in Sabah is provided through the Wildlife Enactment 1997, the Forest Enactment 1968 and the Parks Enactment 1984. All of these laws place restrictions on the removal or damage of plants from areas reserved under the respective enactments. The Wildlife Enactment 1997 regulates the collection and sale of Totally Protected Plants and Protected Plants listed in the enactment (Table A2-8).

Table A2-8: Totally Protected and Protected Plants (under Sabah Wildlife Conservation Enactment 1997)

Schedule	Plants
SCHEDULE I, PART II (Section 54(1)(a)) Totally Protected Plants	1. *Nephentes Rajah* spp. – Periuk Kera 2. *Paphiopedilum* spp. – Orkid Selipar 3. *Rafflesia* spp. – Rafflesia 4. *Tetrastigma* spp. – Pokok Perumah Rafflesia
SCHEDULE II, PART II Protected Plants	1. *Caryota* spp. – Botu 2. *Ceratolobus* spp. – Rotan 3. *Corypha* – Gabang 4. Cycadaceae – Paku Laut 5. Cytoceae – Paku 6. Zingiberaceae – Halia Hutan 7. *Nenga* spp. – Pinang Hutan 8. Orchidaceae – Anggerek Hutan 9. *Podocarpus* spp. (Commercial spp) 10. *Rhododendron* spp. – Mawar Hutan 11. *Livistonia* spp. – Silad 12. *Arenga* sp. – Polod

Sabah Forest Department, Sabah Parks, Sabah Museum, Sabah Agriculture Department and Universiti Malaysia Sabah maintain important collections of both preserved and living plant specimens. The Forest Research Centre at Sepilok alone has a herbarium with over 250,000 specimens.

The Agriculture Department, through its Agriculture Research Station in Tenom has assumed a key role in terms of ex-situ conservation. Its expansive collection of rare species from a number of plant groups, including orchids, fruit trees, gingers, and hoyas serve as a critical gene bank, especially for rare species that have limited distribution in the wild. For orchids, the centre has adopted a strategy of producing large quantities of seeds and seedlings of rare and desirable species for distribution to other institutions and onwards to orchid breeders. This is a strategy to depress the market value of such favoured species and make it less worthwhile for commercial collectors to smuggle specimens removed from forests.

A2.3.3 Wetlands

There are many wetlands in Sabah. The Malaysian Wetland Directory (1987) lists 20 wetland sites in Sabah which fulfil the Ramsar criteria as Wetlands of International Importance. These areas cover an estimated 1,773,132 hectares. Wetland ecosystems in Sabah are classified as follows:

Table A2-9: Types of Wetlands in Sabah

Types of Wetlands	Examples
Saline and brackish wetlands	Mudflats Mangroves
Brackish wetlands	Nipah swamps
Freshwater wetlands	Coastal (freshwater) lagoons Freshwater swamp forest Peat swamp forest River floodplains Oxbow lakes Other natural lakes Mud volcanoes Riverine bank vegetation Highland swamp forest
Cultivated and artificial wetlands	Open *padang* Sago Paddy Aquaculture ponds Dams and reservoirs

Source: Davison, 2001

Mangroves: One of the largest wetland type is the mangrove forest. Sabah's mangroves occur largely along the east coast, facing the Sulu and Sulawesi seas and are the most extensive in Malaysia. A total of 329,743 ha of mangroves are classified as Permanent Forest Reserve (Class V) under the Forest Enactment 1968 (SFD, 2012). The mangroves at the Lower Kinabatangan-Segama area form the 78,803 hectare Ramsar site, Malaysia's largest.

Mangrove ecosystems in Sabah provide a multitude of services. They play an essential role in protecting the coastline against strong winds and waves, and erosion. They are important as breeding and nursery grounds for fish and crustaceans, and play an important role as biological filters and carbon sinks. Sabah's mangroves support a variety of endangered species of wildlife such as proboscis monkey, estuarine crocodile, and the lesser adjutant stork as well as a many other highly specialised species whose survival depends on mangrove ecosystems.

Nipah swamps: Nipah swamps are tidal, mono-specific stands of the palm *Nypa fruticans*. Nipah in Sabah occurs in association with mangroves, often lining the tidal reaches of rivers and forming huge swamps in delta areas such as the Klias Peninsula. They serve as refuges for the estuarine crocodile and provide roosting areas for waterbirds such as the egret roost at Padas Damit.

Freshwater Swamp Forest: Most of the remaining freshwater swamp forests in Sabah are located along the east coast. Freshwater swamp forests occur on permanently or seasonally flooded soils with over 35 percent mineral content, normally in a zone along the lower reaches of certain rivers. It also occurs around freshwater lake systems. This forest type is species-rich compared to mangroves. Trees of freshwater swamp forests are of economic importance for their timber value and flood-mitigation function. These habitats are of significant conservation importance for large mammal species.

Peat Swamp Forest: Most of the peat swamp forests in Sabah are found in the Klias Peninsula. Peat swamp forest is valuable as a sustainable timber resource and for flood-mitigation and water supply. Peat swamp forests are used by endangered mammals such as the Sumatran rhinoceros, proboscis monkey and two subspecies of banded langur (*Presbytis melalophos*, *P.m. chrysomelas* and *P.m. cruciger*) both of which are endemic to the peat swamp forests of northwestern Borneo and are probably endangered.

Oxbow Lakes: Oxbow lakes occur mainly along the meandering lower reaches of the Kinabatangan, Sugut and Segama rivers. They support rich freshwater fish populations, and may be fringed with thick floating mats of vegetation. The more remote oxbows provide some of the last remaining suitable breeding habitat for estuarine crocodiles.

An oxbow lake at the Kinabatangan floodplains. Oxbow lakes support fish, crocodiles and other aquatic lifeforms

River Systems: There are 78 river systems in Sabah. The largest rivers in terms of discharge are the Kinabatangan River, Padas River and Papar River. The Kinabatangan River is the longest river in the state and the second longest river in Malaysia. It spans 560 km from its headwaters in the mountains of southwest Sabah, to its outlet to the Sulu Sea, east of Sandakan. The Kinabatangan floodplain is known for its remarkable wildlife and wetland habitats such as riverine forest, freshwater swamp forest, oxbow lakes and mangrove swamps at the coast.

Freshwater fishes of Sabah are diverse and inhabit a great variety of habitats ranging from small torrential streams to estuarine, highly acidic ecosystems and alkaline waters. The A total of 155 freshwater fish species, including twelve exotic species have been recorded so far (Inger and Chin, 1990). Fish diversity in Sabah is

inadequately inventoried and the true number of freshwater fish species in Sabah is likely to be considerably higher.

Marshes: There are relatively few open marsh areas in Malaysia. Kota Belud Bird Sanctuary on the Tempasuk Plain in northwestern Sabah consists of freshwater marshes together with a complex of other wetland habitats. It is known to be of importance to resident and migratory waterbirds. Another marsh, Padas Damit in the Klias Peninsula, is known to support waterbirds and estuarine crocodiles.

A2.3.4 Terrestrial Protected Areas

Sabah has a long history of setting aside vast areas for conservation. The Master List of Sabah's protected areas has 93 named protected areas covering about 1,174,398 ha of land (Figure A2-2), representing about 15.95 percent of Sabah's land area (Payne, 2006). This figure exceeds the target set by the 1992 Sabah Conservation Strategy for at least "10% of Sabah's land area to be retained as totally-protected forest habitat". Some of the more well-known protected areas include the Kinabalu Park, Crocker Range Park and the Tabin Wildlife Reserve (Table A2-10).

Kinabalu Park was gazetted as protected area in 1964.

The majority of these areas, which are all owned by the state and managed by a specified government authority, gazetted under either the Land Ordinance 1930 (as reserve for conservation purposes), or Parks Enactment 1984 (as a Park), or Wildlife Conservation Enactment 1997 (as Wildlife Sanctuary), or Forest Enactment 1968 and its subsequent amendments (as Forest Reserve).

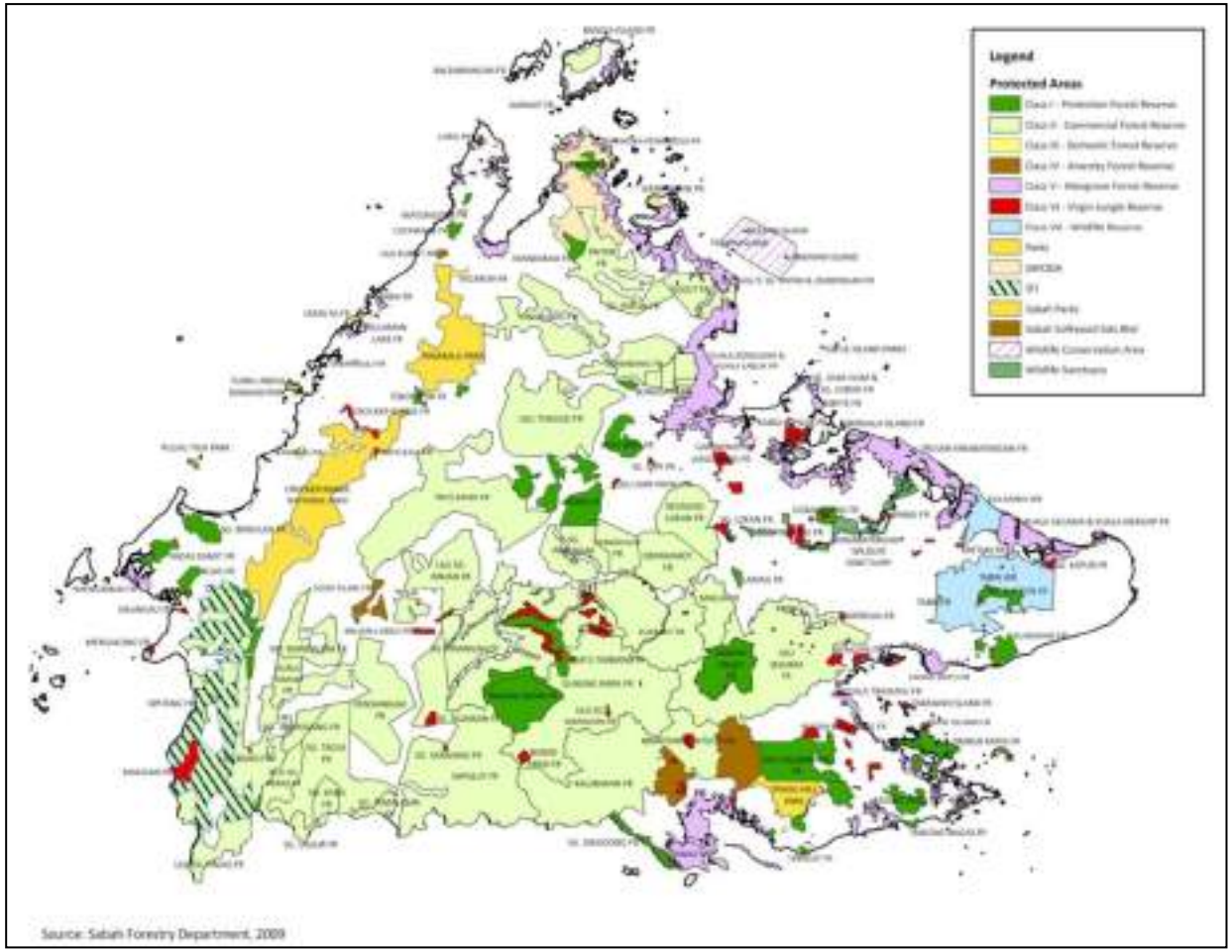


Figure A2-2: Protected Areas in Sabah

Table A2-10: Ten of the largest terrestrial protected areas in Sabah

Protected area	Area (hectares)	IUCN Category
Crocker Range Park	139,919	II
Tabin Wildlife Reserve	111,971	IV
Kinabalu Park	75,381	II
Maliau Basin Conservation Area	58,840	II
Ulu Kalumpang Protection Forest Reserve	50,964	IV
Danum Valley Conservation Area	43,800	II
Tawau Hills Park	27,972	II
Lower Kinabatangan Wildlife Sanctuary	26,103	IV
Tawai Protection Forest Reserve	22,697	II
Kulamba Wildlife Reserve	20,682	III

Source: adopted from J. Payne, 2006; Department of Forestry Sabah.

A2.4 MARINE ECOSYSTEMS AND SPECIES

Located within the Coral Triangle Region and Sulu-Sulawesi Marine Ecoregion, the marine biodiversity found within the coastal waters off Sabah are among the richest in the world. The coastal waters off Sabah span an area of 5,436,000 ha while the total length of the coastline is about 4,328 km.

A2.4.1 Marine Protected Areas

About 1.95% (102,001 ha) of Sabah's coastal waters are protected at present (Table A2-11). This figure will increase substantially once the proposed Tun Mustapha Park (1.02 million ha) is gazetted.

All of these marine protected areas are gazetted under the Parks Enactment 1984 (as a Park) except the Sugut Islands Marine Conservation Area (SIMCA) which was gazetted under the provision of the Wildlife Conservation Enactment 1997. Sabah's marine protected area legislation is stronger as compared to other States in Malaysia as both land and surrounding marine waters are included within its marine protected areas hence allowed better planning, management and control of both inland and coastal developments within the protected areas.

Table A2-11: Area of sea protected in Sabah

Name	Management Authority	Area of Sea protected (ha)
Pulau Tiga Park	Sabah Parks	15,193
Tunku Abdul Rahman Park	Sabah Parks	3,711
Tun Sakaran Marine Park	Sabah Parks	35,000
Turtle Islands Park	Sabah Parks	1,725
Pulau Sipadan	Sabah Parks	60
Sugut Islands Marine Conservation Area	Wildlife Department	46,312
	Total area of sea protected	102,001

Source: Sabah Parks, Sabah Wildlife Department

A2.4.2 Coral Reefs

Sabah has the largest concentration of coral reefs and reef fishes in Borneo (Oakley *et al*., 2000). The southeast and northeast shores of Sabah and the Spratly islands in the South China Sea are most notable for coral reef development. The waters off Sabah's north and east coasts are part of 7-nation Coral Triangle Initiative.

Sabah supports over 75% of the coral reefs in Malaysia. There are about 252 species of hard corals from 71 genera recorded in the coastal waters off Sabah. Some of the significant genera recorded include *Acropora, Montipora*, *Fungia*, *Porites*, *Pavona*, *Leptoseris*, and *Lobophyllia*. The most extensive reefs occur on southeast of Sabah, around the islands such as Sipadan Islands and Tun Sakaran Park.

Sabah supports over 75% of the coral reefs in Malaysia

In addition to the high diversity of coral species, coral reefs in Sabah also support rich assemblage of marine life including reef fish, molluscs, echinoderms, bivalve etc. The Semporna Ecological Expedition organized by WWF and various local and international Universities in 2010 has recorded over 756 species of reef fish and 90 species of coral shrimps in the coral reefs.

A2.4.3 Seagrass

In Sabah, seagrasses are mainly distributed on the west and southeastern coast. The seagrasses usually grow on substrates such as sand, muddy sand and coral rubbles; and can be found in the semi-enclosed lagoon, sub-tidal and inter-tidal area to a depth of 2.5m.

On the west coast of Sabah, seagrasses are found intermix with coral reefs at the sub-tidal area of islands in Tunku Abdul Rahman Park, P. Labuan and Pulau Mengayau. Besides that, patches of segrasses were also recorded in the semi-enclosed lagoon at Sepangar Bay, Sg. Salut, Sulaman lake, Tg. Mengayau and Bak-Bak.

At the northern of Sabah, seagrasses were reported near the coast of P. Banggi and P. Balambangan. Offshore islands of P. Selingan, P. Maganting, P. Tabawan, P. Bohay Dulang, P. Mabul and P. Sipadan on the east coast of Sabah have sub-tidal seagrasses growing on coral rubbles (Japar *et al*., 2006; Japar and Muta, 2003; UNEP, 2006).

Seagrass bed has always been associated with dugongs and sea turtles as seagrass is main diet for these marine fauna. Seagrass beds in Turtles Islands and Mantanani Islands are among the important foraging grounds for marine turtles.

A2.4.4 Seaweeds

There are about 85 species of seaweeds recorded along the coastline of Sabah. The red seaweeds (Rhodophyta) comprise the highest number of species (51 species), followed by brown seaweeds (Phaeophyta) about 22 species and green seaweeds (Chlorophyta) about 12 species. These seaweeds are commonly found in either coral reefs, rocky shores, mudflats, mangroves or as epiphytes. Traditionally seaweeds have been used by the coastal communities in Sabah as food, traditional medicine and for extraction of agar and carrageenan (Phang, 2006).

Seaweeds cultivation has been carried out off the coastline of Semporna since 1978 and has increasingly become important economic resource for Sabah and Malaysia in general. In 2010, Sabah produces about 207,850 tonnes of brown seaweeds with an estimated value of RM83,140. Currently, mariculture of seaweeds is carried out by coastal communities around Semporna, Lahad Datu, Kunak and Kudat

A2.4.5 Mudflats

Mudflats are a dominant feature of the coastline of Sabah and are usually associated with mangrove forest. Most of the mudflats are found on the east coast of Sabah where the most extensive mangroves are recorded such as Marudu Bay, Kinabatangan area, Cowie Bay etc. To date, there is no comprehensive survey of mudflat in Sabah or any part of Malaysia.

A2.4.6 Marine Mammals

A high diversity of marine mammal species occurs in Sabah's seas, largely due its location in the geologically stable Sundaland biogeographical region, its warm tropical climate and productive tropical marine waters. In Sabah, a total of 18 species of marine mammals including sirenians (dugongs) and cetaceans (whales and dolphins) can be found either residing or as transients in the state's coastal waters (Table A2-12).

Dugong is at the verge of extinction.

Table A2-12: Marine mammals in the coastal waters of Sabah

Marine Mammals	Coastal Area	IUCN Red List Status
Irrawaddy dolphin (*Orcaella brevirostris*)	Sandakan Bay, Labuk Bay, Cowie Bay, Kinabatangan River, Jambongan Island, Berhala Island, Silumpat Island	Vulnerable
Indo-Pacific Humpback Dolphin (*Sousa chinensis*)	Jambongan Island, Sipadan Island, Cowie Bay	Near Threatened
Dugong (*Dugong dugon*)	Brunei Bay, Labuan Island, Sandakan Bay, Mantamani Island, Banggi Island	Vulnerable
Bryde's Whale (*Balaenopteridae edeni*)	Tunku Abdul Rahman Marine Park	Data deficient
Fin Whale (*Balaenoptera physalus*)	Continental shelf waters of the South China Sea	Endangered
Cuvier's beaked Whale (*Ziphius cavirostris*)	Continental shelf waters of the South China Sea, Mapun Island	Least Concern
Sperm Whale (*Physeter macrocephalus*)	Pandanan Island, Bohey Dulang Island, Suluwesi Sea, Continental shelf waters of the South China Sea, Layang-layang Island	Vulnerable
Indo –Pacific Bottlenose Dolphin (*Tursiops aduncus*)	Gullisan Island, Kota Marudu	Data Deficient
Common Bottlenose Dolphin (*Tursiops truncatus*)	Layang-layang Island, Southern Sulu Sea	Least Concern
Spinner Dolphin (*Stenella longirostris*)	Layang-layang Island, Kuala Kinabatangan, Ligitan Island, Boheyan Island, Lakayan Island, Balak Island	Data Deficient
Pantropical Spotted Dolphin (*Stenella attenuate*)	Layang-layang Island, Southern Sulu Sea	Least Concern
Fraser's Dolphin (*Lagenodelphis hosei*)	Mapun Island	Least Concern
False Killer Whale	Teringai Beach, Nagus Bay, South China Sea	Data Deficient

Marine Mammals	Coastal Area	IUCN Red List Status
(*Pseudorca crassidens*)		
Melon-headed Whale (*Peponocephala electra*)	Layang-layang Island	Least Concern
Short-finned Pilot Whale (*Globicephala macrorhynchus*)	Kota Kinabalu, Sipadan Island, LIgitan Island, Terumbu Siput, Mapun Island	Data Deficient
Finless Porpoise (*Neophocaena phocaenoides*)	Sandakan Bay	Vulnerable

Source: UMS, 2009

The most threatened of the marine mammal species is the Dugong (*Dugong dugon)*. Although the Dugong is widely distributed in coastal and island waters of the Indian and Pacific region, it is categorised as Vulnerable by the World Conservation Union (IUCN) and listed in Appendix I of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Over much of it's range, the dugong is now represented by relict populations separated by large areas where it is close to extinction. Dugongs (*Dugong dugon*) are found at Brunei Bay, Sandakan Bay, Labuan Island, Mantamani Island and Banggi Island. The Dugong population in the coastal waters of Sabah is resident and probably undergoing local movement only. The population seems likely shared in the north with the Island of Palawan and in the east with the Southern Sulu (Philippines) and Kalimantan, Indonesia.

The two common species of dolphins found in Sabah's coastal waters are the Irrawaddy dolphin (*Orcaella brevirostris*) and Indo-Pacific humpbacked dolphin (*Sousa chinensis*) (Jaaman, 2004). These mammals can be found in Sandakan Bay, Labuk Bay and Cowie Bay and the Kinabatangan estuary. The Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), Spinner dolphin (*Stenella longirostris*) and Pantropical spotted dolphin (*Stenella attenuate*) are the most abundant cetaceans recorded in the open waters off Sabah.

A2.4.7 Turtles

Three species of marine turtles have been recorded in Sabah, namely the green turtle, hawksbill turtle and olive Ridley turtle. All three species are found at the Turtle Islands Park (of Pulau Gulisan, Pulau Selingan and Bakungan Kechil). Marine turtles can also be found foraging near Mantanani Islands, Sipadan Islands and Brunei Bay (UMS, 2009).

Sabah has the highest nesting population of the green turtles in Malaysia; around 2,000 green turtles nesting here annually. Pulau Gulisan of the Turtle Islands Park has the highest nestings of hawksbill turtles in Malaysia. Between 400 and 450 hawksbill turtles nest on the island each year (UMS, 2009). There are records of three species of softshell turtles in Sabah, six species of hardshell turtles and one species of tortoise (Table A2-13).

Hawksbill turtle is listed as Critically Endangered under the IUCN Red List of Threatened Species

Most of the 14 species of turtles, terrapins and tortoises inhabiting Sabah are considered by the IUCN (2011) to be threatened. The hawksbill turtle is listed as Critically Endangered, five are Endangered and four are Vulnerable.

Table A2-13: Turtles, Terrapins and Tortoise recorded in Sabah

Common Name	Scientific Name	IUCN status (2011)	Protection in Sabah (WCE 1997)*
Sea Turtles	Cheloniidae		
Green turtle	*Chelonia mydas*	EN	Schedule 1
Hawksbill turtle	*Eretmochelys imbricata*	CR	Schedule 1
Olive Ridley turtle	*Lepidochelys olivacea*	VU	
Softshell turtles	Trionychidae		
Asian softshell turtle	*Amyda cartilaginea*	VU	
Malayan Soft-shelled Turtle	*Dogania subplana*	LC	
Frog-faced Softshell Turtle	*Pelochelys cantorii*	EN	
Asian hardshell turtles	Geoemydidae		
South Asian box turtle	*Cuora amboinensis*	VU	
Asian leaf turtle	*Cyclemys dentata*	NT	
Spiny hill turtle	*Heosemys spinosa*	EN	
Malayan flat-shelled turtle	*Notochelys platynota*	VU	
Malaysian giant turtle	*Orlitia borneensis*	EN	Schedule 2
American hardshell turtles	Emydidae		
Red-eared slider**	*Trachemys scripta*	LC	
Land tortoises	Testudinidae		
Asian brown turtle	*Manouria emys*	EN	Schedule 2

CR: Critically endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern (IUCN, 2011)
*Wildlife Conservation Enactment 1997, ** Introduced species

A2.5 INSTITUTIONS AND LEGISLATION

Sabah has a good range of biodiversity-related legislation to safeguard various facets of our biodiversity which are enforced by different agencies. Sabah

Biodiversity Enactment which was enacted in 2000 provides a legal framework for the safeguarding of biodiversity and biological resources of the State. The Sabah Biodiversity Council and Sabah Biodiversity Centre (SaBC) serve as the institutional framework to ensure such biodiversity is managed in sustainable manner.

The Wildlife Conservation Enactment 1997 regulates the protection of wildlife including plants. The Sabah Wildlife Department is responsible for implementation and administration of the Sabah Wildlife Conservation Enactment, 1997. Under this Enactment the department conserves and regulates wildlife utilization in Sabah and it manages a number of protected areas. The SWD also implements the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as well as contribute to the implementation of the international convention of Biological Diversity and to a number of other international, regional and bilateral agreements.

Forest Enactment 1968 is the principal forestry law in Sabah. The Forest Enactment provides for the gazettement of forest reserves, their use and management as well as for control of cutting and removal of forest produce from "State land" (publicly owned land which is not a forest reserve). The Forest Enactment contains extensive provisions for creation and abolition of forest reserves. At present the area of forest reserves gazetted under the Forest Enactment is 3.6 million hectares. The Enactment stipulates that none of the listed reserves can be de-reserved except when needed for a park or a game or bird sanctuary. The Sabah Forestry Department is the steward of the Forest Enactment 1968. Its main responsibilities are manage and develop Sabah's forest reserves are in accordance with the principles of Sustainable Forestry Management and to optimise the utilisation of forest resources in order to sustain socio-economic benefits to the State. Its responsibilities also include conserving sufficient natural forest areas for the protection and maintenance of the environment, water resources, soils and biodiversity and to promote the rehabilitation of natural forests and the establishment of forest plantations.

The Parks Enactments 1984 provides the Board of Trustees with the powers to initiate and control the activities in all Parks in Sabah, facilitate Parks development, provide services and facilities at all Parks, to take such steps to ensure the security and preservation of the Parks in their natural state, to reserve or set aside any portion of the Park as breeding places for animals and as nurseries for vegetation and to levy fees or to collect dues from persons utilizing the accommodations, amenities, facilities or services provided under this enactment. Sabah Parks is a statutory body under the Ministry of Tourism, Culture and Environment, and is administered by the Sabah Parks Board of Trustees. It is responsible for the

management of the parks system in Sabah which include Kinabalu Park, Turtle Islands Park, Tunku Abdul Rahman Park, Pulau Tiga Park, Tawau Hills Park and the Crocker Range Park.

Other enactments such as the Conservation of Environment Enactment 1996, Cultural Heritage (Conservation) Enactment 1997 and Sabah Water Resources Enactment 1998 have various clauses and safeguards to protect the state's biodiversity.

Various governmental agencies in Sabah are actively involved in biodiversity conservation. These include the Sabah Biodiversity Centre, Sabah Forestry Department, Sabah Parks, Sabah Wildlife Department, Environmental Protection Department, Sabah Foundation, Sabah Museum, Agriculture Department and Fisheries Department.

In addition to government agencies, numerous non-governmental organisations and local communities are also active in biodiversity conservation. Among the NGOs are WWF Malaysia, Sabah Society, HUTAN, Borneo Conservation Trust, MNS, Sabah Environmental Protection Association, Sabah Environmental Education Network (SEEN), PACOS and GDF. In some parts of the state, local communities have also embarked on biodiversity conservation – the most prominent among these is the Bundu Tuhan Community Forest.

A2.6 ON-GOING CONSERVATION EFFORTS

There are numerous initiatives and programmes to conserve biodiversity in Sabah – undertaken by government agencies, NGOs, private sector and local communities. These range from large-scale international programmes to localised tree-planting and education projects.

Besides executing duties and functions as mandated by their respective legislation, government agencies in Sabah are working with their counter-parts in Sarawak and other countries to protect biodiversity in the region. Two of the most ambitious projects are the 3-nation Heart of Borneo and the 7-nation Coral Triangle Initiative. The Heart of Borneo programme is a conservation and sustainable development programme aimed at conserving and managing contiguous tropical forests in the heart of the Borneo island. The HoB covers about 200,000 km^2 of ecological inter-connected rainforest in the province of Kalimantan (Indonesia), the states of Sabah and Sarawak, and Brunei Darussalam.

The Coral Triangle Initiative (CTI) on Coral Reefs, Fisheries, and Food Security (CTI-CFF) is a multilateral partnership of six countries (Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands and Timor-Leste) working together to sustain the marine and coastal resources in the region by addressing crucial issues such as food security, climate change and marine biodiversity. In 2009, the six nations agreed to adopt a 10-year CTI Regional Plan of Action to safeguard the region's marine and coastal biological resources. Through this plan, the six nations have agreed to support people-centered biodiversity conservation, sustainable development, poverty reduction and equitable benefit sharing.

Forest restoration is, and will continue to be an important forest management activity in Sabah at least for the next 20 years. Degraded forests are being restored in many parts of Sabah by government agencies, NGOs and local communities. The SFD has been actively pursuing funding for forest rehabilitation mainly through leveraging on carbon or biodiversity offsets as well as smart partnerships with NGOs and the private sector. The largest is the Malua-Ulu Segama rehabilitation project (Box A2-2) targeting a total of 241,098 ha of degraded forests for the purpose of conservation and future production.

Indigenous communities in Sabah have a long history of natural resource management. Bundu Tuhan is a Kadazandusun village in the foothills of Mount Kinabalu is a classic example. Bundu Tuhan is exceptional among Sabah's villages in that it possesses a sizeable Native Reserve of over 1,263 hectares. Roughly 60% of this area has been voluntarily set aside by the community as a village forest reserve. As a result of this visionary action, Bundu Tuhan retains a pleasant forested setting and enjoys an abundant supply of clean water for its households and farms. Together with the adjacent Tenompok Forest Reserve, Bundu Tuhan Native Reserve remains as the most significant block of upland montane forest left between the boundaries of Kinabalu Park and Crocker Range Park.

The Bundu Tuhan Native Reserves is a good example of the desire for communities to conserve forest, as well as their determination to sustain its wise use

The Native Reserve is completely community managed according to collectively recognised rules and regulations. The Bundu Tuhan Native Reserves provides a compelling example of the desire for communities to conserve forest, as well as their determination to sustain its wise use in perpetuity despite pressures and obstacles faced. Recognising and supporting these grassroots initiatives could

significantly benefit Sabah by engaging communities that are already actively conserving nature.

Many non-governmental organizations are actively conserving biodiversity in Sabah. These include WWF Malaysia, PACOS, LEAP, HUTAN, Global Diversity Foundation, Borneo Conservation Trust, Malaysian Nature Society, Sabah Environmental Protection Association, Borneo Rhino Alliance, Sabah Wetland Conservation Society and Marine Conservation Society, just to name a few. Their activities range from raising awareness and education, forest restoration, species protection, wetlands conservation, wildlife and marine surveys and capacity building. The collaboration between NGOs, government agencies, indigenous communities, and the public at large has contributed significantly to conservation of biodiversity in the state.

The biodiversity conservation initiatives in Sabah are too numerous to be described in this document. Although only a small selection is described above, they are representative of the hundreds of similar efforts throughout the state. Sabah can be proud of the close cooperation between the government, NGOs, private sector and local communities in protecting the state's biodiversity.

BOX A2-1: BUNDU TUHAN NATIVE RESERVE

Bundu Tuhan is a Kadazandusun village at the southern foothills of Mount Kinabalu. It has a population of about 3,600 people. Bundu Tuhan is exceptional among Sabah's villages in that it possesses a sizeable Native Reserve of over 1,263 hectares. Roughly 60% of this area has been voluntarily set aside by the community as a village forest reserve.

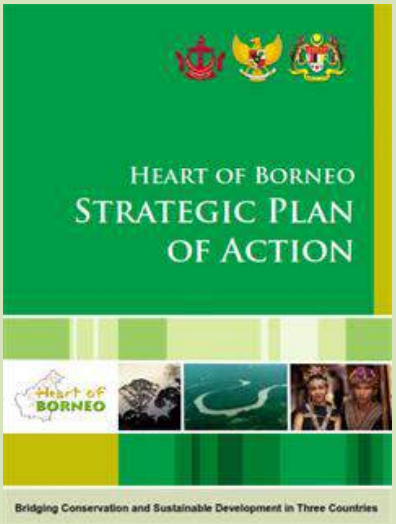
Source: ERE Consulting Group Sdn Bhd

The primary forest at the Bundu Tuhan Native Reserve is well protected by the communities

The proposal to establish the Native Reserve was first mooted by the community in 1961 as a means of securing the long term needs of the community for village forest and to retain a sufficient area under communal management to prevent internal conflict arising from competition for Native Titles. Village leaders with the support of the District Officer submitted their application for a Native Reserve in 1966 and have followed the process resolutely until the Reserve was finally gazetted 17 years later, in 1983.

