PART II:

PROTECTED AREA MANAGEMENT
Protected Areas and Ecosystem Conservation: Why We Need Protected Areas?

By

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SABAH PARKS
**What is Protected Area?**

IUCN World Commission on Protected Areas Symposium

Masaaki Yoneoka (JICA Advisor)

**Protected Areas in Sabah**
- Forestry Department
  - Forest Reserves (Class 1–7)
- Sabah Parks
  - Six State Parks
- Sabah Wildlife Department
  - Wildlife Sanctuaries; Conservation Areas
- Sabah Foundation
  - Two Conservation Areas
    - Danum Valley Conservation Area
    - Maliau Basin Conservation Area

**Objectives of Protected Areas**
- Scientific Research
- Wilderness protection
- Preservation of species and ecosystem
- Maintenance of ecosystem services
- Protection of specific nature and cultural features
- Recreation and Tourism
- Education
- Sustainable use of resources from natural ecosystem
- Maintain culture and traditional feature

**IUCN Protected Area Management Categories (I – III)**

I. Strict protection:
   a) Strict Nature Reserve / Wilderness Area:
      mainly for science
   b) Strict Nature Reserve:
      mainly for wilderness protection
II. Ecosystem conservation and recreation
    (National Park)
III. Conservation of natural features (Natural Monument)

**IUCN Protected Area Management Categories (continue) IV - VI**

IV. Conservation through active management
    (Habitat / Species Management Area)
V. Landscape / seascape conservation and
    recreation (Protected Landscape / Seascape)
VI. Sustainable use of natural ecosystems
    (Managed Resource Protected Area)

**Matrix of Protected Area Management Objectives**

<table>
<thead>
<tr>
<th>Management Objectives</th>
<th>I-a</th>
<th>I-b</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific research</td>
<td>***</td>
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<td>***</td>
</tr>
<tr>
<td>Wilderness protection</td>
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<td>***</td>
</tr>
<tr>
<td>Species diversity</td>
<td>***</td>
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<tr>
<td>Environmental service</td>
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<td>***</td>
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<tr>
<td>Natural/cultural feature</td>
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<td>***</td>
</tr>
<tr>
<td>Tourism &amp; recreation</td>
<td>***</td>
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<td>***</td>
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<tr>
<td>Education</td>
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<td>***</td>
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<tr>
<td>Sustainable use</td>
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<td>***</td>
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<tr>
<td>Cultural attributes</td>
<td>***</td>
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<td>***</td>
</tr>
</tbody>
</table>

* = Primary Objectives, ** = Secondary Objectives, = Potentially not applicable.
Protected Areas in the World

- A total of 30,350 protected areas are listed (1997)
- (> 1,000 ha areas,
  (island > 100ha))
- The Protected area covers 13,232,275 km² including
  1,580,609 km² marine protected area

Protected Areas of the World (2)
Area size and numbers of the protected area in the world

<table>
<thead>
<tr>
<th>Size (ha)</th>
<th>Numbers (%)</th>
<th>Total area (km²) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1,000</td>
<td>17,892</td>
<td>28,713</td>
</tr>
<tr>
<td>1,000-100,000</td>
<td>10760</td>
<td>1,854,976</td>
</tr>
<tr>
<td>&gt;100,000</td>
<td>1,673</td>
<td>11,560,000</td>
</tr>
</tbody>
</table>

Large Protected Areas in the World:
1. Desert: 972,000 km² (7.3% of the total protected area of the world)
2. At-Taba-Helal protected area (Saudi Arabia): 640,000 km² (4.8%)
3. Great Barrier Reef (Australia): 344,925 km² (2.4%)

Protected Areas of the World (3)
Percentage of number and areas of protected areas according to IUCN Categories

International Convention for Protected Areas

Why we need international protected area?
1. Ecosystem (Biome) cross national boundary
2. Protection of migratory species
3. Protection from borderless human activities

Central Stars:
Biogeographic Unit

Elephant Migration

International Convention for Protected Areas (2)

Global:
- Ramsar Convention (Wetland Convention)
- World Heritage Convention
- Convention on Biological Diversity
- Bonn Convention (Convention on Conservation of Migratory Wild Animals)
- UNESCO MAB (Man and Biosphere) Program

Regional:
- ASEAN Heritage Parks and Reserves (1997)

Flora: Enumeration

- 621 species of ferns
  - 3% of the world’s total; 50 species endemics
- 711 species of orchids
  - Only 60% from its estimated total orchid flora of 1200 species.
  - 5% of the world’s total; 10% endemism
- 600 species of moss and liverworts
- 27 species of Rhododendron
  - 9 endemics
  - Including one that has just been discovered and published last year: Rhododendron aemulare
Ramsar Convention: Convention on Wetlands of International Importance (1)

Objectives:
- Registration of important wetlands
- Wise use of wetlands
- Establishment of protected areas
- Preparation of Wetland management plan
- Conservation of wetlands by national law/regulations

Ramsar Convention: Convention on Wetlands of International Importance (2)

Old criteria for registration
- Important Wetland for waterfowl

New criteria (after 1999)
1. Representative wetland in a biological region
2. Habitat of rare species
3. Wintering/Breeding area of waterfowl
4. Habitat of fish

Ramsar Convention: Convention on Wetlands of International Importance (3)

Wetlands registration
- Global: ≥1,000 (Goal: 2,000 wetlands until 2005)
- Malaysia: Tasek Bera (Peninsula Malaysia)
- Japan: 10 sites
- Potential site in Sabah:
  - Lower Kinabatangan
  - Lower Segama
  - Klias - Padas

World Heritage Sites

Heritage types:
1. Natural Heritage
2. Cultural Heritage
3. Mix Heritage

Criteria:
"Natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty"

Bonn Convention (Conservation of migratory animals)

Objectives:
- Protection of trans boundary migratory animals

Listed species:
- Appendix I: 66 species
  - Strict protection (including several whales)
- Appendix II: 170 species
  - Including 99 birds, African elephant, hawksbill

Biome and Protected Area of the World
Area of Region and Protected Areas (%) of the World

Global Important Area for Conservation (1)

- Hotspot (CI)
  - Unusual Concentration of species area
  - Covered habitat of 47% of plant species
    (124,000 species) of the world

Global Important Area for Conservation (2)

Endemic Bird Areas (Birdlife International)

- Select endemic bird (2,623 species)
- Mapping the endemic bird habitat
- Selecting 218 EBAs in the World
- Borneo: Borneo mountain area

Global Important Area for Conservation (3)

Global 200 (WWF)

- Classification of global ecoregion
- A total of 233 bio-geographic realm were Selected
  (Terrestrial ecosystem = 136, Freshwater ecosystem = 36, Marine and polar ecosystem = 61)
- Borneo:
  1) Northern Borneo – Palawan mountain forest
  2) Mt. Kinabalu Montane and Alpine scrub & forest

Focused protected areas under BBEC programme

Lower Kinabatangan
Crocker Range Park
Kulamba and Tabin Wildlife Reserves (Lower Segama)
Malau Basin
Protected Area Management Training for Sabah Parks Staffs

What is Protected Areas?
- Why we need protected areas and why we have to conserve ecosystem? -

Masaaki Yoneda
(JICA advisor for park management and conservation biology)

1. Background
We want to enlarge our agriculture land, but you prohibit slashing forest inside park. Why do you establish protected area? This might be frequent question and claim from local communities around the park to park rangers. Why we need protected area? It is a basic question and most difficult matter to answer, but we have to give a reply it to get consensus of our park management. I think that each person who is in charge of park management should prepare answer to the question respectively. In this class, history of national parks, definition and needs of the protected area are lectured on to give suggestion to the question.

2. Definition of protected areas
[Sabah Parks (Parks Enactment 1984, Part I)]
Park means any area of land constituted as a Park under the provisions of Part II (Park Enactment 1984)

[Wildlife sanctuary (Wildlife Conservation Enactment 1997, Part III)]
(a) protect nature and maintain wildlife habitats and natural processes in a undisturbed state.
(b) ensure the maintenance of biodiversity values; or
(c) ensure the condition necessary to protect significant species of animals or plants, biotic communities or genetic resources.

[Natural Park Law of Japan, 1957]
The Natural Parks Law intends to conserve excellent scenic beauty of Japan with characteristic ecosystem or configuration forever in its original state as much as possible. In accordance with the law the Director General of the Environment Agency designates areas of natural beauty as National, Quasi-national, which open to the public, will contribute to peoples health, recreation, and culture. The Law stipulates that Prefectural Government can designate Prefectural Natural Parks equivalently in accordance with the prefectural regulation.

