

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

The Development Survey  
and The Foreign Investment  
in the Investment-Driven Economy

FINAL REPORT

Volume 3

Financial Risk Area  
(Foreign Investment and Globalization)

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**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

**The Development Survey  
on The Forest Resources  
in Brunei Darussalam**

**FINAL REPORT**

**Volume 3**

**( National Park Area  
Forest Management Guidelines )**

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## **IV FOREST MANAGEMENT GUIDELINES**





## **1. Harmonisation of National Park Development with the Ecosystem**

Emergent trees reaching 50 to 65m in tree height are distributed in Ulu Temburong National Park and groups of trees of fixed storeys form forest spaces. Very beautiful landscapes comprising bank beauty and forest beauty can be viewed from the Temburong River, which is the only access to the Park. The opportunity to experience wonderful nature adventurously, abounds in the rustic charm of this area.

Forests with aboriginality are gradually decreasing year after year at present. Meanwhile, conservation of tropical rain forests on a global scale is called for. Virgin forests such as those found in Ulu Temburong National Park have a value that requires conservation from a global viewpoint, beyond an evaluation criterion in Brunei Darussalam.

Therefore, it is necessary to take countermeasures beforehand, to prevent Park utilisation from impacting on the environment.

### **1.1. Aims of the Environment Assessment**

Ecotourism is a tour mode that meets the needs of the new age and is a new approach to Park utilisation. This method allows observing nature without damaging it, and is defined as nature-oriented tourism. A contribution to nature protection is made by providing a stage for environmental education. However, it can also be interpreted as a new commercial undertaking. The objective of environment assessment was to achieve conservation of the natural environment by checking impacts of ecotourism on the natural ecosystem resulting from Park utilisation.

### **1.2. Flowchart of Environment Assessment**

Figure-1 shows the flowchart for environment assessment of Ulu Temburong National Park. The assessment work will be undertaken in accordance with this flowchart.

### **1.3. Identification of Environment Impact Factors forecasted**

when ecotours are initiated

Environment impact factors caused by ecotours to the National Park will

be identified and their relationships with environmental elements that will be affected will be described. The environmental impact can be classified roughly into the following four factors: Tour facilities, nature trails, accessing, and park management methods. Table-1 presents the relationship between these factors and the three elements, namely, natural environment, social and cultural environment, psychological environment, which are affected by these factors.

#### **1.4. Environment Conservation Goals in the Ecotour Development Plan**

Environment conservation goals in the ecotour development plan were set for individual environment impact elements as shown in Table-2. In setting these goals, "maintenance of the present condition of the environment" and "minimising impacts to the environment" were used as a basis.

#### **1.5. Environment Impact Assessment for the Ecotour Utilisation Plan and Conservation Measures**

The forest ecosystem must be conserved and safety of ecotours must be ensured in executing the ecotour utilisation plan. The facility plan must be of a necessary but minimum scale. As proposed in chapters "Forest Land Conservation Survey", "National Park Development Plan", "Utilisation Facility Plan" and "Forest Management Guidelines," the environment conservation goals can be evaluated as accomplishable, if the National Park can be utilised and managed without damaging the environment of its forest ecosystem. The evaluation of the impacts on the environment by the ecotour utilisation plan and conservation measures for the principal four factors are described below.

##### **1.5.1. Installation of ecotour facilities and harmony with environment**

Various ecotour facilities will be installed while minimising cutting of trees and leaving even withered trees in forests for use by wildlife as places for living. Terrain alteration can be avoided by paying attention to facility design. The flowing of waste from toilets, jetties, lodging facilities and other facilities can be prevented by installing sludge settling tanks and water can be purified. Harmony between facilities and environment can be achieved by paying attention to the selection of facility installation locations. The facilities will

naturally be built using timber produced in Brunei Darussalam to fit the natural landscapes of the area. More beautiful, comfortable and safe facilities can be built by studying design models from overseas countries and by developing unique designs. The aboriginality of Ulu Temburong National Park can be maintained by giving such matters serious consideration.