As a result as a result of this visionary action, Bundu Tuhan today still retains a pleasant forested setting which attracts visitors to its homestays; and its villagers still enjoy an abundant supply of clean water for its households and farms. The benefit to biodiversity conservation is also significant. Together with the adjacent Tenompok Forest Reserve, Bundu Tuhan Native Reserve remains the most significant block of forest left between Kinabalu Park and Crocker Range Park – and a critical component of the remaining forested link between these two world renowned biodiversity hotspots

Box A2-2: The Heart Of Borneo



The ecologically inter-connected rainforests that span the trans-boundary highlands of Borneo through to the foothills and adjacent lowlands in the provinces of Kalimantan (Indonesia), the states of Sabah and Sarawak (Malaysia) and Brunei Darussalam are considered to be among the most biologically diverse ecosystems on earth.

On the 12th of February 2007, the governments of Brunei Darussalam, Indonesia and Malaysia expressed their commitment to protect and sustainably manage these ecosystems by signing the Heart of Borneo (HoB) declaration entitled 'Three Countries, One Conservation Vision'. One of the largest and most ambitious trans-boundary conservation initiatives ever attempted, the HoB entails the conservation and management of an area totalling 220,000 km^2 in size, through international co-operation led by the Bornean governments and the support of the international community.

The objective of the HoB initiative is to carry out collaborative programs relating to the effective management of a network of protected areas, sustainable management of productive forests and other land uses within the HoB area. This includes co-operation in research and development, sustainable use, management, education and training, fund raising, as well as other activities that are relevant to trans-boundary management, conservation and development within the areas of the HoB.

The HoB Strategic Plan of Action (SPA) sets out various priority actions to be taken under five main programs, i.e. Transboundary Management, Protected Areas Management, Sustainable Natural Resources Management, Ecotourism Development and Capacity Building.

The Sabah state government is highly committed towards realizing the HoB vision. The state has designated an area of over around 4 million ha covering 18 districts to be included within the HoB. The implementation of the HoB initiative in Sabah is led by the Natural Resource Office under the Chief Minister's Department. Sabah's HoB Strategic Plan of Action, which is based on the above HoB SPA, sets out the state's various priority actions to be taken under the five main programs.

Section A3
Challenges

A3.1 INTRODUCTION

There are serious challenges in protecting our biodiversity. In Sabah, biodiversity loss has increased in tandem with land use change and natural resource extraction spurred by technological advances and the demands of an increasing population and a modernising state. This pressure continues today. In this section, we explore the major causes of biodiversity loss and the challenges which need to be addressed in order to conserve the state's irreplaceable biodiversity heritage and vital ecological life support systems.

A3.2 HABITAT DEGRADATION AND FRAGMENTATION

Over the last five decades, Sabah's landscape has changed dramatically. Between 1975 and 1995, primary forest cover in Sabah was reduced from 2.8 million hectares to 0.3 million hectares. Commercial Forest Reserves were the most intensively affected with old growth cover being reduced from 98 percent in 1975 to only 15 percent in 1996 (Mannan and Awang, 1997). As logging has declined in importance as a major revenue earner, commercial monocultures have become the primary export commodity. In 2009, around 1.4 million hectares of Sabah's fertile lowlands were already covered with oil palm plantations and another 150,000 hectares were planted with other industrial crops (rubber, paddy, coconut, etc.). Sabah's lowlands are also where the state's richest biodiversity is found. The large-scale destruction of Sabah's lowland ecosystems, initially for timber and subsequently for agriculture has seriously impacted whole wildlife communities. Surviving wildlife populations, displaced into already overcrowded adjacent forested areas, are now threatened by competition for resources and disruption of their social and breeding systems.

The conversion of natural forests still remains the biggest threat to wildlife diversity. Monocultural plantations cannot provide the diversity and complexity of habitats to support wildlife populations and displace wildlife from their traditional range. Today, a large proportion of wildlife populations, including 65 percent of the Sabah's wild orang-utans, survive in the state's remaining non-protected forests many of which are slated for conversion. Therefore, it is imperative for the long-term survival of many wildlife species that these remaining lowland forest refuges are protected and consolidated.

Clearing of the forest for timber or agriculture has had serious impacts on wildlife

A3.2.1 Habitat Degradation

The degradation of natural habitats resulting from unsustainable forest exploitation affects different species in different ways. Some species are able to adapt to new habitat conditions relatively easily, while other more specialised species are highly vulnerable to even minor changes. Long-term ecological research has revealed that orang-utans living in the logged-over forests of the Lower Kinabatangan are sufficiently flexible to adapt to certain levels of habitat degradation. They may even thrive in regenerating secondary forests. However, higher levels of degradation are responsible for the rapid decline of other orang-utan populations (Ancrenaz *et al.*, 2005; Ancrenaz *et al*., 2010).

The biology of some species makes them particularly sensitive to habitat degradation. All eight hornbill species found in Sabah for instance form monogamous pairs with a unique nesting behaviour: hornbills are hole-nesters, preferring natural cavities in large hollow trees. The female hornbill seals the entrance to her nest cavity, leaving only a narrow slit through which she and her chicks receive food from her mate. The selective extraction of larger trees therefore constitutes a major obstacle for the breeding of the hornbills and a serious threat to their survival.

Many other forms of habitat degradation also threaten wildlife populations in Sabah. One example is the level of pollution found in some of Sabah's main rivers which affects freshwater life forms. Sand dredging of exposed sandbanks destroys the feeding and resting grounds of resident and migrant waders (Lackman and Manokaran, 2010). Another example is the colonisation of some of Sabah's natural forests by the acacia an Australian native initially introduced to Sabah for pulp and paper plantations. It has been found to alter ecosystems and outcompete native flora and fauna.

A3.2.2 Habitat Fragmentation

In recent years, habitat fragmentation is emerging to be a major threat to terrestrial biodiversity. Habitat fragmentation breaks the continuity of wildlife habitats and restricts natural movements and breeding patterns. It contributes to the extinction of small and isolated wildlife populations. Deforestation, agricultural land conversion and to a lesser extent, urbanisation have contributed to highly fragmented landscapes. As human activities have intensified alongside fragmented wildlife habitat human-wildlife conflict has increased as well as the risks of

transmission of infectious diseases between human and wildlife. Ease of access has made wildlife species even more exposed and vulnerable to poaching.

Sabah's current system of protected areas accounts for an impressive 16 percent of the state's total landmass. While this would be an impressive achievement for most nations, there are a number of reasons why the distribution and composition of these protected areas make them inadequate for safeguarding the full array of biodiversity found in the state. Some ecosystems are more highly represented within the network, whereas others are hardly covered. There is high level of habitat fragmentation which makes the existing protected areas insufficient to maintain viable populations of terrestrial fauna in the long-term. Sabah's largest national parks, the Kinabalu National Park and Crocker Range Park, are isolated from each other and from any other protected areas. Sabah's Virgin Jungle Reserves are dispersed throughout the state, and are typically small, isolated and vulnerable to edge effects, fire and the potential impacts of climate change.

The connectivity of the mangrove forest reserves along Sabah's north-eastern coast with other protected areas is also threatened. The largest Protection Forest Reserves (the Danum Valley and Maliau Basin Conservation Areas) as well as other conservation zones set aside in commercial forest reserves are becoming isolated islands of undisturbed forests disconnected from other protected areas. The major protected areas of East Sabah, including the Lower Kinabatangan Wildlife Sanctuary, Kulamba Wildlife Reserve and Tabin Wildlife Reserve are increasingly becoming cut off from each other as the remaining corridors of privately-owned forests are converted to oil palm plantations.

A3.3 Forest Management and Plant Conservation

A3.3.1 Sustainable Forest Management

The importance of Sabah's extensive Commercial Forest Reserves for biodiversity conservation has increased as forest cover has declined throughout the state. Now managed under SFM regulations, long-term license holders are charged with managing their FMUs in ways that take into conservation and community concerns as well as production. A specific challenge facing the FMUs is that many of the areas within their concession were logged unsustainably, particularly in the 1980s and their capacity to regenerate is impaired. This has given rise to pressure from concessionaires to allow degraded compartments to be converted into industrial tree plantations and even oil palm. As we strive to safeguard spaces for threatened biodiversity, areas of high conservation value with Commercial FRs will need to be

clearly identified and strategies and support sought to ensure that they remain undisturbed.

The Sustainable Forest Management policy came into effect in 1997. The SFM policy mandates that Sabah's commercial forests be managed to ensure they remain large, healthy, diverse and productive, in order to achieve a balance of competing, but potentially reconcilable uses to timber production. These include conservation of the biodiversity, collection and storage of water for rural and urban needs, soil conservation, education, as well as tourism and eco-tourism.

One of the underlying tenets of SFM is a long-term commitment to maintain healthy and productive forest resources as opposed to viewing logging concessions as opportunities for quick profits. The SFD in 1997 divided the Class II Forest Reserves into 27 Forest Management Units (FMUs) of between 50,000 ha and 100,000 ha each (SFD, 2005). A total of 18 FMUs were allocated to ten private companies for a period of 100 years through long-term agreements called Sustainable Forest Management License Agreements (SFMLA). The SFD manages the remaining FMUs.

Under the agreement, the SFMLA holders take responsibility for the full range of activities required under SFM, including management planning, silviculture and harvesting operations. Long-term license holders are obliged to prepare FMU Management Plans for each FMU through a participatory approach which includes the identification of High Conservation Value Forest (HCVF) areas. They are required to implement mitigation measures for logging operations in accordance with the SFDs RIL Guidelines and the EIA Handbooks and Guidelines prepared by the EPD.

In July 1997, Deramakot Forest Reserve received the gold standard of the Forest Stewardship Council (FSC) certification, a first for any tropical rainforest in the world. Having been re-certified twice since, it is now the oldest and longest FSC certified tropical rainforest. To this end, the SFD has set a target for all Class II Forest Reserves to be certified by 2014. The 27 FMUs under long term licenses may choose to be certified under any recognised (and credible) scheme. The SFD is pursuing FSC certification for Forest Reserves under its supervision. At present, a total of 431,554 ha of Class II forests has been fully certified, while 408,520 ha has been partially certified, adding up to approximately 840,074 hectares in total (most of which is for natural forests) (Table A3-1). Presently, fully certified forests now constitute less than 17 percent of the target. In addition to the areas above, the

SFD is targeting five more areas, totalling about 166,581 ha for FSC certification within the next two to three years.

Table A3-1 : Fully and partially certified forests in Sabah

Locality	Certification System	Validity	Size (Ha)
Deramakot Forest Reserve (SFD)	Full Certification under the FSC (Natural Forest)	April 2008 – April 2013(re-certified twice since 1997)	55,139
Sabah Softwoods SdnBhd (Private Land)	Full Certification under the FSC (Tree Plantation)	September 2007 – September 2012	27,313
KTS Plantation SdnBhd	Full Certification under the MTCS (Malaysian Timber Certification Scheme)	December 2009 – December 2012	57,247
Ulu Segama–Malua (SFD)	Full Certification Under the FSC (Natural Forest)	June 2011 – June 2016	241,098
Tankulap – Pinangah FMU 17A (SFD)	Full Certification Under the FSC (Natural Forest)	June 2011 – June 2016	50,070
Sub-total (full certification)			**430,867**
Sungai Pinangah Forest Reserve (FMUs 15 & 16) (Sabah Foundation)	VLC (verified legal compliance) of the FSC system under Smartwood (Natural Forest)	May 2010 – May 2013	176,993
Sipitang / Ulu Padas Forest Reserves (Sabah Forest Industries Sdn Bhd)	CW (Controlled Wood) Forest Management Certificate (Natural Forest)	November 2010 – November 2015	224,199
Sub-total (partial certification)			**401,192**
Total certified forest			**832,059**

Source: Sabah Forestry Department (as of 2012)

A3.3.2 Plant conservation

Although various efforts are on-going, there is currently no overarching strategy for plant conservation in Sabah. These efforts are often dependent on the initiative of individuals, and are often hampered by a lack of steady funding. There is also considerable duplication of efforts due to inadequate information sharing. In view of the limited human and other resources in Sabah, there is a need for better coordination of the work among the various government bodies involved in the management of plant conservation in Sabah. A plant conservation strategy, based on the recently published Malaysian Plant Conservation Strategy would help to focus and streamline objectives and efforts, as well as optimise resources of the various agencies involved.

A3.4 WILDLIFE MANAGEMENT

Throughout Sabah and the rest of Borneo, wildlife populations have declined considerably primarily due to the large-scale loss of natural habitat through intensive timber exploitation and the ensuing conversion of large expanses of lowland mixed dipterocarp forests to agriculture, particularly to oil palm plantations. It is estimated that Sabah, with an economy based on the production and export of natural resources and agricultural commodities, has lost about half of its natural forest cover, most of which used to be prime habitat for wildlife. Today, a large proportion of wildlife populations, including 65% of the Sabah's wild orang-utans, survive in the state's remaining non-protected forests which are prone to human exploitation. Therefore, any new conversion of natural forests to oil palm plantation and other forms of monoculture diminishes further the remaining habitat available for Sabah's wildlife.

Many other forms of habitat degradation also threaten wildlife populations in Sabah. One example is the level of pollution found in some of Sabah's main rivers which affects all life forms depending on freshwater ecosystems. Another example is the sand dredging of exposed sandbanks which destroys the feeding and resting grounds of resident and migrant waders (Lackman and Manokaran, 2010). A third example is the uncontrolled colonization of some of Sabah's natural forests by the acacia, initially introduced in Sabah in commercial acacia plantations, and which now poses a threat to the native flora and fauna.

A3.4.1 Hunting and Illegal Wildlife Trade

In most areas of Sabah, hunting for household consumption or commercial purposes is probably the most immediate and significant threat to wildlife populations that are already weakened by the impact of habitat changes. Although hunting is regulated by the Wildlife Conservation Enactment 1997, enforcement often proves difficult in remote areas. Over-hunting is already known to have driven many of Sabah's wildlife populations to local extinction (Box A3-1).

Traditionally, wildlife has been an important food resource for rural people in Sabah. In some non-Muslim areas of Sabah, hunting is estimated to supply around 120 kg of wild meat per household annually (PACOS, 2002). A recent survey conducted among communities living between the Kinabalu National Park and the Crocker Range Park showed that subsistence hunting has already decimated populations of large prey species such as the sambar deer and bearded pig (Lackman and Manokaran, 2011). Hunting here is also believed to have caused the

local extinctions of two protected ape species, the orang-utan and the gibbon. Other wildlife populations are now at risk of short to medium-term extinction.

Commercial hunting is thriving in Sabah and the meat of the bearded pig and other wild ungulates is in high demand throughout the state. Commercial hunting is hard to regulate. For instance, many have been found to breach the terms of the hunting licenses issued by the Sabah Wildlife Department by exceeding their quotas or hunting the wrong species in the wrong locations.

Box A3-1 : Illegal Hunting And Wildlife Trade

Illegal hunting and wildlife trade have become a critical global challenge. They feed growing local and international demand for wild meats, exotic goods, pets and traditional medicines. Stemming the unsustainable harvest of wild animals is challenging as we must balance the subsistence and economic needs of local people with the control of an insidious threat which has already driven many species to the brink of extinction, endangered ecosystems, and created new dangers to human health (spreading SARS, avian flu, monkey pox and other deadly diseases).

Source: HUTN-KOCP

A Honorary Wildlife Warden finding a snare in the Lower Kinabatangan Wildlife Sanctuary

In Sabah, wildlife has been traditionally hunted for ages. Perhaps such hunting was sustainable when the forest cover was vast, the human population was low and wildlife was more abundant. Usually a complex system of social taboos, spiritual beliefs and hunting ethics regulated the traditional harvest of wild fauna. More importantly, hunting was limited to subsistence needs and not for commercial interests.

Today, hunting practices in Sabah's rural areas have become largely unsustainable. Easier access to remote regions, the availability of 4WD vehicles, and the use of firearms give hunters unfair advantages. Sport hunting as well as retaliatory killings of crop raiding animals (such as elephants, orang-utans and other primates) have also contributed to the problem.

Most illegal wildlife trade in Sabah probably still occurs within the state's borders, but there is also evidence of a growing volume of the state's wildlife being traded nationally and internationally taking advantage of the long and often remote borders around and within Sabah's shores. Illegal wildlife traders operating in Sabah range from small scale local collectors to major transnational organised operations involving an intricate web of collectors, middlemen, smugglers and brokers. Local and international illegal wildlife trade in Sabah occurs in many different forms: food products (including wild meat, fish, shellfish and turtle eggs), medicinal ingredients, ornaments and cultural artefacts, live pets, curios (butterflies, rhinoceros beetle, corals and shells), and even private and museum collections.

Poaching is a widespread practice among local and foreign oil palm plantation workers trying to supplement their diet and income by hunting in adjacent forested areas. Poaching is also common in most of Commercial Forest Reserves of Sabah. In the eastern parts of the state, snare traps (*jerat*) are a menace to the wildlife – seriously affecting a range of animals including elephants and wild cattle.

Puntung, the female rhino at the Borneo Rhino Sanctuary. Her front left foot was torn off in a snare trap. Photo by J. Payne

Plant species are also under threat. Of particular concern is the poaching of ornamental species such as orchids and hoyas. In spite of adequate legal protection, enforcement is made difficult by insufficient capacity within the Wildlife Department and other enforcement agencies to intercept and identify illegally possessed plants.

Wildlife trade is the sale or exchange of wild animal resources by people. This can involve live animals or a diverse range of products prized by humans—including skins, medicinal ingredients, tourist curios, eggs, fish and other food products. Illegal wildlife trade is a major concern as the species traded are often already highly threatened and in danger of extinction. Illegal wildlife trade operators are often unscrupulous, unconcerned about sustainability and use methods that damage the environment such as using cyanide to capture fish.

Most wildlife trade in Sabah probably occurs within the state's borders, but there is also evidence of a growing volume of the state's wildlife being traded nationally and internationally taking advantage of the long and often remote borders around and within Sabah's shores. Local and international illegal wildlife trade in Sabah occurs in many different forms:

- Food - including wild meat, fish and shellfish as well as turtle eggs
- Traditional medicine - bats, snakes, sun bears gall bladder, international trade of pangolin parts and foetuses, and of long tail porcupine bezoars, etc.
- Ornaments and cultural artefacts - feathers (such as great Argus pheasant or hornbills), skins, scales, furs, skulls.
- Live pets –cage-bird trade (straw-headed bulbul), amphibians and reptiles.
- Collections - curios (butterflies, rhinoceros beetle, corals and shells), private and museum collections.

A3.4.2 Human-wildlife Conflicts

With ever increasing encroachment of human activities into wildlife habitats, human-wildlife conflict is now becoming a serious threat to the survival of many endangered and protected species throughout the world.

Several species in Sabah and are well known for their capacity to cohabitate with humans by extending their dietary habits to human-produced food sources. Some species of mice, rats and squirrels as well as sparrows and munias commonly cause damage to crop fields. Pigs and porcupines are frequent crop raiders. The large flying fox raids domestic fruit trees. Macaques are well known throughout Sabah to raid crops and houses. The Malay weasel, some civets and the monitor lizard often kill chickens in rural areas. The oriental small-clawed otter is reported to hunt in fish farms. Systematic killing of raiding wildlife by crop and farm owners is the most common method to control pest animals and may lead to the local extinction of vulnerable wildlife populations.

Massive habitat loss, fragmentation and degradation throughout Sabah has also forced many other wildlife species to establish their home ranges alongside human activities, sometimes with particularly serious consequences, as in the case of the elephants and the orang-utans displaced by the development of extensive oil palm plantations in Eastern Sabah. Rapid changes in orang-utan habitat and the disruption of the traditional elephant migration routes along the Kinabatangan River for instance have forced the displaced mammals to look for alternative food sources in oil palm plantations and villagers' orchards. Both orang-utans and elephants can cause considerable damages by eating the shoots of young palm trees. Large numbers of elephants and orang-utans are reported to have been killed in the 80s and 90s in newly established commercial oil palm plantations as a crop protection measure. Today, the reduced rate of land clearing and improved law enforcement has significantly reduced this practice but occasional killings are still reported every year.

A3.5 DESTRUCTIVE FISHING PRACTICES

Sabah contains the largest concentration of coral reefs and reef fishes in Borneo (Oakley *et al*., 2000). The southeast and northeast shores of Sabah and the Spratly islands in the South China Sea are most notable for coral reef development. In a review of the status of the reefs of East Malaysia however, Pilcher and Cabanban (2001) painted a general picture of decline as a result of destructive fishing with bombs and cyanide (Box A3-2).

Fish bombing using dynamite and fish poisoning using cyanide are the most destructive and unsustainable fishing methods carried out along the reef-lined Sabah coastline. It was estimated that about 10% of coral reefs in Sabah have been destroyed due to the illegal fishing methods.

Bombing with dynamite can destroy over 5m^2 of coral reef with one blast and the damaged coral reef will take years to recover. In addition, mammals in the area where the co-called "fish bombing" is carried out are liable to be harmed. The same explosive materials have also been used by locals to hunt marine mammals. Fish poisoning using cyanide on the other hand will harm the stability of the coral reef by reducing the umber of small fishes and remove large predators, allowing colonization of infectious grazing invertebrates.

A3.5.1 Overfishing

The number of fishermen in Sabah has increased significantly since 2007. In 2009, there are a total of 24,691 fishermen in Sabah, an 18% increase from 2007. The high number of fishermen has also translated into high number of fishing vessels operating in the inshore coastal waters. This means there are more and more traditional and commercial fishermen competing for the same resources.

Sabah has the largest number of fishermen in the country

According to the statistic on annual marine landing using trawl nets from the Department of Fisheries Sabah, there is a declining trend in trawl catch from year 2000 (91,289 tonnes) to 2009 (57,444 tonnes). This is an indication of overfishing, as it contrasts sharply with the increasing number of trawlers. Besides that, encroachment of trawlers into the restricted grounds of traditional fishermen has also leads to the decline in fish catch.

Based on the Marine Trophic Index, an indicator of marine ecosystem integrity and sustainability of fisheries that is calculated by the Sea Around Us Project, Sabah has been "fishing down the marine food web". This implies that larger fishes at the top of the food chain are declining and consequently fishermen are expected to catch smaller fishes.

Box A3-2 : Fish Bombing And Poisoning

Habitat destruction is a main cause in the decline of the coral–reef fishery in Sabah. In this, fishing "bombing" using dynamite and fish poisoning using cyanide are the two most destructive fishing methods utilised along the reef-lined Sabah coastline. It is estimated that to date, about 10 % of coral reefs in Sabah have been destroyed due to these illegal fishing methods.

The use of dynamite, called fish "bombing", which is used to source for bait in the hook-and-line fishery as well as fish feed in the grow-out of juvenile live reef food fish trade (LRFFT) species, can destroy over 5 m^2 of coral reef with one blast. Damaged coral reefs will take years to recover and become productive again. In addition, fish bombing can harm marine mammals that happen to be in the vicinity of the explosion.

Fishing poisoning on the other hand will harm the stability of the coral reef by reducing the number of small fishes and remove large predators, allowing colonization of infectious grazing invertebrates.

The coral reefs along the east coast of, Pulau Mangalum and other small islands and Kuala Abai off Kota Belud have been identified as the areas most susceptible to these illegal and highly destructive methods of fishing.

A3.5.2 Live Reef Food Fish Trade

Live reef food fish trade is a lucrative industry, with high demand of coral reef fish from countries such as Hong Kong and China. The growing live reef food fish trade in Malaysia has raised concerns on over-exploitation of population of coral reef fishes, particularly in Sabah. Based on the IUCN Threatened Red List of Threatened Species, 20 out of 47 species of live reef food fish trade fish species in Sabah have declining populations.

Scales *et al*. (2007) documented a significant decline in total monthly catch of coral reef fish species in Sabah between 1995 and 2005. Decline in catch were significant for three coral reef fish species, namely humphead wrasse, humpback grouper and *Epinephelus* spp. Among the three species, Humphead wrasse is listed as Endangered species under the IUCN Red List of Threatened Species and viable population of the coral reef fish can only be found in Pulau Layang Layang and Pulau Sipadan.

A3.6 TOURISM


Much of the tourism in Sabah depends on biodiversity

Ecotourism is increasingly used in Sabah as a means to promote wildlife conservation, enhance economic opportunities for local residents, increase public awareness and protect the natural and cultural heritage of the state, including the conservation of biodiversity and improvement of local facilities. Unfortunately, rapid, unmonitored development of ecotourism ventures can lead to degradation of habitats and deleterious effects on animal well-being (Muehlenbein & Ancrenaz, 2009). Habituation of animals to human presence can increase the likelihood that animals will actively seek out contact with humans, particularly in the form of crop raiding and invasion of garbage pits and local households. Habituation may lead to alterations in animal stress responses, and this may lead to immunosuppression, increasing susceptibility to infectious diseases, and decreasing reproductive success. Other risks may include pollution, crowding, the introduction of invasive species, and transmission of pathogens through direct and indirect infection routes.

A3.7 CLIMATE CHANGE

Climate change is recognised as a major threat to terrestrial and marine biodiversity as well as to ecosystem functions. In Sabah, altered rainfall and run-off patterns, sea level rise, increases in air and sea temperatures, and changed frequency of weather events are expected. Many species may not be able to tolerate these changes and become extinct. Droughts and forest fires are a proven threat to plants and ecosystems in Sabah, as plant species here are not adapted to fire. Vast areas of Sabah's forests have been lost to fires, the most severe of which in recent times occurred in during the El Nino periods in 1983 and 1997. It is estimated that the 1983 fires affected a minimum of 950,000 hectares of forests in Sabah, 85 percent of this being in previously logged areas (Wirawan, 1993). Due to the drier conditions and higher amounts of ground biomass present, heavily disturbed forests are the most prone to fires and suffer the most serious fire damage. Additionally, forests close to plantations and local communities, as well as forests on ultrabasic and peat soils are most prone to fires. While fires are frequently associated with the effects of severe droughts caused by the El Niño phenomenon, minor droughts may also lead to fire. While the possible overall impacts of climate change on biodiversity are still uncertain, changes in climatic

conditions such as rainfall and temperature patterns are highly likely to have impacts on tree phenology, as flowering and fruiting of most species are closely linked to these environmental factors. In addition, it may be expected that a rise in mean temperatures will have impacts on montane and sub alpine species.

A3.8 INVASIVE SPECIES

Invasion of water hyacinth has caused substantial problem to the aquatic ecosystems

Invasive species are defined as non-native plants or animals that adversely affect the habitats and bioregions they invade economically, environmentally, and/or ecologically. Invasive species are a major cause of recent concern as that prey upon, or out-compete native species, or modify natural ecosystems, causing the extinction of native wildlife populations. The Global Invasive Species Database (2011) lists a total of 141 invasive species recorded in Malaysia. Sabah suffers from a range of invasive plant species, such as the water hyacinth (*Eichhornia crassipes*), a very fast growing aquatic plant from South America which blocks waterways and prevents sunlight and oxygen from reaching the water column and submerged plants, dramatically reducing biological diversity in aquatic ecosystems. The other common species considered as invasive in Sabah include the house crow (*Corvus splendens*), the red-eared slider (*Trachemys scripta elegans*), the American bullfrog (*Rana catesbeiana*), the golden apple snail (*Pomacea canaliculata*), tilapia, crazy yellow ant (*Anoplolepis gracilipes*), the invasive coral-feeding starfish (*Acanthaster planci*) and the orange-cup coral (*Tubastraea coccinea*).

While they are yet to be widely considered as an important conservation problem in the state, a number of invasive alien plant species have become a familiar part of Sabah's landscape. Perhaps the most widespread and alarming is *Acacia mangium*, which was first introduced as a fast growing plantation species for the State's pulp and paper industry in the 1960s. The tree is native to Queensland, Australia as well as Papua New Guinea, Irian Jaya and in some parts of Indonesia (PIER, 2003). Another case of invasive alien plant species that has received some measure of attention is the occurrence of the dandelion on Mount Kinabalu, which has displaced natural vegetation along parts of the trail. This fast growing species, which was first observed in 1998 in Panar Laban, and has since spread to Mesilau

and Layang Layang, is likely to have been unintentionally carried in on the shoes of climbers.

A3.9 KNOWLEDGE GAPS

A key challenge in our efforts to protect Sabah's biodiversity is the gaps in our knowledge. Current knowledge of Sabah's biodiversity, particularly for groups other than mammals and birds is still insufficient to design appropriate conservation measures due to the following:

- Insufficient information and incomplete inventories on population distribution, numbers and conservation status of wildlife species present in Sabah, especially for groups other than mammals and birds, to monitor population trends and take appropriate management measures.
- Insufficient knowledge on the biological requirements of many wildlife species to design efficient conservation strategies and for the planning of new conservation areas
- Plant diversity remains inadequately inventoried. Many plant species, including trees, in Sabah are known to be rare and endangered. The list of species is expected to become longer as research on the flora intensifies. A pre-requisite for effective plant conservation actions is the availability of sufficient information on the conservation status, habitat location, and phenology of threatened plants. As such, there is a need for a common database of threatened plants for Sabah.
- Freshwater species have been poorly studied
- The diversity of Sabah's invertebrates is recognised as being extremely high but due to limited research this vast group of animals remains almost entirely unknown.
- Absence of a comprehensive inventory of wetlands. It is impossible to adequately assess the status and trends for wetlands in Sabah and to formulate a comprehensive strategy for the conservation and wise use of wetlands ecosystems and species. The information which exists currently is more than 20 years out of date and is in urgent need of being updated.

The oral traditions of the indigenous communities in the state contain a wealth of botanical expertise. Only the surface of this knowledge has been documented. Unless documentation exercises are carried out, this knowledge is threatened as more and more of the indigenous people settle down in urban areas.

A3.10 CAPACITY OF STAKEHOLDERS

Sabah's remarkable biodiversity and iconic wildlife species are renowned internationally. It may seem highly paradoxical that Sabah's wildlife can be so seriously threatened, despite its remarkable diversity, sound policies and laws as well as its numerous governmental and non-governmental conservation efforts.

The inadequate capacity of stakeholders to effectively protect biodiversity is a major concern. Government agencies, NGOs and local communities – all suffer from inadequate capacity.

Although Sabah possesses recent and progressive laws pertaining to wildlife diversity conservation, there remain gaps in jurisdiction and legislation. The key government agencies are involved in biodiversity conservation — the SaBC, SWD, SP and SFD have inadequate human and financial resources to fulfil their respective missions and objectives. The SaBC was created to provide leadership and coordination to all biodiversity conservation efforts in Sabah, but it has not fully achieved this role at the moment.

There are also gaps in some legislation. While in general, the Wildlife Conservation Enactment 1997 provides strong regulations for plant protection, two gaps stand out. Firstly, entire plant families instead of specific species are listed under the enactment, regardless of the fact that not all of the species in each family are threatened (some may be abundant or even widespread in horticulture), whereas there are many threatened species in other families not listed in the enactment. Secondly, the SWD, which is empowered to enforce the enactment, does not have the required expertise to do so effectively.

Management of the tree flora in the biologically diverse tropical (including in-situ and ex-situ approaches) forests requires expertise in the fields of plant taxonomy, forest ecology, forest harvesting and others. The shortage of experts in these fields is a major shortcoming in all of the key agencies responsible for ecosystem and plant conservation. The integration of ecosystem and plant conservation into SFM will also require SFMLA holders to acquire this expertise.

Section A4
Socio-Economic Drivers

A4.1 INTRODUCTION

Biodiversity is directly affected by the socio-economic factors around us. Population growth, economic activities, employment patterns and resource consumption have a major influence on the integrity of our biodiversity. We need to better understand how these socio-economic factors exert influences on our flora, fauna, habitats and ecosystem so that we can design measures to minimise adverse impacts. This section provides an overview of the socio-economic forces at work in Sabah and elaborates how they are influencing and will influence biodiversity conservation in the state.

A4.2 POPULATION GROWTH

Sabah is the third most populous state in Malaysia (after Selangor and Johor). The state's population has grown rapidly from 0.93 million in 1980 and 1.73 million in 1991 to 3.12 million in 2010 (Table A4-1). The population growth rate was very high from 1980 to 1991 (5.67 percent) and from 1991 to 2000 (3.92 percent) but has slowed down to 2.34 percent from 2000 to 2010. Although the rate of population growth has slowed down in recent years, the burgeoning population will continue to put pressure on land and natural resources.