[IUCN-WCPA, 1994]
An area of land and/or sea especially dedicated to the protection and maintenance biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

IUCN: The World Conservation Union (International Union for Conservation of Nature and Natural Resources)
WCPA: World Commission on Protected Areas

World Heritage Sites

1. Criteria for listing
"outstanding universal value"
   i) Geological processes (including evolution of the earth)
   ii) On-going ecological and biological processes
   iii) Superlative natural phenomena and/or exceptional natural beauty
   iv) Habitats for the conservation of biological diversity (including threatened species)

2. Criteria of outstanding universal value (IUCN)
   i) The intention is to not list all sites of great interest, importance or value
   ii) Although sites would be the "best of their kind", a regional perspective is also required in order to make a selection
   iii) The term implies uniqueness and representatives, so the comparative evaluation of similar properties is essential
3. History of protected area and park land owner

The first national park was established in 1872 as the Yellowstone National Park in United States. Before the time, there were hunting protected areas or protected forests in most of countries in the world. However, most of the areas were private lands for royal family or noblemen and were not open for public. The Yellowstone NP was a public park under federal law. The national park idea was spread to the world especially to Europe, the Commonwealth of England and Spain colonial countries in 20th century. It is said that the idea of national parks was born in United States and was made practical by England.

<table>
<thead>
<tr>
<th>Country</th>
<th>Name of NP</th>
<th>Year establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>Yosemite NP</td>
<td>1890 (State Park of California: 1864)</td>
</tr>
<tr>
<td>South Africa</td>
<td>Kruger NP</td>
<td>1929</td>
</tr>
<tr>
<td>Zambia</td>
<td>South Ruanga</td>
<td>1938</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Taman Negara</td>
<td>1939</td>
</tr>
<tr>
<td>Kenya</td>
<td>Nairobi NP</td>
<td>1946</td>
</tr>
</tbody>
</table>

There are around 30,000 protected areas and they covers 8% of terrestrial land of the earth. But, land owners of the national parks or protected are different among the countries. Most of countries in North America and Oceania adapt “national parks on public estate” system (Group 1), whereas Japan and many countries of Europe use “parks on zoning estate” or mixed system (Group 2 or Group 3).

- Group 1: Park on public estate (National Parks are established on wilderness area of public land, and human settlement are not allowed in principle in the National Park)
  - North America, Oceania (Australia and New Zealand) and Commonwealth countries (England colonial countries). Spanish colonial countries (Central and South American Counties, however, some of the National Park are not managed effectively)

- Group 2: Park of zoning estate (human activities / settlement areas are allowed under regulation in the National Park)
  - Japan and many European countries

- Group 3: Mixed system of park on public estate and zoning estate
  - Other countries (including developing countries)

4. Ecosystem and protected area

(1) Definition of ecosystem
A dynamic complex of plan, animal, fungal and microorganism communities and their association non – biological (abiotic) environment interacting as a ecological unit

(2) Ecosystem services and four level Biodiversity
Fore level biodiversity is recognized by the scientists and international convention for biodiversity conservation. Ecosystem diversity offers a lot of “services” to our life (Table 1).

1) Genetic diversity: the variety of genes within a particular species
2) Species diversity: the number and variety of species found in a given area in a region
3) Ecosystem diversity: the variety of ecosystems that occurs within a larger landscape
4) Landscape diversity: the diversity of ecosystem complex

Table 1. Economic value of blessings of nature  (After, Costanza et al., 1997)
5. Why we need protected areas

Ø Our life depends on the ecosystem process (productivity and services).
Ø Humanity is ultra power animal on the earth, and use around 40% of global natural products.
Ø The monopoly/overuse of the natural resources might bring catastrophic degradation of the global ecosystem.
Ø Communal land (forest/agriculture area) system usually bring “Tragedy of Commons”
Ø Protected areas are necessary
Ø To maintain ecosystem as our life support system
Ø To preserve focused area from “Tragedy of Commons”
1. Category of Protected Areas
IUCN had decided 10 categories of protected areas until 1994. The protected area categories have been revised in 1994 and 7 categories are used for classification of the protected areas of the world. The State parks of Sabah are classified into Category II.

[Categories of protected areas by IUCN]
Category I. Strict protection:
   I-a) Strict Nature Reserve / Wilderness Area: mainly for science
   I-b) Strict Nature Reserve: mainly for wilderness protection
Category II. Ecosystem conservation and recreation (National Park)
Category III. Conservation of natural features (Natural Monument)
Category IV. Conservation through active management (Habitat / Species Management Area)
Category V. Landscape / seascape conservation and recreation (Protected Landscape /Seascape)
Category VI. Sustainable use of natural ecosystems (Managed Resource Protected Area)

Table 1. Matrix of protected area management objectives and IUCN categories (after, IUCN, 1994)

<table>
<thead>
<tr>
<th>Management objectives</th>
<th>Category by IUCN</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific research</td>
<td>Strict Reserve</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Wilderness protection</td>
<td>Wilderness Area</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Species / genetic diversity</td>
<td>National Parks</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Environmental services</td>
<td>National Monument</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Natural / cultural features</td>
<td>Habitat</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Tourism and recreation</td>
<td>Landscape</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Education</td>
<td>Resource protection</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sustainable use</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Cultural attributes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Key: 1; primary objective, 2; secondary objective, 3; potentially not applicable, -; not applicable

2. Protected area lists of the world
The United Nations List of Protected Areas (UN List) provides a single definitive list of the world’s protected areas, classified according to IUCN categories. For practical reasons alone, only those protected areas larger than 1,000 ha are actually listed, as well as offshore or oceanic islands of at least 100 ha where the entire island is protected. A total of about 30,000 protected areas are listed in the UN List and they cover 8.8% of the earth’s surface (Table 2).

Table 2. Global protected areas network classified by IUCN category (After, IUCN, 1997)

<table>
<thead>
<tr>
<th>IUCN management category</th>
<th>Number (%)</th>
<th>Extent (km²) (%)</th>
<th>Mine size (km²)</th>
<th>National land (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>4,389 (14%)</td>
<td>978,698 (7%)</td>
<td>223</td>
<td>0.65</td>
</tr>
<tr>
<td>b</td>
<td>809 (3%)</td>
<td>940,360 (7%)</td>
<td>1,162</td>
<td>0.63</td>
</tr>
<tr>
<td>c</td>
<td>3,384 (11%)</td>
<td>4,001,605 (30%)</td>
<td>1,183</td>
<td>2.67</td>
</tr>
<tr>
<td>d</td>
<td>2,122 (7%)</td>
<td>193,021 (11%)</td>
<td>91</td>
<td>0.13</td>
</tr>
<tr>
<td>e</td>
<td>11,171 (37%)</td>
<td>2,459,703 (19%)</td>
<td>220</td>
<td>1.64</td>
</tr>
<tr>
<td>f</td>
<td>5,578 (18%)</td>
<td>1,057,448 (8%)</td>
<td>190</td>
<td>0.71</td>
</tr>
<tr>
<td>g</td>
<td>2,897 (10%)</td>
<td>3,601,440 (27%)</td>
<td>1,243</td>
<td>2.40</td>
</tr>
<tr>
<td>h</td>
<td>30,350 (100%)</td>
<td>13,232,275 (99%)</td>
<td>436</td>
<td>8.83</td>
</tr>
</tbody>
</table>

Table 3 shows the protected area percentage to national land of 225 countries of the world. The percentage
of protected areas is over than 10% in Seventy-seven countries, but it is less than 1% in 32 countries. Protected areas is still not establish in fourteen countries analyzed.

<table>
<thead>
<tr>
<th>Percentage of Protected areas</th>
<th>Number of countries</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 10%</td>
<td>77</td>
<td>34</td>
</tr>
<tr>
<td>&gt; 5%</td>
<td>49</td>
<td>22</td>
</tr>
<tr>
<td>&lt; 5%</td>
<td>53</td>
<td>24</td>
</tr>
<tr>
<td>&lt; 1%</td>
<td>32</td>
<td>14</td>
</tr>
</tbody>
</table>

3. Management cost and staffs of the protected areas
Management cost of the protected areas is different among the region and countries. IUCN-WCPA estimates that $436/km² in average and a total of about 5.7 billion US$ is required for protected area management of the world per year. Twenty five staff in average is also required for proper management of the protected areas (Table 4).