### **1.5.2. Setting nature trails and harmony with environment**

Care must be exercised when constructing footpaths as nature trails, to conserve the ecosystem. Changes in terrain and soil conditions, and erosion of steep slopes can be prevented by constructing wooden log paths and stairs. Hillside landslides directly affecting footpaths can be conserved by stabilising slopes using fallen trees remaining there to accelerate natural restoration. Log paths and other structures will be constructed in places where footpaths cross a steep slope with unstable soil banks, to prevent footpaths from causing landslides. Materials and design of signs for nature trails and guide boards for trees, should be selected carefully to harmonise with the landscapes, and to reduce any adverse psychological impacts.

### **1.5.3. Relaxation of impact factors to channel access**

The Temburong River is an important access for ecotours and stable channels must be ensured. The utilisation range of ecotour boats must be decided after carefully examining floor characteristics of the Temburong River. The accessible limits for boats can be checked and day-trip ranges can be decided for both the rainy and dry seasons using the discharge survey data. Safety of landslides and the prevention of collapses affecting channels will be ensured by stabilising slopes using remaining fallen trees and driftwood nearby. Driftwood and fallen trees posing a danger to passing boats should be removed to safe places.

Gravel on stream beds repeat undergoes a repeated cycle of flow and deposition, and this unavoidably halts passing of boats temporarily. A minimum level of dredging will have to be studied also, including dredging for the low water season. Tour boats are required to have a design matching the excellent natural environment while also being comfortable. The traditional customs of channel utilisation by residents living around the National Park

such as at Batang Duri must be respected.

#### **1.5.4. Technique for guideline setting**

The basic policy for setting guidelines for Ulu Temburong National Park will be to give the highest priority to preventing damage to the surrounding environment and the forest ecosystem in using and managing the National Park. In this case, forests adjacent to the National Park should be made a buffer zone to sustain the intrinsic structures and characteristics of the virgin forests. The proposal to maintain collaboration with the Kuala Belalong Field Studies Centre to gather research information on natural science and to ensure ecosystem conservation and user safety by using such information, can be evaluated from the standpoint of enhancing ideas on ecotourism. Ideas such as having nearby residents participate in managing the forest ecosystem to utilise their wisdom, can be evaluated as a technique rich in identity.