Table A4-1: Sabah's Population Growth

	1980	1991	2000	2010	2025
Population (million)	0.93	1.73	2.47	3.12	4.2*

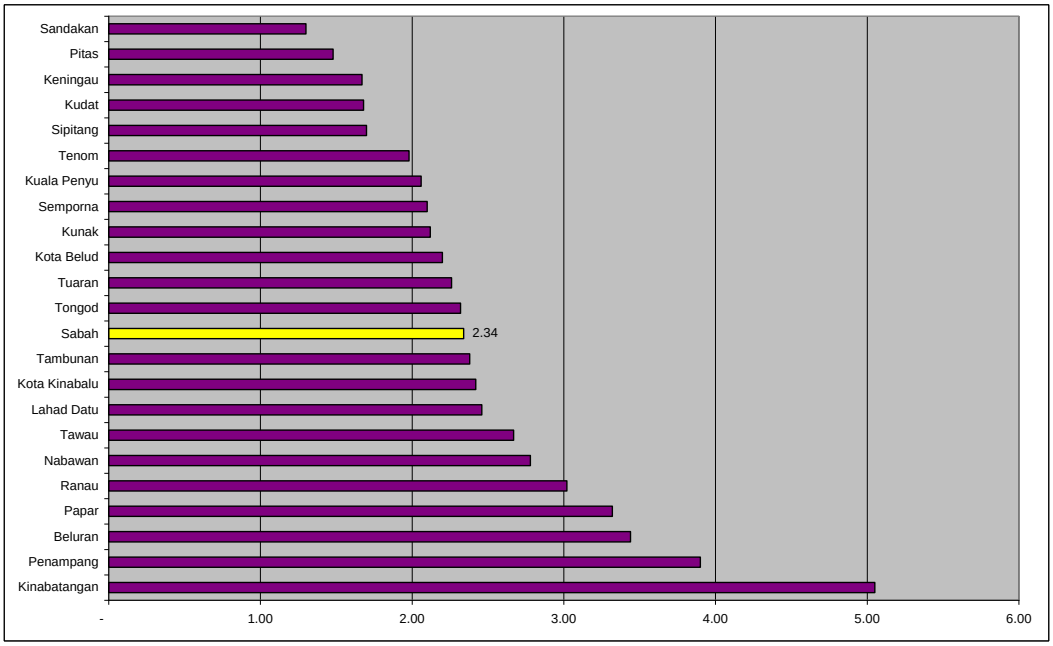
Source: Department of Statistics

* estimated based on a growth rate of 2% per annum

The population of Sabah is projected to reach 4.2 million by 2025 even with a modest annual growth rate of 2 percent, which represents an additional one million persons compared to now. The population density in 2025 will be 57 persons/km^2, representing a 30 percent increase over the current density. The additional population will need food, shelter, clothing, and other material needs in addition to education and employment. As a result, additional pressure on land and the natural resources of the state can be anticipated. Population density is not uniform throughout Sabah. As expected, the more urban districts (e.g. Kota Kinabalu, Penampang, Sandakan) have higher population densities than districts such as Tongod, Nabawan, Sipitang and Beluran that have population densities of less than 20 persons/km^2.

Notwithstanding the urbanisation process, rural population continues to grow in Sabah. In fact, during the period 2000-2010, the average annual population growth

rates of Kinabatangan, Beluran, Papar, Ranau and Nabawan were significantly higher than the state's 2.34 percent growth rate (Figure A4-1). Underlying this trend is the relatively slow pace of urbanisation in Sabah, at about 54 percent, which is much lower than the national average (71 percent). As urban areas presently only occupy less than one percent of the land area of the state, much of Sabah's population is scattered in rural areas all over the state. Given that the rural population's land utilisation rate is much higher than that of the urban population, further pressures will be exerted on the state's natural resources and environment.



Source: DOS, 2010a

Figure A4-1: Average Annual Population Growth Rate by District 2000-2010

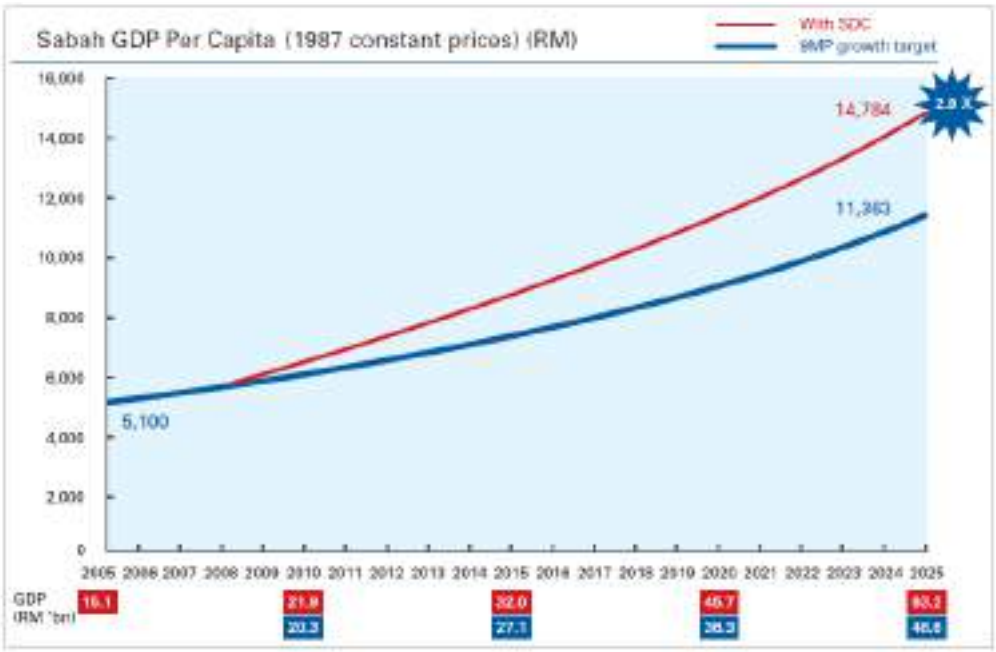
A4.3 IMPROVEMENTS IN THE STANDARD OF LIVING

The standard of living in the state is also expected to rise. The mean gross household income per capita for Sabah increased from RM 1,212 in 1984 to RM 3,144 in 2009. One of the key objectives of Sabah Development Corridor (SDC) Blueprint (Box A4-1) is to increase the per capita GDP in Sabah from the current level of about RM 5,000 to RM 14,784 by 2025 (Figure A4-2) – an increase of almost 200 percent. To achieve this, the SDC focuses on capturing higher value economic activities and promoting balanced economic growth. The SDC aims to boost the agriculture, tourism and logistic services, and manufacturing sectors.

Box A4-1: Sabah Development Corridor

The Sabah Development Corridor (SDC) was launched in 2008 to enhance the quality of life of the people of Sabah by accelerating the growth of state's economy, promoting regional balance and bridging the rural-urban divide while ensuring sustainable management of the state's resources. The SDC programmes are underpinned by three key principles that will guide development in Sabah, namely the need to: (1) Capture higher value economic activities; (2) Promote balanced economic growth with distribution; and (2) Ensure sustainable growth via environmental conservation.

Implementation of the SDC initiative is guided by the SDC Blueprint 2008-2025. The SDC Blueprint recognises that as the State develops, a number of critical environmental challenges will impact will need to be addressed. These include: implementing the sustainable use of natural resources, a more integrated approach to biodiversity and environmental conservation, redressing habitat fragmentation, improving wastewater treatment systems, managing pollution from industries and the need for regulations on Good Agriculture Practices (GAP). Chapter 7 of the Blueprint (Conserve and Protect the Environment for Future Generations) sets out eight core strategies that will need to be developed to enhance the conservation and protection of the environment in Sabah.



Source: IDS (2007)

Figure A4-2: Projected increase in GDP (2008-2025)

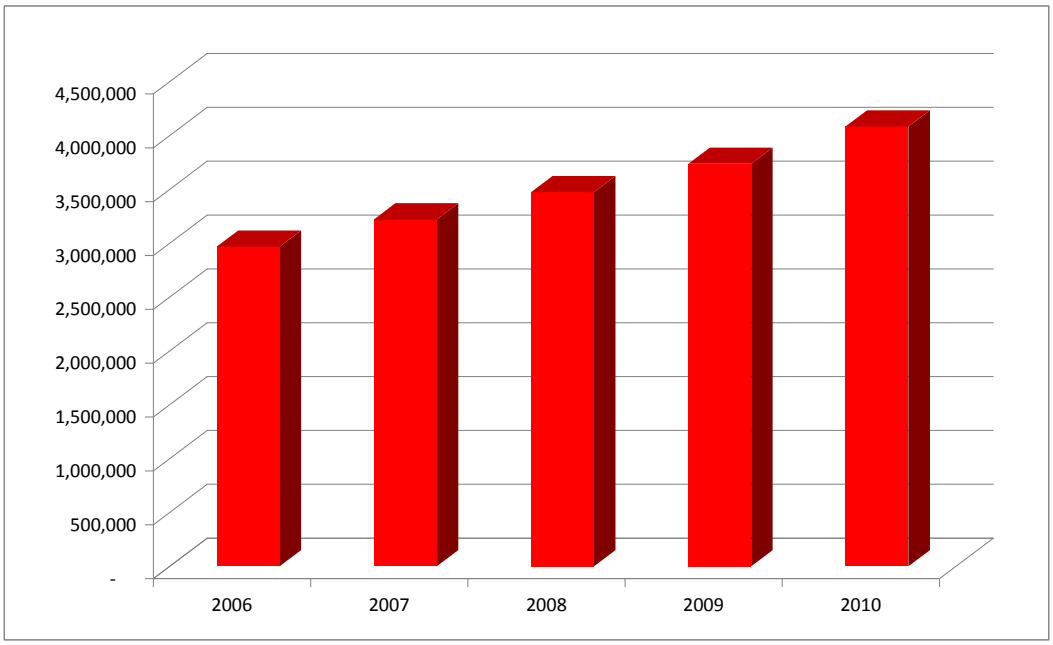
Poverty eradication is among the main agendas under the Tenth Malaysia Plan whereby state and federal government programmes are targeted at eliminating hardcore poverty and reducing relative poverty in Sabah. Under the Plan, various programmes have been implemented to help improve the economy and livelihoods

of the poor listed under the e-Kasih programme. As a result of these interventions, the incidence of poverty is expected to decline in the coming years.

Poverty-environment linkages are highly complex due to the multi-faceted issues that impact the two. However, the poverty-environment nexus is more apparent in rural areas as the poor are more likely to depend on natural resources from their immediate surroundings for their livelihood. Alleviating poverty could reduce the pressure on the natural environments as the poor become less reliant on natural resources. Similarly enhancing the environment through conservation measures and sustainable wise use increasingly demonstrate positive benefits towards reducing poverty levels. Some examples include payments for ecosystem services, work opportunities e.g. from nature based tourism, mangrove and coastal restoration for fisheries and sustainable forest management systems that allows for the continuous use of non-timber forest products.

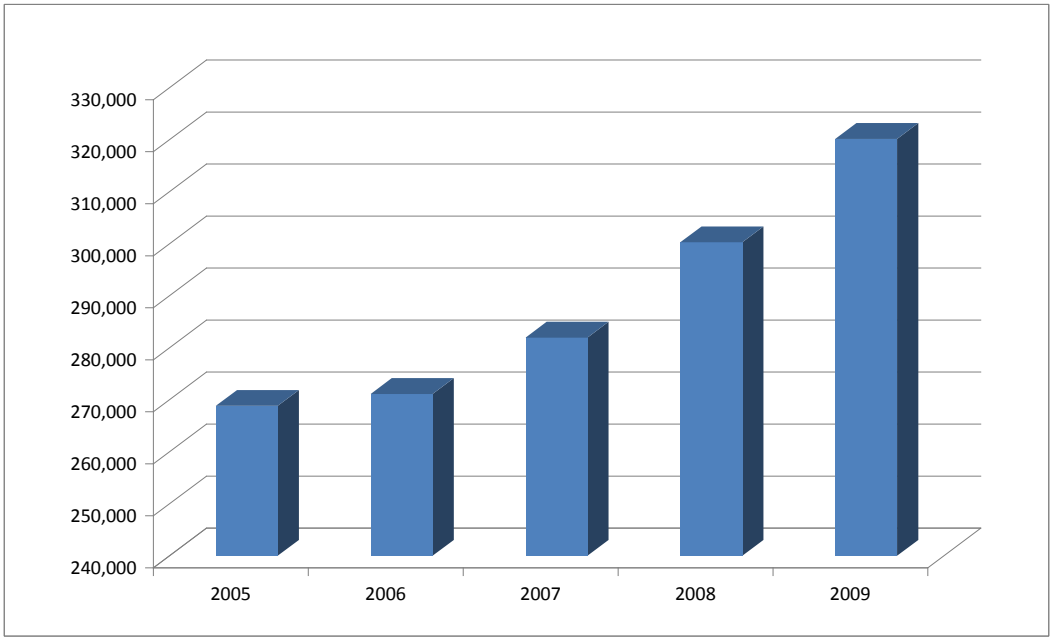
The rise in income levels coupled with population growth will lead to higher demand for energy, water and transportation. Pollution levels and the production of household and industrial waste can be expected to increase, and these will put more pressure on biodiversity. Already, electricity and water consumption in Sabah has been steadily rising (Figure A4-3 and Figure A4-4). Similarly, demand for transportation and fuel as reflected by the total number of motor vehicles is also on the rise (Figure A4-5).

The drive to increase the income levels will impose additional pressures on the land and natural resources. With the rise in income levels, consumption rates will also increase – leading to greater demand for energy, water, transportation and infrastructure and a greater amount of waste and pollution.



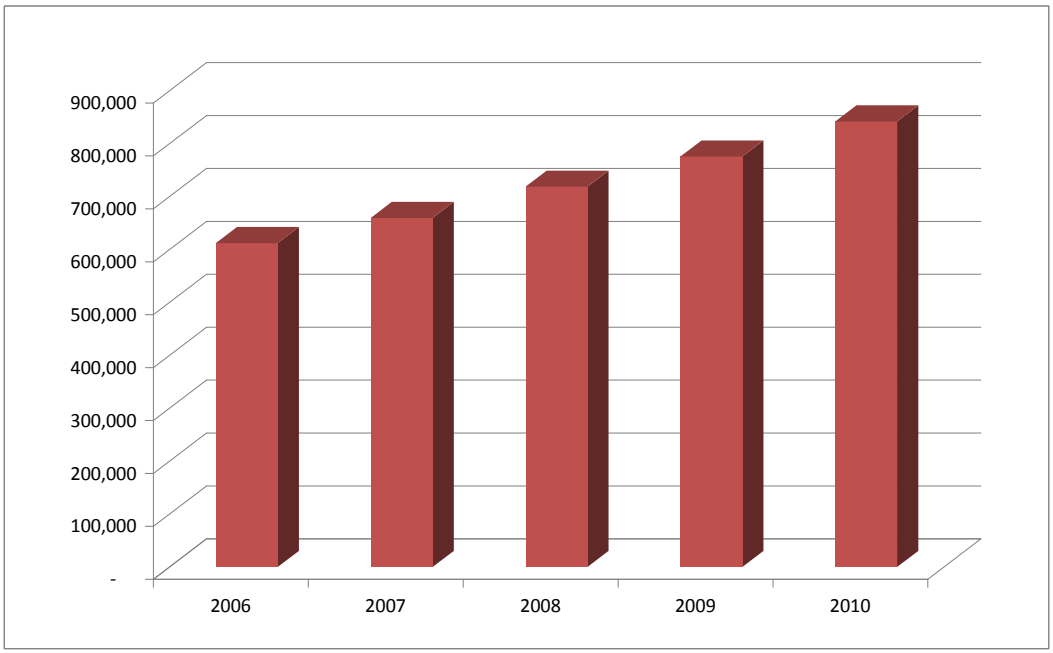
Source: DOS, 2010b

Figure A4-3: Sabah, Electricity, Unit Consumed ('000 KWH)



Source: DOS, 2010b

Figure A4-4: Sabah, Water, Total Quantity Supplied (Million Litres)



Source: DOS, 2010b

Figure A4-5: Sabah, Number of Motor Vehicles Registered, 2006-2010

A4.4 CHANGES TO THE STRUCTURE OF THE ECONOMY

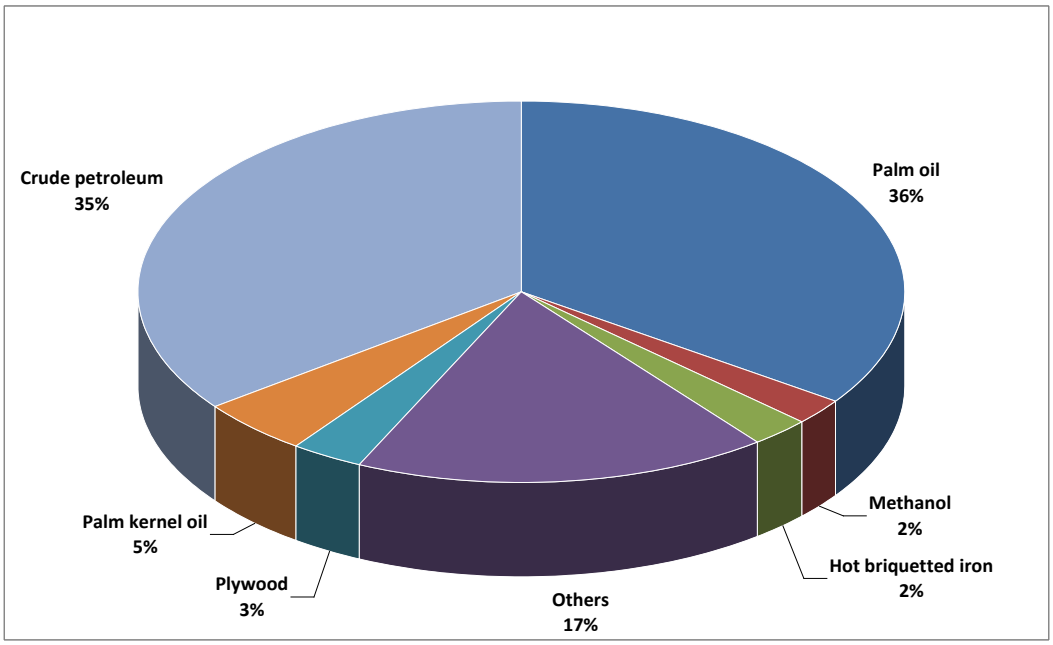
The structure of the state's economy of is also changing with the primary sector now giving way to the secondary and tertiary sectors (Table A4-2). The contribution of the agriculture sector to Sabah's GDP decreased from 37.6 percent in 1993 to less than 23 percent in 2010, while the contribution of the services sector increased from 33.9 percent in 1993 to 50.4 percent.

Table A4-2: Sectoral Contribution to Sabah's GDP

	1993	2010
Agriculture	37.6	22.9
Mining & Quarrying	14.5	16.9
Manufacturing	13.8	7.9
Construction	3.2	1.4
Services	33.9	50.4

Source: Department of Statistics Sabah

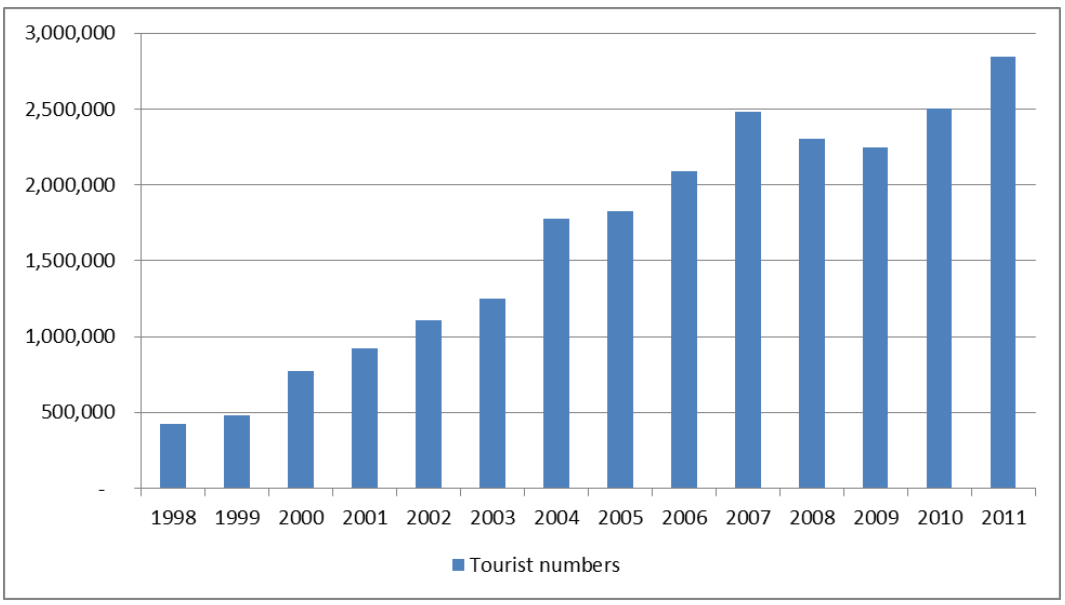
On the whole, Sabah's economy is still very much resource-based with close to 40 percent of its real GDP coming from the agriculture and mining & quarrying sector. Sabah's exports in 2010 were dominated by palm oil (36 percent share of the total export value), crude petroleum (35%) and palm kernel oil (5%) (Figure A4-6).



Source: DOS, 2010b

Figure A4-6: Sabah's Major Exports in 2010

The services sector is now an important engine of growth for the state and as the sector continues to increase in prominence, this will reduce pressures on land and natural resources. The tourism industry, for example, has achieved strong growth over the past ten years. The number of visitors visiting the state had increased rapidly, from less than 0.5 million in 1998 to 2.5 million in 2010 (Figure A4-7). In 2011, tourist arrivals reached an all-time high with 2.84 million visitors, bringing the state an estimated RM4.98 billion in tourism income.

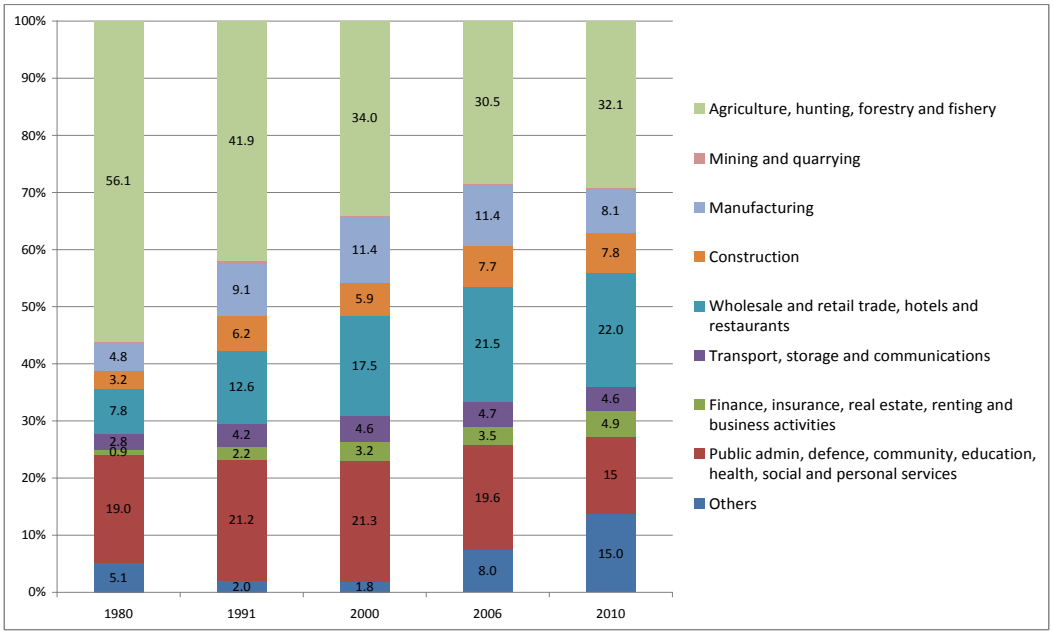


Source: Sabah Tourism Board

Figure A4-7: Sabah's Tourist Arrival, 1998-2011

Agriculture and forestry provided for more than half the employment in the state in 1980 (Figure A4-8). That figure has now dropped to less than 30 percent. Wholesale and retail trade, hotels and restaurants, which only provided 7.8 percent of employment in 1980, now provide 22 percent. The changes to the employment structure also indicate an increase in jobs in urban areas.

The implementation of the SDC programmes is expected to boost the role of the manufacturing sector in Sabah. These are aimed at boosting downstream value through activities which include the establishment of Palm Oil Industrial Clusters in Lahad Datu and Sandakan, the development of an oil and gas industrial cluster in Sipitang and the expansion of the Kota Kinabalu Industrial Park. With the momentum generated by these initiatives, the contribution of the manufacturing sector to the state's GDP is expected to increase.



Source: Department of Statistics

Figure A4-8: Changes in Employment Structure, 1980-2010

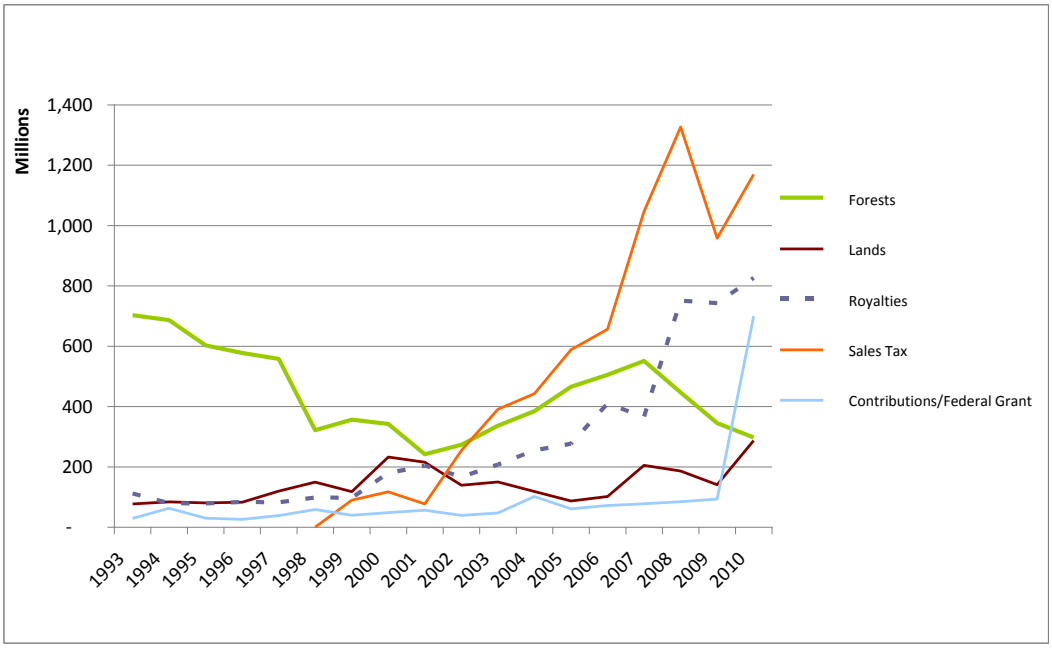
In terms of resource use and environmental impacts, the secondary and tertiary sectors are far more efficient than the primary sector in terms of per Ringgit GDP. The move from the reliance on primary sector towards the secondary and tertiary sectors will, in the long-run, reduce the pressures on the land and natural resources.

A4.5 STATE GOVERNMENT'S RELIANCE ON NATURAL RESOURCES FOR REVENUE

Despite the impressive diversification of the state's economy over the last 30 years, the state government continues to rely heavily on revenue from the extraction of natural resources and land-based activities. Sales taxes from crude palm oil,

royalties and fees from forest produce and petroleum remain the major revenue contributors (Figure A4-9).

Prior to 1998, revenue from forestry was the biggest contributor to the state revenue. Some 25 to 50 percent of the state's total revenue was derived from this source. However, the relative importance of forestry revenue to state revenue has declined since forest resources have become depleted and the state has intervened to strictly enforce sustainable forest management and focus on rehabilitating its degraded forest estate.



Source: Sabah Treasury Department, State Estimates of Revenue and Expenditure

Figure A4-9: Sabah: Main Sources of State Revenue (RM), 1993 - 2010

Customs duties in the form of import and excise duties on petroleum used to be the second biggest contributor to the state's revenue, with an average annual contribution of more than 17 percent during the period 1995-1999. However customs revenue has dropped to a negligible level following the state's decision to support the national government's commitment under the ASEAN Free Trade Area to abolish import and excise duties on petroleum products effective 1 January 2000. Petroleum royalty from the federal government has since become one of the main sources of state revenue. In 2010, about 20 percent of state revenue came from this source.

In 1998, Sabah introduced the State Sales Tax Enactment, focusing heavily on collection of sales tax on crude palm oil. Revenue derived from the sales tax has increased significantly since the early 2000s on the back of higher crude palm oil

prices. To date, this form of sales tax represents the most important source of revenue; it now accounts for over 30 percent of the state total revenue. To diversify its revenue sources, Sabah began to impose two new forms of sales tax in 2000s, namely, a sales tax on lottery tickets and sales tax on sale of bets through slot machine. However, these taxes contribute only around five percent of state revenue.

Sabah's heavy reliance on revenue from the extraction of natural resources and land-based activities is of course a direct result of the provisions in the Federal Constitution that give the state government jurisdiction over land and natural resources. Although the services sector is growing rapidly in the state, the state government derives very little revenue from these activities save for indirect land premium and quit rents from premises such as hotels and retail outlets.

The state government's reliance on revenue from land and natural resources will continue to exert significant pressure on biodiversity. The structural changes to the economy towards the services sector may not yield much additional revenue to the state government.

A4.6 IMPLICATIONS ON BIODIVERSITY CONSERVATION

Population growth, the expansion of the economy and the increase in purchasing power of the people in Sabah has the potential to impose tremendous pressure on biodiversity. The biggest pressure will be the competition for land. Given that the land is finite, forests and wilderness areas will have to compete with schools, houses, hospitals and agriculture for precious land. It is therefore vital that we have policies and strategies that promote efficient use of land. This could mean that we have to improve our agriculture productivity, enhance our downstream economic activities and embrace the services sector to lead our economy. The other significant pressure will be wastes and pollution that will arise from the expanding production and consumption – the impacts of which will affect our ecosystems and biodiversity in many ways.

PART B
STRATEGIES

Section B1
Strategy 1 – Engaging The People of Sabah

B1.1 INTRODUCTION

Goal 1 :
By 2022, we would have engaged with and harnessed the commitment of all stakeholder groups to ensure our biodiversity is protected

Strategy 1 aims at achieving Goal 1 (see section A1.4), namely to **engage with and harness the commitment of all stakeholder groups to ensure our biodiversity is protected.** It focusses on harnessing the collective reach, creativity and commitment of all stakeholders, and building partnerships to ensure that biodiversity endures as the pride of the state. The state government will take on a lead role in delivering the Strategy, but it cannot achieve success alone. Every stakeholder can contribute to the implementation of the strategy. Each stakeholder, according to their level of responsibility and capabilities, can develop various projects and programmes which can contribute to the goals of this strategy.

Ultimately, it is the people of Sabah — the public, businesses, indigenous communities, civil society and all levels of government—that have the power to prevent biodiversity loss and nurture balanced development. Engaging everyone is fundamental if we are to succeed in conserving the state's biodiversity effectively.

B1.2 TARGETS

Strategy 1 has three targets, namely :

Target 1.1
By 2022, the people of Sabah are aware of the values of biodiversity and the steps they can take to conserve and use it wisely. Target 1.1 will be met by implementing actions and activities that :

- nurture support through education, communication and awareness
- improve access to information

Target 1.2
By 2022, public participation in biodiversity conservation initiatives has increased by 200% compared to present levels. Target 1.2 will be met by implementing actions and activities that :

- provide a platform for public participation
- increase public – private partnerships for biodiversity conservation

Target 1.3
By 2022, land that is managed as ICCAs has increased significantly. Target 1.3 will be met by implementing actions and activities that :

- support community-based conservation
- support collaboration with indigenous communities within Protected Areas and Forest Reserves

B1.3 COMMITMENTS TO ACTION

B1.3.1 Nurturing Support through Education, Communication and Awareness

Educating the people of Sabah and raising awareness are crucial to cultivate environmental stewardship. Education often needs to be done at an early age for these values to take root. While there are already many on-going awareness raising programmes, we can do more.

We need a comprehensive communication, education and public awareness programme designed to engage the people of Sabah in biodiversity conservation. Public awareness campaigns in conjunction with the civil society and private sector can also be used to promote the idea that safeguarding biodiversity is the privilege and responsibility of everyone in Sabah. Conservation projects and programmes undertaken at all levels of society can be showcased to demonstrate the range of efforts that are currently in place.

Action 1.1 We will develop a clear communication strategy to ensure that all stakeholders understand and support actions for biodiversity conservation. We will ensure that the roles and responsibilities of each stakeholder are clearly communicated.