<table>
<thead>
<tr>
<th>Total protected area of the world (km²)</th>
<th>Actual budget (US$161/km²)</th>
<th>Required budget (US$436/km²)</th>
<th>Required number of staffs (25person/1,000km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13,232,275</td>
<td>2.13 billion</td>
<td>5.77 billion</td>
<td>330,000</td>
</tr>
</tbody>
</table>

(Source, James et al., 1997)

4. Protected areas listed by international conventions

<table>
<thead>
<tr>
<th>Cultural Heritage</th>
<th>Natural Heritage</th>
<th>Mixed Heritage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>529</td>
<td>138</td>
<td>23</td>
<td>690</td>
</tr>
</tbody>
</table>

2) Ramsar Convention sites (2001) (number of countries ratification = 124 (2001))
Number of sites listed (1998); 1069 sites

3) Man and Bioshpere (MAB)
Number of sites listed (2000); 226 sites
Please read following model case around the park, and discuss better management of the “Padas National Park” regarding role of protected areas, “tragedy of commons” and ecosystem service value.

Situation:
A new car road has been opened from “Kota Lama city” to the “Kg. Ulu Istana” which locates near the “Padas National Park”. Population of the village is increasing because many people moved from towns to get new land. Number of village people who have lived for long time in the village are also increasing because many of their children come back from town. The village people want to enlarge agriculture area into inside the national park. Products of the village have increased but, income differentials are enlarging. Some people insist that there are traditional use areas inside the park, and they say that we have right to use the natural resources and land inside the park under the native customary right (NCR).

Problem
The other hand of increase of the population and agriculture area, following problems occur in the village and the national park;
- Illegal logging inside the park has increased because demand for construction material of new houses are become larger.
- Shifting cultivation (dry pady) areas have also increased and they have expanded inside the “Padas National Park”.
- Increase of cultivation area of ginger in steep slope along river has caused soil erosion.
- Landscape of the national park has been damaged because of increase of open area
- Visitors of the (nature lovers) has been decrease
- Poaching is also increasing because access to the animal habitat has been made easy.
As results of these activities, risk of natural disaster and soil erosion have been raised because of decrease of forest cover upstream of the village. Actually, landsides have occurred in several sites which were newly opened for cultivation. Fluctuation of water level of the river enlarges and flushes have occurred in downstream areas. Water of the river which the village people depend has got muddy.

Option (suggestion)
- Change of park boundary considering actual land use situation and the native customary right (NCR)
- Accept traditional land use inside the park for particular people who live there before the park established
- Development of wet pady for more rice product to reduce slush and burn sites
- Introduction / promotion of ecotourism
Parks: Design, Management and Functions

By

Mr. Paul Basintal
Assistant Director
Admin, Finance & Development

SABAH PARKS
Parks: Design, Management and Functions

A Lecture on Protected Areas Management for Sabah Parks Staff Poring Hot Spring Kinabalu Park, World Heritage Site 9 August 2002

Content of presentation (Kandungan syarahan)
- Background
- Definitions of the IUCN Protected Management Categories
- Designs
- Resource components of Parks
- Recreational impacts on resource components
- Strategies and concept of Management
- Recreational resource management
- Visitor management
- Functions of Parks

Background
- In 1872, President Grant of the US signed into law an act creating Yellowstone National Park, more than 2 million acres of superlative scenery and natural wonders.
- In 1916, US National Park Service was established to administer these preserves its duty was set forth:

Background (contd.)
- “to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of the future generations.”

Definitions of the IUCN Protected Management Categories
- Category Ia: Strict Nature Reserve: protected area managed mainly for Science
- Category Ib: Wilderness Area: protected area managed mainly for wilderness protection
- Category II: National Park: protected area managed mainly for ecosystem protection and recreation
- Category III: Natural Monument: protected area managed mainly for conservation of specific natural resources

Definitions of the IUCN Protected Management Categories (contd.)
- Category IV: Habitat/Species Management area: protected area managed mainly for conservation through management intervention
- Category V: Protected Landscape/Seascape protected area managed mainly for landscape/seascape conservation and recreation
- Category VI: Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems
**Designs**

- It is widely recognized that nearly all parks and reserves are too small to protect their biological diversity.
- Boundary models suggest that exposure of the reserve is a major determinant of potential vulnerability. (source: Schonewald-Cox & Bayes, 1996)

**Designs (contd)**

- The shape and size is used to determine an area-perimeter (a:p) ratio which is used as a measure of the principal exposure of the reserve interior to the exterior.
- If the a:p ratio is low for a reserve (e.g. bar-shaped), the average distance from any interior point to the nearest boundary point is small. In such a case, external processes would have a stronger influence on internal processes.
- If the a:p ratio is high for a reserve (e.g. circular) of the same size, the average distance from any point to the boundary is increased, and exposure is decreased.

**Physical Features**

- Mountains
  - Mount Kinabalu (4,095.2 m)
  - Various peaks and ridges
  - Mount Tombuyukan (2,579 m)
    - Third highest mountain in Malaysia (after Kinabalu and Trus Madi)
    - Overlooked by the famous Kinabalu, just 12 km north
    - Its peak is the intersection of the boundaries of three districts: Ranau, Kota Belud, Kota Marudu
    - Underexplored floristically, potential for new discoveries
  - Mount Tempier (1,133 m)
    - Possible site for a scientific expedition for 2003.

**Climate**

- Generally, humid tropical climate
- The climate differs according to elevations:
  - Elevation at the Park ranges from 132 m (at) around the upper western boundary at Marah Perak, to 1363 m at the top, to 4082 m at the summit.
- Mean Temperature
  - 18.3°C at the KP Hq (1,368m)
  - 24.3°C at the Poring Hot Springs Station (350m)
  - 11.9°C at Layang-Layang (2,645m)
  - 9.3°C at Perak Leban (3,372m)
- Mean Rainfall
  - 2,358mm at the KP Hq
  - 2,793mm at Poring Hot Springs
  - 2,239mm at Carson Camp and
  - 2,833mm at Perak Leban

**Flora**

- Reported to have one of the richest flora in the world per unit area;
  - 5000-6000 species of vascular plants
  - Contained in 200 families & 1000 genera
  - This is about 14% of the total flora of Malasia
    - (Malaysia: the phytogeographical region that covers Malaysia, Indonesia, Philippines and New Guinea)
  - About 2.5% of the total flora of the earth!

**Flora: Enumeration**

- 621 species of ferns
  - 5% of the world’s total, 50 species endemics
- 711 species of orchids
  - Only 60% from its estimated total orchid flora of 1200 species.
  - 5% of the world’s total, 10% endemics
- 600 species of moss and liverworts
- 27 species of Rhododendron
  - 9 endemics
  - Including one that has just been discovered and published last year: *Rhododendron lamabum*
Flora: Enumeration (2)
- 9 species of Nepenthes
  - 3 endemics
- 78 species of Figs
  - 13 endemics
- 30 species of wild ginger
- 6 species of bamboo
- 81 species of palms
- 2 species of Rafflesia
  - From the current 18 species in the world

Fauna: Enumeration
- 326 species of birds
  - In 47 families and 180 genera
  - (compare to 620 species in Borneo and 567 species in Sabah. Total Sabah Parks birds species: 442)
- 90 species of lowland mammals
  - (including 21 species of bats)
- 22 species of montane mammals

Fauna: Enumeration (2)
- 81 species of frogs and toads
- 112 species of moths
- Almost all of the 850 species of butterflies in Sabah
- 43 species of land snails
- 40 species of freshwater fishes
- 62 snakes
- 44 species of lizards

Species Richness & Endemism
- Six reasons why species are so prevalent and endemism is high on Kinabalu:
  - Great altitude and climatic range from tropical rain forests near sea level to sub-alpine conditions,
  - Precipitous topography causes geographical isolation of species even over short distances,
  - The geological history of the Malay Archipelago involving movement of several tectonic plates and the rise and fall of the sea level in ancient times,
  - Diverse geology with many localized bedrock and soil type conditions particularly serpentine and ultramafic substrates,
  - Frequent climatic oscillations influenced by the El Nino events, and
  - Local environment instability resulting from landslides, droughts, river flooding and glaciation.

Ecosystem Carbon at Kinabalu
- One of the most important functions of tropical rain forests is the storage of carbon in the vegetation and soils:
  - An extensive study found that the total amount of ecosystem carbon sequestered at Kinabalu is:
    - 300-400 tonnes/ha km in the lowland, and
    - 100 tonnes/ha km in the cooler highlands
  - Thus, total amount of ecosystem carbon within the Kinabalu Park is projected to be 21.4 million tonnes.