Figure-1 Flowchart for National Park environment assessment

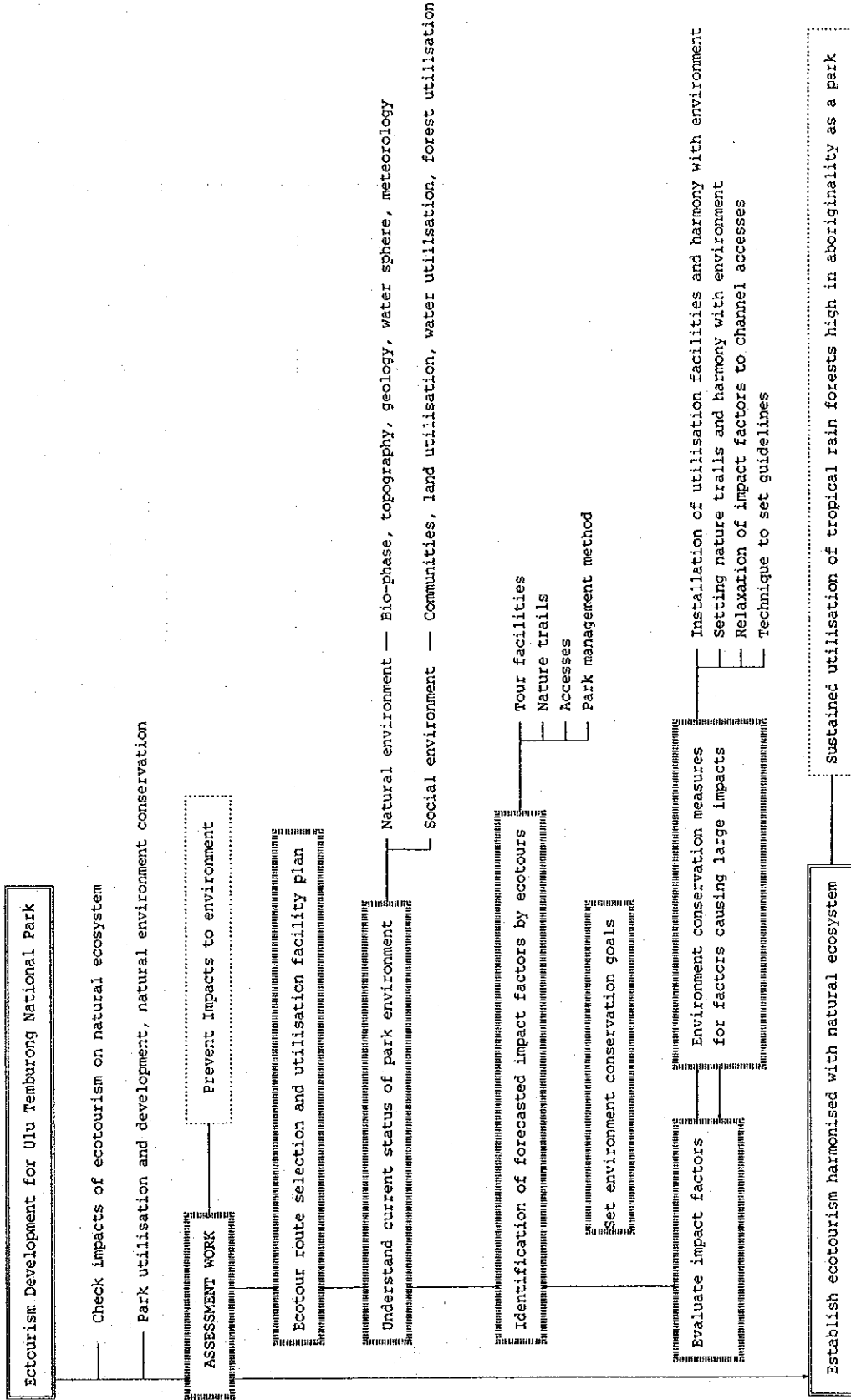


Table-1 Environment impacting factors and affected environment elements

Environment Impacting Factor Environmental Elements	Management Facilities	Observation Facilities	Rest Facilities	Utilisation Facilities Toilets Jetties	Lodging Facilities	Nature Trails Foot- paths	Signs Guide Boards	Access Boats Chann- eis	Park Management Method Guidelines
Natural Environment Naturalness Plants Animals Rivers Water Quality Topography, Geology, Soil Natural Landscapes Hillside Landslides Bank Landslides Driftwood, Fallen Trees Gravel on Stream Beds	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Social and Cultural Environment Natural Science Research Traditional Customs								<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Psychological Environment Materials and Design Comfort Identity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

Table-2 Environment conservation goals in ecotour utilisation plan

Environmental Element	Conservation Goal
<p>Natural Environment                      Naturalness                      Plants                      Animals                      Rivers                      Water quality                      Topography, Geology, Soil                      Natural Landscapes                      Hillside Landslides                      Bank Landslides                      Driftwood, Fallen Trees                      Gravel in Stream Beds</p>	<p>To maintain aboriginality in facility installation and park utilization.                      To maintain forest ecosystem which has virginity.                      To maintain living environment of wildlife.                      To ensure channels of existing rivers in channel utilisation.                      To prevent deterioration of water quality in utilising facilities and channels.                      To minimise changes to topography, geology and soil in installing facilities, footpaths and nature trails.                      To harmonise with landscapes in utilising facilities and the park.                      To take conservation measures for hillside landslides affecting footpaths and nature trails.                      To take measures for bank landslides that impact channel accesses.                      To take measures if impacting channel accesses.                      To take measures if impacting channel accesses.</p>
<p>Social and Cultural Environment                      Natural Science Research                      Traditional Customs</p>	<p>To enhance ideas of ecotourism by utilising natural science information.                      To respect traditional customs of residents living around the National Park in channel utilisation.</p>
<p>Psychological Environment                      Materials and Design                      Comfort                      Identity</p>	<p>To harmonise facilities, nature trails and boats with environment by using indigenous wooden materials.                      To enhance comfort facilities, boats and channels.                      To provide enhanced identity to forest guidelines.</p>

## **2. Matters of National Park Utilisation and Management Requiring Attention**

### **2.1. Matters of Forest Conservation Requiring Attention**

The area upstream of the confluence of Sg. Belalong including the survey area comprises the forests which should be kept intact, and preserved permanently for scientific, educational and other special purposes, as conservation forests.