Activities
Conduct baseline survey on level of public awareness
Formulate State Biodiversity Communication Plan

Action 1.2 We will develop programmes, curricula and campaigns to engage students and teachers at all educational levels to understand and protect Sabah's biodiversity. We will fully utilise our array of parks, sanctuaries, reserves, research facilities, institutions and museums to enhance public awareness and education about Sabah's biodiversity and their value.

Activities
Expand scope of the Sabah Environmental Education Network

Action 1.3 We will showcase on-going conservation programmes (e.g. Heart of Borneo, Coral Triangle Initiative, Borneo Rhino Alliance) in order to demonstrate current initiatives, encourage public support and participation, acknowledge supporters, and facilitate mutual learning.

Activities
Establish Nature Centres throughout Sabah

B1.3.2 Improving Access to Information

Information pertaining to the status of biodiversity conservation is crucial for stakeholders to plan their projects, campaigns and fund-raising activities. With the availability of appropriate information, stakeholders can be more effective in their efforts, more sensitive to changing conditions, and respond better to emerging issues.

There is already a wealth of knowledge among various stakeholders in Sabah. We need to consolidate this knowledge and share it among people to enable better decision-making and to facilitate actions on biodiversity. We will create opportunities for discussion and collaboration among stakeholders.

Providing a benchmark of the current status can then become a basis for spurring involvement; and progress can be measured by regularly updating improvements such as in the extent of protected areas, and improvement in the numbers of endangered or threatened species. We need to develop appropriate information

for various segments of the society. We recognise that to communicate biodiversity effectively, any information provided must have the target audience in mind and should be easy to understand.

Action 1.4 We will ensure that information on biodiversity is consolidated and made available for all the people of Sabah. This includes information on the current status of biodiversity and significant successes, on-going efforts, and progress towards achieving the goals of this Strategy.

Activities
Develop Sabah Biodiversity Clearing-House Mechanism
Link and ensure accessibility to all government and other libraries

Action 1.5 We will identify the information needs of different stakeholders. By understanding the type of information each stakeholder group needs, we will be able to better consolidate and disseminate such information in a timely manner.

Activities
Undertake stakeholder information needs analysis

B1.3.3 Providing a Platform for Public Participation

The people of Sabah enjoy nature and identify strongly with the state's biodiversity heritage. However, many do not perceive that they have a role in conservation. A commonly held belief, especially among the urban population, is that conservation is the sole responsibility of government. There is considerable scope for enhancing biodiversity conservation initiatives if a framework is established which can tap the creativity, resources and energy of civil society, indigenous communities and the private sector.

We recognise that public participation is important to bolster the work of state agencies. We need to make it easier for the public to participate and access information about biodiversity. We have to find ways to bring various stakeholders together, to interact, to share experience and to cooperate on matters pertaining to biodiversity. We need to promote inter-stakeholder consultation and collaboration so that all stakeholders can share in the responsibility for biodiversity protection and management.

Action 1.6 We will establish programmes to encourage biodiversity-oriented voluntarism among all sectors of society by providing them incentives and support to participate in habitat restoration, wildlife monitoring, and waste reduction.

Activities
Establish Sabah Biodiversity Volunteers Network
Expand Junior Rangers programme
Support nature clubs and "green" scouts and girl guides programme

Action 1.7 We will create a framework to support the participation of national and international visitors who want to contribute to biodiversity conservation.

Activities
Streamline volunteer and research tourism programmes

Action 1.8 We will develop tools for participatory planning and decision-making.

Activities
Enhance policy and guidelines on participatory planning

B1.3.4 Increasing Public – Private Partnerships for Biodiversity Conservation

The private sector in Sabah, being the largest employer and contributor to the state's economy, has the potential to play a more significant role in long-term biodiversity conservation. It has the ability to bring biodiversity-related issues to a much wider audience and can provide much-needed resources and funding.

We need to support partnerships between the private and public sectors. We need to match supporters with priority biodiversity-related initiatives. This would ensure that funding is channelled where it most urgently needed and where it has the greatest impact. In addition, improved coordination would ensure that these programmes complement the on-going efforts of government agencies and other stakeholders.

Action 1.9 We will establish a platform for the private sector to participate in and contribute to biodiversity conservation at all levels – policy making, programme design and project implementation.

Activities
Establish Sabah Business Council for Sustainable Development
Establish Tour Operators' Associations throughout Sabah

Action 1.10 We will engage with the private sector to explore ways to reduce the negative impact of economic activities on biodiversity.

Activities
Provide incentives for the private sector to support biodiversity conservation

B1.3.5 Supporting Community-Based Conservation

Local communities in Sabah have long engaged in community-based natural resource management (CBNRM) in fulfilment of their cultural practices. Indigenous and Community-Conserved Areas (ICCAs) are an integral part of Sabah's protected area landscape. Many areas outside the formal PA network are managed by communities and these help fulfil valuable conservation functions.

We will support the initiatives of local communities to conserve biodiversity on customary lands and privately owned land. We will document and recognise ICCAs as well as traditional community-based natural resource management systems that are used by indigenous communities. We will support local communities in the implementation of the various forms of traditional resource management such as *tagal* which has proven to be effective in sustaining the health and productivity of riverine fisheries resources. We will adopt elements of best practices from programmes such as the Satoyama Initiative to ensure our CBNRM are sustainable.

Box B1-1 : Community Involvement In Wildlife Conservation: HUTAN-KOCP

In 1998, the Kinabatangan Orang-Utan Conservation Programme (KOCP), a partnership between Hutan, a grassroots non-profit organization, the Sabah Wildlife Department and the Lower Kinabatangan community, was established. KOCP places priority on training its local staff to conduct high quality research and conservation activities. Today, the KOCP team has 40 highly skilled personnel hailing from the local Kinabatangan community. They focus on promoting the sustainable use of natural resources which supports the conservation of wildlife and its habitat.

Over the past 15 years, KOCP has achieved many successes. Numerous discoveries have been made of the ecology of the orang-utan and other wildlife species which have contributed to the management of the Lower Kinabatangan Wildlife Sanctuary and the development of sound State-wide wildlife conservation policies. In the Kinabatangan floodplain, Hutan-KOCP actively participates in efforts to recreate a forest corridor along the river by engaging with oil palm plantations. It also involves local communities in the protection and management of wildlife through the Honorary Wildlife Warden scheme and community-based forest restoration programme. Solutions are also implemented to mitigate human-wildlife conflicts (such crop raiding by elephants in oil palm plantations) through landscape planning and other non-harmful conflict mitigation methods.

Hutan-KOCP supports initiatives to provide alternative sustainable economic development opportunities to the local community while maintaining viable habitat for wildlife. Projects are conducted with local fishermen, farmers and bird nest collectors to wisely manage the natural resources they depend on. A successful village homestay programme has been established in Sukau and Hutan-KOCP is also involved in a community-based ecotourism tour venture which enables local families to derive direct benefits from the conservation of the Lower Kinabatangan Wildlife Sanctuary and its unique wildlife.

Box B1-2 : The Satoyama Initiative

The Satoyama Initiative is a joint effort by the Ministry of the Environment, Japan and the United Nations University's Institute of Advanced Studies. The Initiative is aimed at protecting and encouraging customary sustainable use of human-influenced natural environments which provides positive outcomes for biodiversity and human beings. It was adopted at the 10th Meeting of the Conference of the Parties (COP10) to the Convention on Biological Diversity.

Source: JICA

Landscapes such as this one in Tambunan allow rich diversity to coexist in harmony with agricultural production.

To achieve its vision of "realizing societies in harmony with nature", the Satoyama Initiative encourages activities based on a number of fundamental principles including the Ecosystem Approach. It covers a wide range of human-influenced areas, such as villages, farmlands, and adjacent woodlands and grasslands, which have been formed and maintained sustainably through long-term human influence. In order to maintain and rebuild these landscapes, the Satoyama Initiative adopts a three-fold approach:

1. Consolidating wisdom on securing diverse ecosystem services and values
2. Integrating traditional ecological knowledge and modern science to promote innovations
3. Exploring new forms of co-management systems or evolving frameworks of "commons" while respecting traditional communal land tenure

The Initiative is expected to slow the escalating loss of biodiversity worldwide by retaining and enhancing the biodiversity in human-influenced environments and the sustainable use of natural resources. In addition, the Initiative can also help improve well-being of local communities with improved food production, rise in income and better living conditions.

We will support local communities to develop income generating activities based on the conservation of outstanding cultural landscapes and biodiversity areas and promote related recreational use. We will also disseminate information on and promote the use of the Sabah Regulations for Access and Benefit Sharing to guide all aspects of research and potential commercialisation of findings.

Action 1.11 We will support the establishment of an ICCA Network which would be a peer support group and resource base for capacity building and knowledge sharing among communities that seek to more effectively manage their conservation areas.

Activities

Establish Working Group on CBNRM

Develop an ICCA Registry

Action 1.12 We will expand programmes which engage local communities in playing conservation roles and develop training programmes to support them in this role.

Activities
Expand and strengthen the Honorary Wildlife Warden Programme
Establish Community Marine Patrols and Marine Wardens

B1.3.6 Collaborating with Indigenous Communities within Protected Areas and Forest Reserves

Many communities live in and adjacent to protected areas in Sabah. These communities rely on the natural resources within these PAs and forest reserves and have a long history of harvesting these resources for their needs.

We need to continue encouraging greater collaboration between state agencies and these communities. We need to learn from on-going initiatives such as the proposed Community Use Zones at Crocker Range Park and the collaborative approaches to conservation being introduced in Sabah's Marine Protected Areas. In the Forest Reserves, partnering local communities from Kg. Batu Puteh has enabled the rehabilitation of a degraded protection FR and oxbow lake, and enabled them to establish a successful tourism business. In addition, there is much scope for collaboration in other areas where local communities have a vested interest in assuring the protection of important cultural and historical sites as well as areas of biodiversity significance.

Action 1.13 We will encourage innovative partnerships that promote biodiversity conservation in conjunction with resident communities, particularly those with an interest in protecting areas of significance within Parks, Forest Reserves and Sanctuaries. We will continue working with indigenous communities on Community Use Zones in Parks, and community and amenity zones in commercial FRs.

Activities
Implement CUZ at Crocker Range Park

Action 1.14 We will engage indigenous communities in programmes to restore degraded natural areas and will jointly learn from research initiatives and pilot projects. We will document the progress with these partnerships in order to provide useful models (e.g. the Kelawat Model) for these strategies and

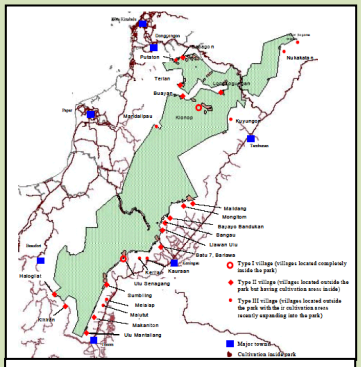
approaches to be employed elsewhere in Sabah, and as models for collaborative approaches for biodiversity conservation elsewhere in the region.

Activities

Local Community Forest Rehabilitation Programme

Box B1-3 : Community Use Zones In Crocker Range Park

Crocker Range Park (CRP) is one of the largest protected areas in Sabah. Covering 139,919 ha of mostly pristine highland forest, CRP extends over eight districts in the West Coast and interior. However the area's protected status, as a Forest Reserve in 1968 and subsequently as a Park under the Sabah Parks Enactment 1984, is not without controversy. Several communities were already living within this area, and had been doing so for generations long before the creation of these reserves. Due largely to the remoteness of their villages, many are highly dependent on their farms and natural resources in the CRP for their livelihoods. The Parks Enactment, however, prohibits any human modification of natural landscapes and extraction of natural resources – agriculture, hunting, fishing, gathering of forest products are technically illegal within the Park.



CUZs in and around the Crocker Range Park

Source: BBECII

To overcome this quandary, the Community Use Zones (CUZs) proposed in the Zoning Plan for the Crocker Range Park Management Plan (2006) seems to offer a promising solution. The CUZ proposal emerged from a five-year consultative process. The legal framework for the establishment of CUZs was approved by the State Legislative Assembly in an amendment to the Parks Enactment. According to the CRP Management Plan, the future approach to managing CRP is to focus on a wide range of stakeholders, involve local communities and to be adaptive and participative. The CUZ would legalise community access to resource areas within the Park, provide avenues for the local participation, and enable the settlements to be furnished with facilities and infrastructure.

This decision to 'integrate' local communities in Park management is a milestone in protected area management policy in Sabah and is in line with international policy shifts which have embraced the potential of indigenous and community-conserved areas as a legitimate form of governance in IUCN Category V and VI protected areas that integrate local community resource needs with biodiversity conservation priorities. The next step is for a CUZ Management Agreement to be developed by Sabah Parks with the respective communities involved.

Box B1-4 : Social Forestry – The Kelawat Model

The Sabah Forestry Department (SFD) initiated a social forestry project in Kelawat Forest Reserve (KFR) about twenty years ago. It was an attempt to solve conflicts amongst stakeholders and to seek linkages between the perceived development needs of the Kg. Ponopuan communities and the conservation and restoration of KFR through a social forestry program.

Forest restoration of Kelawat Forest Reserve from 1991 to 2002 by the Sabah Forest Department

Source: Sabah Forestry Department

The success includes improved income and livelihood of the local communities; the highly degraded areas restored and biodiversity reinstituted. The lessons that emerged from the initiative amongst others are: (i), the Kg. Ponopuan communities are interested in social forestry if their basic subsistence needs are met (ii), the communities agree to participate in forest restoration and protection if they could share in the benefits and (iii), their impact on KFR is reduced if their development needs are met from other alternative sources.

The program has also strengthened the emotional and psychological aspect of the communities. A fundamental change has taken place among both the local communities and the SFD personnel at KFR – the antagonistic relationship has gradually given way to friendship and mutual respect.

1.4 ACTIVITIES

Activity B1.1 **:** Conduct baseline survey on level of public awareness

In Sabah, there is already growing awareness and understanding on biodiversity and conservation issues; however, there is little hard data on the level of awareness. A baseline survey on the level of public awareness is required to provide stakeholders with the necessary information to facilitate effective engagement programmes based on the needs of the various target groups.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	SEEN	1	1

Activity B1.2 : Formulate State Biodiversity Communication Plan

A communication plan is a strategic investment for any policy, programmes or plans that have high public interest. The formulation of a State Biodiversity Communication Plan will aim to disseminate appropriate and timely information to all stakeholders – both to educate the public as well as to provide update on the Strategy.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	SEEN	1	1

Activity B1.3 : Expand scope of the Sabah Environmental Education Network

The Sabah Environmental Education Network (SEEN) is a network of organisations interested in developing environmental education in Sabah. SEEN has conducted a host of activities mostly targeting environment-related issues. The platform shall be expanded for the introduction of biodiversity and conservation programmes for a variety of target groups such as schoolchildren, urban and rural communities, and private organisations.

Leadership	Partner(s)	Start Phase	End Phase
EPD	SEEN	1	3

Activity B1.4 : Establish Nature Centres throughout Sabah

The establishment of nature centres within or close to the cities would provide an opportunity for urban dwellers to develop better appreciation and understanding on biodiversity and conservation. Nature centres, such as the KK Wetlands in Kota Kinabalu and the Rainforest Discovery Centre in Sandakan, should be replicated in all large towns in Sabah.

Leadership	Partner(s)	Start Phase	End Phase
MTCE	SFD	2	3

Activity B1.5: Develop the Sabah Biodiversity Clearing-House Mechanism

The Clearing-House Mechanism (CHM) aims to facilitate the efficient flow of scientific and technical information among all stakeholders. The development of a Sabah CHM would meet this objective while ensuring that there is a systematic collation and documentation of information on the State's biological resources.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	NRO	1	1

Activity B1.6 : Link and ensure accessibility to all government and other libraries

There is a wealth of information on biodiversity and conservation within the libraries of many government agencies and NGOs. There must be a concerted effort to upgrade all libraries in developing an updated inventory on where resources are and in ensuring that all stakeholder have access to these resources.

Leadership	Partner(s)	Start Phase	End Phase
State Library	SFD, SP, SWD	1	3

Activity B1.7 : Undertake stakeholder information needs analysis

There are various types of stakeholders in Sabah with different roles, resources and levels of understanding on biodiversity. To facilitate effective dialogue and engagement of any party, there is a need to understand what the information requirements are for each target group. The undertaking of a stakeholder information needs analysis will aim to help government agencies gain a better understanding on how to design the right programmes.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	SEEN	1	1

Activity B1.8 : Establish the Sabah Biodiversity volunteers network

Many groups in Sabah are increasingly concerned about the state of their natural environment and want to take a more proactive role. The Sabah BioD volunteers' network will be coordinated by SaBC to link volunteers to organised activities by government agencies, NGOs etc. It will leverage upon of the resources of groups such as students, young adults, senior citizens, families etc.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	SEEN	1	1

Activity B1.9 : Expand the Junior Ranger programme

The Junior Ranger programme provides an opportunity for young children to explore nature more closely under the guardianship of Rangers. It can help to develop better awareness and understanding on conservation among the younger generation. The programme, already established at Kinabalu Park, Sepilok and in Kinabatangan, will be expanded to all include all parks in Sabah.

Leadership	Partner(s)	Start Phase	End Phase
SWD, SP	SaBC	2	3

Activity B1.10 : Support nature clubs and "green" scouts and girl guides programmes

Sabah Nature Clubs are being established in all schools to raise awareness on nature. In addition, scouts and girls guides associations are active in most schools. These associations are important avenues where biodiversity-related education and training programmes could be integrated to educate young people.

Leadership	Partner(s)	Start Phase	End Phase
Sabah Education Department	SEEN	2	3

Activity B1.11 : Streamline volunteer and research tourism programmes

Volunteer and research tourism programmes (e.g. Scientific, Academic, Volunteer and Educational tourism) target tourists who are interested in creating a positive impact on the destination they visit. A number of Volunteer and research programmes will be streamlined under MTCE to facilitate the participation of tourist from within Sabah as well as from outside of the State.

Leadership	Partner(s)	Start Phase	End Phase
MTCE	SaBC	2	3

Activity B1.12 : Enhance policy and guidelines on participatory planning

The participatory planning paradigm emphasises the involvement of all stakeholders in planning processes of policies, programmes and projects. The objective is to ensure that any policy, programmes or plans maintains the interest of all stakeholders, and that of environmental considerations. The State policy and guidelines will need to be reviewed and updated to ensure that these objectives are met.

Leadership	Partner(s)	Start Phase	End Phase
UPEN	SaBC	1	1

Activity B1.13 : Establish Sabah Business Council for Sustainable Development

The proposed Sabah Business Council for Sustainable Development will aim to bring together private companies to support and fund activities related to sustainable development. The Council is also envisaged to be a catalyst to create a better sense of responsibility within the private sector.

Leadership	Partner(s)	Start Phase	End Phase
MTCE	EPD	1	1

Activity B1.14 : Establish Tour Operators' Associations throughout Sabah

There is a growing number of tour operators in Sabah who rely on nature-based attractions. However, some operators do not exert sufficient care, impacting the attractions that they depend on. The establishment of Tour Operators Association will aim to regulate and promote good practises among operators.

Leadership	Partner(s)	Start Phase	End Phase
MTCE	NGO	2	3

Activity B1.15 : Provide incentives for private sector to support biodiversity conservation

The private sector has a crucial role to play in supporting conservation initiatives either directly or indirectly. Tax rebates can be introduced for companies to offset any contributions for carrying conservation initiatives (e.g. for plantations establishing wildlife corridors within their holdings) or for donations to approved organizations.

Leadership	Partner(s)	Start Phase	End Phase
NRO	UPEN	1	1

Activity B1.16 : Establish Working Group on CBNRM

Community-Based Natural Resources Management (CBNRM) in Indigenous Community-Conserved Areas (ICCA) will play an important role in conserving biodiversity in areas outside of the protected area system. A Working Group on CBNRM will help to facilitate the collaboration among local communities, government agencies and other stakeholders.

Leadership	Partner(s)	Start Phase	End Phase
NRO	NGO	1	1

Activity B1.17 : Develop an ICCA Registry

Many local communities maintain ICCAs, in the formal sense (such as Natives Reserves) or informally (such as preserved old growth forests). Examples include the Bundu Tuhan and Kiau ICCAs. However, most of these are poorly documented. A registry of ICCAs would play an important role in documenting these conservation areas.

Leadership	Partner(s)	Start Phase	End Phase
NRO	NGO	2	2

Activity B1.18 : Expand and strengthen Honorary Wildlife Warden Programme

Sabah Wildlife Department's Honorary Wildlife Warden programme allows for the appointment of individuals as wildlife wardens. The programme needs to be better resourced to ensure that appointed wardens are adequately trained, monitoring and enforcement is effective.

Leadership	Partner(s)	Start Phase	End Phase
SWD	NGO	2	2

Activity B1.19 : Establish Community Marine Patrols and Marine Wardens

The enforcement of marine laws is a challenge. WWF together with the Malaysian Maritime Enforcement Agency (MMEA) has initiated community marine patrol at the coastal area of Kudat-Banggi and Semporna. Similar with the Honorary Wildlife Warden programme, responsible members of the community can be appointed as marine wardens to involve local communities in conducting patrolling along the coastline.

Leadership	Partner(s)	Start Phase	End Phase
MMEA	DOF, SP, NGO	2	2

Activity B1.20 : Implement CUZ at Crocker Range Park

Several communities reside within Crocker Range Park. The needs of these communities, who depend on land and forest resources, must be rationalised with the conservation aims of the Park. The implementation of Community Use Zones (CUZ) could be an important tool to resolve conflicts in resource utilisation.

Leadership	Partner(s)	Start Phase	End Phase
SP	LSD, NGO	2	3

Activity B1.21 : Local Community Forest Rehabilitation Programme

Many rural communities are interested in establishing 'community forest'. Some areas have undergone logging or have been under agriculture. Support is required in terms of technical expertise, extension services and funding to facilitate the rehabilitation of degraded areas.

Leadership	Partner(s)	Start Phase	End Phase
SFD	NGO	1	3

Section B2
Strategy 2 – Reducing Pressures on Biodiversity

B2.1 REDUCING EXTERNAL PRESSURES ON BIODIVERSITY

Goal 2 :
By 2022, we would have significantly reduced direct and indirect pressures on biodiversity

Strategy 2 aims at achieving Goal 2, namely to **significantly reduce the pressures on biodiversity**. Our economic activities place significant pressures on biodiversity, which if not managed, can diminish the health of the state's biological resources and the ecosystem services that they provide. This is important because the economic activities themselves are dependent on the goods and services delivered by biodiversity. The fact that about 80% of the state's revenue is directly or indirectly linked to ecosystem health and biodiversity makes it vital that we reduce the pressures caused by our activities.

All economic sectors in Sabah need to incorporate (mainstream) biodiversity considerations into their planning, management and decision-making processes. This includes those that rely directly on biodiversity or impact upon it – agriculture, tourism, fishing and forestry, and those that that are indirectly connected such as hospitality, financial services and construction. Impacts on biodiversity must be evaluated in all relevant transactions and decisions. We will ensure that ecosystem services and biodiversity values are factored into the relevant state decision-making processes.

We need to integrate biodiversity fully into the economic sphere to reconcile public and private interests, ensure mainstreaming in the long term and encourage stakeholders to invest in ecological capital and play a role in developing this common asset. This includes better planning of our activities, adopting good management practices, appreciating the capacity of natural ecosystems and rationalizing incentives and subsidies. Considering that pressures on biodiversity come from various sources, action to reduce them must be undertaken at local, state and national levels.

B2.2 TARGETS

Strategy 2 has four targets, namely :

Target 2.1
By 2022, the agriculture sector would have implemented good management practices to reduce pressures on biodiversity. Target 2.1 will be met by implementing actions and activities that :

- Reduce pressure from agriculture

Target 2.2
By 2022, all resource extraction activities are properly planned and executed in a manner that minimises pressures on biodiversity. Target 2.2 will be met by implementing actions and activities that :

- Reduce pressure from forestry
- Improve freshwater management and pollution control
- Reduce pressure from fisheries
- Reduce pressure from quarrying and mining

Target 2.3
By 2022, all activities that are dependent on biodiversity have instituted sufficient safeguards to reduce their impacts. Target 2.3 will be met by implementing actions and activities that :

- Reduce the impacts of tourism
- Control hunting and wildlife trade

Target 2.4
By 2022, the state is well on its way towards green economy. Target 2.3 will be met by implementing actions and activities that :

- Rationalise incentives and taxes
- Green the economy

B2.3 COMMITMENTS TO ACTION

B2.3.1 Reducing Pressure from Agriculture

Agriculture is very important to Sabah. Over 2.1 million ha of the land is used for agriculture and over 32% of the people are employed in this sector. Agriculture shapes the state's landscape and contributes significantly to the state's economy. Oil palm alone contributed almost 40% of the state government's revenue in 2010.

The oil palm industry contributed almost 40% of the state government's revenue in 2010

Ensuring the optimal use of land for agriculture, getting the best yields and managing the impacts from agriculture are fundamental to conserving our biodiversity. We need to incorporate biodiversity conservation into all sectors of agriculture policy and decision-making. We also need to develop and implement good agriculture practices, including appropriate agriculture landscape planning, to ensure agricultural activities are compatible with long-term preservation of biodiversity.

Action 2.1 We will develop ways to ensure that agriculture does not encroach into high conservation value areas and will systematically rehabilitate such areas that have been encroached by agriculture. We will pay particular attention to the problem of encroachment into riparian areas, steep slopes and forest reserves. We will not alienate, for agriculture, unsuitable land or land that is of high conservation value

Activities
Undertake mapping and documentation of HCVA in Sabah
Make EIA mandatory for replanting of oil palm

Action 2.2 We will focus our efforts on improving yields from existing agriculture land. This is vital to increase food production and commodities without having to open up greenfield sites. We will continue to provide extension services and technical support to smallholders and farmers to help them improve their productivity

Activities
Implement SPOC at Beluran, Kinabatangan, Kunak, Tongod and Tawau
Establish seed gardens for crop diversity and increase yields
Undertake post-harvest loss minimization programme for smallholders

Action 2.3 We will encourage agriculture players to participate in certification schemes that support good agriculture practices such as the Skim Amalan Ladang Malaysia (SALM), Skim Organik Malaysia and Roundtable on Sustainable Palm Oil (RSPO) so that our agriculture production is well managed and imposes minimal impacts on biodiversity. We shall aim for 70% of oil palm areas in Sabah to be RSPO (or similar) certified.

Activities
Provide incentives and undertake awareness programme to encourage RSPO certification

Action 2.4 We will design our agriculture and plantation schemes to enhance the mobility of wildlife across agricultural landscapes by retaining areas of forest within plantations adjacent to protected areas, and ensuring that infrastructure development does not block wildlife movements.

Activities
Undertake mapping and documentation of HCVA in Sabah

Action 2.5 We will protect the agricultural biodiversity of the state by ensuring that indigenous crops are systematically cultivated and propagated.

Activities
Enhance the germaplasm collection at Ulu Dusun and Tenom
Expand the wild tropical fruit diversity programme
Develop Sabah's bio-resource registry

Action 2.6 We will continuously educate all players in the agriculture sector to reduce the environmental impacts and protect biodiversity. We will continue to educate farmers and millers on good agriculture practices including the proper use of agrochemicals. We will pay particular attention to farming practices in the upland areas to ensure that aquatic ecosystems are not adversely affected by erosion and water pollution

Activities
Establish demonstration sites for BMPs in agriculture

BOX B2-1 : ROUNDTABLE OF SUSTAINABLE PALM OIL

Palm oil is an important and versatile raw material for both food and non-food industries. It contributes significantly to the economic development of Sabah. Driven by ever-increasing global demand for edible oils, the past few decades have seen rapid expansion in the production of palm oil in the state. Now over 1.4 million ha of land is planted with oil palm, representing over 90 percent of total agriculture land.

Sustainable palm oil aims to minimise harm to the environment while ensuring Sabah's economy remains robust

Source: ERE Consulting Group

Although palm oil has the highest yield per hectare than any other oil or oilseed crop,. there are environmental pressures on its cultivation in eco-sensitive areas such as tropical rainforests Development of new plantations has resulted in the conversion of large areas of forests with high conservation value and has threatened the rich biodiversity in these ecosystems. In some cases, the expansion of oil palm plantations has also given rise to social conflicts between the local communities and project proponents.

In response to the urgent and pressing global call for sustainably produced palm oil, the Roundtable on Sustainable Palm Oil (RSPO) was formed in 2004 with the objective of promoting the growth and use of sustainable oil palm products through credible global standards and engagement of stakeholders. RSPO is a not-for-profit association that unites stakeholders from seven sectors of the palm oil industry - oil palm producers, palm oil processors or traders, consumer goods manufacturers, retailers, banks and investors, environmental or nature conservation non-government organisations (NGOs) and social or developmental NGOs to develop and implement global standards for sustainable palm oil production

B2.3.2 Reducing Pressure from Forestry

Forestry is a key sector for biodiversity conservation in Sabah, as 50 percent of the State's land area falls within its Permanent Forest Estate. With a good management system in place, as well as initiatives such as Reduced Impact Logging (RIL) which all FMUs are required to practise, forest certification and restoration, Sabah's forests are among the best managed in the region. In adopting the Sustainable Forest Management (SFM) approach, Sabah is committed to maintaining an extensive, healthy, diverse and productive forest estate that serves multiple benefits, including timber production, biodiversity conservation and the provision of ecosystem services.

Our two main challenges now are to make SFM economically viable in the long term and to enhance the capabilities of SFM long-term agreement holders to manage commercial forest reserves as habitats for biodiversity. We will continue to invest in forest plantations in non-ecologically sensitive areas as a means to reduce pressures on natural forests. We shall continually improve SFM practices through translation of R&D and the incorporation of best management practices. We will continue to support forest restoration efforts in all FMUs, particularly by facilitating the transfer of technology and experience gained from on-going restoration efforts such as those at Malua-Ulu Segama. We will also need to ensure that forestry operations are socially-responsible, particularly to neighbouring communities by incorporating appropriate social programmes into planning and development of FMUs.

Action 2.7 We will ensure that all SFM long-term agreement holders obtain forest certification under the FSC or any comparable internationally recognised system. We will invest in upgrading the skills and expertise of SFM long-term agreement holders in managing the forest resource for multiple benefits including timber production, environmental and social needs of local communities.

Activities
Increase the number of foresters trained in FSC and other certification programmes
Increase the number of FMUs certified under FSC and other certification programmes
Undertake mapping and documentation of HCVA in Sabah

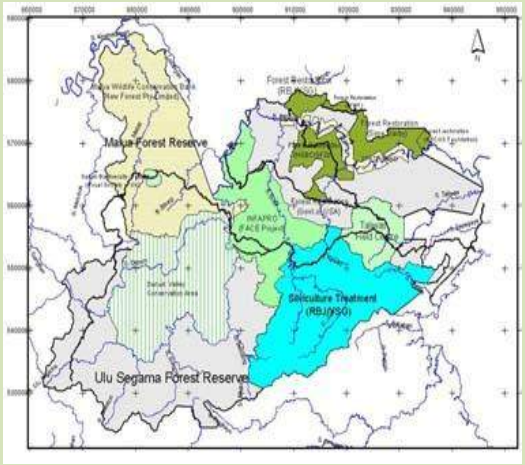
Action 2.8 We will manage commercial forests to also serve as habitats for wildlife. This will include incorporating Wildlife Management and Conservation Plans into the Forest Management Plans of each FMU and the identification and protection of HCVF.

Activities
Strengthen the mobile wildlife patrol units
Plant fruit trees in forest restoration areas to provide food for widlife

Action 2.9 We will incorporate the conservation of rare, endangered and threatened indigenous plants into forest management and restoration programmes.

Activities
Ensure protection of rare, threatened and endangered plants in forest management plans

BOX B2-2 : SUSTAINABLE FOREST MANAGEMENT IN ULU SEGAMA - MALUA



Source: Yayasan Sabah website

The Ulu Segama – Malua (USM) forest complex is an important landscape for large mammals, including the rhinoceros, elephant, orang-utan, tembadau, sun bear, clouded leopard and bay cat. However, continuous logging since the 1960 has taken a toll on the area - leaving waterways disturbed, food sources for wildlife depleted and the forest vulnerable to wild fires. In August 2006, the Sabah government set aside the 241,098 ha USM area, which consists of six Commercial Forest Reserves, for conservation.USM is now the focus of the largest forest rehabilitation initiative in Sabah, through the 10-year Ulu Segama-Malua Sustainable Forest Management Project, which is jointly managed by the Sabah Forestry Department (SFD) and Yayasan Sabah.