Scientific Research
- Scientific research has always been a major emphasis within the Parks system.
  - Data for effective management
  - Information for nature education and awareness
- Among the on-going research programmes at Kinabalu:
  - The Distribution, Reproductive Ecology and Conservation of Rafflesia
  - The Medicinal Plants of Mount Kinabalu
  - The Altitudinal Distribution of the Birds of Kinabalu
Publications

- A total of 446 publications since.
- To date, Sabah Parks has published 14 books in our official publication series.
- Sabah Parks Nature Journal; Annual publication; 5 volumes since 1998.
- 36 publications - in the form of books, monographs, scientific papers, journals, dissertations and reports - that introduced Kinabalu Park to the world.
- Among the early publications are:
  - Iy Spiewak St John in 1882 (Life in the Forests of the Far East).
  - K.A. Whitehead in 1933 (The Exploration of Mount Kinabalu).
  - C.M. Enriquez in 1937 (Khaebal, The Haunted Mountain of Borneo), and
  - Scientific papers by the like of Hugh Low, Lillian Gibbs, Shaft, Corin, Van Steenvo, Meier, Holleysey, Kurea, Beerman, etc.

Publications (books, video/cd & multi-media);
- Sabah Parks publication series; (Guide to the Parks, Nepenthes, Rhododendron, Moss, Frogs, etc.)
- Rafflesia of The World
- CRP expedition series
- Sabah Parks Nature Journal (Annual)
- Sabah Parks Official Guide Series
- Parks of Sabah

Communities Around Kinabalu

- The protection of Kinabalu probably started long before written history.
- Kinabalu is sacred to the Kadazandusuns who believe it to be the resting place of the spirits of their ancestors.
- The mountain is revered and respected, thus the locals have refrained from cultivating or deforesting the mountain.
- Still pristine and intact when gazetted in 1964.
- In a way, we are indebted to the surrounding indigenous communities for protecting the mountain and forgoing their rights after gazettement. We are looking into ways of incorporating them into our system.

The Kinabalu Park Management Masterplan, 1990

- Towards sustained development
- Five strategic thrusts:
  1. Conserving the biological and physical resources
  2. Spearheading scientific research and enhancing educational values
  3. Increasing recreational and touristic activities
  4. Preserving cultural and historical values
  5. Instituting management procedures to support the other strategic thrusts.

Focused protected areas under BBEC programme

What are purpose and activities of Park Management Component?
Basic strategies for managing recreational sites

- Leave open, culturally treat:
  - keeping the site open to public use while implementing some cultural program to maintain ground vegetation and soils.
  - The only effective way to implement this policy is on a regular basis.

Basic strategies for managing recreational sites

- Close, Natural Recovery:
  - When the sites are in the early stages of deterioration, we should predict certain results and close the area at that point, allowing more rapid recovery.
  - Appropriate for heavily used sites in wilderness areas that must be allowed to recover naturally.

Basic strategies for managing recreational sites

- Close and culturally treat:
  - The overused site is closed to public use and certain cultural treatment (soil aeration and fertilization) are introduced to speed recovery.
  - Appropriate for heavily deteriorated sites.

Basic strategies for managing recreational sites

- Rest and rotate:
  - Additional sites are developed so that sufficient facilities are still available when other areas are closed for rejuvenation.

A Basic Approach to Ecosystem Management

- Inventory of present soils and vegetative conditions
- Reconstruction of Recent Ecological History
- Establishment of a policy
- Coordination of Fire Management
- Interpretation of the natural role of fire

Visitor Management

- Aimed at directly or indirectly manipulating visitors to protect and enhance their recreational experiences and to protect, enhance or rehabilitate the resource base.
A Basic Approach to Visitor Management

- Distribution of visitor use
- Information services:
  - To inform visitors of behavioral norms, to guide visitors' resource use, and to explain why certain actions are necessary.
- Interpretative services
- Public safety

Functions of Parks

- Maintenance of biodiversity
- Gene pool
- To serve as outdoor laboratories to which the uninterupted operation of natural laws can be studied to the best advantage
- Eradication control
- Watershed
- Carbon sequestration
- Wildlife habitat
Planning for Protected Areas Management

By

Dr. Masaaki Yoneda
JICA Advisor

SABAH PARKS
An Overview into Conventions and Legislations related to Protected Areas in Sabah

Jamil Nais

Protected Areas in Sabah

- Forestry Department
  - Forest Reserves (Class 1 – 7)
- Sabah Parks
  - Six State Parks
- Sabah Wildlife Department
  - Wildlife Sanctuaries; Conservation Areas
- Sabah Foundation
  - Two Conservation Areas
    - Deram Valley Conservation Area
    - Maluang Beach Conservation Area

Sabah Parks Area

- 6 parks in Sabah:
  - 3 terrestrial parks (243,261 ha)
  - 3 marine parks (22,533 ha)
- Representing various habitat types found in Sabah:
  - Coral reef, mangrove, island vegetation, lowland dipterocarp forest, hill dipterocarp forest, ultrabasic forest, lower montane forest, mossy montane forest, sub-alpine.

Sabah Parks Area

- (1) Kinabalu Park;
  - 1964 (75,370 ha)
  - Montane environment
- (5) Tawau Hills Park;
  - 1979 (27,972 ha)
  - Lowland trop. rainforest
- (6) Crocker Range Park
  - 1984 (139,919 ha)
  - Sub-montane & lowland

Sabah Parks area

- (2) Tunku Abdul Rahman Park;
  - 1974 (4,929 ha)
- (3) Turtle Islands Park;
  - 1977 (1,740 ha)
- (4) Pulau Tiga Park
  - 1978 (15,864 ha)

Process of Planning of Protected Areas

Three major contents
1. Analysis of present situation
2. Policy making (planning)
3. Implementation plan

Process of CPR case

Making data collection team
- Collaboration with other organizations
Draft of management plan
Workshop (public comment)
Final Plan
1. Introduction

- Consideration for policy / strategy -

National Policy on Biological Diversity

To conserve Malaysia’s biological diversity and to ensure that its components are utilized in a sustainable manner for the continued progress and socio-economic development of the nation (MOSTE, 1998)

Introduction (2)

National Park Policy for Sabah

The basic purpose of the National Parks System is to preserve for all time areas which contain significant geographical, geological, biological or historical features as a national heritage for the benefit, education and enjoyment of the people of Sabah (Sabah Parks, 1975)

Introduction (3)

Other major references to policy

- Sabah Conservation Strategy (WWF – Ministry of Tourism and Environmental Development, 1992)
- National Ecotourism Plan (Ministry of Culture, Arts and Tourism, 1994)
- Malaysia 8th National Development Plan (2001-2005)

Process and Contents of CRP Management Plan

- Introduction (Chapter 1)
- Present Situation (Chapter 2)
- Emerging issues (Chapter 4)
- Management Strategy (Chapter 5)
- Detail Plan (Chapter 6)
- Monitoring Plan (Chapter 10)
- Implementation Plan (Volume II)

- Value Evaluation (Chapter 3)
- Zoning Plan (Chapter 6)
- Tourism Plan (Chapter 7)
- Land Use Plan (Chapter 8)
- Organization Plan (Chapter 9)
2. Present Situation of CRP

History and legal status:
- 1969: Crocker Range Forest Reserve
- 1984: Crocker Range Park (transferred from forest reserve without public comment)
- 1996: Construction of Park HQ in Keningau
- 2000: Park boundary study and marking have been completed

Park Area and boundary:
- Park Area: 139,919 ha
- Boundary length: 408 km
- IUCN management category: II

Abiotic feature of CRP:
1. Hill – lower chain mountains (100-2076m)
2. Tertiary sedimentary rocks
3. High precipitation area

2. Present situation

Biotic feature of CRP (1)
CRP belongs to Central Borneo bio-geographic sub-unit.