The area is regarded as a place to preserve a biologically large variety of animals and plants as a National Park.

In the history of the development of the Temburong River water shed in the past, virgin forests around the mainstream of the Temburong River and trunk roads as traffic lines from the vicinities of Bangar and other communities have been cut, and controlled burning carried out. These virgin forests have been developed as land for buildings, rights of way, farmland and other purposes. As a result of this development, secondary forests have gradually expanded and are now reaching near the borders of the National Park. If the development area is allowed to expand, it is feared that secondary forests will penetrate inside the National Park also.

The fundamentals for the forests inside the National Park are to adhere to the purposes of designation as conservation forests and National Park, and to give the highest priority to protecting the ecosystem of the forests and environment around them against damage. However, a minimum of facilities should be built such as nature trails for scientific, educational and other special purposes. Building of facilities, giving a careful consideration to minimising impacts to the natural environment will lead to safeguarding the entire National Park area from human impacts.

The precondition to observing forests in the National Park is to accomplish a compatibility between forest conservation and utilisation by managed facilities. Guides should be knowledgeable about the mechanism of the forest ecosystem in accordance with the ideal of ecotourism "observe nature without destroying nature" which has been attracting attention throughout the world recently.

The fundamental approach concerning natural phenomena which



change the present state of forests by landslides and fallen trees, is to leave the transition of nature untouched except when it is necessary to ensure the safety of users of the forests, and to remove psychological suppression.

Forests in certain areas adjoining the National Park need be handled by the same method as that for forests inside the National Park to protect them against impacts from the outside. This will allow the virgin forests in the National Park to maintain their unique structures and characteristics.

Furthermore, forests in the areas circumscribing these above should receive similar consideration. Activities which will cause radical forest environment changes such as clear cutting should be avoided and the forest condition maintained to buffer impacts to forests inside the National Park.

Three elements are needed to support wildlife, namely, food, water and shelter. Wildlife and the forest ecological system, mutually depend each other. Wildlife survives by depending on these three elements provided by the forest ecological system. Continued conservation of the primeval condition of forests in the National Parks will conserve wildlife.

## **2.2. Matters on National Park Utilisation Requiring Attention**

Regarding the utilisation of the National Park, the watershed of Sg. Belalong is regularly used for research and educational purposes. In other areas also, local residents, outdoor educational groups, researchers and survey personnel visit the National Park area from time to time. The number of these visitors is estimated to be about several tens per day at most. Except for the facilities of the Kuala Belalong Field Studies Centre, the area inside the National Park is not inhabited by man, and human impact problems are not expected to occur. Nevertheless, there are possibilities that the forests of this area will come to international attention and will attract popular interest. The users of the National Park will also increase as ecotours planned under this survey are carried out.

It is important for the administrator of the National Park to maintain close contact with the Kuala Belalong Field Studies Centre in order to enhance understanding of the utilisation state and problems of the National Park. The use of scientific conservation information to provide appropriate guidance to the users and to manage the park, should be encouraged. This will be

important to conserve the ecosystem of the forests in the National Parks and to ensure the safety of the users.

### **2.2.1. Establishment of guidance and management structure of National Park**

The first prerequisite will be for the Forestry Department and Temburong District office to provide a lead in establishing and organising a guidance and management structure, in cooperation with the Kuala Belalong Field Studies Centre.

The structure can be established by studying it from various angles. Figure-2 shows one suggested approach for studying this structure as a reference.