Although implementation of SFM is expensive – forest rehabilitation and silviculture activities alone at USM cost at least RM7.15 million per year – the SFD has managed to reduce the financial burden to the state by leveraging on partnerships with local and international organisations such as WWF, Hutan, Arcus Foundation, the Alexander Abraham Foundation, the US and Australian governments, Marks and Spencer (UK) and Sime Darby Plantations Sdn Bhd. As a result of these efforts, USM was awarded full certification under the FSC (Natural Forest) in June 2011.

In addition, USM has been the focus of two highly innovative Payment for Ecosystem Services (PES) projects. The first of these is the Innoprise-Face Foundation Rainforest Rehabilitation Project (INFAPRO), collaboration between the Sabah Foundation and the Face (Forests Absorbing Carbon dioxide Emission) Foundation of the Netherlands. Set up in 1992, the general objective of the project is to plant trees to sequester CO2 from the atmosphere. The project aims to rehabilitate 25,000 ha of degraded forest in USM. Over 11,566 ha have been successfully rehabilitated to date. The second is the Malua Wildlife Habitat Conservation Bank (MWHCB) or more commonly known as the Malua BioBank, which was launched in 2008 through an agreement between the state government and MWHCB to drive commercial investments in forest rehabilitation and wildlife conservation within the 34,000 ha Malua Forest Reserve over a period of 50 years.

B2.3.3 Improving Water Management and Pollution Control

The rivers in Sabah play important roles in supporting the human population including the provision of drinking water, recreation and fisheries. Many riverine communities in Sabah are dependent on rivers for their livelihoods. Our rivers are also rich in aquatic life. The management of our water, both in terms of the quality and quantity, is important to the conservation of aquatic biodiversity and wetland habitats.

We need to be resourceful in the way we use our water resources. We will continue protecting our rivers and water bodies and associated ecosystems through the integrated catchment planning approach. Our catchment management plans will address many pressures including water abstraction and various sources of pollution arising from activities on land and in water. We need to reduce pollution and improve the regulation and monitoring of our water resources.

Action 2.10 We will establish integrated catchment management committees in all districts. These district level committees will develop and implement plans for creating and maintaining healthy water bodies. We will also support other stakeholders who wish to participate in catchment planning and management.

Activities
Gazette important water catchment areas as Water Conservation and Water Protection areas
Formulate Rules under the Sabah Water Resources Enactment for development near water bodies (see Strategy 5)
Establish community-based water quality monitoring
Implement the Kota Kinabalu River of Life Programme

Action 2.11 We will actively pursue water demand management, reduce non-revenue water, minimise water losses and promote water conservation as a means of reducing the need to build new dams and lessen the stress on our rivers. We will review the existing state tariff structure of water supply with the goal of arriving at a pricing mechanism that better reflects the prevailing production costs of water.

Activities
Review the water tariff structure

Action 2.12 We will reduce water pollution from various sources through more coordinated enforcement and by imposing deterrent penalties. We will develop rules and regulations to regulate the non-point sources of water pollution, use of riparian areas, wetlands and water abstraction.

Activities
Establish the palm oil mill rating system
Formulate Rules under the Environmental Protection Enactment to regulate non-point sources of pollution (see Strategy 5)
Initiate third party audit for palm oil mills

B2.3.4 Reducing Pressure from Fisheries

The commercial, artisanal and subsistence harvesting of marine fish plays a pivotal role in sustaining the livelihoods of Sabah's coastal communities and ensuring food security. The socio-economic importance of marine fisheries is reflected by the fact that Sabah has the highest number of fishermen among all States in Malaysia. In 2009, there were a total of 24,691 fishermen in Sabah – constituting 20% of all fishermen in the country. A saturated inshore fisheries industry, the continued use of destructive fishing practices as well as the degradation of coastal habitats place pressure on our marine fish stock.

Sabah is a party to the Coral Triangle Initiative. We are committed to good fishing practices, which address the multiple needs of societies, as well as seek to maintain the options for future generations to benefit from the full range of goods and services provided by marine ecosystems. We will need to adopt market-based and other economic instruments as well as reform perverse economic subsidies and other economic barriers impeding good fishery practices and EAFM.

Action 2.13 We will implement the SSME Activities for Sabah and monitor it closely. We will implement Ecosystem Approach to Fisheries Management (EAFM) as adopted in the CTI Regional and National Plan of Action.

Activities
Develop institutional and regulatory framework for EAFM (see Strategy 5)

Action 2.14 We will enhance our understanding of the health and stability of our marine ecosystem through research to determine catch limits and monitoring the health of fish stocks and marine ecosystems

Activities
Establish Fisheries Observer Programme

Action 2.15 We will address fishing over-capacity and reduce dependency of coastal communities on fisheries by engaging with local communities for fisheries co-management. We will continuously educate coastal communities about fishing regulations and conservation of the marine ecosystem.

Activities
Strengthen the capacity of enforcement agencies to enforce fisheries regulations (see Strategy 5)
Promote the use of environmentally friendly fishing gears

Action 2.16 We will support the evaluation and development of a deep sea fishing management plan to tap the deep sea resources of the South China Sea.

Activities
Formulate Sabah deep sea fishing master plan

Action 2.17 We will implement the strategic action plans contained in the Sabah Aquaculture Master Plan (1996). We will promote research and development of Good Aquaculture Practices, focusing on cage culture, raft and rack culture of mollusc such as oysters and mussels as well as mariculture of seaweed, as alternative livelihood options for artisanal fishermen

Activities
Promote the use of alternative feed sources as fish meal
Revise the 1996 Sabah Aquaculture Master Plan
Develop pilot small-scale environmental friendly aquaculture projects
Formulate Code of Conduct for Responsible Aquaculture Practice

B2.3.5 Minimising Impacts from Quarrying and Mining

The extraction of sand, aggregates and earth is an important economic activity in Sabah and provides the necessary raw materials needed for the construction of homes, schools and infrastructure. Royalties earned from sand, earth, granite and other material extractions are also an important source of revenue to the state.

The careful planning and extraction of these resources are important to protect the biodiversity that some of these sites and adjacent areas may harbour. Good management practices will help to reduce the impacts these activities impose on our biodiversity.

Action 2.18 We will ensure that high conservation value areas are avoided in the choice of sand and mineral extraction sites and when carrying out marine dredging. We will plan marine sand extraction activities carefully, taking into account the need to protect critical marine habitats. In this regard, we will ensure that no resource extraction activities are permitted close to coral reefs and seagrass beds.

Activities
Undertake the mapping and documentation of Marine HCVA in Sabah

Action 2.19 We will identify and map stretches of rivers in Sabah where sand mining can be permitted and will develop comprehensive guidelines to ensure that the activities are conducted with minimal impacts to the aquatic ecosystems.

Activities
Implement river sand mining guidelines and plans for rivers in Sabah

B2.3.6 Reducing the Impacts of Tourism

Tourism is a very important industry to Sabah and the state is widely known for its iconic wildlife such as the Orang Utan, Proboscis Money and the Pygmy Elephant. Tourist numbers are rising fast and Sabah is gaining a reputation worldwide as the place to experience the wonders of the tropical rainforest and seas. Over 2.5 million tourists visited Sabah in 2010 and contributed significantly to the state's economy. Employment and businesses in the state have grown as a result of this boom in tourism.

The Community Return to the Mountain Day shall be turned into an annual event

Tourism is dependent on the rich biodiversity that Sabah has. It is therefore important that we protect these resources so that our tourism industry can continue contributing to our economy. We shall continue to promote Sabah as a haven for responsible nature tourism and we will ensure that all our programmes and promotional activities reflect this. We need to explore more areas for tourism around, not within, protected areas, taking cognisance of the care needed to protect the integrity of the sites. In particular, we will implement the safeguards recommended in the Sabah Tourism Masterplan (2011 - 2025).

Action 2.20 We will formulate and enforce best management practices for eco-lodges and resorts, paying particular attention to key sites such as the Lower Kinabatangan, Tabin, Maliau Basin, Kinabalu Park and offshore islands.

Activities
Formulate rating system and guidelines for eco-lodges
Formulate and implement guidelines for wildlife watching

Action 2.21 Recognising that Kinabalu Park is the premier tourist attraction in Sabah, we will create more avenues for tourists and visitors to appreciate the flora, fauna and other natural attractions within Kinabalu Park.

Activities
Develop the third trail to the Kinabalu summit
Promote trekking activities and heritage tourism along the Sabah's Salt Trails
Sustain the "Return to the Mountain" Community Day

Action 2.22 We will continue to promote our other parks including the Crocker Range Park, Tawau Hills Park, Tunku Abdul Rahman Park and Tun Sakaran Park in a manner that safeguards their ecosystems and benefits local communities in the vicinity. This will indirectly reduce pressure on Kinabalu Park. We will ensure that all our parks have comprehensive management plans.

Activities
Review the management plan for Kinabalu Park
Formulate and implement management plan for Tawau Hills Park
Review the management plan for Tunku Abdul Rahman Park
Formulate management plan and visitor guidelines for Trusmadi FR and Tambayukon FR

Action 2.23 We will engage and empower local and indigenous communities living in and around nature tourism attractions so that their livelihoods are improved and the sites are better protected.

Activities
Sustain the Community Return to the Mountain Day

Action 2.24 We will educate and train our tourist guides about safeguarding our flora and fauna so that they in turn can impart knowledge to tourists who come to Sabah.

Activities
Establish the mountain guides rating system for Mount Kinabalu

B2.3.7 Controlling Hunting and Wildlife Trade

Illegal hunting and wildlife trade, together with habitat loss, degradation and fragmentation, are the primary causes of species decline. Rampant hunting and illegal wildlife trade have already led to the localised extinction of wildlife populations in some areas. Beyond extinctions and biodiversity loss, recent epidemics caused by wildlife-to-human contact – such as the avian influenza and severe acute respiratory syndrome – emphasise the public health implications of unregulated hunting and wildlife trade.

We have to strengthen all aspects of enforcement against illegal hunting and wildlife trade. We will continue to develop the Honorary Wildlife Warden programme where local communities are legally empowered to control illegal

hunting and poaching. We will also continue our involvement in the ASEAN Wildlife Enforcement Network (ASEAN-WEN), a regional inter-agency and inter-governmental initiative to counter the illegal cross-border trade in endangered flora and fauna.

Action 2.25 We will promote alternatives to hunting as a source of income and meat for local communities. We will establish community hunting reserves in suitable areas where hunting is sustainably managed by kampung hunting licenses.

Activities
Expand and strengthen the Honorary Wildlife Warden Programme (see Strategy 1)
Expand the village home-stay programmes

Action 2.26 We will educate the public on the impacts of poaching and enlist public participation in reporting illegal wildlife trade, including rewards for information leading to the interception of these activities.

Activities
Implement a public awareness campaign to illegal hunting and wildlife trade

B2.3.8 Rationalising Incentives and Taxes

Incentives and taxes influence people's behaviour towards resource use. Such instruments impact consumption and production patterns; and encourage economic efficiency and productivity. Compared to the traditional "command and control" approaches which often take the form of environmental standards or limits (legislation), market-based economic instruments are easily adapted to address specific environmental problems and require less enforcement efforts.

Action 2.27 We will evaluate the effectiveness of the incentives, taxes and subsidies and ascertain the extent of their impact on biodiversity in Sabah. We will adopt and accelerate the implementation of the economic instruments that we see are critical for eliminating or mitigating threats to biodiversity of Sabah.

Activities
Undertake study of the impacts of incentives, taxes and subsides on biodiversity

Action 2.28 We will provide incentives for the promotion of low-cost and low impact energy options in rural areas. We will enhance Sabah's status as the leading renewable energy producer in the country.

Activities
Accelerate the implementation of Feed-in Tariff for renewable energy such as biomass, biogas, micro-hydropower and solar power

B2.3.9 Greening the Economy

Around 80% of the revenue for Sabah is directly or indirectly linked to ecosystem health and biodiversity. This underlines the importance of ensuring the adoption of green economy concepts that promote economic development within environmental capacities. Based on the United Nations Environment Programme (UNEP)'s Global Green New Deal, the three broad objectives for adopting Green Economies are i) contributions towards reviving the economy, saving and creating jobs, and protecting vulnerable groups; ii) promote sustainability and inclusive growth and the achievement of the Millennium Development Goals, especially ending extreme poverty by 2015 and iii) reduce carbon dependency and ecosystem degradation.

Sustainable Forest management, as practised in Sabah, contributes significantly in greening the economy. It is the way forward for managing the state's rich forest resources in contrast to the exploitative practices of the past. This is a great leap in faith and has been proven to be practical through the establishment of a SFM model in Deramakot Forest Reserve in 1989, which led to the subsequent adoption of the management system state-wide in 1997.

The greening of Sabah's economy is necessary to reduce threats to biodiversity. Greening the economy requires the state to increasingly pursue market based approaches. The potential for trade in environmental goods and services are significant compared to the conventional exploitative use of ecosystem resources. We need to ensure the values of biodiversity are fully integrated into Sabah's economic policy development and decision making processes/tools.

Action 2.29 We will support and create green employment opportunities and green businesses in Sabah to provide the competitive edge to meet future demand.

Activities
Develop incentives for green business

Action 2.30 We will strive to capture opportunities in innovative environmental market mechanisms such as the ongoing Malua BioBank, carbon credits and other biodiversity banking and offsets.

Activities

Develop and implement compensatory mitigation programmes in Sabah

Develop and implement the Sabah REDD+ roadmap (see Strategy 5)

B2.4 ACTIVITIES

Activity 2.1 : Undertake mapping and documentation of HCVA in Sabah

High Conservation Value Areas (HCVA) are areas that have critical ecological attributes, ecosystem services and social functions. In regions that have been earmarked for development, the identification of HCVAs will be important to aid government authorities and land use planners in controlling where development can take place and in identifying options that are appropriate for conservation planning.

Leadership	Partner(s)	Start Phase	End Phase
TRPD	SWD, SFD, SaBC	1	2

Activity 2.2 : Make EIA mandatory for replanting of oil palm

The replanting of oil palm can cause significant impacts to the environment if no proper mitigation measures are taken. However, replanting is not clearly stated in the list of prescribed activities under the Sabah Environment Protection (Prescribed Activities) Order 2005. The Sabah Environment Protection (Prescribed Activities) Order 2005 shall be amended to include “replanting” as a prescribed activity.

Leadership	Partner(s)	Start Phase	End Phase
EPD	MPOB	1	1

Activity 2.3 : Implement SPOC at Beluran, Kinabatangan, Kunak, Tongod and Tawau

The Sustainable Palm Oil Clusters (SPOC) is a programme by MPOB to enhance the productivity of smallholders. It seeks to instill good agriculture practices amongst smallholders whose productivity and yields are much lower than those of the large plantations. Five areas have been identified for the initial phase: Beluran, Kinabatangan, Kunak, Tongod and Tawau.

Leadership	Partner(s)	Start Phase	End Phase
MPOB	Min Rural Development	1	3

Activity 2.4 : Enhance seed gardens for crop diversity and to increase yields

The ‘seed garden’ concept aims to increase the diversity of crops and to produce quality seeds with better germination rates, higher yields as well as resistance to disease and adverse weather conditions. The DOA is already pursuing this with the aim to raise the level of rural agricultural systems as well as serve as a one-stop center for seeds in Sabah.

Leadership	Partner(s)	Start Phase	End Phase
DOA		1	3

Activity 2.5 : Undertake post-harvest loss minimisation programme for smallholders

The quality and quantity of oil extracted from palm oil fruits are impacted when fruits are damaged during handling and if fruits are not sent to the mill on time. This is an issue for many smallholders who lack adequate training and access to good transportation services. The post-harvest loss minimisation programme will aim to address these issues and raise the level of income received by the smallholder.

Leadership	Partner(s)	Start Phase	End Phase
MPOB	NGO	1	3

Activity 2.6 : Provide incentives and undertake awareness programme to encourage RSPO certification

The production of certified sustainable palm oil addresses a number of issues related to biodiversity conservation in the palm oil sector. Awareness among the industry as well as financial support need to be provided for companies and smallholder to achieve certification.

Leadership	Partner(s)	Start Phase	End Phase

MPOB		1	1

Activity 2.7 : Enhance the germaplasm collection at Ulu Dusun and Tenom

The preservation of germplasm is necessary to maintain genetic diversity and to enable the study local genetic material, particularly, under utilised species. Germaplasm collections can be found at the Ulu Dusun and Tenom agriculture research centres. These collections need to be enhanced to ensure that the diversity of species in Sabah is not lost over the long-term.

Leadership	Partner(s)	Start Phase	End Phase
DOA		1	3

Activity 2.8 : Expand the wild tropical fruit diversity programme

Sabah is rich in tropical fruit species but its diversity is poorly documented. Many of these fruits are now at risk of local extinction. The wild tropical fruit programme will aim to establish a catalogue of fruit species, support conservation measures (in-situ and on-farm), and to improve knowledge on the cultivation and commercialisation of these fruits to increase the income of rural communities.

Leadership	Partner(s)	Start Phase	End Phase
DOA		2	3

Activity 2.9 : Develop Sabah's bio-resource registry

Traditional local communities in Sabah have utilised thousands of different types of biological resources for food and medicine, feed and fodder, construction material and a host of other purposes. However, as local communities become more modernised, knowledge on these resources is being slowly lost. A bio-registry is proposed to document and store records of all bio-resources in Sabah; the registry will be made publically available.

Leadership	Partner(s)	Start Phase	End Phase
DOA	SFD, SaBC	2	3

Activity 2.10 : Establish demonstration sites for BMPs in agriculture

As part of agricultural extension services, the establishment of sites to demonstrate Best Management Practices for crop management is an important tool to educate farmers. The practical nature of being able to see how things are done in the field will enable participants to quickly grasp concepts and techniques that can be integrated within their own agricultural practices.

Leadership	Partner(s)	Start Phase	End Phase
DOA	DID	2	3

Activity 2.11 : Increase the number of foresters trained in FSC and other certification programmes

The certification programme under the Forest Stewardship Council (FSC) (as well as other programmes) emphasizes responsible management of the forest to meet various needs: economic, ecological and socio-cultural. The number of foresters trained in FSC or other certification programmes will be increased to develop better capacity in the industry for responsible production and management of the State's forest resources.

Leadership	Partner(s)	Start Phase	End Phase
SFD		2	3

Activity 2.12 : Increase the number of FMUs certified under FSC or other certification programmes

To ensure sustainability of the forestry sector in Sabah, the number of FMUs certified under the Forest Stewardship Council (FSC) as well as other certification programmes must be increased.

Leadership	Partner(s)	Start Phase	End Phase
SFD		2	3

Activity 2.13 : Strengthen the mobile wildlife patrol units

Production forests that are logged sustainably can maintain large areas of habitat for wildlife. However, SWD has limited access to these forest reserves. To monitor and control illegal activities such as the hunting in forest reserves, mobile wildlife patrol units needs to be strengthened..

Leadership	Partner(s)	Start Phase	End Phase
SFD	SWD	2	2

Activity 2.14 : Plant fruit trees in forest restoration areas to provide food for wildlife

Planting fruit trees in forest restoration and rehabilitation areas will provide food for wildlife and enhance biodiversity in the area. The return of wildlife to the restored forests will further enhance the forest in the wider area by spreading seeds.

Leadership	Partner(s)	Start Phase	End Phase
SFD	SWD	1	3

Activity 2.15 : Ensure protection of rare, threatened and endangered plants in forest management plans

Production forests supply a variety of products and also play an important role in the conservation of biodiversity and in maintaining ecosystem services. Silviculture practices optimise the production of high value timber species such as dipterocarps but often result in diminish diversity of these trees and other large species. In addition, species that are rare, threatened and endangered are not given adequate protection as part of silviculture measures reducing the overall potential of the habitat.

Leadership	Partner(s)	Start Phase	End Phase
SFD		1	2

Activity 2.16 : Gazette important water catchments as Water Conservation and Water Protection Areas

There are a number of important water catchments in Sabah where water resources are threatened by the growth and intensity of human activities. Catchments (such as Upper Liwagu and Babagon) should be gazetted as Water Conservation Areas (under the Water Resources Enactment 1998) where the type of activities and mitigation methods can be prescribed to prevent pollution and the degradation of water resources.

Leadership	Partner(s)	Start Phase	End Phase
DID	LSD	1	3

Activity 2.17 : Expand community-based water quality monitoring

Community-based water quality monitoring has been carried out in Sukau, Ranau, Tambunan and Penampang. Under the programme, members of the local community are engaged to monitor local rivers and detect pollution episodes. This programme shall be expanded to other places in Sabah.

Leadership	Partner(s)	Start Phase	End Phase
DID	NGO	2	3

Activity 2.18 : Establish the Kota Kinabalu River of Life Programme

Urban rivers are under stress as a result of pollution from sewage and industrial sources. The Kota Kinabalu River of Life programme will aim to return urban rivers to their natural condition while integrating human activities in a balanced manner.

Leadership	Partner(s)	Start Phase	End Phase
DID	DBKK	1	3

Activity 2.19 : Review the water tariff structure

While protecting the freshwater system is an important component, there is also a need to control demand and ensure that water is used in an efficient manner. A review of the water tariff structure is required to better capture the cost of water production and distribution.

Leadership	Partner(s)	Start Phase	End Phase
Water Department	UPEN	2	2

Activity 2.20 : Establish the palm oil mill rating system

Mill operators who meet or exceed environmental conditions often fail to derive any rewards for their efforts. The palm oil mill rating system would therefore provide an incentive for these mills to continue their efforts whereas non-performing mills would be pressured to improve their performance.

Leadership	Partner(s)	Start Phase	End Phase
DOE	EPD, MPOB	2	2

Activity 2.21 : Initiate third party audit for palm oil mills

To increase the effectiveness of enforcement, third party audits shall be undertaken by the mill operators to provide DOE with better information on compliance status. Environmental audits are provided for under Section 33A of the Environmental Quality Act 1974.

Leadership	Partner(s)	Start Phase	End Phase
DOE	EPD, MPOB	1	1

Activity 2.22 : Establish Fisheries Observer Programme

Fisheries observer programme has been used to collect detailed data on catch and by-catch (which is often lost when vessels arrive at landing sites) by observers stationed onboard fishing vessels. This information is important to understand and assess the health of fish stocks and the overall marine ecosystem, and in the planning and management of marine resources (including determining catch limits). This programme will be introduced in other areas.

Leadership	Partner(s)	Start Phase	End Phase
DOF	NGO	1	2

Activity 2.23 : Promote the use of environmentally friendly fishing gears

To increase their catch, many fishermen are using gear that have destructive impacts on fish populations. In addition to regulating the type of gear sold and monitoring fishing activities (see 3.7.3), awareness programmes and fishing gear that are less harmful should be introduced and promoted among the fishing community.

Leadership	Partner(s)	Start Phase	End Phase
DOF	NGO	1	3

Activity 2.24 : Formulate Sabah deep sea fishing master plan

The demand for fish resources is increasing resulting in severe pressure in the EEZ. Deep sea fishing could potentially reduce this pressure while allowing for fish stocks to recover. The formulation of a deep sea fishing master plan for Sabah will aim to guide the development of the industry while ensuring that the exploitation of deep sea resources is regulated and that healthy fish stocks are maintained over the long-term.

Leadership	Partner(s)	Start Phase	End Phase
DOF		2	2

Activity 2.25 : Promote the use of alternative feed sources as fish meal

Trash fish, which has low commercial value, is used as a major source of fish meal in aquaculture farms. With the growth of the industry, there has been an increase in the demand for trash fish which leads to over-harvesting. Alternative non-fish feed sources need to be introduced to sustain the industry. Some potential sources include biomass from the oil palm sector.

Leadership	Partner(s)	Start Phase	End Phase
DOF	DOA	2	3

Activity 2.26 : Revise the 1996 Sabah Aquaculture Master Plan

The Sabah Aquaculture Master Plan was developed in 1996 which resulted in the growth of the industry. However, there is now a need to revise and update this plan with new developments that have taken place. For example: (1) potential sites that were identified in 1996 may no longer be suitable for aquaculture, and (2) the introduction of exotic species, hybrids and genetically-modified organism has proliferated and is now a concern.

Leadership	Partner(s)	Start Phase	End Phase
DOF		1	1

Activity 2.27 : Develop pilot small-scale environmental friendly aquaculture projects

The severe pressure on marine resources has resulted in diminished catch and has impacted the lives of many artisanal fishermen who now barely make a living. To resolve this problem, small-scale environmental friendly aquaculture projects are proposed. These projects will aim to be simple, with minimal labour and inputs such as feeds or chemicals. Nutrient resources will be obtained naturally from the marine ecosystem.

Leadership	Partner(s)	Start Phase	End Phase
DOF		2	3

Activity 2.28 : Formulate Code of Conduct for Responsible Aquaculture Practice

The fundamental purpose of the Code of Conduct is to strengthen aquaculture progress and encourage good stewardship of all living and non-living marine resources found offshore. The document will form a set of basic principles which embrace environmental, managerial, social and operational concerns and elaborate general standards of conduct within aquaculture sites.

Leadership	Partner(s)	Start Phase	End Phase
DOF	NGO	1	1

Activity 2.29 : Undertake the mapping and documentation of Marine HCVA in Sabah

High Conservation Value Areas (HCVA) encompasses areas of critical ecological attributes, ecosystem services and social functions. Similar with terrestrial HCVAs, the identification of marine HCVAs will be important to aid government authorities in controlling where human activities such as fishing and coastal development can take place and in identifying options that are appropriate for conservation planning.

Leadership	Partner(s)	Start Phase	End Phase
DOF	SaBC, SP	1	1

Activity 2.30 : Implement river sand mining guidelines and plans for rivers in Sabah

River sand mining has resulted in severe impacts on river ecosystems in Sabah. In 2009, the Federal Department of Irrigation Drainage (DID) developed guidelines on river sand mining management while in 2011, the Environment Protection Department (EPD) commissioned sand mining management plans for Sg. Papar and Sg. Kimanis.

Leadership	Partner(s)	Start Phase	End Phase
EPD	DID	1	3

Activity 2.31 : Formulate rating system and guidelines for eco-lodges

With the growth of nature-based tourism in Sabah, the number of 'eco-lodges' has steadily increased. 'Eco-lodges' are usually located near (or even within) areas where nature-based attractions are found. Due to this, the development and operation of these facilities should be low-impact and in harmony with the natural surroundings. The development of a rating system and guidelines will aim to provide developers and operators with the necessary technical information to raise their level of operations.

Leadership	Partner(s)	Start Phase	End Phase
MTCE	NGO	2	2

Activity 2.32 : Formulate and implement guidelines for wildlife watching

Wildlife watching is increasingly popular activities in Sabah, attracting visitors from local and foreign counties and generates a substantial amount of economic activities across Sabah. Formulation of the guidelines for wildlife watching aim to guide the visitors and tour guides to carry out the activities in a sustainable manner to minimize disturbance to the wildlife, their habitats and local communities on which it depends on.

Leadership	Partner(s)	Start Phase	End Phase
SWD	NGO	2	2

Activity 2.33 : Develop the third trail to the Mount Kinabalu summit

Mount Kinabalu is arguably Sabah's most well-known attraction. The number of tourist summiting the mountain has steadily increased over the years resulting not only in congestion at bottlenecks along the trail but also on impacts on the sensitive highland ecosystem. To reduce the pressure along the two existing tracks, the proposed third route to the peak from Kiau along the western region of Mount Kinabalu should be developed.

Leadership	Partner(s)	Start Phase	End Phase
SP	Sabah Tourism Board	1	2

Activity 2.34 : Promote trekking activities and heritage tourism along the Sabah's Salt Trails

The Salt Trails are traditionally used by villagers to go to the market to trade their goods. These trails located within the Crocker Range Park and pass through different scenic landscapes and villages. The trails are potential to be promoted for nature and heritage tourism such as trekking activities, homestay programme etc. Currently, only one trail (Inobong-Terian-Buayan-Kionop-Tikolod trail) is accessible to tourist.

Leadership	Partner(s)	Start Phase	End Phase
Sabah Tourism Board	SP	2	3

Activity 2.35 : Sustain the 'Return to the Mountain' Community Day

Mount Kinabalu has been an iconic backdrop in the development of the culture and heritage of the highland communities. In December 2010, the 'Return to the Mountain' Community Day was first organised under the auspices of Sabah Parks. The event marked a modern-day pilgrimage by members of the local communities to the summit of the much revered mountain. This event must be sustained to strengthen local cultural heritage and the relationship of the local communities with each other as well as with the present custodians of the mountain.

Leadership	Partner(s)	Start Phase	End Phase
SP	Sabah Tourism Board, NGO	1	3

Activity 2.36 : Review the management plan for Kinabalu Park

The management plan for Kinabalu Park was developed in 2000. It focuses primarily on conserving biological and physical resources while enhancing research, education and cultural values; recreational and tourist activities; and instituting management procedures. The plan needs to be updated to reflect new developments and challenges.

Leadership	Partner(s)	Start Phase	End Phase
SP		1	1

Activity 2.37 : Formulate and implement management plan for Tawau Hills Park

Tawau Hills Park was gazetted in 1979. The tourist attraction area housed many interesting wildlife species and forms may natural deepwater pools and waterfalls. Formulation of management plan for the park will help in proper planning and management of the park and reduce impact from tourism activities.

Leadership	Partner(s)	Start Phase	End Phase
SP		1	1

Activity 2.38 : Review the management plan for Tunku Abdul Rahman Park

Tunku Abdul Rahman Park was gazetted in 1976. Covering an area of 50 km^2 comprising of 5 islands, Tunku Abdul Rahman Park is a famous tourist attraction and receives thousand of visitors annually. The management plan for the park needs to be updated to reflect new developments and challenges

Leadership	Partner(s)	Start Phase	End Phase
SP		1	1

Activity 2.39 : Formulate management plans and visitor guidelines for Trusmadi FR and Tambayukon FR

Trusmadi and Tambayukon are attracting a growing number of visitors who attempt to scale its mountain peaks. As visitor numbers are increasing, there will be a need to develop better facilities. However, any development needs to sufficiently address biodiversity considerations. In addition, visitors need to be provided with sufficient knowledge on how to reduce their individual impacts of these sensitive highland ecosystems.

Leadership	Partner(s)	Start Phase	End Phase
SFD		1	1

Activity 2.40 : Establish the mountain guides rating system for Mount Kinabalu

The main objective of the mountain guides rating system is to enhance the professionalism of guiding services and raise the income of local guides. Guides will be rated according to their level of competencies such as knowledge on biodiversity and geological features of the mountain, ability to converse in English or other languages, etc. Guides with high ratings would be able to command a higher fee to commensurate with their competencies.

Leadership	Partner(s)	Start Phase	End Phase
SP		2	2

Activity 2.41 : Expand the village home-stay programme

The main objectives of the mountain guides rating system is to professionalise guiding services and raise the income of local guides. Guides will be rated according to their level of competencies such as knowledge on biodiversity and geological features of the mountain, ability to converse in English or other languages, etc. Guides with high ratings would be able to command a higher fee to commensurate with their competencies.

Leadership	Partner(s)	Start Phase	End Phase
MTCE	NGO	2	3

Activity 2.42 : Undertake campaign on illegal hunting and wildlife trade

Illegal hunting and wildlife trade remain as serious issues in wildlife conservation in Sabah. Although there are a number of agencies addressing this problem, better awareness and understanding on the issues and impacts of hunting and trade will be able to increase the support among all stakeholders.

Leadership	Partner(s)	Start Phase	End Phase
SWD	NGO	2	3

Activity 2.43 : Undertake study of the impacts of incentives, taxes and subsides on biodiversity

It is anticipated that a significant amount of public funds are expended on incentives, taxes and subsidies that induce production and consumption on behaviours which result in biodiversity degradation and discourages conservation efforts. An evaluation needs to be conducted to identify where perverse systems can be removed and funds channelled towards biodiversity conservation.

Leadership	Partner(s)	Start Phase	End Phase
NRO	SaBC	1	1

Activity 2.44 : Accelerate the implementation of Feed-in Tariff for renewable energy such as biomass, biogas, micro-hydropower and solar power

Feed-in tariff (FiT) is a new mechanism under the Renewable Policy and Action Plan to increase the production of renewable energy. Individuals or organisations can produce and sell electricity generated from renewable energy such as biomass, biogas, solar power and micro-hydropower back to power utility firms at a premium price at a specific time. The FiT has been introduced in December 2011, and its implementation will be accelerated.

Leadership	Partner(s)	Start Phase	End Phase
UPEN	Ministry of Finance, SaBC	1	1

Activity 2.45 : Develop incentives for green businesses

To encourage all enterprises to incorporate sustainability principles within their businesses, the implementation of green technology will be encouraged through incentives. The green technology soft loan scheme under the Ministry of Energy, Green Technology and Water should better publicised while other incentives such as tax reductions etc. could be introduced to spur the development of the green economy base in Sabah.