Biotic feature of CRP (2): Vegetation
Five altitudinal vegetation zones are classified in CRP:
1. Montane forest >1,800 m
2. Lower montane forest 1300 - 1800 m
3. Upper Dipterocarp forest 800 - 1,300 m
4. Hill Dipterocarp forest 300-800 m
5. Lowland forest <300 m

Altitudinal vegetation zone (forest type)

Biotic feature of CRP (3): Vertebrate Fauna
Number of vertebrates known in Borneo, Sabah, Kinabalu Park and CRP: Many species in CRP might not be found

<table>
<thead>
<tr>
<th>Group</th>
<th>Borneo</th>
<th>Sabah</th>
<th>Kinabalu Park</th>
<th>CRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals</td>
<td>245</td>
<td>207</td>
<td>130</td>
<td>113</td>
</tr>
<tr>
<td>Birds</td>
<td>641</td>
<td>573</td>
<td>238</td>
<td>270</td>
</tr>
<tr>
<td>Reptiles</td>
<td>258</td>
<td>160</td>
<td>127</td>
<td>56</td>
</tr>
<tr>
<td>Amphibian</td>
<td>143</td>
<td>nd</td>
<td>63</td>
<td>64</td>
</tr>
<tr>
<td>Freshwater Fishes</td>
<td>440</td>
<td>118</td>
<td>42</td>
<td>31</td>
</tr>
</tbody>
</table>
Socio-economic feature of CRP (1): Population

Surrounding area of CRP is most dense and high population growth area in Sabah (8 Districts + Kota Kinabalu = 40% of Sabah population)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8 District around CRP</td>
<td>14,077 (20%)</td>
<td>454,645</td>
<td>666,325</td>
<td>151</td>
</tr>
<tr>
<td>Kota Kinabalu</td>
<td>350</td>
<td>209,175</td>
<td>372,047</td>
<td>178</td>
</tr>
<tr>
<td>Sabah</td>
<td>73,711</td>
<td>1,743,685</td>
<td>2,603,485</td>
<td>149</td>
</tr>
</tbody>
</table>

Socio-economic feature of CRP (2): Shifting cultivation belt in western Sabah

CRP locates ‘shifting cultivation belt’ in western Sabah

2. Present situation

Socio-economic feature of CRP (3-1): Settlement and cultivation area inside CRP

Population and cultivation area inside the park

<table>
<thead>
<tr>
<th>District</th>
<th>No. Family</th>
<th>Total Population</th>
<th>Population inside park</th>
<th>Cultivation area inside park (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penampang</td>
<td>99</td>
<td>881</td>
<td>84</td>
<td>6,750</td>
</tr>
<tr>
<td>Keningau</td>
<td>202</td>
<td>691</td>
<td>53</td>
<td>668</td>
</tr>
<tr>
<td>Tenom</td>
<td>311</td>
<td>1,880</td>
<td>338</td>
<td>2,605</td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>612</td>
<td>3,452</td>
<td>475</td>
<td>8,033</td>
</tr>
</tbody>
</table>

Note: Penampang does not include Babagon village data

Socio-economic feature of CRP (3-2): Settlement and cultivation area inside CRP

Park management: Stakeholders

- Governmental group (12)
  - Sabah Parks
  - Land and Survey Department
  - Ministry of Tourism
  - Wildlife Department
  - Forestry Department
  - CID
  - District Offices
  - Ministry of Rural Development
  - Unit of Science and Technology
  - Environmental Protection Department
  - University Malaysia Sabah
  - Ministry of Education
- Local communities
  - Villagers
  - JKKK
  - Village head
- Tourism industry
  - Sabah Tourism Board
  - Tour Company
  - Tourists
- Others
  - NGO
  - International Agencies

3. Significance of CRP and Valuing
### Significance of CRP and Valuing (1)

**Global Significance of CRP / Northern Borneo**

<table>
<thead>
<tr>
<th>Title</th>
<th>Organization identified</th>
<th>Area and feature</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotspots</td>
<td>Conservation International</td>
<td>Whole Borneo and Sundaland</td>
<td>Tropical rain forest</td>
</tr>
<tr>
<td>Global 200</td>
<td>WWF</td>
<td>Northern Borneo - Palawan moist forest</td>
<td>Tropical moist forest</td>
</tr>
<tr>
<td>Endemic Bird Area</td>
<td>Birdlife International</td>
<td>Borneo mountain area</td>
<td>Urgent</td>
</tr>
</tbody>
</table>

### Significance of CRP and Valuing (2): Estimation of monetary value

<table>
<thead>
<tr>
<th>Water resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of users: 700,000, Unit price of water: RM0.5 m³</td>
</tr>
<tr>
<td>Consumption: 0.2 m³/day person x 365 days x 700,000 people = 51,000,000 m³/year</td>
</tr>
<tr>
<td>Total monetary value: RM25.5 million / year</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tourism revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target number of visitors: 30,000 in 2010</td>
</tr>
<tr>
<td>Travel cost: RM8.4 million</td>
</tr>
<tr>
<td>Conservation fee: RM 1.32,000</td>
</tr>
</tbody>
</table>

### Significance of CRP and Valuing (3): Estimation of monetary value

**Comparison of opportunity value and conservation value of CRP (US$/year)**

<table>
<thead>
<tr>
<th>Value categories</th>
<th>Opportunity value</th>
<th>Conservation value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumptive direct use</td>
<td>22,706,560 ¹</td>
<td>215,360</td>
</tr>
<tr>
<td>Other values</td>
<td>80,499,434</td>
<td>186,414,860 ²</td>
</tr>
<tr>
<td>Total</td>
<td>103,206,064</td>
<td>188,675,260</td>
</tr>
</tbody>
</table>

1. Most value from oil palm plantation (2,000 ha plantation assumption).
2. Most value from ecosystem services.

### Emerging Issues

1. **Large scale development near park boundary**
   - Increase oil palm plantation surrounding the park (Beaufort and Tenom).
   - Commercial logging near park boundary.

   **Threat to ecosystems inside park**

2. **Land use and shifting cultivation**
   - New cultivation area inside the park increases in southeastern part.
   - Village people claim 'communal land' by native customary right (NCR) inside the park.
4. Issues

Emerging Issues (3): Hunting, Fishing and Fish Culture

- Subsistence hunting and fresh water fishing pressure is high inside the park.
- Fish culture of exotic species (Tilapia nilotica, so on) becomes popular among villagers (risk of biological pollution).

Emerging Issues (4): Forest Fire

Forest fire have given serious damage of the ecosystem of CRP

<table>
<thead>
<tr>
<th>Date and location</th>
<th>Inside CRP</th>
<th>Surrounding area of CRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983-1997</td>
<td>5,500 ha</td>
<td>20,000 ha</td>
</tr>
<tr>
<td>1998</td>
<td>19,000 ha (14% of park area)</td>
<td>6,300 ha</td>
</tr>
</tbody>
</table>

Emerging Issues (5): Tourism and Environmental Education

- Few visitors of CRP
- Environmental Education is not enough in and around CRP

<table>
<thead>
<tr>
<th>Number of visitors of Sabah Parks</th>
<th>Park</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinabalu park</td>
<td>187,439</td>
<td>224,800</td>
<td>197,018</td>
<td>172,856</td>
<td></td>
</tr>
<tr>
<td>Poring Hot spring</td>
<td>196,023</td>
<td>224,965</td>
<td>255,602</td>
<td>202,998</td>
<td></td>
</tr>
<tr>
<td>Tunku Abdul Rahman</td>
<td>171,919</td>
<td>206,852</td>
<td>188,576</td>
<td>147,188</td>
<td></td>
</tr>
<tr>
<td>Tawau Hill Park</td>
<td>15,118</td>
<td>36,605</td>
<td>83,299</td>
<td>57,618</td>
<td></td>
</tr>
<tr>
<td>Crocker Range Park</td>
<td>15</td>
<td>90</td>
<td>653</td>
<td>975</td>
<td></td>
</tr>
</tbody>
</table>

Emerging Issues (6): Insufficient park staff and park monitoring system

<table>
<thead>
<tr>
<th>Number of staff from 2004</th>
<th>Park Warden</th>
<th>Assistant Park Warden</th>
<th>Senior Park Ranger</th>
<th>Park Ranger</th>
<th>Administration section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent staff: 16</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Temporary Staff: 32</td>
<td>Keningau HQ</td>
<td>Inobong</td>
<td>Mahua</td>
<td>Ulu Kimani</td>
<td>Melalap</td>
</tr>
</tbody>
</table>

Monitoring and Interpreter for Environmental Education

- Research and Education Unit staff: Only 1
- Natural Environment and Socioeconomic monitoring staff: 0
- Full-time interpreter for environmental education: 0

5. Management Strategy

Management Strategy (1): Purpose and Goal

Purpose

- To maintain ecosystem function including water catchment in the park
- To provide opportunity of outdoor recreation and education
- To involve local communities for park management
- To promote research and monitoring for feedback park management

Goal

To ensure sustainable benefit of the park for people of Sabah through better park management.
Management Strategy (2)
Elementary Management Plan

1. Preservation of ecosystem function
   - to preserve landscape of the park
   - to keep water resource quality and quantity
   - to prevent forest fire

2. Species conservation
   - to protect endangered species
   - to maintain park boundary for protection of habitats

3. Sustainable tourism and environment education
   - to develop facilities and system for sustainable tourism
   - to promote community base ecotourism
   - to encourage environmental education in the park

Management Strategy (2)
Elementary Management Plan (continue)

4. Community participation and land use management
   - to encourage dialog with communities for resolution of land use
   - to wean slowly people in shifting cultivation to sedentary form agriculture outside the park