This plan visualises that, in the long term, the system will be set up utilising the wisdom of the residents in the nearby areas, including Batang Duri, who have been living there for many years, and who are familiar with the area. This will assist in conserving the natural environment of the National Park, and ensure safety of the users. The local residents will initially engage in transporting persons entering the National Park, act as guides in the National Park, giving elementary explanations, and assist with management work at the site. The residents will be trained to gradually accomplish management functions independently.

Some residents are already working occasionally as work assistants for National Park management, and as assistants in research and survey work. Given an opportunity for training, local residents will be able to perform good work as members of the guidance and management structure.

### **2.2.2. Matters on guidance and management of visitors to National Park requiring attention**

The matters requiring attention in guiding and managing visitors to the National Park are listed below:

- 1) Record of visitors to the National Parks (name, sex, purpose, period of entry and place of entry, etc.)
- 2) Advice, guidance and confirmation of adequate preparations prior to entering the Park, e.g., whether accompanied by a guide, whether drinking

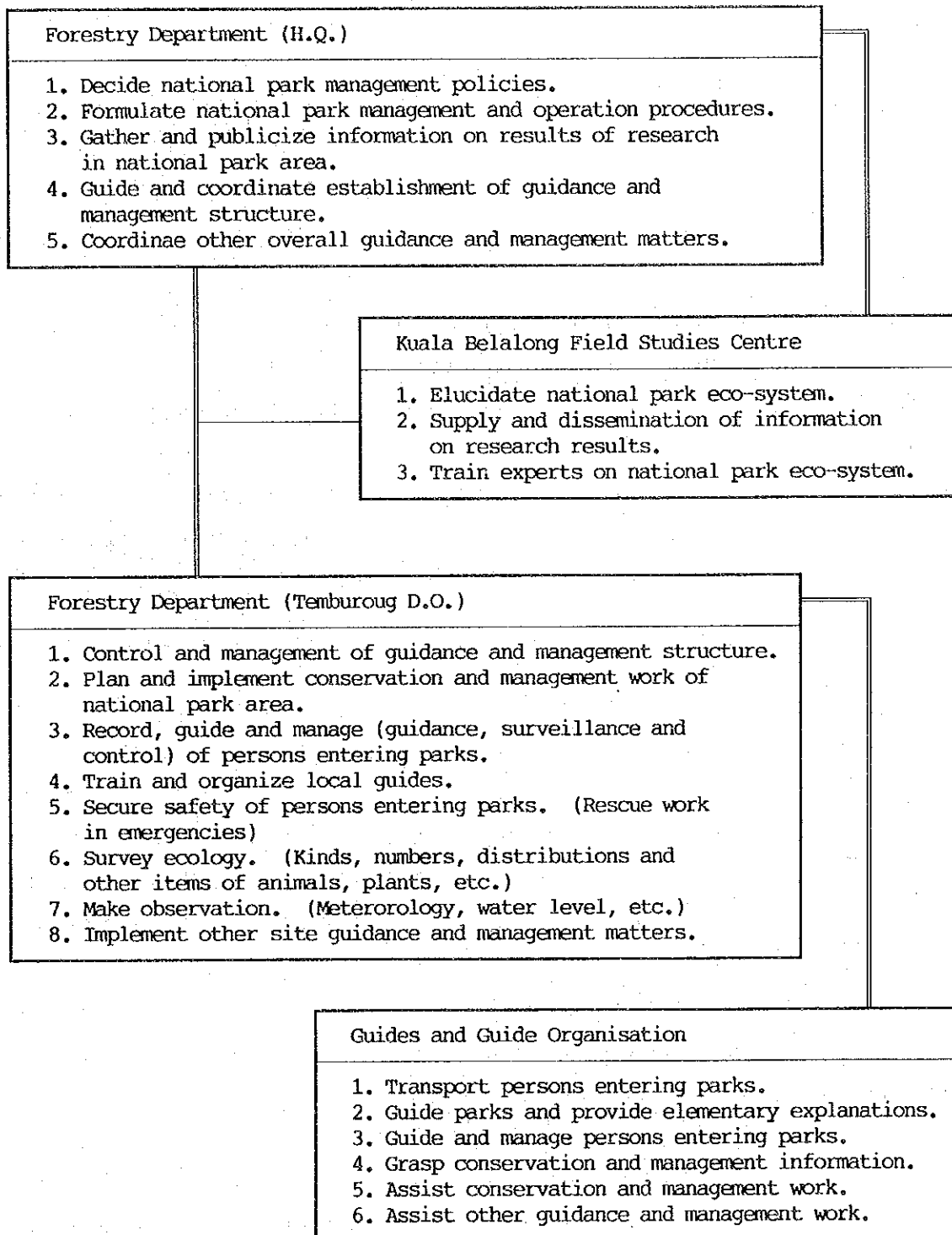


Figure-2 Suggested approach to establishing guidance and management structure for National Park

water and/or food are to be carried, whether clothing and footwear are appropriate, etc.

3) Obligations regarding the management of litter e.g. bringing it home, instructions regarding decomposable, and undecomposable litter such as glass and plastics.

4) Distribution of, guidance to, and management of rest facilities, camp sites, evacuation places and methods of calling for rescue in an emergency.

5) Guidance and management relating to restrictions on entering places away from the nature trails.

6) Guidance and management relating to restrictions on gathering or catching animals, collecting plants, etc. other than for research and survey purposes.

7) Distribution of brochures for the National Park.

8) Other

### **2.2.3. Safety measures**

The Temburong River is normally a calm and safe river. However, the water level of the river rapidly rises if heavy rain falls in the upstream area. According to the water-level observation conducted between 12th September, 1992 and 17th September, 1993, the water level increased 3.4m in one hour during the night. The water level falls about 1m in three or four hours during recession. The water level returns to the original stable level in 20 to 30 hours assuming it does not rain thereafter.

Based on this observation, it will be necessary to advise the people not to camp or walk on river beds or centre-fields when it rains.