Leadership	Partner(s)	Start Phase	End Phase
UPEN	Ministry of Finance, SaBC	2	3

Activity 2.46 : Develop and implement compensatory mitigation programmes in Sabah

Compensatory mitigation programmes aim to offset impacts on natural resources due to the implementation of a development project. In such cases, project proponents in Sabah would be required to compensate for such losses by contributing to a fund that will be used to preserve or restore an area for conservation purposes. Provisions for such a programme exist under the 2002 Environment Protection Enactment.

Leadership	Partner(s)	Start Phase	End Phase
EPD	SaBC, SFD	2	2

Section B3
Strategy 3 – Building Ecosystem Resilience

B3.1 INTRODUCTION

Goal 3 :
By 2022, all of our key ecosystems, species and genetic diversity are protected and well managed

Strategy 3 aims at achieving Goal 3, namely to **ensure that our key ecosystems, species and genetic diversity are protected and managed.** The resilience of our ecosystems is vital. Boosting ecosystem resilience is important not just for plants and animals, but also crucial for maintaining the quality of life and security of the people of Sabah. The rural poor are especially dependent on healthy ecosystems which provide them with sources of food, water and timber, and therefore most vulnerable to any loss of goods and services as a result of degraded ecosystems. On a global level, the biomass within Sabah's forests and wetlands serves as carbon sinks that is critical to mitigate climate change. As such, it is imperative that healthy ecosystems do not just exist in protected areas, but across the entire landscape of the State.

Enhancing ecosystem resilience can be done by ensuring optimal species diversity and numbers within the various habitats; by designing favourable structural patterns at the landscape level; as well as by ensuring that key biological processes are allowed to continue unhindered. We need to strengthen our protected area network as well as habitat connectivity across landscapes, we need to protect our plant and animal species, and we need to be able to respond to natural disasters and emergencies.

B3.2 TARGETS

Strategy 3 has three targets, namely :

Target 3.1
By 2022, our protected areas network has been significantly strengthened with at least 20% of terrestrial areas and 5% of coastal and marine areas fully protected. Target 3.1 will be met by implementing actions and activities that :

- Strengthen the terrestrial protected area network
- Strengthen the marine protected area network

Target 3.2
By 2022, key habitats are fully protected. Target 3.2 will be met by implementing actions and activities that :

- Conserve biodiversity outside of terrestrial protected areas
- Conserve biodiversity outside marine protected areas
- Protect wetlands and freshwater ecosystems
- Improve preparedness to natural and man-made disasters

Target 3.3
By 2022, key wildlife and plant species are fully protected. Target 3.3 will be met by implementing actions and activities that :

- Conserve terrestrial plant species
- Conserve terrestrial animal species
- Conserve marine and freshwater species
- Control invasive species

B3.3 COMMITMENTS TO ACTION

B3.3.1 Strengthening the Terrestrial Protected Area Network

Sabah has a long history of setting aside vast areas for conservation. The Master List of Sabah Protected Areas has 93 named protected areas covering 1,174,398 ha of land, representing about 16% of Sabah's land area. This greatly surpasses the 10% target set in the CBD's 2010 Strategic Plan as well as the 1992 Sabah Conservation Strategy – proof of the state's strong commitment to biodiversity conservation. The majority of these areas are gazetted under either the Land Ordinance 1930 (as reserve for conservation purposes), or Parks Enactment 1984 (as a Park), or Wildlife Conservation Enactment 1997 (as Wildlife Sanctuary), or Forest Enactment 1968 (as Forest Reserve).

While the coverage and management of our protected areas rank among the best in the region, we shall strive for continuous improvement of the system, with the main aim of increasing the effectiveness of our protected area network. We need to improve the design of our protected area network and appropriateness of management systems. We need to periodically review the Master List to ensure that it is up to date and the addition of new areas is reflected.

Action 3.1 We will expand Sabah's terrestrial protected area network to include ecosystems which are currently under-represented and enhance connectivity between existing protected areas.

Activities
Protect Ulu Padas' primary forests
Establish broad riverine reserve of natural habitat between Lokan River and Bukit Garam along the middle Kinabatangan River

Action 3.2 We will periodically evaluate the effectiveness of protected area management at sites and state levels, paying particular attention to the degree to which biological resources are protected. Such assessments will serve to guide our protected area strategy and capacity development, enable adaptive management, guide effective resource allocation, and build support for protected area management.

Activities
Formulate management plan for Kota Belud – Tempasuk Wildlife Sanctuary
Formulate management plan for Lower Kinabatangan Wildlife Sanctuary

Action 3.3 We will strengthen our efforts to mitigate conflicts that may arise between protected areas, neighbouring communities and human activities, such as human-wildlife conflicts, encroachment, poaching and other illegal activities.

Activities
Establish a dedicated "community engagement and conflict resolution" team at key agencies (see Strategy 5)

Action 3.4 We will restore the resilience and functionality of terrestrial ecosystems that have been degraded. We will rehabilitate forests in selected protected areas to restore degraded ecosystems.

Activities
Rehabilitate degraded areas in key protected areas

Action 3.5 We will fulfil Sabah's commitment to the Heart of Borneo trans-boundary conservation initiative to ensure that representative swathes of

biodiversity rich landscapes are conserved in conjunction with the efforts of partner states and countries.

Activities
Implement the Heart of Borneo Strategic Plan of Action

B3.3.2 Strengthening the Marine Protected Area Network

Located within the Coral Triangle Region and Sulu-Sulawesi Marine Ecoregion, the marine biodiversity found within the coastal waters off Sabah are among the richest in the world. The coastal waters off Sabah span an area of 5,436,000 ha. Although only around 1.9% (101,929 ha) of this area is protected at present, this figure will increase substantially once the proposed Tun Mustapha Park (1.02 million ha) is gazetted.

Protecting this marine ecosystem is crucial to our coastal communities, food supply and tourism industry. We need to improve the management of our marine protected areas and improve collaboration among various stakeholders. We will continuously monitor tourism activities in the marine protected area to ensure that it will not cause any impact or degradation to the marine ecosystem of the protected area.

Action 3.6 We will expand our marine protected area network to accommodate the biology and lifecycles of important fish and other marine species and to ensure maintenance of viable populations and protection of critical habitat and foraging ground for marine species. We will ensure connectivity of important marine habitats is established with representation across biological scales and realms.

Activities
Assess the effectiveness of Sabah's marine protected area network

Action 3.7 We will ensure that each marine protected area has its own comprehensive management plan. We will periodically revise the management plan for each protected area taking into account the natural and socio-economic changes.

Activities
Formulate management plan for all marine protected areas
Revise Tun Sakaran Park Management Plan

Action 3.8 We will involve of the coastal communities and the private sector in decision making, planning and management of the marine protected area.

Activities
Establish Community Marine Patrols and Marine Wardens (see Strategy 1)

B3.3.3 Conserving Biodiversity Outside of Terrestrial Protected Areas

A large proportion of Sabah's unique terrestrial biodiversity is found outside of the existing protected areas, which on its own might not be able to achieve the long-term survival of some of the state's endangered species. More than 65% of Sabah's orang-utans for instance, live outside of protected areas, in forests that are prone to human exploitation. Conserving Sabah's biodiversity therefore requires whole-of-ecosystem efforts across landscapes, in both public and private ownership.

In this, it should be noted that over the past decade, the Sabah Forestry Department and its partners have been at the forefront of commendable efforts to restore Sabah's forests. Forest restoration is, and will continue to be in the next 20 years, one of the most important management activities in forest management in Sabah. These efforts shall be further strengthened to create functional ecosystems that support the full array of plant and animal populations that they can potentially contain.

All stakeholders will have to work closely to integrate biodiversity safeguards in development planning and approval to ensure that biodiversity occurring in non-protected areas is also effectively protected and managed. We will prioritize maintaining the structural connectivity of protected and non-protected terrestrial ecosystems when considering proposals for development in these areas. As far as possible, we have to minimise the loss or degradation of habitats and ecosystem services throughout the landscape.

Action 3.9 We will embed proper consideration of biodiversity and ecosystem conservation into all relevant sectors of management, policy and decision-making outside of protected areas. We will especially further develop and implement good forestry and agriculture practices ensuring that human activities in non-protected landscapes are compatible with, and support the long-term preservation of biodiversity.

Activities
Undertake mapping and documentation of HCVA in Sabah (see Strategy 2)
Implement the Heart of Borneo Strategic Plan of Action (see Action 3.5)

Action 3.10 We will reduce habitat fragmentation by enhancing connectivity between isolated protected areas and build a coherent network of ecological linkages across non-protected landscapes.

Activities
Formulate the State master plan for ecological connectivity
Establish the Kinabalu ECOLINC
Establish the ecological linkage between Lower Kinabatangan Wildlife Sanctuary, Kulamba Wildlife Reserve and Tabin Wildlife Reserve
Enhance connectivity between Forest Reserves under the HOB programme

Action 3.11 We will restore the resilience and functionality of terrestrial ecosystems outside of protected areas that have been degraded or fragmented in order to preserve biodiversity and ecosystem services.

Activities
Identify and rehabilitate important conservation areas outside of protected areas

Box B3-1 : Kinabalu Ecolinc

The Kinabalu EcoLINC is envisaged as a landscape-level corridor that will connect Kinabalu Park and Crocker Range Park through a network of Community Conserved Areas (CCAs). The proposal, initiated by Sabah Parks in 2011, aims to strengthen ecological connectivity between the habitats of Kinabalu Park and Crocker Range Park.

The ecological connectivity between Kinabalu Park and Crocker Range Park needs to be strengthened

Source: ERE Consulting Group

Although there is intermittent forest cover along the ridge, the concern is that. in the long-term both parks could become completely isolated from each other hence affecting their ecological integrity The area between the two parks is however largely part of traditional land utilized by over 31 indigenous communities. The communities therefore have strong connection with, and maintain customary tenure over much of the land in the region.

While there are some concerns that agriculture expansion and hunting poses a threat to connectivity, Sabah Parks is adamant that the local communities must not lose the land and forest resources that they still depend on. In fact, most communities are already well aware of the need to conserve these forests, which function as water catchments that provide many villages with their main source of water.

As such, the establishment of CCAs was proposed, whereby local communities as a group will be given management use rights over forests within their traditional territories. The CCAs can be gazetted as Natives Reserves under Section 78 of the Land Ordinance, which are common use areas established for the benefits of a resident community and managed through the appointment of trustees.

Nine CCAs are have been proposed based on traditional village boundaries, namely : Kiau Nuluh-Bersatu, Kiau Taburi, Bundu Tuhan, Terolobou-Ratau, Lokos, Toboh-Tinatasan, Toboh Pahu, Kotonuon, and Nuluhon-Kimulau-Wasai. Two of these are already well-established: The CCAs of the Bundu Tuhan Native Reserve and the Kiau Nuluh Community Forest are being actively managed by the local communities for the purposes of conservation and the sustainable utilization of forest resources.

B3.3.4 Conserving Biodiversity Outside Marine Protected Areas

The bulk of our marine and coastal areas are outside of the protected area network. Nevertheless, they harbour rich biological resources and crucial ecosystems which need to be accorded due protection. In addition, these areas provide ecosystem goods and services to over 1.5 million people living along the coast.

We need to protect the biodiversity in these areas to ensure that the marine ecosystem remains healthy and productive in perpetuity. Although numerous research and studies have been conducted by various stakeholders on the marine ecosystem in Sabah, much remain unknown and ready to be explored.

Action 3.12 We will minimise the impact of fisheries on marine ecosystems using the ecosystem approach to fisheries management.

Activities
Develop institutional and regulatory framework for EAFM (see Strategy 5)
Evaluate the effectiveness of the deployment of artificial reefs
Evaluate the impacts of fishing methods and practices

Action 3.13 We will continuously monitor important marine habitats. We will encourage research and studies to enhance our understanding on marine ecosystem including mapping of the important habitats such as coral reefs and seagrass beds, distribution of marine species etc.

Activities
Support the Reef Check monitoring programme

B3.3.5 Protecting Wetlands and Freshwater Ecosystems

Sabah has an extensive array of wetlands and freshwater ecosystems. Mangroves, freshwater swamps, peatland, oxbow lakes, mudflats and other marshes harbour a plethora of wildlife and plant species and provide many ecosystem services to the people of Sabah.

We need to protect these important ecosystems. We have to adopt an integrated approach to decision-making on the conservation and management of wetlands habitats and species. We need to ensure that any action taken to conserve, manage and utilise wetlands will be considered within the larger basin context to ensure that vital wetland ecosystems services are safeguarded. We need to develop strong governance arrangements and institutions favouring wetland

ecosystem conservation and wise use at multiple levels and across different sectors. This will include mechanisms to enhance the participation of all stakeholders in the planning and implementation processes.

Action 3.14 We will expand the extent of protected wetlands in Sabah to ensure critical ecosystems are maintained.

Activities
Expand the Klias PFR by another 500 ha
Protect Padang Terak water bird habitat (800 ha)
Protect Tempasuk plains critical water bird habitat (1500 ha)
Protect Weston Menumbok mangroves
Conduct comprehensive inventory of wetlands in Sabah

Action 3.15 We will take measures to protect water bodies such as ox-bow lakes and floodplains. The oxbow lakes in the lower Kinabatangan will be afforded due protection.

Activities
Formulate and implement the Lower Kinabatangan River Corridor Management Plan
Gazette oxbow lakes in the lower Sg. Kinabatangan

Action 3.16 We will enhance our knowledge on freshwater fish species diversity, ecological requirements and threats to these species. This is vital to ensure effectiveness in our conservation efforts and to minimize extinction risk of endangered fish species. We will promote CBNRM using tools such as the *tagal* to manage fish stock in the rivers.

Activities
Establish aquatic life fish inventory for important rivers in Sabah
Undertake socio-economic study of the tagal system

Box B3-2 : Tagal – A Traditional System For Sustaining Fisheries

Tagal is an indigenous system of sustaining riverine fisheries which has been revived by indigenous communities in Sabah over the past ten years. Riverine fisheries resources had begun to decline in various parts of Sabah from the 1960s as logging and the conversion of forests for agriculture impacted on the aquatic environments. To add to the problem, uncontrolled fishing, often with the use of explosives, poison or electricity, had also became more widespread.

A communal fish harvest

Source: Department of Fisheries, Sabah

Then in 1997, the villagers of Kg. Notorus in the Penampang District decided to enforce the their traditional *tagal* system to reverse the worrying decline of fish in the Babagon River. This soon prompted many other communities to follow suit by reinstating communal management of sections of the river. Wherever the *tagal* system is in force, fishing is prohibited within particular stretches of the river for a specific length of time. Fish are harvested communally at the appointed time with the catch shared equally among the community. Anyone found guilty of breaching *tagal* regulations will be fined heavily, for example a 50kg pig and RM200 cash. If a case cannot be solved by the village chief, it will be brought to the Native Court.

The Department of Fisheries has been supportive of *tagal* system. Section 35 of the Inland Fisheries and Aquaculture Enactment 2003 specifically allows for the declaration and recognition of the indigenous system of resource management (*tagal*). This recognition of indigenous management of fisheries resources has been an important milestone for the incorporation of traditional knowledge into conservation in Sabah. The Fisheries Department serves as a technical advisor to the various *Tagal* Committees, carrying out research to further improve the system, conducting training and public education, and providing material assistances to the *Tagal* Committees such as signboards and fish fry.

There are now more than 200 *tagal* managed areas involving more than 100 rivers in Sabah. The numbers are fast increasing.

B3.3.6 Improving Preparedness to Natural and Man-Made Disasters

Vast areas of Sabah's forests have been lost to fires in the past; the most recent being the El Nino periods in 1983 and 1997. Due to the drier conditions and the ground biomass present, heavily disturbed forests are prone to fires and suffer the most damage. Additionally, forests close to plantations and local communities are also prone to fires. While comprehensive mitigation measures are now in place to prevent and combat forest fires, preparedness is necessary to contain their potential for destruction.

Across the globe, climate change is expected to become the dominant direct driver of biodiversity loss by the end of the century. In many cases, climate change is already having an impact on biodiversity either through shifting habitat, changing life cycles, the development of new physical traits or species die-offs and extinctions. In Sabah, we need to consider the potential impacts of climate change into all decisions and actions relating to land, resource and biodiversity management.

Action 3.17 We will ensure a high level of preparedness to combat forest fires at our protected areas.

Activities
Formulate State-wide strategy for forest fire management

Action 3.18 We will maintain and restore mangroves and other coastal wetlands to help mitigate against the impacts of tsunamis and coastal flooding.

Activities
Implement mangrove restoration programme at tsunami high vulnerability area

B3.3.7 Conserving Terrestrial Plant Species

Sabah's rainforests are extremely diverse, with many pockets of different ecosystems having varying floristic assemblages. Although many important plant habitats have been lost to development in the past, many have been afforded protection within the state's protected reserves, and numerous efforts have been undertaken to rescue threatened plants from the wild into in-situ conservation collections.

We will streamline ex-situ plant conservation efforts currently undertaken by the various state agencies and civil society, in order to create a comprehensive plant conservation programme based on the National Strategy for Plant Conservation.

We will continue to collaborate with our counterparts in FRIM and Sarawak on the on-going Tree Flora of Sabah and Sarawak project, and subsequently on the Tree Flora of Malaysia project.

Action 3.19 We will integrate plant conservation into on-going forest restoration programmes. This will include re-establishing populations of rare tree species, including both dipterocarp and non-dipterocarp species within commercial forest reserves.

Activities
Establish a State level working group on plant conservation

Action 3.20 We will continue efforts to commercialise rare plant species with potential commercial value, in particular wild fruit trees and ornamental species. We will identify approaches and methods to reduce the poaching of plants.

Activities
Enhance the germaplasm collection at Ulu Dusun and Tenom (see Strategy 2)
Enhance research on rare plant species with potential commercial value (see Strategy 4)

Action 3.21 We will establish smart public-private partnerships to integrate plant conservation efforts with eco-tourism initiatives.

Activities
Streamline volunteer and research tourism programmes (see Strategy 1)

B3.3.8 Conserving Terrestrial Animal Species

Sabah is known worldwide for its iconic animal species such as the orang-utan, proboscis monkey, pygmy elephant and Sumatran rhinoceros. Sabah's forests are also home to a wide array of birdlife as well as a vast diversity of lesser known animal groups. Preserving this unique diversity means ensuring that all representatives of terrestrial ecosystems and their component species and genes are conserved into the future.

Protecting the diversity of terrestrial ecosystems, species and genes is the core of our conservation efforts. We need to pay attention to those species whose survival is threatened in the short or medium term. We need to enhance support to long-term research-based approaches to strengthening our in-situ and ex-situ conservation. We have to improve the conservation of animals by implementing sound population management plans. We will also aim at maintaining healthy levels of genetic diversity in wild populations to ensure their long-term survival. We

will judiciously implement the State Action Plans for the orang-utan, elephant and the Sumatran rhinoceros.

Action 3.22 We will strengthen our ex-situ conservation programmes for highly endangered animal species as a means to reinforce dwindling wild populations. This will be done while ensuring that the pressures affecting these species in their natural habitats are alleviated so that rehabilitation programmes can be successful.

Activities
Implement the State Action Plans for the elephant, Orang Utan and the Sumatran rhinoceros
Establish Orang Utan Post-Rehab Release Programme at Tabin Wildlife Reserve
Strengthen the Bornean Sun Bear Conservation Centre at Sepilok, Sandakan
Strengthen the Borneo Rhino Sanctuary in the Tabin Wildlife Reserve

Action 3.23 We will formulate and implement State Action Plans for those species or taxa whose survival is threatened in the short or medium term. These species action plans shall be based on the analysis of up-to-date knowledge on population distribution, densities and genetic diversity.

Activities
Formulate and implement State Action Plans for the Proboscis monkey
Formulate and implement State Action Plans for the Clouded leopard
Formulate and implement State Action Plans for the Sun bear
Formulate and implement State Action Plans for the Banteng

Action 3.24 We will protect Important Bird Areas (IBAs) in Sabah and identify more IBAs i.e. areas being globally important habitat for the conservation of bird communities.

Activities
Include the Lower Kinabatangan – Segama Ramsar site within the East Asian-Australasian Flyway site network
Develop and implement management plans for IBAs that are under threat

Box B3-3 : The Borneo Rhino Sanctuary

The Borneo Rhino Sanctuary concept dates from an expert workshop organised by SOS Rhino Sabah and Sabah Wildlife Department in 2007. The workshop resulted in a strong consensus that Sabah's remaining rhinos should be concentrated into a single designated area in order to boost their breeding rates. Following a review of eight potential sites, Tabin was chosen as the most suitable. Located 42 kilometres from Lahad Datu, Tabin Wildlife Reserve consists of 1,220 square kilometres of mainly regenerating logged dipterocarp forest, which for the past 25 years has been designated for the primary purpose of wildlife conservation. Tabin's regenerating canopy cover, as well as natural mineral salt licks and as clay-rich soils suited for mud wallows, makes it an excellent rhino habitat.

The major emerging problem is that even fewer rhinos remain than anticipated, and capture is extremely difficult. In addition, it is becoming clear that most Sumatran rhinos are infertile, so advanced reproductive technology may be needed. Sabah is collaborating with Indonesia, Cincinnati Zoo (the only successful breeder of the species) and Leibniz Institute for Zoo and Wildlife Research (Berlin) to pursue all possible avenues to prevent the imminent extinction of the Sumatran rhinoceros. Development of the BRS facilities is under the Sabah Wildlife Department, with full-time operational assistance provided by a not-for-profit company, Borneo Rhino Alliance (BORA).

Kretam, a male rhino in the Borneo Rhino Sanctuary

Source: Borneo Rhino Alliance

B3.3.9 Conserving Marine and Freshwater Species

The waters of Sabah, inland and marine, house a diversity of aquatic species. In the costal water off Sabah, there is a total of 1400 species of fishes, 18 species of mammals and 3 species of turtles, both resident and transient. Our knowledge on the inland freshwater species is limited due to the lack of research in the past and this hampers our effort in conserving the species. Up to date, about 40 species of freshwater fishes reported to be endemic to Sabah. Endemic fishes are vulnerable to environmental changes such as habitat degradation, human disturbance and pollution. We need to protect this ecosystem through proper planning and strong regulation to ensure minimal alteration or destruction of the ecosystem.

Action 3.25 We will adopt recommendation in the Malaysia Ocean Policy 2011-2020 to gazette Special Marine Conservation Areas to ensure maintenance of viable populations and protection of critical habitats and foraging grounds for marine species.

Activities
Gazette the proposed Tun Mustapha Marine Park
Undertake mapping and documentation of Marine HCVA Areas (see Strategy 2)

Action 3.26 We will reduce the number of incidental capture of marine turtles by adopting the Turtle Exclusion Device (TED). We will provide technical support and training to encourage fishermen to implement the TED.

Activities
Enforce the regulations on fishing gear
Prevent the harvesting of turtle eggs

Action 3.27 We will undertake efforts to combat the illegal harvesting and sale of turtle eggs. We will educate and engage local communities in planning and management of turtle nesting grounds.

Activities
Establish Community Marine Patrols and Marine Wardens (see Strategy 1)

Action 3.28 We will ensure effective management and sustainable trade of live-reef fish (LRF) and reef-based ornamentals. We will encourage adoption by traders of Code of Practice for sustainable live-reef food trade through capacity building and awareness campaigns.

Activities
Strengthen the regulations on live-reef fish trade (see Strategy 5)
Develop and implement certification scheme and standards for live reef food fish production

Action 3.29 We will fulfil Sabah's commitment to ban shark hunting to protect and ensure survival of the degrading shark population. We will strengthen the regulation and enforcement to prohibit fishing of any shark species.

Activities
Amend the Sabah Wildlife Conservation Enactment 1997 to enforce the State-wide ban on shark hunting (see Strategy 5)

Action 3.30 We will provide incentives and resources to undertake research and various trials to reduce and prevent bycatch particularly entanglement on fishing gear used by artisanal fishermen.

Activities
Promote the use of environment-friendly fishing gears
Development and implement guidelines for the handling of by-catch in the fishing industry

Action 3.31 We will enhance our understanding on marine and freshwater species through research and studies including study of the population, mapping of the distribution and habitats, home range and migratory pattern. We will ensure that information on marine and freshwater species is consolidated and made available to all.

Activities
Support the development of a database on freshwater and marine species

B3.3.10 Controlling Invasive Species

Invasive species are plants or animals that adversely affect the habitats and bioregions they invade. Invasive species are a major cause of concern as they prey upon, or out-compete native species, or modify natural ecosystems, causing the extinction of native wildlife populations. The Global Invasive Species Database (2011) lists a total of 141 invasive species in Malaysia. Sabah also suffers from a range of invasive alien plant and animal species which need to be controlled or eradicated.

Action 3.32 We will identify alien invasive species in Sabah as well as their pathways for entry and movement in the state. We will develop and implement a state strategy and good practices to control or eradicate invasive alien species.

Activities
Formulate and implement the State Action Plan on invasive species
Implement action plan to mitigate the spread of invasive aquatic plants in rivers and ox-bow lakes

B3.4 ACTIVITIES

Activity 3.1 : Protect Ulu Padas' primary forests

Ulu Padas forms part of the mountainous heartland of Borneo along with adjoining areas in Kalimantan and Sarawak. Ulu Padas covers mainly by undisturbed hill dipterocarp and montane forests and is a significant cultural heritage containing archaeological. This forest shall be protected through designation of adequate protection and conservation compartments in the SFI concession long term forest management plan.

Leadership	Partner(s)	Start Phase	End Phase
SFD	Sabah Forest Industries	2	3

Activity 3.2 : Establish broad riverine reserve of natural habitat between Lokan River and Bukit Garam along the middle Kinabatangan River

There has been much focus on conservation activities within the Lower Kinabatangan. However, as part of the larger river basin, Kinabatangan's middle area also supports wildlife populations as well as the natural ranges of species such as the Pygmy elephants. The broad riverine areas and habitats starting from Sg. Lokan to Bukit Garam should be protected.

Leadership	Partner(s)	Start Phase	End Phase
SWD	Kinabatangan District Office, SFD, private sector	2	3

Activity 3.3 : Formulate management plan for Kota Belud-Tempasuk Wildlife Sanctuary

The wetlands in Kota Belud-Tempasuk Wildlife Sanctuary is an important wintering site for globally threatened bird species. The management plan for Kota Belud-Tempasuk Wildlife Sanctuary will be developed to assist in the administration and management of Sanctuary to achieve the targeted conservation objectives and to promote sustainable tourisms.

Leadership	Partner(s)	Start Phase	End Phase
SWD	Kota Belud District Office	2	2

Activity 3.4 : Revise management plan for Lower Kinabatangan Wildlife Sanctuary, incorporating actions needed outside the Sanctuary boundary

Kinabatangan Wildlife Sanctuary has rich array of unique habitats, a diverse wildlife fauna and rich culture and history. The management plan for Lower Kinabatangan Wildlife Sanctuary will be developed to assist in the administration and management of Sanctuary to achieve the targeted conservation objectives.

Leadership	Partner(s)	Start Phase	End Phase
SWD	Kinabatangan District Office, SFD, LSD	1	1

Activity 3.5 : Rehabilitate degraded areas in key protected areas

A rehabilitation programme shall be established to rehabilitate the degraded forests in key protected areas such as the Lower Kinabatangan Wildlife Sanctuary. The aim is to enhance the value of the protected area for some of the important species for which its establishment was intended.

Leadership	Partner(s)	Start Phase	End Phase
SFD	SWD	1	3

Activity 3.6 : Implement the Heart of Borneo Strategic Plan of Action

The Heart of Borneo Strategic Plan of Action contains a list of interventions that sets the direction for Sabah's contribution towards this tri-nation initiative. During the Strategy period, the Strategic Plan of Action shall be fully implemented.

Leadership	Partner(s)	Start Phase	End Phase
SFD	SWD, SP, NRO	1	3

Activity 3.7 : Assess the effectiveness of Sabah's marine protected areas network

A well-planned marine protected areas network will provide important spatial links needed to maintain ecosystem processes and connectivity, as well as improve resilience by spreading risk and help to ensure long term sustainability of marine populations. The marine protected areas network in Sabah will be evaluated to ensure integrity and resilience of the connectivity.

Leadership	Partner(s)	Start Phase	End Phase
SP	DOF	2	2

Activity 3.8 : Formulate management plans for all marine protected areas

The marine protected areas (such as Pulau Sipadan Park and Tun Mustapha Park) receive thousands of visitors annually. The formulation of management plan for each protected area will aim to guide the development of these parks to accommodate the increase in visitors and the need to new facilities while ensuring that any impact is minimised and that conservation objectives are met.

Leadership	Partner(s)	Start Phase	End Phase
SP		1	2

Activity 3.9 : Revise the Tun Sakaran Park Management Plan

The management plan for Tun Sakaran Park, which consists of eight islands, was developed in 2001. Since then, human activities within the park has steadily increased. As such, the management plan for the park needs to be revised to account for these increasing pressures. The planning process should also engage the local communities.

Leadership	Partner(s)	Start Phase	End Phase
SP		2	2

Activity 3.10 : Formulate the State master plan for ecological connectivity

The development of ecological corridors that maintain or re-establish critical pathways for the movement of wildlife are crucial. While there are already many initiatives, a State master plan is urgently required to guide all conservation actions, aid government authorities and land use planners identifying options that are appropriate for conservation planning and identify priority connections.

Leadership	Partner(s)	Start Phase	End Phase
NRO	SWD, LSD, SFD	1	1

Activity 3.11 : Establish the Kinabalu ECOLINC

The proposed Kinabalu ECOLINC is an ecological corridor connecting Kinabalu Park and Crocker Range Park. The initiative aims to establish a network of Community Conserved Areas which will integrate the role of local communities in conservation planning and implementation.

Leadership	Partner(s)	Start Phase	End Phase
SP	SaBC, NRO, LSD	1	3

Activity 3.12 : Establish the ecological linkage between Lower Kinabatangan Wildlife Sanctuary, Kulamba Wildlife Reserve and Tabin Wildlife Reserve

Lower Kinabatangan Wildlife Sanctuary, Kulamba Wildlife Reserve and Tabin Wildlife Reserve corridor is one of the key ecological corridors identified under the Sabah Mega Ecological Corridor Project for conservation. The ecological connectivity between these key habitats will be secured, restored, protected and managed sustainably by local stakeholders. This could be approached as a remediation plan for RSPO palm oil producer members.

Leadership	Partner(s)	Start Phase	End Phase
NRO, SWD, SFD	TRPD, Borneo Conservation Trust, RSPO	1	3

Activity 3.13 : Enhance connectivity between Forest Reserves under the HOB programme

Sabah has an extensive network of Forest Reserves. However many of the reserves are not connected to one another. As part of the Heart of Borneo programme, these Forest Reserves shall be connected and their fragmentation reduced.

Leadership	Partner(s)	Start Phase	End Phase
SFD		1	3

Activity 3.14 : Identify and rehabilitate important conservation areas outside of protected areas

Sabah has an extensive protected area network. However due to its high diversity, large fractions of unique species and habitats still occur outside of protected areas. These areas have been vulnerable to human exploitations with large areas being degraded. However, they remain as important components in the conservation landscape. Important conservation areas in Sabah will be identified and rehabilitated to ensure its integrity and functionality.

Leadership	Partner(s)	Start Phase	End Phase
NRO, LSD	SWD, SFD, SaBC	1	3

Activity 3.15 : Evaluate the effectiveness of the deployment of artificial reefs

Artificial reefs are commonly deployed to promote the establishment of habitat areas for marine plants and aquatic life. However, there are concerns that these reefs are ineffective due to poor design and/or location of deployment. An evaluation of artificial reefs is therefore required to determine if these reefs are meeting their objectives.

Leadership	Partner(s)	Start Phase	End Phase
DOF	NGO	2	2

Activity 3.16 : Evaluate the impacts of fishing methods and practices

There are numerous fishing methods and practices used by local fishermen to increase catch such as fish aggregating devices, *bagan* etc. However, very little information is available on the effectiveness of these methods and practices which include the ability to attract catch species, effects on fish populations and the impacts of the material used.

Leadership	Partner(s)	Start Phase	End Phase
DOF	NGO	2	2

Activity 3.17 : Support the Reef Check monitoring programme

Reef Check is an international coral reef monitoring programme that involves volunteer divers and marine scientist. The programme provides valuable information on the health of coral reefs which is essential for agencies to protect and manage the marine ecosystem. The programme shall be supported and data collected shared across all relevant agencies.

Leadership	Partner(s)	Start Phase	End Phase
DOF, SP	UMS, NGO	1	3

Activity 3.18 : Expand the Klias PFR by another 500 ha

This extension of the Klias PFR is necessary to sustain the last remaining relict peat swamp forest in Sabah which is also a critical habitat for endangered wildlife species. The peat swamp forest, which housed high population of endangered species particularly Proboscis monkey is often threatened by forest fires due to prolong droughts.