5. Research and monitoring
   - to conduct research and monitoring to increase scientific knowledge
   - to monitor park ecosystem and socio-economic situation for feedback management system
   - to establish early detection and alarm system of forest fire

Management Strategy (3)
Key items of management plan

1. Zoning plan (Chapter 6)
2. Tourism and education (Chapter 7)
3. Land use and social development (Chapter 8)
4. Institutional development (Chapter 9)
5. Monitoring and review (Chapter 10)

Management Strategy (4)
Ecosystem Conservation Plan

1. Preserving non disturbed forest
2. Recovery of forest fire affected area
3. Management of traditional use area
4. Management of multiple use area

Management Strategy (5)
Proposed new protected area

New forest reserve on hill of CRP

Management Strategy (6)
Forest Fire Prevention

Forest fire prevention
- Preparation of forest fire fighting equipment
- Staff training
- Development fire monitoring system
- Trail construction for fire prevention
Management Strategy (7): Park Boundary Maintenance

Maintenance and patrol schedule
- Patrol and monitoring of park boundary: every year
- Painting and renewal of information boards: every 3 years

Honorary Park Warden
- Assignment of honorary park warden from village
- Park boundary keep by honorary park warden (co-management system)

Management Strategy (8): Species Conservation Plan

Priority in species
- Legal Status (Protected species) + Rarity (IUCN Threatened Species)

Number of selected species
- Animals (Vertebrates): 17 species
- Plants: 18 groups

<table>
<thead>
<tr>
<th>Species</th>
<th>CITES</th>
<th>IUCN</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Sunda Iguana</td>
<td>0</td>
<td>IL 2</td>
<td>Critically</td>
</tr>
<tr>
<td>Sun Bear</td>
<td>0</td>
<td>LR 2</td>
<td>Least</td>
</tr>
<tr>
<td>Clouded Leopard</td>
<td>0</td>
<td>LR 2</td>
<td>Least</td>
</tr>
<tr>
<td>Orangutan</td>
<td>0</td>
<td>LR 2</td>
<td>Least</td>
</tr>
<tr>
<td>Borneo Rhinoceros</td>
<td>0</td>
<td>LR 2</td>
<td>Least</td>
</tr>
<tr>
<td>Bako Tapir</td>
<td>0</td>
<td>LR 2</td>
<td>Least</td>
</tr>
</tbody>
</table>

Management Strategy (9): Special Important Animals and known distribution area

Orangutan
Sun Bear
Clouded Leopard

6. Park Zoning Plan

Zoning (1): Objectives of zoning

What is park zoning?
- National Park zoning is a system used to divide the park area into various zones according to their function and suitability of natural resources

Objectives of park zoning
- Zoning of a park is necessary for administrative and development control that will ensure a proper balance between visitor use and park purpose (National Park Policy for Sabah)

Zoning (2): Strategy and Method

Park zoning strategy
- To keep biodiversity with high density areas of animals
- To conserve fragile ecosystem and mountainous species (ecosystem sensitive area)

Methods
- Overlapping of thematic maps (1-km grid analysis) and scoring

<table>
<thead>
<tr>
<th>Theme A:</th>
<th>Theme B:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Zoning (3): Proposed Zoning Categories of CRP

1. Conservation area
   - The whole park area
2. Preservation zone
   - Areas with unique and important ecological environment
   - Disturbed areas caused by natural or human activities
3. Recovery Zone
   - Areas where tourism development
   - Limited traditional human activities are allowed under control
4. Multiple use zone
   - Identification of Preservation Zone
5. Limited Traditional Use Zone
   - Sensitive ecosystem
   - Habitat of endangered species
6. Buffer Zone
   - Disturbed area
   - Accessibility, tourism resources
   - Cultivation area
   - Zone established surrounding the park to avoid direct human impact

Draft Zoning Plan for CRP (Summary)
Combined 6 zones proposed
- Preservation zone (Highland forest, potential orangutan habitat, and main ridge)
- Recovery zone
- Multiple use zone
- Potential limited traditional use zone
- Buffer zone

7. Tourism and Education

Tourism and education (1): Strategy and Resources
Tourism strategy
- Small scale tourism development (eco-tourism)
- Linkage with other tourism destination sites
- Local tourists first, foreign tourists as supplement

Tourism resources
- Scenic beauty
- Forest landscape
- Waterfalls
- Plants and animals
- Village landscape

Tourism and education (2): Number of visitors
Target number of visitors at major tourist sites

<table>
<thead>
<tr>
<th>Area</th>
<th>Target in 2005</th>
<th>Target in 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keningau HQ</td>
<td>3,600</td>
<td>14,400</td>
</tr>
<tr>
<td>Inobong</td>
<td>2,400</td>
<td>6,000</td>
</tr>
<tr>
<td>Mahua</td>
<td>3,600</td>
<td>6,000</td>
</tr>
<tr>
<td>Ulu Papar</td>
<td>600</td>
<td>1,200</td>
</tr>
<tr>
<td>Other areas</td>
<td>1,200</td>
<td>2,400</td>
</tr>
<tr>
<td>Total</td>
<td>11,400</td>
<td>30,000</td>
</tr>
</tbody>
</table>
Tourism and education (3): Park Facility Development

Tourism and education (4): Community base ecotourism

- Mahua
- Ulu Sg. Papar (Salt Trail)
- Ulu Sg. Apin-Apin
- Ulu Kimanis
- Ulu Semagan - Melalap

Tourism and education (5): Networking of tourism destination site around CRP

Tourism and education (6): Park Information and education programme

- Sign board
- Pamphlet
- Website

Education Programme

- Target people: 1) park visitors, 2) school children and 3) community people
- Topics: 1) natural science, 2) water resources, 3) human dimension, 4) conservation

8. Land Use and Social Development

Land Use and Social Development (1): Background of issues

Background

- Most of villagers in and around CRP is native certificated people
- They claim land inside the park based on native customary right (NCR)
- Around 500 people live inside the park
Land Use and Social Development (2): Communities

Major cultivation areas inside park

- Total Area: about 3,500 ha
- Communities claim area: about 5,800 ha

Land Use and Social Development (3): Direction for solution

Short term (<20 years)
- Park zoning scheme: Limits traditional use zone (community management zone)
- Combination with social development programme (improvement agriculture system)

With some exceptions, applications for alienation of land which is reserved or proposed for reservation by government are not accepted (Sabah Conservation Strategy).

Land Use and Social Development (4): Direction for solution (continue)

Long term strategy (>20 years)
- Slowly wean people involved to sedentary forms of agriculture in lowland outside of the park (Land Capability Classification of Sabah, 1976)

9. Institutional Development

Institutional Development (1): Park Staff

Park staff
- Assignment of permanent staff for each substations
- From ‘enforcement’ to ‘multi task force’ staff

Proposed minimum number of staffs (Total 21)
- Park warden: 1
- Assistant park warden: 2
- Senior ranger: 1
- Ranger (each station 9 + HQ 3): 12
- Research: 2
- Administration: 3

Institutional Development (2): Organization

Park HQ in Keningau

Administration
- Park Management (Enforcement)
- Monitoring

Northern Zone
- Northern Zone
- West Coast Zone
- South East Zone
- Keningau and Tenom

Research and Education
- Socio-economic & Tourism

New section proposed
Institutional Development (3): Zone Management System and Substations

- Telont
- Matas Forest Management
- Ulu Kimanis
- Ulu Membakul
- Rayoh
- Melalap
- South East Management Zone
- West Coast Management Zone
- Northern Management Zone

Institutional Development (4): Creation of Forest Fire Fighting (FFF) Team

Need organizing, providing equipment and training.
- Forest fire monitoring system in HQ
- Fragile area for forest fire
- Potential area for forest fire
- West Coast Zone
- South East Zone
- Northern Zone

Institutional Development (5): Number of Visitors and finance simulation

<table>
<thead>
<tr>
<th>No. Visitors/Year</th>
<th>3,000</th>
<th>10,000</th>
<th>50,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Staff</td>
<td>20</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Cost (x RM1,000)</td>
<td>1,080</td>
<td>1,620</td>
<td>2,700</td>
</tr>
<tr>
<td>Income (x RM1,000)</td>
<td>165</td>
<td>550</td>
<td>2,750</td>
</tr>
<tr>
<td>Balance (x RM1,000)</td>
<td>-915</td>
<td>-1,070</td>
<td>+50</td>
</tr>
</tbody>
</table>

Assumption:
- Staff salary: RM30,000/year/person.
- Operation Cost: 50% of Staff salary, Project Cost: 60% of operation cost.
- Conservation fee: average RM6/person (foreigner=RM10, Malaysian=RM5), Governmental fund: RM50 for one visitor.