Leadership	Partner(s)	Start Phase	End Phase
SFD	LSD	2	3

Activity 3.19 : Protect Padang Teratak water bird habitat (800 ha)

This 800 ha wetland site, near the Padas Damit Amenity FR, is crucial as habitat for resident and migratory water birds. The site supports the highest concentration of migratory ducks in Borneo, wintering about 2,000 to 5,000 migratory ducks annually.

Leadership	Partner(s)	Start Phase	End Phase
SWD	Beaufort District Office, LSD	2	3

Activity 3.20 : Protect Tempasuk plains critical water bird habitat (1500 ha)

About 1,500 ha of Tempasuk Plain is wetland habitat that is not intensively used or cultivated, and used by migrant and resident water birds, including some globally threatened water birds. The wetland at the site (about 12,200 ha) was gazetted in 1960 under repealed legislation as Kota Belud Bird Sanctuary. Nevertheless, the important bird areas are susceptible to exploitation as the repealed bird sanctuary legislation protected only the birds and not the habitat.

Leadership	Partner(s)	Start Phase	End Phase
SFD	LSD	2	3

Activity 3.21 : Protect Weston Menumbok mangroves

The land located between the Menumbok Mangrove FR and Nabahan Amenity FR is a crucial piece of mangrove of the north side of the Brunei Bay, supporting high concentration of the endangered Proboscis monkey. Protection of the mangrove forest is vital to improve the forest connectivity and enhance movement of wildlife.

Leadership	Partner(s)	Start Phase	End Phase
SFD	LSD	2	3

Activity 3.22 : Conduct comprehensive inventory of wetlands in Sabah

Sabah's is home to a diverse variety of wetland types but which extensive range and status is still inadequately documented. An inventory of these sensitive habitats which have been under constant threat from ill-planned development, illegal clearing and overharvesting is required to better manage these important ecosystems.

Leadership	Partner(s)	Start Phase	End Phase
NRO	SFD	1	1

Activity 3.23 : Formulate and implement the Lower Kinabatangan River Corridor Management Plan

The Lower Kinabatangan River Corridor is a complex mosaic of wildlife sanctuary, state land forests, mangroves, oil palm plantations, tourist lodges and human settlements. It was identified as a potential biosphere reserve but would require the development of a management plan which demarcate various land use zones, land use prescriptions, remedial works, monitoring system and governance.

Leadership	Partner(s)	Start Phase	End Phase
MTCE	DID, TRPD, SWD	1	2

Activity 3.24 : Gazette oxbow lakes in the lower Sg. Kinabatangan

The ox-bow lakes along Sg. Kinabatangan sustain rich and distinct biological diversity. They also serve as habitat and refuge for fish and other aquatic organism especially when conditions in the main river fluctuates (i.e. water quality and quantity). These important habitats require better protection - the ox-bow lakes and surrounding buffer can be gazette as a Wildlife Sanctuary under the Sabah Wildlife Conservation Enactment 1997.

Leadership	Partner(s)	Start Phase	End Phase
SWD	DID	2	3

Activity 3.25 : Establish aquatic life inventory of important rivers in Sabah

Most major rivers have undergone considerable changes as a result of human activities. However, there has very little recent data on freshwater ecosystems and the impact of these changes. An inventory of aquatic life is proposed for the major rivers in Sabah: Sg. Kinabatangan, Sg. Padas and Sg. Segama

Leadership	Partner(s)	Start Phase	End Phase
DOF	UMS	2	2

Activity 3.26 : Undertake socio-economic study of the tagal system

The tagal system, a method that is used by local communities to manage inland fisheries, is now widely practiced throughout Sabah. While the system has gained acceptance as a model for community-based natural resources management, there is dearth of information of how effective the system is in terms of sustaining fisheries, and how it influences the social and economic dynamics of the respective communities.

Leadership	Partner(s)	Start Phase	End Phase
DOF	NGO	1	1

Activity 3.27 : Formulate State-wide strategy for forest fire management

In Sabah, the risk of forest fires is particularly prevalent during dry El-Nino periods. This risk is expected to increase in the future as forested areas become more vulnerable due to degradation and encroachment. A state-wide strategy for the forest fire management will allow relevant authorities to strengthen fire prevention and control programmes, including the use of new technologies and early warning systems.

Leadership	Partner(s)	Start Phase	End Phase
SFD	SP	2	2

Activity 3.28 : Implement mangrove restoration programme at tsunami high vulnerability area

Sabah's north and east coast can be vulnerable in the event of a large tsunami. However, natural mangroves chains along the coast can significantly reduce the impact should a tsunami event occur. A number of areas along the coast with high vulnerability during tsunamis have been identified by DID. At these sites, mangrove habitats that are degraded should be restored to protect the coastline.

Leadership	Partner(s)	Start Phase	End Phase
SFD	DID	2	3

Activity 3.29 : Establish a State level working group on plant conservation

There a numerous government agencies, research institutions and CSOs involved in plant conservation programmes at the state (and national level). To coordinate the efforts of these organisations, a state-level working group is proposed to facilitate documentation, collaboration and the development of goals and targets for conservation activities.

Leadership	Partner(s)	Start Phase	End Phase
SFD	DOA, UMS	1	1

Activity 3.30 : Implement the State Action Plans for the elephant, Orang Utan and Sumatran rhinoceros

Three species action plans were launched by the Sabah Wildlife Department in 2011. The action plans for the elephant, Orang Utan and Sumatra rhinoceros, a comprehensive directive for conservation actions, is aimed at ensuring the long-term survival of the three species in Sabah.

Leadership	Partner(s)	Start Phase	End Phase
SWD		1	3

Activity 3.31 : Establish Orang Utan Post-Rehab Release Programme at Tabin Wildlife Reserve

The Tabin Wildlife Reserve holds one of the highest populations of Orang Utans within any protected area in Sabah. The reserve would be a key site for the establishment of a centre for the rehabilitation and release of displaced Orang Utans into the wild.

Leadership	Partner(s)	Start Phase	End Phase
SWD		1	3

Activity 3.32 : Strengthen the Bornean Sun Bear Conservation Centre at Sepilok, Sandakan

The Bornean Sun Bear Conservation Centre was established at Sepilok for the rehabilitation and release of orphaned and captive sun bears into the wild. The centre is still developing its facilities to meet this purpose. Adequate support is required to ensure that the centre becomes fully operational.

Leadership	Partner(s)	Start Phase	End Phase
SWD	SFD, BSBCC	1	2

Activity 3.33 : Strengthen the Bornean Rhino Sanctuary in the Tabin Wildlife Reserve

The Bornean Rhino Sanctuary is a fenced-off area within the Tabin Wildlife Reserve where captive breeding of the Sumatran rhinoceros is being conducted. The initiative is led by the Bornean Rhinoceros Alliance and is being co-funded by Yayasan Sime Darby. Adequate support is required in the future to ensure that the initiative is sustained over the long-term.

Leadership	Partner(s)	Start Phase	End Phase
SWD	BORA, WWF, UMS	1	2

Activity 3.34 : Formulate and implement the State Action Plan for the Proboscis monkey

The Proboscis monkey is endemic to Borneo with an estimated 6,000 individuals left in Sabah. It is listed as Endangered under the IUCN Red List. The population is threatened by the degradation and loss of its native habitat which is restricted to the riparian of rivers and along coastal mangroves. There are possibilities of local extinction as habitat becomes fragmented and too small to support healthy populations.

Leadership	Partner(s)	Start Phase	End Phase
SWD	UMS	1	3

Activity 3.35 : Formulate and Implement the State Action Plan for the Clouded leopard

The Clouded leopard population in Sabah is under threats with an estimated 1,500 to 3,200 individuals left in Sabah. It is listed as Vulnerable under the IUCN Red List. The population is threatened by the rampant degradation of its forest habitat due to industrial logging and agricultural developments. The leopards are the targets of commercial poachers where they are illegally traded for pets, meat and traditional medicines.

Leadership	Partner(s)	Start Phase	End Phase
SWD		1	3

Activity 3.36 : Formulate and Implement the State Action Plan for the Sun bear

Sun bear is listed as Vulnerable under the IUCN Red List. Their population and distribution in Sabah however is not well studied with only handful of information available. Sun bear has been widely exploited for their body parts as traditional medicine and traded for pet.

Leadership	Partner(s)	Start Phase	End Phase
SWD		1	3

Activity 3.37 : Formulate and Implement the State Action Plan for the Banteng

The distribution of Banteng in Sabah is confined to protected areas such as Tabin Wildlife Reserves, Kulamba Wildlife Reserves etc. with an estimation of 300 to 500 individuals left. The population is rapidly declining due to the loss of its forest habitat to commercial logging and agricultural developments. Currently the wildlife is listed as Endangered under the IUCN Red List.

Leadership	Partner(s)	Start Phase	End Phase
SWD	HUTAN, Danau Girang Field Centre	1	3

Activity 3.38 : Include the Lower Kinabatangan-Segama Ramsar site within the East Asian-Australasian Flyway site network

The East Asian-Australasian Flyway Partnership is an informal and voluntary initiative aimed at protecting migratory waterbirds and their habitat across one of nine major flyways in the world. Within this flyway, the Lower Kinabatangan-Segama Wetlands Ramsar site is an important stop-over particularly for the Chinese egret. The site should be nominated under this partnership where international collaboration can be developed with other sites within the flyway.

Leadership	Partner(s)	Start Phase	End Phase
SWD	MNS, Borneo Bird Club	2	2

Activity 3.39 : Develop and implement management plans for IBAs that are under threat

The diversity of forest type in Sabah has attracted high numbers of resident and migratory birds. Although most of the important bird areas in Sabah are protected, few sites including Tempasuk plains and Trus Madi Range remain vulnerable to exploitation. The management plan for these IBAs will be developed to assist in administration and management of the sites to achieve the targeted conservation objectives.

Leadership	Partner(s)	Start Phase	End Phase
SWD	MNS, YS, SP, SFD	2	3

Activity 3.40 : Gazette the proposed Tun Mustapha Marine Park

The proposed Tun Mustapha Marine Park is located off northern Sabah and within the Sulu-Sulawesi Marine Ecoregion. It is a priority conservation area where there are important habitats for marine turtles and coral reefs. The area is however threatened by overfishing, destructive fishing methods and coastal development.

Leadership	Partner(s)	Start Phase	End Phase
SP		1	2

Activity 3.41 : Enforce the regulations on fishing gear

The use of the illegal fishing gear has destructive impacts on fish populations and marine habitats. The regulations on fishing gear needs to be strictly enforced to ensure that only licensed gear are used by the industry and within authorised areas. The collaboration between all related agencies i.e. Department of Fisheries, Malaysian Maritime Enforcement Agencies etc. will need to be strengthened.

Leadership	Partner(s)	Start Phase	End Phase
MMEA	DOF	1	2

Activity 3.42 : Prevent the harvesting of turtle eggs

Under the Wildlife Conservation Enactment 1997, marine turtles are protected species and the collection and sale of turtle eggs is illegal. However, the harvesting of eggs is still is still prevalent in parts of the state. The enforcement of this enactment needs to be strengthened. In addition, the powers of enforcement of Sabah Parks should be extended to include offences that occur outside park boundaries.

Leadership	Partner(s)	Start Phase	End Phase
SWD	MMEA, Marine Police, Royal Malaysian Customs Department	1	2

Activity 3.43 : Develop and implement certification scheme and standards for live reef food fish production

In addition to strengthening regulations, the overall level of the live reef food fish industry needs to be raised to ensure that it is productive and does not result in detrimental impacts of reef fish populations. The introduction of a certification scheme and the development of standards for the industry would be a step in the right direction.

Leadership	Partner(s)	Start Phase	End Phase
DOF		2	3

Activity 3.44 : Promote the use of environmentally friendly fishing gears

To increase their catch, many fishermen are using gear that have destructive impacts on fish populations. In addition to regulating the type of gear sold and monitoring fishing activities, fishing gear that are less harmful should be introduced and promoted among the fishing community through awareness programmes.

Leadership	Partner(s)	Start Phase	End Phase
DOF	NGO	1	2

Activity 3.45 : Development and implement guidelines for the handling of by-catch in the fishing industry

By-catch refers to catch that fishermen did not intend to catch but could not avoid, often did not want or chose not to use, and are usually dead or will not survive after release. Formulation of the guidelines aims to provide guidance on measures that contributes toward more effective management of by-catch and to minimize post-release mortality.

Leadership	Partner(s)	Start Phase	End Phase
DOF	NGO	1	1

Activity 3.46 : Support the development of a database on freshwater and marine species

Information on Sabah's vast freshwater and marine resources is still inadequately documented with data located in many different places. To support efforts in the conservation and management of these resources, the development of a consolidated and updated database is required. In particular, information on some of Sabah's freshwater and marine species that is of socio-economic significance is particularly lacking.

Leadership	Partner(s)	Start Phase	End Phase
DOF	UMS	1	2

Activity 3.47 : Formulate and implement the State Action Plan on invasive species

Human activities have increased the movement of invasive species which threaten both native terrestrial and marine biodiversity. An action plan is needed to prevent or minimise the impact of these species, find invasions before they establish permanent footholds and eradicate incipient populations of undesirable species. The plan will comprise of efforts to monitor and inventorise invasive species and to develop cooperation across all agencies.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	SWD, SFD, DOF, DOA, Malaysian Customs Department	2	3

Activity 3.48 : Implement action plan to mitigate the spread of invasive aquatic plants in rivers and ox-bow lakes

The Action Plan for Aquatic Invasive Alien Species in Malaysia was developed by the Department of Fisheries Malaysia in 2007. The action plan aims to balance conservation and management of aquatic resources through prevention, control and mitigation of issues pertaining invasive aquatic plants that are threatening to the ecosystem, habitats and species.

Leadership	Partner(s)	Start Phase	End Phase
DOF	DOA, DID	2	3

Section B4
Strategy 4 – Improving Our Understanding

B4.1 INTRODUCTION

Goal 4 :
By 2022, our understanding of biodiversity and ecosystem services have significantly improved to enable a more effective management of our resources

Strategy 4 aims at achieving Goal 4, namely to improve our understanding of biodiversity so that we can better understand and manage our resources. In addition to increasing knowledge on biodiversity, understanding how different sectors and stakeholders impact biodiversity will improve decision-making. Sabah's immense diversity of biological resources does not make this an easy task.

We need to increase research on various facets of biodiversity. We need to pay special attention to conserving traditional ecological knowledge as it is a vast treasure trove of location-specific knowledge accumulated over generations. We have to invest in long-term monitoring of biodiversity as a means of tracking progress in our conservation efforts as well as to understand trends.

B4.2 TARGETS

Strategy 4 has two targets, namely :

Target 4.1
By 2022, Sabah is recognized as a centre of excellence for biodiversity research. Target 4.1 will be met by implementing actions and activities that :

- Enhance research activities
- Undertake long-term monitoring

Target 4.2
By 2022, the traditional ecological knowledge of indigenous communities in Sabah have been adequately conserved. Target 4.2 will be met by implementing actions and activities that :

- Conserving traditional ecological knowledge

B4.3 COMMITMENTS TO ACTION

B4.3.1 Enhance Research Activities

Research is the foundation for the development of knowledge on biodiversity. Without sufficient research, our understanding of our biological heritage and how we can manage it will be hampered. While there are already several institutions carrying out research in the state, much more remains to be done.

We need to create a conducive research environment with good facilities to attract scientists and researchers from around the world. We have to commit more funding to boost research and development at our research institutions. Fortunately, Sabah already has a good track record of collaboration with reputable local and international institutions. These should be expanded upon. We need to enhance and continuously update our knowledge of animal and plant species diversity, ecological requirements as well as population genetics and conservation status. Reliable scientific knowledge is necessary to guide our conservation efforts and to respond swiftly to changes and new threats. We need to share this knowledge with all stakeholders via the Sabah Biodiversity Clearinghouse Mechanism.

Action 4.1 We will establish Sabah as a Centre of Excellence in Tropical Biology to spearhead research in the region. We will leverage upon the experiences of research activities in established research sites (e.g. Danum Valley, Maliau Basin), which already attract researchers from around the world. We will develop strategic

partnerships and become prominent partners in international research and conservation practice.

Activities
Support the development of a regional Centre of Excellence on tropical biodiversity
Expand research facilities at field sites across Sabah
Develop the Sabah Biodiversity Clearing-House Mechanism (see Strategy 1)
Enhance research on rare plant species with potential commercial value

Action 4.2 We will increase research on freshwater species and ecosystems in Sabah particularly at ecosystems such as ox-bow lakes.

Activities
Establish aquatic life inventory for important rivers in Sabah (see Strategy 3)
Expand facilities at the Danau Girang Field Centre in the Lower Kinabatangan River Basin

Action 4.3 We will improve our understanding of the birds, insects and plants by expanding our research to lesser-known species.

Activities
Undertake a comprehensive inventory of bird species in Sabah
Develop a road map for monitoring, documenting and research of lesser known and vulnerable species
Undertake study to inventories threatened/rare plant species

Action 4.4 We will seek to understand and integrate the biological requirements of our wildlife in the design of conservation strategies including landscape-level design and ecological connectivity.

Activities
Formulate the State master plan for ecological connectivity (see Strategy 3)

Action 4.5 We will conduct research on the most vulnerable species and ecosystems, in particularly those that are highly dependent on climate such as sub-alpine species.

Activities
Develop a road map for monitoring, documenting and research of lesser known and vulnerable species (see action 4.3)

B4.3.2 Monitoring

The complexity of our ecosystems and associated processes is compounded by the fact that changes are rapidly occurring. The loss of habitat and extinction of species are realities that require the most accurate and updated information for decision-

making. Monitoring and reporting on species population will be required to make decisions and evaluate our actions. Long-term monitoring of biodiversity needs to be given sufficient priority and adequately resourced.

Many stakeholders are already actively conducting monitoring programmes. We have already established long-term plots in places such as the Crocker Range Park and in Danum Valley. We need to better coordinate our activities, pool resources and share information. It is only when we measure that we can start to evaluate and manage what we have done. Long-term monitoring, albeit resource consuming, is crucial to our understanding of our biodiversity.

Action 4.6 We will enhance knowledge on species diversity by refining inventories on our plant and animal populations (especially for groups other than mammals and birds) and by monitoring population distribution, numbers and conservation status. We will continue collecting long-term data using tools such as long-term plots and camera traps at critical sites throughout the state.

Activities

Develop a road map for monitoring, documenting and research of lesser known and vulnerable species (see action 4.3)

Expand and diversify permanent long-term research plots

Box B4-1 : CRP Permanent Research Plot Project

The effectiveness of forest and park management is highly dependent on availability of robust data, which can only be derived from long-term monitoring and research. The Crocker Range Park (CRP) Permanent Research Plot Project was initiated in 2004 in order to generate this data for the management of the CRP, which at 139,919 ha, is the largest terrestrial protected area in Sabah.

Source: JICA

Initiated under the BBEC programme, the CRP Permanent Research Plot Project is also aimed at developing a model for long-term forest ecosystem monitoring that can be effectively applied throughout Sabah. The project is also significant as being the first long-term collaborative project between Sabah Parks and the Institute of Tropical Biology & Conservation (ITBC).

Six permanent research plots have been established to date. Tree census and climate data, which serve as important basic variables for all other ecological research, have been collected for each of the plots. While Sabah Parks will take the lead in continuously collecting this basic data, the ITBC shall facilitate and conduct research into other ecosystem components such as insects, mammals and birds. A manual published by ITBC and BBEC in 2006 provides a comprehensive description of the methodology used for establishing the permanent research plots in the CRP, including plot establishment, tree census and monitoring.

B4.3.3 Conserving Traditional Ecological Knowledge

Sabah is rich in traditional ecological knowledge. It has more than 30 distinct indigenous communities, many of which have over generations, garnered detailed knowledge of plants, animals and ecosystems. This knowledge is essential to the cultures and lifestyles of indigenous communities and offers insights into our understanding of biodiversity.

We must ensure that the necessary support is given to document and conserve traditional knowledge on biodiversity, agrodiversity and community-based resource management approaches and consider the wider application of such approaches throughout Sabah. We have to increase our understanding of traditional ecological knowledge and bio-cultural diversity. We have to document the relationship between Sabah's diverse indigenous communities and the

environment including traditional practices and resource use as well as agro-biodiversity.

Action 4.7 We will encourage further research into biocultural diversity in collaboration with local indigenous communities. We will collaboratively document agrodiversity, traditional cultivars, herbal plants and marine resources which are unique to Sabah's different ethnic groups. We will ensure that local communities are provided with access to information and documentation arising from these collaborative studies.

Activities

Undertake collaborative research to document TEK

Action 4.8 We will ensure the necessary training and capacity building is provided for both communities and government to correctly utilise FPIC protocols and respect intellectual property rights.

Activities

Expand the collection and storage of local crop domesticates and other traditional cultivars

Conduct training and awareness-raising programme on intellectual rights and FPIC for local communities (see Strategy 5)

Introduce a training module on FPIC for government staff from the related agencies (see Strategy 5)

B4.4 ACTIVITIES

Activity 4.1 **:** Support the development of a regional Centre of Excellence on tropical biodiversity

Sabah holds some of the most important biological resources in the region. The establishment of a Centre of Excellence in tropical biology will aim to pool the expertise of renowned researchers and facilities across various disciplines and organisations while supporting the growth of research activities and the identification of priority areas in the region.

Leadership	Partner(s)	Start Phase	End Phase
UMS	UPEN, SaBC	1	3

Activity 4.2 : Expand research facilities at field sites across Sabah

Danum Valley and Maliau Basin are well-known field sites that are used by local and international researchers. In addition to these sites, there is potential to further strengthen research activities through the expansion of research facilities in other field sites across the state. Potential sites include the Klias Peninsular and Darvel Bay.

Leadership	Partner(s)	Start Phase	End Phase
SFD, SP, YS	UMS, SaBC	1	3

Activity 4.3 : Expand facilities at the Danau Girang Field Centre in the Lower Kinabatangan River Basin

The Danau Girang Field Centre is a collaborative research facility jointly managed by Cardiff University, UK and Sabah Wildlife Department. The centre is located within the Kinabatangan Corridor of Life and is an important facility for research on lowland habitats and wildlife, and the impacts of anthropogenic activities on biodiversity.

Leadership	Partner(s)	Start Phase	End Phase
SWD		1	3

Activity 4.4 : Enhance research on rare plant species with potential commercial value

There are potential numerous plant species in Sabah with significant commercial value. These plants need to be researched and documented

Leadership	Partner(s)	Start Phase	End Phase
SFD	UMS	1	3

Activity 4.5 : Undertake a comprehensive inventory of bird species in Sabah

Sabah has a significant number of bird species, some of which are endemic. However, bird populations are one of the least documented and researched groups of wildlife. There is therefore a need to develop a comprehensive inventory of the bird population in Sabah. An annual monitoring programme of key species is also required to determine the overall status of the bird population.

Leadership	Partner(s)	Start Phase	End Phase
SWD, SaBC	CSO	2	3

Activity 4.6 : Develop a road map for the monitoring, documentation and research of lesser known and vulnerable species

Research on both terrestrial and marine biology has generally been focused on large and enigmatic species. However, the tropical ecosystem is home to thousands of species that have important roles, some of which are vulnerable to threats, but have not been adequately documented or researched. A roadmap is proposed as a long term strategy to guide research activities and funding in this area.

Leadership	Partner(s)	Start Phase	End Phase
SWD		2	3

Activity 4.7 : Undertake study to inventories threatened/rare plant species

To assist in sustainable forest management as well as to ensure plants are not lost, an inventory of all threatened and/or rare plants in Sabah must be established.

Leadership	Partners(s)	Start Phase	End Phase
SFD	SaBC, UMS	2	3

Activity 4.8 : Expand and diversify permanent long-term research plots

Permanent long-term research plots are valuable in assessing a host of ecosystem and biological processes. Such plots were established in Crocker Range Park in 2004. To develop a more comprehensive understanding of the ecosystem and biological processes, permanent long-term research plots should be extended to include different types of habitats in other protected areas, both terrestrial and marine.

Leadership	Partner(s)	Start Phase	End Phase
SFD, SWD, SP, YS	CSO, UMS	2	3

Activity 4.9 : Undertake collaborative research to document TEK

Local communities possess rich traditional ecological knowledge on resources and landscapes that go back hundreds of years. Today, such knowledge can help managers and researchers better understand how natural resources can be sustainably managed. Two sites are proposed for the development of collaborative research projects to document indigenous resource management strategies: Ulu Padas and Tun Mustapha Park.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	UMS, Sabah Museum, Sabah Cultural Board	1	3

Activity 4.10 : Expand the collection and storage of local crop domesticates and other traditional cultivars

Local communities have, across the generations, used a variety of wild plants species that have been domesticated as crops and for other purposes. These cultivars (such as the many local rice varieties) are an important genetic resource which may be lost as commercial cultivars become dominant and traditional agricultural practices slowly disappear. Efforts to collect, document and store such cultivars needs to be increased.

Leadership	Partner(s)	Start Phase	End Phase
DOA, SaBC		1	3

Section B5
Strategy 5 – Strengthening Our Capacity to Manage Biodiversity

SECTION B5: STRATEGY 5 – STRENGTHENING OUR CAPACITY TO MANAGE BIODIVERSITY

B5.1 INTRODUCTION

Goal 5 :
By 2022, all stakeholder groups will have the necessary capacity to conserve biodiversity

Strategy 5 aims at achieving Goal 5, namely to strengthen the capacity of all stakeholders to manage biodiversity. Managing our biodiversity is a challenging task. It requires a vast amount of knowledge, tools and resources – which may sometimes be hard to come by. We need to acknowledge that at present all the stakeholders – government, civil society, indigenous communities and private sector – do not have adequate capacity to manage all facets of biodiversity.

We need resources, tools, finance and manpower while recognizing that various stakeholders have differing capacities to contribute. The strategy is designed to stimulate the active participation of stakeholders, while giving partners and local areas the freedom to choose how they might contribute and to focus on where there strengths lie according to local circumstances.

We have to strengthen the capacity of all stakeholders to conserve biodiversity

B5.2 TARGETS

Strategy 5 has three targets, namely :

Target 5.1
By 2022, the capacities of state institutions have been adequately enhanced to enable them to effective manage biodiversity. Target 5.1 will be met by implementing actions and activities that :

- Strengthen government institutions
- Streamline legislation
- Enhance sustainable financing

Target 5.2
By 2022, civil society organizations and local communities have developed the capacity to contribute substantially to managing Sabah's biodiversity. Target 5.2 will be met by implementing actions and activities that :

- Strengthen capabilities of civil society
- Strengthen capabilities of indigenous communities

Target 5.3
By 2022, Sabah will become a major focal point and contributor to global biodiversity conservation. Target 5.3 will be met by implementing actions and activities that :

- Strengthen national and international cooperation

B5.3 COMMITMENTS TO ACTION

B5.3.1 Strengthening Government Institutions

The state government and its agencies will play a leading role in delivering the strategy and action plans. There are many agencies involved and their capacities in terms of knowledge and resources must be strengthened so that the strategy is implemented and monitored effectively.

We need to significantly increase the number of government personnel working on biodiversity-related issues, either through institutional reorganization or via new recruitments. Recognizing the ever-changing paradigms and nature of work, new positions such as sociology, communications and GIS/remote sensing will be created in key agencies. Coordination among government agencies will be improved in all aspects of planning, development, management and monitoring.

SECTION B5: STRATEGY 5 – STRENGTHENING OUR CAPACITY TO MANAGE BIODIVERSITY

Action 5.1 We will significantly strengthen the capacity of the Sabah Biodiversity Centre to plan, implement and monitor biodiversity conservation programmes.

Activities
Develop the Sabah Biodiversity Clearing-House Mechanism (see Strategy 1)
Develop biodiversity assessment toolkit for EIA
Develop training modules for mainstreaming biodiversity
Establish a Geospatial Mapping Unit and an Information & Communications Unit at SaBC

Action 5.2 We will provide planning tools and resources to agencies involved in land matters, agriculture and infrastructure to enable them to mainstream biodiversity considerations into their programmes and projects.

Activities
Implement biodiversity capacity building programme on biodiversity for the Department of Agriculture, Department of Lands & Survey, Department of Town & Regional Planning and Public Works Department
Develop a state GIS-based biodiversity information system

Action 5.3 We will strengthen the capacity of the Department of Fisheries to plan, implement and monitor programmes on marine and freshwater biodiversity conservation including in key sites outside protected areas.

Activities
Enforce the regulation on fishing gear (see Strategy 3)
Strengthen the capacity of enforcement agencies to enforce fisheries regulations
Develop institutional and regulatory framework for EAFM

Action 5.4 We will enhance financial and human resource capacity for protected areas management, including the development of facilities and provision of equipment, and enhance capacity for research and monitoring.

Activities
Establish a dedicated “community engagement and conflict resolution” team at key agencies
Establish a plant conservation unit at Sabah Wildlife Department

Action 5.5 We will establish a platform for agencies to share resources and carry out joint enforcement activities, particularly on poaching, illegal wildlife trade, and encroachment into protected areas.

Activities
Establish Sabah Wildlife Enforcement Network

Action 5.6 We will streamline the jurisdiction of all biodiversity-related institutions in the state and eliminate gaps and overlap of jurisdiction.

Activities
Undertake a comprehensive review of all biodiversity-related institutional frameworks in Sabah

B5.3.2 Streamlining Legislation

Sabah already has a good range of biodiversity-related legislation to safeguard various facets of our biodiversity which are enforced by different agencies. However as new threats emerge and priorities change, this legislation needs to be improved, streamlined and strengthened.

Action 5.7 We will review and strengthen our legislation to safeguard important aquatic ecosystems such as oxbow lakes, riparian vegetation, and floodplains.

Activities
Formulate Rules under the Environmental Protection Enactment to regulate non-point sources of pollution
Formulate Rules under the Sabah Water Resources Enactment 1998 for development near water bodies

Action 5.8 We will fulfil Sabah's commitment to ban shark hunting to protect and ensure survival of the degrading shark population. We will strengthen the regulation and enforcement to protect critical marine species.

Activities
Amend the Sabah Wildlife Conservation Enactment 1997 to enforce the State-wide ban on shark hunting
Strengthen the regulations on Live Reef Food Fish Trade

Action 5.9 We will review of our land-related legislations to identify opportunities for improvements, to allow for greater flexibility for conserving forests on alienated land, and to support greater participation by local communities in biodiversity protection.

Activities
Encourage conservation on alienated land and native reserves

Action 5.10 We will streamline all our biodiversity-related legislation to eliminate gaps and overlap of jurisdiction.

Activities
Undertake a comprehensive review of all biodiversity-related legislation in Sabah.

B5.3.3 Sustainable Financing

Biodiversity conservation requires substantial amount of funding. Most protected areas in Sabah are in need of additional resources to be managed more effectively. Urgent actions need to be undertaken by all stakeholders to address the issue of securing funding so that the goals of the strategy may be achieved. We will explore platforms for encouraging greater Federal Government contributions towards the protection of natural areas in Sabah for example through income from services. We will actively tap into international grants to finance our conservation programmes and projects.

Action 5.11 We will review the entry fees and user charges at our Protected Areas. In addition, fees for services/activities that are provided (boating fees, guide fees, accommodation, food & beverage and photography), and fines and compounds should also be efficiently channelled to improving conservation systems and services.

Activities
Review entrance fees to protected areas

Action 5.12 We will consider implementing an eco-tax on tourists to Sabah to finance and support biodiversity conservation initiatives and maintain tourist areas including natural areas/protected areas. We will adopt a state environmental fund targeted at environmental and biodiversity related initiatives in Sabah.

Activities
Conduct feasibility study on the implementation of eco-tax on tourists

Action 5.13 We will facilitate corporate social responsibility initiatives (CSR) to support conservation measures in Sabah.

Activities
Establish Sabah Business Council for Sustainable Development (see Strategy 1)

Action 5.14 We will continue exploring economic instruments and markets such as carbon trading and other ecological services markets to make SFM financially attractive in the long term as well as to offset the need for converting natural forests to ITPs to fund the high investments required for silviculture and restoration.

Activities
Develop and implement the Sabah REDD+ roadmap

Action 5.15 We will provide support to the private sector in utilizing funding opportunities provided by the Federal Government for the implementation of environmental projects in Sabah. We will also sensitise and support investors in Sabah to qualify for tax incentives provided by the Federal Government.

Activities
Create awareness of the green technology soft loan scheme

B5.3.4 Strengthening Capacities of Indigenous Communities

Indigenous resource management systems in Sabah have all been challenged by land use changes, globalisation, and its' inevitable impacts on culture and economic aspirations. Nevertheless, there remain community-conserved areas in Sabah which have endured and thrived due to strong organisations and solid leadership. There are also many other communities that desire to conserve biodiversity areas more effectively but lack experience, organisational strength, networks, and resources to exclude outsiders and to mobilise their own programmes. These local communities should be assisted in this role.

We need to create a platform wherein local communities can obtain exposure, training and capacity building support in order to strengthen their own community-based organisations to better fulfil their ability to manage their community-conserved areas. In addition, it is worthwhile to provide them with technical assistance and funding since these initiatives contribute to the goals of this strategy.

Action 5.16 We will establish a Registry of community-conserved areas in Sabah based on the stated intention and commitment of those communities to conserve and sustainably manage areas which support natural biodiversity.

Activities
Develop an ICCA registry (see Strategy 1)

Action 5.17 We will provide training and capacity building opportunities for these community organisations in order to boost their ability to manage these areas to fulfil their conservation function, and connect to a Network of similar community organisations and NGOs which would provide management resources and shared experience.

Activities
Undertake collaborative research to document TEK (see Strategy 4)

Action 5.18 We will ensure that local communities and all levels of government are familiarised and provided with training on new approaches which include ICCAs, TEK, CBNRM, FPIC, ABS and Bio-cultural Protocols to better engage with these new concepts and tools.

Activities

Conduct training and awareness-raising programme on intellectual rights and FPIC for local communities

Introduce a training module on FPIC for government staff from the related agencies

B5.3.5 Strengthening Civil Society Capabilities

Civil society will play a major role in realising the goals of this strategy. Sabah has a longstanding tradition of active civil society participation in all aspects of environmental protection including nature appreciation and biodiversity conservation. Historically, their ability to more effectively pursue worthwhile initiatives has been constrained by a lack of resources. Engaging civil society more directly and providing them with the necessary support will enable them to make a more meaningful contribution. We will allocate funds and training for civil society organisations to undertake biodiversity work that is strategic to the state.

Action 5.19 We will establish a platform wherein all biodiversity-related NGOs can cooperate and coordinate their activities in partnership with the respective government agencies and local communities, enable all parties to understand each other's challenges and to foster goodwill and close cooperation.

Activities

Organise an annual "Green Dialogue"

Action 5.20 We will provide civil society with better access to biodiversity-related information to enable them to plan and manage their activities effectively.

Activities

Link and ensure accessibility to all government and NGO libraries (see Strategy 1)

B5.3.6 Strengthening National and International Cooperation

Sabah has had a long history of national and international cooperation. The cooperation is necessary to exchange knowledge, learn good management practices, optimise and share resources and build goodwill. We will continue to strengthen cooperation with the Federal government and other states governments in Malaysia. We will fully support Malaysia's international obligations to biodiversity-related conventions including the CBD, RAMSAR and CITES. We aim

to be the model state with regards to fulfilling the nation's international obligations.

We will embrace the BIMP-EAGA and ASEAN initiatives on biodiversity conservation including supporting the ASEAN Socio Cultural Community Blueprint 2009-2015, ASEAN Agreement on Transboundary Haze Pollution, ASEAN Peatland Management Strategy 2006-2020 and ASEAN Environmental Education Action Plan 2008-2012. We will continue to be a strategic partner in the implementation of the 3-nation Heart of Borneo programme and the 7-nation Coral Triangle Initiative and will participate actively to achieving the objectives of both programmes.

Action 5.21 We will work closely with Sarawak on transboundary issues, particularly those related to Heart of Borneo programme.

Activities
Implement the HOB Strategic Plan of Action (see Strategy 3)

Action 5.22 We will actively engage with international institutions to conserve Sabah's unique biodiversity and support information exchanges on biodiversity conservation at global level.

Activities
Develop twinning programme between LKSW Ramsar Site and Ramsar sites in other countries

Action 5.23 We will strive to become a centre for regional biodiversity training, research and education. We will ensure that Danum Valley remains a world leading centre for tropical rainforest research.

Activities
Establish the Sabah Regional Biodiversity Training Centre

Action 5.24 We will continue to pursue recognition of the global importance of Sabah's biodiversity conservation areas by international bodies, programmes and treaties such as the Ramsar Convention on Wetlands and the UNESCO Man and the Biosphere Programme.

Activities
Nominate the Lower Kinabatangan as a Biosphere Reserve under the UNESCO MAB Programme
Nominate the KK Wetlands as a RAMSAR site
Nominate the Maliau Basin, Danum Valley and Imbak Canyon as a UNESCO World Heritage Site

SECTION B5: STRATEGY 5 – STRENGTHENING OUR CAPACITY TO MANAGE BIODIVERSITY

Box B5-1 : Lower Kinabatangan – Segama Ramsar Site

The Lower Kinbatangan – Segama wetlands

Source: ERE Consulting Group

Designated in 2008, the Lower Kinabatangan – Segama Wetlands is the first Ramsar site in Sabah, and the sixth in Malaysia. The site, which spans 78,803 ha across three contiguous protected areas: Trusan Kinabatangan Forest Reserve (40,471 ha), Kulamba Wildlife Reserve (20,682 ha), and Kuala Maruap and Kuala Segama Forest Reserve (17,650 ha), is the largest Ramsar site in the country. The site contains the largest remaining forest-covered floodplain in Malaysia (and possibly in Southeast Asia), which includes the largest remaining contiguous block of mangroves in Malaysia, and possibly in the southern Sulu Sea region. The peatswamp forest within the site is dominated by *Lophopetalum multinervium* (local name: Perupok), a unique natural peat swamp forest association found only in eastern Sabah.

Following the Ramsar designation, the Sabah State Government, in cooperation with the Bornean Biodiversity and Ecosystems Conservation (BBEC) Programme embarked on the development of the Lower Kinabatangan – Segama Wetlands Ramsar Site Management Plan 2011 – 2020. The plan sets out river basin level actions to be carried out by various stakeholders to protect and maintain the globally-important values of the Ramsar Site. These actions are contained within 13 broad strategies for the Core Area (the Ramsar site), Buffer Area (the basins of the Kinabatangan and Segama rivers as well as the nearshore waters surrounding the Ramsar site), as well as for the maintenance of the Management Plan.

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BOX B5-2 : CORAL TRIANGLE INITIATIVE ON CORAL REEFS, FISHERIES AND FOOD SECURITY

Covering nearly 6 million km^2 of ocean across parts of the seas of 6 countries in the Indo-Pacific – Indonesia, Malaysia, Papua New Guinea, the Philippines, the Solomon Islands, and Timor-Leste – the Coral Triangle contains a myriad life forms.

The Coral Triangle is defined by marine zones containing at least 500 species of reef-building coral - the yellow-shaded area in the map that is roughly triangular in shape. In this massive area, more than half of the world's reefs and 75% of the world's coral species, 40% of the world's coral reef fish species, and 6 of the world's 7 species of marine turtles are found. The Coral Triangle is also part of a wider region that contains 51 of the world's 70 mangrove species and 23 of the 50 seagrass species.

CTI-CFF Regional map

Source: CTI website

The Coral Triangle supports livelihoods and provides income and food security, particularly for coastal communities. Resources from the area directly sustain more than 120 million people. The primary human benefits include:

1. Direct livelihood, income and food security benefits;
2. Major spawning and nursery ground for commercially important tuna species, which supports a multi-billion dollar industry;
3. Healthy marine ecosystems contribute to a growing nature-based tourism industry;
4. Healthy reef systems and mangroves help to protect coastal communities from storms and tsunamis, reducing casualties, injuries, and reconstruction costs;
5. On many of the region's islands, the marine and coastal realm is a foundation for traditional cultures and societal wellbeing.

On 15 May 2009 in Manado, Indonesia, the leaders of the six nations signed the Coral Reef Initiative Leaders' Declaration on Coral Reefs, Fisheries and Food Security, affirming their commitments to protect and to sustainably manage the marine, coastal, and small island ecosystems in the Coral Triangle region.

SECTION B5: STRATEGY 5 – STRENGTHENING OUR CAPACITY TO MANAGE BIODIVERSITY

B5.4 ACTIVITIES

Activity 5.1 : Develop biodiversity assessment toolkit for EIA

A toolkit on biodiversity assessment for EIA shall be developed to enable relevant agencies to assess the impacts of proposed developments on biodiversity. The toolkit will integrate systematic assessment and evaluation of the functions and services of natural habitat, as part of the coast and benefit analysis of proposed projects.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	EPD	1	1

Activity 5.2 : Develop training modules for mainstreaming biodiversity

To demonstrate the value of biodiversity and to integrate biodiversity considerations within each of these sectors, training modules on mainstreaming biodiversity will be developed targeting key agencies. The module will integrate theory with a practical approach of field visits and case studies. The main target agencies involved in economic, land and land use planning.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	SEEN	1	2

Activity 5.3 : Establish a Geospatial Mapping Unit and an Information & Communications Unit at SaBC

A Geospatial Mapping Unit and an Information & Communications Unit shall be established at SaBC. The Geospatial Mapping Unit will be responsible in maintaining all geospatial information on biodiversity in Sabah. The unit will collaborate with other related agencies such as the Forestry Department, Wildlife Department, Town & Regional Planning Department, Lands and Survey Department, etc. The Information & Communications Unit would directly be responsible for the Sabah Biodiversity Clearing-House Mechanism as well as all public communications.

Leadership	Partner(s)	Start Phase	End Phase
SaBC		2	2

Activity 5.4 : Implement a capacity building programme on biodiversity for the Department of Agriculture, Department of Lands & Survey and Department of Town & Regional Planning, and Public Works Department

The capacity building programme of biodiversity will aim to target two groups of i.e. graduate officers and assistant officers (diploma holders) at key agencies where better general knowledge on biodiversity and specific technical knowledge will be required in the future. The programme will build upon the development of training modules on mainstreaming biodiversity (see 5.1.2) while addressing the specific needs of each agency. Specific manual and guidelines may also be developed for each agency.

Leadership	Partner(s)	Start Phase	End Phase
DOA, LSD, TRPD, PWD	SaBC	2	3

Activity 5.5 : Develop a state GIS-based biodiversity information system

The state GIS-based biodiversity information system is envisioned as a common repository for all spatial information pertaining to biodiversity. The system will be accessible to all government agencies, and when necessary, to other stakeholders. To maintain the integrity of the information and its use, data will be controlled according to varying of levels of user access.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	SWD, SFD	1	1

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Activity 5.6 : Strengthen the capacity of enforcement agencies to enforce fisheries regulations

Illegal, unregulated and unreported fishing is a widespread issue along Sabah's vast coastline. There is therefore an urgent need to increase the capacity of the enforcement agencies which include: Malaysian Maritime Enforcement Agency (MMEA), Dept. of Fisheries, and the Royal Malaysian Police's Marine Operation Force. These should include more personnel, equipment and boats.

Leadership	Partner(s)	Start Phase	End Phase
MMEA	DOF, Royal Malaysian Police	1	3

Activity 5.7 : Develop institutional and regulatory framework for EAFM

The Ecosystem Approach to Fisheries Management (EAFM) is an integrated approach to fisheries management i.e. harvesting of fish within ecologically meaningful boundaries that do not stress fish stocks over the long-term. In line with Malaysia's commitment in the Coral Triangle Initiative (CTI), an institutional and regulatory framework for EAFM will need to be developed. The EAFM has already been introduced and implemented in Semporna and the Tun Mustapha Park (which could be used as a case study for the development of the EAFM regulatory framework).

Leadership	Partner(s)	Start Phase	End Phase
DOF	SP	2	3

Activity 5.8 : Establish a dedicated 'community engagement and conflict resolution' team at key agencies

Many local communities live within and adjacent to forest reserves, wildlife reserves and Parks in Sabah. These communities may often have impacts that conflict with general conservation objectives. However, to engage local communities and to develop amicable solutions requires government personnel to be adequately trained in the local cultural settings and sensitivities. A dedicated team is therefore proposed to be established at key agencies to continuously carry out engagement and develop solutions to resolve conflicts.

Leadership	Partner(s)	Start Phase	End Phase
SP, SFD, SWD		2	3

Activity 5.9 : Establish a plant conservation unit at Sabah Wildlife Department

The Wildlife Department has a role on the protection of plant species listed under CITES. This includes enforcement on illegal collection of plant species with protected areas, the regulation of the harvesting and cultivation of protected plant species, and the control of the movement of protected and exotic plant species in Sabah. The plant conservation unit shall focus on CITES-related activities.

Leadership	Partner(s)	Start Phase	End Phase
SWD		2	3

Activity 5.10 : Establish the Sabah Wildlife Enforcement Network

The Sabah Wildlife Enforcement Network (WEN) will be a multi-stakeholder platform to optimise enforcement for wildlife offences such as poaching and illegal trade. No single agency can carry out this function effectively but the WEN will enable key stakeholders to leverage upon each other's strengths, networks and resources. The WEN will also allow for better information/intelligence sharing among all agencies. Lessons learnt from the ASEAN WEN could be applicable.

Leadership	Partner(s)	Start Phase	End Phase
SWD	MMEA, Police	2	3

SECTION B5: STRATEGY 5 – STRENGTHENING OUR CAPACITY TO MANAGE BIODIVERSITY

Activity 5.11 : Undertake a comprehensive review of all biodiversity-related institutional frameworks in Sabah

Many agencies have important roles and responsibilities in the conservation of biodiversity in Sabah. However, there are issues in terms of gaps in jurisdiction and conflicting laws and legislations as well as frameworks. A review is required to streamline the functions as well as to optimise already limited resources available at each agency.

Leadership	Partner(s)	Start Phase	End Phase
SaBC		1	1

Activity 5.12 : Formulate Rules under the Sabah Environmental Protection Enactment to regulate non-point sources of pollution

Non-point sources of pollution are the dominant sources of river water pollution in Sabah. Regulating activities that contribute non-point pollution is therefore crucial to mitigate this problem. The proposed NPS Rules shall empower the EPD to require NPS Pollution Control Plans for a delineated river stretch or catchment and subject all properties that drain into the identified river stretch, sub-catchment or catchment to such regulations.

Leadership	Partner(s)	Start Phase	End Phase
EPD	Attorney General's Chambers, DID	1	1

Activity 5.13 : Formulate rules under the Sabah Water Resources Enactment 1998 for development near water bodies

Development activities near or adjacent to river and lakes result in many adverse impacts on the water body (e.g. pollution generation, removal or degradation of riparian vegetation etc.). Rule shall be formulated under the Sabah Water Resources Enactment 1998 to prescribe the types of development activities that result in earthwork, removal of vegetation, alteration of the watercourse and discharge of pollution.

Leadership	Partner(s)	Start Phase	End Phase
DID	Attorney General's Chambers	1	1

Activity 5.14 : Amend the Sabah Wildlife Conservation Enactment 1997 to enforce the State-wide ban on shark hunting

Sabah is expected to completely ban the hunting of sharks for its fins by 2013 to allow shark populations in its waters to recover. The Sabah Wildlife Conservation Enactment 1997 should be amended to provide the legal provisions to enforce this state-wide directive (in addition to future amendments that could be introduced in the Fisheries Act 1985).

Leadership	Partner(s)	Start Phase	End Phase
SWD	Attorney General's Chambers	1	1

Activity 5.15 : Strengthen the regulations on Live Reef Food Fish trade

Increases in the market demand for live reef food fish has resulted in the overall decline of reef fish populations throughout the region. Presently, the Fisheries Act 1985 does not specifically address issues related to live reef food fish. The Act needs to be strengthened to incorporate catch restrictions (e.g. for the rare Humphead wrasse), catch limits and the regulations of the sale and export of live reef food fish.

Leadership	Partner(s)	Start Phase	End Phase
DOF	Attorney General's Chambers	2	2

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Activity 5.16 : Encourage conservation on alienated land and native reserves

Land-related legislations shall be reviewed to encourage biodiversity conservation on alienated land and native reserves.

Leadership	Partner(s)	Start Phase	End Phase
LSD	Attorney General's Chambers	2	2

Activity 5.17 : Undertake a comprehensive review of all biodiversity-related legislation in Sabah

Many agencies have important roles and responsibilities in the conservation of biodiversity in Sabah. However, there are issues in terms of gaps in jurisdiction and conflicting laws and legislations as well as frameworks. A review is required to streamline the functions as well as to optimise already limited resources available at each agency.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	Attorney General's Chambers	1	1

Activity 5.18 : Review entrance fees to protected areas

The entrance fees to all our protected areas and parks shall be reviewed from time to time to ensure that the fees reflect the actual costs of protecting and upkeeping the areas.

Leadership	Partner(s)	Start Phase	End Phase
SP, SFD		2	2

Activity 5.19 : Conduct feasibility study on the implementation of an eco-tax on tourists

Funding for conservation activities is limited, as such the need to source for funds through other mechanisms. An eco-tax could be imposed on the tourism sector, which directly benefits from conservation activities. However, a feasibility study needs to be carried out to assess how funds are collected, managed and disbursed; and how much can be potentially generated and its impact, if any, on the tourism sector.

Leadership	Partner(s)	Start Phase	End Phase
UPEN, SEDIA		2	2

Activity 5.20 : Develop and implement the Sabah REDD+ roadmap

The Sabah Forestry Department is developing a State roadmap for UNFCCC's Reduced Emissions from Deforestation and Degradation (REDD+) programme. The roadmap takes into cognisance of the role of Sabah's tropical rainforest which is an important carbon sink and component of the global carbon cycle. The key components of the roadmap will be the mapping of the State's carbon stock, the establishment of demonstration projects, the identification of funding options and capacity building. The roadmap shall be implemented immediately.

Leadership	Partner(s)	Start Phase	End Phase
SFD		1	3

Activity 5.21 : Create awareness of the green technology soft loan scheme

Funding for conservation activities is limited, as such the need to source for funds through other mechanisms. An eco-tax could be imposed on the tourism sector, which directly benefits from conservation activities. However, a feasibility study needs to be carried out to assess how funds are collected, managed and disbursed; and how much can be potentially generated and its impact, if any, on the tourism sector.

Leadership	Partner(s)	Start Phase	End Phase
UPEN, SEDIA		2	3

SECTION B5: STRATEGY 5 – STRENGTHENING OUR CAPACITY TO MANAGE BIODIVERSITY

Activity 5.22 : Conduct training and awareness-raising programme on intellectual rights and FPIC for local communities

The Free, Prior, and Informed Consent (FPIC) principles refers to the right of people to participate in any decision-making process that will have an impact on them. For many local communities, there is still inadequate understanding what these rights are and on how they can articulate their concerns during the decision-making process.

Leadership	Partner(s)	Start Phase	End Phase
SaBC		1	3

Activity 5.23 : Introduce a training module on FPIC for government staff from the related agencies

To support the process of FPIC, all stakeholders need to be adequately trained. In particular, the front liners of related government agencies that directly engage with local communities (and other stakeholders) must understand their role in facilitating the participation of people that are affected and in ensuring that any concerns are reflected in decisions that are made.

Leadership	Partner(s)	Start Phase	End Phase
SaBC		1	3

Activity 5.24 : Organise an annual 'Green Dialogue'

SaBC will target to hold an annual 'Green Dialogue' which will aim to engage all related organisations i.e. government agencies, non-government organisations, community-based organisation etc. in a discussion where issues related to biodiversity will be addressed. The dialogue would also be a platform to share information, monitor progress, collaborate on projects, development partnerships and resolve conflicts.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	EAC, SEEN	1	3

Activity 5.25 : Develop twinning programme between LKSW and Ramsar sites in other countries

Twinning programmes with well-established Ramsar sites in other countries shall be explored. There are numerous financial and management benefits: (1) the capacity of staff can be increased through staff exchanges and other types of joint exercises, (2) a platform to facilitate collaborative projects would be developed, and (3) there will be better recognition and visibility to attract visitors from around the world.

Leadership	Partner(s)	Start Phase	End Phase
SFD	SaBC	1	2

Activity 5.26 : Establish the Sabah Regional Biodiversity Training Centre

The Sabah Regional Biodiversity Training Centre is envisaged as a world-class training facility where both Malaysian and international participants would be trained across various facets of tropical biodiversity. In the long-term, the centre shall be self-financing through fees, grant and professional services.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	UMS	2	3

Activity 5.27 : Nominate the Lower Kinabatangan as a Biosphere Reserve under the UNESCO MAB Programme

The Lower Kinabatangan is a complex mosaic of wildlife sanctuaries, state land forests, mangroves, oil palm plantations, tourist lodges and human settlements. As a Biosphere Reserve, it would be an ideal site where innovative approaches and practices to manage nature and human activities in a sustainable manner could be tested and demonstrated. A draft dossier for the nomination has already been prepared by SWD/HUTAN.

Leadership	Partner(s)	Start Phase	End Phase
SWD	HUTAN	1	1

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Activity 5.28 : Nominate the Kota Kinabalu Wetlands as a RAMSAR site

The Kota Kinabalu Wetlands comprises of 24 ha of mangrove forest located right outside of Kota Kinabalu. In addition to its rich biological resources, the site is important for education, recreation, tourism and research activities. The wetlands can be designated as a Ramsar site to enhance its protection and to support the maintenance of its multiple functions and services.

Leadership	Partner(s)	Start Phase	End Phase
SaBC	Sabah Wetland Conservation Society	1	1

Activity 5.29 : Nominate the Maliau Basin, Danum Valley and Imbak Canyon as a UNESCO World Heritage Sites

Sabah is blessed with a number of natural areas of biological significance. To enhance protection and conservation, important areas can be designated as World Heritage Sites which. This would provide better recognition for Sabah as a biodiversity hotspot, attract more tourists and also enable site managers to access funding dedicated for such sites.

Leadership	Partner(s)	Start Phase	End Phase
SFD, YS	MTCE	1	1

PART C
IMPLEMENTATION

Section C1
Implementation Framework

C1.1 INTRODUCTION

This strategy:

- **is a call to action to a wide biodiversity partnership to work together to protect the biological diversity of Sabah.** Government and its agencies will play a leading role delivering the strategy, but cannot achieve success alone. The wider partnership of civil society, private sector, indigenous communities and the society at large, that has already played a hugely important role, is essential for success.

- **provides a supporting and enabling framework for action across Sabah by partners at all levels. It is intended to help guide, inform, empower and support action for biodiversity, setting out goals and targets to be achieved and identifying how partners can best contribute.** The strategy is designed to deliver its outcomes, while allowing partners freedom to choose how they might contribute and how to best deliver according to their local circumstances and capabilities.

The overarching long-term goals, the 2022 targets and the actions are designed to clearly communicate the state priorities.

Concrete results in terms of conserving and enhancing biodiversity can only be achieved if “everybody is involved”. We need to continuously strive to engage all the people of Sabah to participate in the implementation and monitoring of the strategy.

C1.2 ROLES AND RESPONSIBILITIES FOR IMPLEMENTING THE STRATEGY

The Strategy is designed to provide a road map for all stakeholder groups involved in conserving biodiversity. The broad roles and responsibilities of these stakeholder groups in implementing the Strategy are outlined below.

C1.2.1 Indigenous Communities

Many of the indigenous communities in Sabah have a long history of natural resource management in fulfilment of their cultural practices. Many areas outside the formal PA network are managed by communities and these help fulfil valuable conservation functions. The indigenous communities also have rich traditional ecological knowledge. Indigenous communities will be active partners in the long-

term conservation of biodiversity, applying traditional knowledge in biodiversity management together with other stakeholders. The proposed Working Group on CBNRM will strategize and coordinate local and indigenous communities' contribution to this strategy.

C1.2.2 Society at Large

For this strategy to be effective, all the people of Sabah need to contribute personally to biodiversity conservation. This could involve learning more about how to live sustainably—for example, by supporting, joining or forming groups concerned with issues such as conserving particular species or areas or reducing their ecological footprint. The proposed Sabah Biodiversity Volunteers Network will harness the energy of the society at large to contribute towards protecting Sabah's biological heritage.

C1.2.3 Civil Society

Non-governmental environmental and community-based organisations have considerable local knowledge and expertise in biodiversity conservation management. They too have had a long history of working in Sabah and many of the past successes in the state can be attributed to their support and initiatives. Given their vast knowledge, their credibility and the ability to work with local communities as well as regional and international network, civil society will play a very important role in the implementation of this strategy. Civil society also has extensive networks that offer an important mechanism for improving and communicating Sabah's biodiversity knowledge.

C1.2.4 Private Sector

The private sector includes the tourism, fisheries, forestry, agriculture, financial services, and land and urban development industries. Of these sectors, agriculture and forestry have major influences on biodiversity, as they occupy more than 90% of the land area of the state. A large proportion of the state's working population is employed by the private sector. The private sector has a fundamental role in making most of the development and investment decisions that affect our lands and the ocean. The formation of enduring partnerships with the private sector will help to ensure that the priorities of this strategy influence their decision making and investments. The foundation to sound partnerships is open communication, information sharing and consultation on actions. The proposed Sabah Business Council for Sustainable Development will drive the private sector initiatives.

C1.2.5 Research and Education Communities

Implementing the strategy will require the best available scientific expertise and knowledge. Sabah has a good research community at the universities and research institutions and this community has an important role in the effective implementation of the strategy. Establishing practical partnerships with educators and communicators will also be valuable in increasing the community's awareness and understanding of Sabah's biodiversity and its role in our society. The Universiti Malaysia Sabah and the Sabah Environmental Education Network will be the focal points for coordinating research and communication efforts respectively.

C1.2.6 Local Authorities

Local initiatives are important for achieving sustainable development. Local government will be a valuable contributor to efforts to conserve biodiversity through its role in local planning and, increasingly, through its role in environmental management and monitoring. Local government engagement in the strategy will, in general, be managed through the relevant state government machinery.

C1.2.7 State Government

The State Government and its agencies will play the leading role delivering the strategy and have constitutional and legal responsibility for the management of land, water and biodiversity within their jurisdictions. Many agencies will be directly responsible for implementing this Strategy, either on their own or in partnership with other agencies, civil society and private sector. Besides these, all agencies will continue their on-going efforts of planning, monitoring and enforcement. Most of the funding and resources for implementing this strategy will also come from various government agencies. The Sabah Biodiversity Centre (SaBC) will be the coordinating agency and it will be strengthened to enable it to play this role effectively.

C1.2.8 Federal Government

The Federal Government has obligations to Sabah's biodiversity in many ways. These include strategizing at the national level, regulating the import and export of animals and plants and coordinating national efforts to fulfil our international obligations. The Federal Government is also responsible for the oceans between

the limit of state managed waters and the 200 nautical mile boundary of Malaysia's exclusive economic zone.

C1.3 COORDINATING MECHANISM

C1.3.1 Sabah Biodiversity Council

This strategy which will be implemented over a 10-year period, will be steered by the Sabah Biodiversity Council which is chaired by the Chief Minister. This is in line with the provisions of the Sabah Biodiversity Enactment that mandates the Council to plan, implement and monitor strategies pertaining to the state's biological diversity. Sabah Biodiversity Centre (SaBC) will act as the secretariat.

C1.3.2 Sabah Biodiversity Centre

SaBC will be the key agency to coordinate, facilitate, communicate, review and monitor the strategy although the responsibility of implementing the many action plans lies with various stakeholders. SaBC's responsibilities with regards to this strategy will include :

- Communications pertaining to the strategy and its implementation (see section C1.5)
- Collating and disseminating information pertaining to the strategy
- Liaison with Federal government with regards to mainstreaming Sabah's priorities into the various national planning processes.
- Convening meetings and supporting the SBS Advisory and Monitoring Panel (see section C1.3.3)
- Convening meetings and supporting the Working Group on CBNRM (see section C1.3.5)
- Coordinating the monitoring and measuring the success
- Coordinating the review of the strategy (if necessary)

C1.3.3 SBS Advisory and Monitoring Panel

In line with the spirit of the strategy that calls for partnerships between all stakeholders, a multi-stakeholder SBS Advisory and Monitoring Panel will be established. The role of the SBS Advisory and Monitoring Panel will include :

- Provide technical advice and support to the SaBC to refine and coordinate the various actions plans of this strategy.

- Assist the SaBC in encouraging and roping in potential partners to implement the various action plans and identify funding sources.
- Act as the interface between the government and other stakeholders for the purpose of soliciting and disseminating information pertaining to the implementation of the strategy.
- Monitor the implementation of the strategy, guided by the goals and targets of this strategy.
- Promote the spirit, values and goals of the strategy to the people of Sabah.

The SBS Advisory and Monitoring Panel will consist of the following :

- Director, NRO (Chair)
- 4 representatives from government agencies
- Universiti Malaysia Sabah
- 2 representatives from environmental/biodiversity-based NGOs
- 2 representatives from community-based NGOs
- 3 representatives from the private sector
- 3 eminent persons appointed by the SaBC

C1.3.4 Sabah Business Council for Sustainable Development

The, yet to be formed, Sabah Business Council for Sustainable Development (SBCSD) will be the main organization for the galvanizing and coordinating the private sector's contribution to the strategy. It is envisaged that SBCSD, recognizing the diversity of private sector organizations, will be able to encourage the private sector to develop various programmes that will contribute to the implementation of this strategy. Besides the SBCSD platform, individual private companies may choose to work directly with government agencies and civil society. The SBCSD will comprise exclusively of private companies.

C1.3.5 Working Group on CBNRM

The Working Group on CBNRM will be the main platform for encouraging, facilitating and strategizing conservation efforts by local indigenous communities. This multi-stakeholder working group will be established under the aegis of the NRO. The members of the Working Group will include :

- Director, NRO (Chair)
- 1 representative from Lands & Survey Department
- 1 representative from Forestry Department

- 1 representative from Wildlife Department
- 1 representative from Sabah Parks
- 1 representative from Museum Department
- 1 representative from Ministry of Local Government (Native Affairs Unit)
- 1 representative from Native Court
- 3 representatives of community-based NGOs
- 3 representatives of environment-based NGOs
- 1 representative of School of Social Sciences, UMS
- 2 eminent persons to be appointed by the SaBC

C1.4 PHASING

This is a 10 year plan from 2013 to 2022. The implementation of the strategy is divided into three phases. 2012 is considered as the planning/ inception year.

Phase 1 : 2013 – 2015 (3 years)
Phase 1 will be an important period for fostering partnerships, raising awareness, establishing and strengthening various institutional arrangements and fund raising – that will eventually expedite the implementation of the entire strategy.

Phase 2 : 2016 – 2018 (3 years)
Phase 2 will see many of the action plans under Strategic Thrusts 2 and 3 commence and be completed. Capacity building, awareness raising, and the implementation of best management practices will all be intensively pursued during this phase. Some of the action plans may have to be fine-tuned based on the outcomes in Phase 1.

Phase 3 : 2019 – 2022 (4 years)
The Phase 3 would be a busy period with the execution of all the remaining action plans. The focus during Phase 3 will be on securing habitats and eliminating external pressures.

SaBC, together with NRO, will develop a more detailed phasing schedule.

C1.5 COMMUNICATING THE STRATEGY

Communicating the strategy to all stakeholders will be a vital and continuous activity during the implementation period. This will entail five key tasks :

- Communicating and continuously reinforcing the goals of strategy and how it helps in the development of the Sabah and well-being of the people
- Communicating about the progress in implementing the strategy, what projects and programmes are going on and who is involved
- Communicating about the opportunities for and collaboration and participation in on-going and upcoming programmes and projects
- Communicating about the progress in achieving the targets
- Communicating about the success stories

SaBC shall play the lead role in the communications – from designing the messages, collating progress and ensuring that the message is effectively delivered and understood by the stakeholders. The methods and messages shall be determined through the formulation of the Sabah Biodiversity Communications Plan.

The SBS Conference will held at the end of each phase to disseminate information about the success and setbacks of the strategy as well as to enable various partners to learn from each other. The first such conference shall be held at the end of 2015.

Annual reports will be published every March of the following year and disseminated to all stakeholders.

C1.6 MAINSTREAMING THE STRATEGY AT ALL LEVELS

We need to work with the Federal government to ensure that Sabah's biodiversity priorities are reflected in the National Biodiversity Strategy and Action Plans review. Similarly we need to engage with existing national planning processes in order to mainstream Sabah's biodiversity conservation priorities, in e.g. poverty reduction strategies, national strategies related to the Millenium Development Goals and strategies to adapt to climate change. SaBC will lead this process.

All government agencies will ensure that this strategy is integrated into spatial and sectoral planning at the district and local levels.

C1.7 REVIEW OF THIS STRATEGY

It is vital that we regularly review the strategy. This can be in response to or in anticipation of changing priorities at the global (e.g. MEA conference decisions), national or state level priorities; and funding opportunities or challenges. The findings of the review shall be discussed at the SBS conference. The review will be coordinated by SaBC.

Appendix I
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