Institutional Development (6): CRP Advisors board

Activities of board:
- To monitor and review park management progress.
- To recommend solution of issues arisen.
- To coordinate necessary activities of relevant agencies.

Members:
- Sabah Parks
- Natural Resource Offices
- Sabah Forestry Dept.
- Dept. Irrigation and Drainage
- Ministry of Rural Development
- District offices
- Land and Survey Dept.
- Forest Research Ctr.
- Environmental Protection Dept.
- University Malaysia Sabah

Frequency:
- Annual meeting and occasional meeting for emergency issues.

10. Monitoring and Review

Monitoring and Review (1): Feed back system

Feed back park management
- Park policy
- Situation analysis
- Management plan cycle
- Park Management Plan
- Evaluation
- Implementation
- Monitoring
Monitoring and Review (2): Monitoring items

**Abiotic data**
1. Weather and climate change
2. Natural disaster and forest fire

**Biotic data**
1. Biodiversity
2. Endangered Species
3. Forest ecosystem

**Socio-economic**
1. Statistic of communities
2. Land use in limited traditional use zone
3. Eco-tourism

**Management**
1. Number of visitors
2. Illegal activities in and around park

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Monitoring and Review (3): Monitoring stations and visitor record point

Weather Observation stations
- Visitor record point

---

Monitoring and Review (4): Management plan cycle

Master Plan = 10 years plan

<table>
<thead>
<tr>
<th>Year</th>
<th>Planning cycle</th>
<th>Three type plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>Draft Plan</td>
<td>1. Master plan (10 years)</td>
</tr>
<tr>
<td>2005</td>
<td>Authorized plan</td>
<td>2. 5 years plan</td>
</tr>
<tr>
<td>2006</td>
<td>Start implementation</td>
<td>3. Annual plan</td>
</tr>
<tr>
<td>2010</td>
<td>Revision of master plan</td>
<td>1st 5 years plan (2005-2010)</td>
</tr>
<tr>
<td>2015</td>
<td>Preparation of new master plan</td>
<td>2nd 5 years plan (2011-2014)</td>
</tr>
<tr>
<td>2016</td>
<td>Start new master plan</td>
<td></td>
</tr>
</tbody>
</table>

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Summary

1. Management plan is a tool for sustainable conservation and sustainable tourism in the park
2. Open workshops were held for planning
3. Refer to existing policy and strategy
4. CRP is characterized by unique highaltitude mountain ecosystem in western Sabah
5. Crocker Range provides water resource for >700,000 people

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Summary (Continue)

6. About 500 people live inside park and they engage agriculture in about 4,000 ha of shifting cultivation inside park
7. CRP is recognized global level rich biodiversity area
8. Conservation value is estimated 168 million/year
9. Major issues are cultivation, forest fire and hunting inside park
10. Goal of management plan is to ensure sustainable benefit for people of Sabah (to keep hill-tower mountain ecosystem)
11. Six zones plan is prepared

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Summary (Continue)

12. Development of community base ecotourism, targeting Malaysian people
13. Target No. of visitors: 30,000 in 2010
14. Limited traditional use zone may be best option for solution of native customary right inside park (future decision on land use)
15. Establishment of monitoring section is proposed
16. Feed back park management planning is necessary
17. This master plan is 10 years plan
Welcome any suggestion / comments / advices for the draft but
Please not by oral criticism,
Please contribute written comment / data / sentence / paragraph for us to make better management plan
Thank you
1. Objectives and procedure of park management plan

(1) From BBEC program document
- Crocker Range Park is better managed.
- Management plan is prepared for CRP, taking into account of the relationship between the local communities and the park.

(2) Park Management Plan – Japan
- **Procedure**: Park Management plan is decided by the Minister of Environment considering opinion of relating provinces of the park and committee on national park.
- **Contents**: Zoning of special protection area and facilities development area (intensive use zone = development of hotel, visitor center so on)

<table>
<thead>
<tr>
<th>Nature Park</th>
<th>National Park</th>
<th>Special protection area (30-80% of each park)</th>
<th>Strict protection zone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1st protection zone (no building)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2nd protection zone</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd protection zone</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Normal use area (limited logging is allowed under plan accepted)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Facilities developing area (Concentrating use zone)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quasi National Park</td>
<td>Marine park zone</td>
<td></td>
</tr>
</tbody>
</table>

Nature parks and area classification system in Japan (Nature Park Law, 1957)(outline)

(3) Guidelines for preparation of National Park Management Plan of Indonesia

**Purpose of the Management Plan**

The purpose of national park management is to conserve the natural resources and its ecosystems in the related national park for the following purpose: protection of life supporting system, preservation of flora and fauna, optimal and sustainable utilization of the forest biodiversity and their ecosystems so that all of these can be used for research purposes on science, education, cultivation support, tourism and recreation.

**National Park Management System**

**Zonation**: The national park will be administered by using the zonation system which consists of core zone, use zone and other zones in accordance with its individual function and condition.
Buffer zone: The development of the buffer zone reflects the status of the zone taking into account the socio-economic and cultural condition of the community. Because the status of the buffer zone is either forest land, unused state owned or land under other rights, its management is still carried out by the agency or authority.

2. Recent consideration on management plan

(1) Recent trend in protected area management

- **Bioregional planning**: integrated approach for zoning plan and nature resource management base on ecological area unit
- **Co-management**: good relations with local community and involvement their activities in the planning
- **Management structure**: involvement private sectors and NGO for the management
- **Financial sustainability**: financial self-sustaining by generating their own income and not relying on governmental budgets
- **The Convention on Biological Diversity** (CBD): an aim of CBD is “establish a national system of protected areas
- Increasing Category V and Category VI protected areas by IUCN: as a result of combining biodiversity with continuation of local livelihood and services (CRP = Category II)

Definition of Protected Area Category by IUCN, 1994)

- Category II: National Park; protected area managed mainly for ecosystem protection and recreation
- Category V: Protected landscape/seascape; protected area managed mainly for landscape/seascape conservation and recreation
- Category VI: Managed Resources Protected; protected area managed mainly for the sustainable of natural ecosystem

(2) Stakeholders (beneficiary and organizations involved)

- **Public sectors**: Implementation organizations of BBEC programs; Sabah Parks, Forestry Department, Wildlife Department, Land and Survey Department, Environmental Conservation Department, UMS and 8 District offices in CRP
- **Local communities**: 
- **Commercial sector**: Tour agencies, plantation companies, logging companies
- **Non-governmental organizations (NGOs)**: 
- **Research institutes**: UMS, Sabah Museum, Sabah Development Institute

3. Objectives summarized of the park management plan

- To review policy and existing management systems
- To evaluate status of ecosystem (park resources) and socio-economic situation inside and surrounding area of the parks through scientific study
- To make zoning plan for management (zoning plan) base on the scientific study
- To prepare action plan based on the zoning plan and management system;
- to maintain biodiversity, ecosystem and landscape
- to conserve cultural important site
- to protect watershed
- to ameliorate soil erosion, local climate and natural disaster (flush flood so on)
- to provide recreation/tourism opportunity for peoples
- to make benefit sharing mechanism for local communities (providing nature resources and products for subsistence use, and involvement the communities for nature tourism)

- To prepare management mechanism (institutional development, finance, and policy)
  - to make institutional development plan (organization structure, man-power so on)
  - to prepare plan for financial sustainability
  - to recommend on policy, revision of relative laws and local developing planning for ecosystem conservation

Figure 1. Flow chart of park management plan process

4. Zoning – Why we need zoning of protected areas?
(1) Objectives of the zoning are;
  - to classify conservation and sustainable use zone in the target protected areas based of scientific data
  - to clear priority of focused area for management action plan
  - to get consensus of people for management plan

(2) Zoning categories
The zoning categories are different among countries and protected area types.
Example (1):
- Core zone (strict conservation zone)
- Wilderness zone
- Utilization zone
- Intensive use zone (construction of facilities is approved)
- Traditional use zone
- Rehabilitation zone
- Buffer zone

Example (2): Pulau Semporna Terumbu Kanag Manine Park Proposal (Marine park)
- Wilderness zone
- Central Park zone
- Intensive use zone
- Local use / buffer zone

(3) Zoning process
Spatial data on natural environmental features and socio-economic are necessary for zoning plan

Protected area zoning based on socio-economic situation and natural environment features (example)

Table 1. Example for scoring for zoning plan
(1) Topics of today

Biodiversity Conservation Project in Indonesia was started in July 1995, and research activities on Gunung Halimun National Park (GHNP) were conducted in FY1996 and FY1997 by a joint team of researchers of LIPI (The Indonesian Institute for Science), park rangers of PHPA (Directorate General of Forest Protection and Nature Conservation, Ministry of Forestry), and experts of JICA (Japan International Cooperation Agency). I talk about 5 topics on the Gn. Halimun Project in the seminar.

1) Background and objectives of the project
2) Results of biological research in GHNP.
3) Conservation planning of GHNP based on the biological research
4) Camera trap and radio tracking study in Cikaniki
5) Suggestion on LIPI and PHPA for biodiversity research and conservation in future

(2) Background and objectives of the project

The overall goal of our project is to support the BAPI (Biodiversity Action Plan for Indonesia). The international organizations and some countries including USA and Japan consider cooperation for the conservation of the biodiversity in Indonesia, because Indonesia is one of the richest countries on biodiversity in the world. The project is supported by three countries, Indonesia, USA, and Japan. GEF (Global Environmental Facility) also support the project. But the technical cooperation program on GHNP project in narrow definition was conducted under a agreement of both countries of Indonesia and Japan.

Gunung Halimun National Park was selected as a model study area in the field of the biodiversity conservation project between Indonesia and Japan through JICA scheme. LIPI and PHPA are counterpart organizations of Indonesia side, and JICA is the organization of Japan side in the Gn. Halimun project. The main objectives of the Gn. Halimun project are to promote research activities for biodiversity conservation and to enforce park management. We made 3 component under PHPA, LIPI and JICA team for the Gn. Halimun project; 1) information and data base component, 2) research component, 3) park management component. Under the research component, we also made 3 subcomponent; 1) abiotic subcomponent, 2) biotic subcomponent, and 3) socio-economic subcomponent. I mainly talked about the experience and research results of the biotic subcomponent in the today’s seminar.

(3) Biological research in GHNP

Under the biotic subcomponent, we made 10 teams to conduct the research in the field and data

1) Floristic study

About 500 flowering plant species belong to 266 genera and 93 families were recorded by the floristic explorations in 5 sites in GHNP in 1996. Within the plants recorded in GHNP, about 150 species were not recorded in Gede Pangrango National Park.

2) Vegetation study

The vegetation study focusing on altitudinal zonation on the forest showed that the forest in GHNP could be classified into 3 zones; 1) colline zone at the altitude lower than 900 m altitudes (some times up to 1,150 m), 2) submontane forest zone at 1,050 - 1,400 m, and 3) montane zone at 1,500 - 1,800 m altitudes.

3) Forest Ecology

We established 3 permanent plot of 1-ha for tree inventory and forest dynamic study in GHNP. The number of tree species are 116 and 105 in the two permanent plots in 1,100 m in altitudes, however that decreases 46 in the permanent plot in 1,700 m altitudes. Remeasurment of trees in the two permanent plots in 1997 suggested that the forest seemed to be nearly at stable condition. Our remeasurment on *Altigia excelsa* (Rasamara) and *Qurcus lineata* (Kuspa) which are dominant trees in submontane zone revealed that both young trees of 5cm in DBH would take 260 to 300 years to became 100cm in DBH of the biggest size tree in the area. We also have studied on seedling of a palm species, *Pinanga cornata* in the permanent plots for forest dynamics study. We found about 1600 young palm trees in a plot. The young *Pinanga cornata* mainly distribute lower slope in the plots.

4) Primates

Four primate species, Javan gibbon (*Hylobates moloch*), grizzled leaf monkey (*Presbytis comata*), silver leaf monkey (*Trachypithecus auratus*), and crab-eating macaque (*Macaca fascicularis*) inhabit in the national park, however the distribution area of crab-eating macaque would be limited in lowland along the rivers. The densities estimated of the three primates species except crab-eating macaque for two altitudinal zones are higher in hill (colline) forest (<1,200 m altitudes) than in the lower montane forest and montane forest (>1,200m in altitudes). The primate density also decreased in western part of the national park. We estimate that vegetation type especially Fagaceae tree distribution and disturbance of the forest by human activities affect the density distribution of the primates.

5) Carnivores

Most of Carnivore mammals are difficult to observe directly in dense rain forest like in GHNP. Camera trap and Radio tracking methods were introduced for the study of the carnivores with field sign observation as general method. I explain the results of camera trap and radio tracking study component in detail.

6) Small mammals

Forty species of small mammals including 37 species collected by trapping or mist-netting and 3 species observed or based information from local people were recorded by the field study in 1996 and 1997. The number of small mammal species recorded in GHNP until 1997 occurs 36 % of its in Java.

7) Birds

A total of 203 species were reported including the previous report and a total of 34 bird species was
recorded by bird banding study which focused on altitudinal distribution of birds in Gn. Halimun National Park. Eight species of the birds collected for bird banding were new recorded ones which were not reported in previous reports.

8) Reptiles and Amphibians

A list of 37 amphibians and reptiles were systematically arrange, consists of 16 frogs, 12 lizards and 9 snakes by collection in the field in August 1997.

9) Molluscs

Ten species of land snails were found and some of them collected alive. The rare species *Amphidromus alticola* and *Dyakia clypeus* found from Gunung Botol.

10) Insects

A total of 20,000 insects specimen were collected in the study in August in 1997. Fogging method was useful for collection of canopy insects.

Results of the biotic research in GHNP by LIPI and JICA team are summarized;

1) About 500 plants were recorded in 1996 study and the number increased to about 700 in the last fiscal year study

2) 58 mammals, 203 birds, 21 reptiles and 16 amphibians species were recorded in GHNP

3) New vegetation classification was proposed by the vegetation study

4) Forest ecology study suggested that the forest seemed to be nearly at stable condition

5) Species richness, primate and bird density decrease in high altitude area of the national park, however, some specific species distribute only in high altitude area

(4) Camera trap and radio tracking study

As a example of specific theme study, I talk about our experience on camera trap, radio tracking and food habits study of the carnivores in GHNP.

1) Camera trap

We taken pictures of animals in a total of 61 times (nights) in the 509 camera trap nights from December 1996 to November 1997 in Cikaniki in GHNP. Nine mammalian carnivores including panther, feral cat and feral dog, tree shrew, rat and 3 bird species were recorded by the camera trap work. Common palm civet is the most common animal taken pictures by the camera trap, followed by banded linsang. Both type of the leopard cats, spotted leopard and black one, were photographed by the camera traps. Camera trap is a useful equipment for study of carnivores in tropical forest.

2) Radio tracking

We conducted radio tracking study on carnivores to study range size and habitat utilization. We caught 4 carnivore species for the radio tracking from December 1996 to December 1997.

The range size of a female common palm civet measured monthly varied from 2.9ha to 17.9 ha and the total size through the study period was 23.3 ha. The palm civet used mostly area along the Cikaniki river and avoided the tea plantation.
3) Food habit of common palm civet

We collected feces of common palm civet for food habit study of the animal. Plant matter was present in most samples and accounted for 89% of the feces collected. The feces consisted mostly of fruits of two plant species; a palm (*Pinanga cornata*) and a fig (*Ficus grossularioides*). The distribution pattern of the palm and fig trees support habitat preference by the radio tracking of the palm civet.

(5) Park management and conservation based on biological research

1) Conservation priority

Adequate park management is needed for conservation of specific species and its habitat. To clear species and habitat conservation point in the fauna management plan, we selected notable animal species considering conservation status, niche, function in the ecosystem and habitat preference. Eight mammals and 4 birds were listed under notable animals and 3 species, panther, Javan gibbon and Javan Hawk-eagle, were selected as umbrella species from the notable species. We recommended the park management authority to pay special attention of conservation and to prepare rehabilitation program for these umbrella species in future.

2) Zone planning and corridor forest

For park zone planning concerning ecological sensitive area, we overlapped 4 thematic maps with giving specific score for each categories of the maps; 1) Vegetation map, 2) animal density map, 3) altitude map = species richness map, and 4) slop map. As conclusion, we got a ecological sensitive map which shows the center area and south-east area of the national park should be paid special attention as ecological sensitive area. We also indicated the 3 importance of corridor forests among Gn. Halimun and surrounding forest areas; 1) Gn. Halimun - Gn. Salak, 2) Gn. Halimun - Gn. Endut, and 3) Gn. Halimun - South-western part of forest.
Situation

Following features (map information) of natural environment and socio-economic situation inside the park have been revealed from survey and joint expedition. Please discuss zoning of the park, trail for tourist and facility development for the park management.

Management plan (Zoning)

Zone 1:
Zone 2:
Zone 3:
Zone 4:
Zone 5:
Zone 6:
Zone 7:

* Suggestion: Zoning categories; core zone, wilderness zone, utilization zone for tourists, traditional use zone