One of the great attractions of the National Park is to observe forests using boats. Dangerous driftwood must be removed and river beds must be cleared lightly to maintain this attraction and to secure safe channels for the users.

Improvements and maintenance of nature trails will be useful in maintaining the ecosystem of forests and in ensuring user safety. Collapsed land and fallen trees along the nature trails give the users psychological anxiety and endanger safety. Grading work and removal of fallen trees will be necessary.

## **2.3. For Enhancing Evaluation of National Park**

### **2.3.1. Gathering and distribution of research results regarding forest ecosystem**

The Kuala Belalong Field Studies Centre is situated inside the National Park, and many researchers are analysing the forest ecosystem. By distributing and disseminating these research results to the various people in Brunei Darussalam, and to people in foreign countries, the value of forests of the National Parks can be enhanced.

In recent years, the way the people enjoy leisure has been changing. The demand for adventurous, active and nature-oriented tourism is increasing. This trend has not been seen before. The users desire knowledge of the places they visit, and desire to be active users by directly experiencing these places for themselves. They are interested in learning about the forest ecosystem, as well as animals and plants that make it up.

The custodians of the National Park need to support the research activities of visiting researchers, and to make the accumulated results available to amateur naturalists.

### **2.3.2. Promotion of public-relations activities to naturalists in and outside of Brunei Darussalam**

The history of the Ulu Temburong National Park as a National Park is not old and the existence and nature of the Park has not been widely known to people both within and outside Brunei Darussalam. The existence of the Ulu Temburong National Park must be disseminated to leaders of naturalist groups not only in Brunei Darussalam, but also in foreign countries.

### **2.3.3. Define transportation means and service organisation**

Transportation must be made available and the National Park must be made easily accessible and easy to use. This should have the effect of extending the range of visitors, from those with a professional and/or well defined interest, to other sections of the population with a more general interest in nature. Transportations means from Bangar to Batang Duri and from Batang Duri to the National Park must be improved and expanded

urgently.

Training and organisation of guides, and the improvement and expansion of comfortable lodging facilities for ordinary users, are urgently required. At the same time, a contact window has to be provided for users and information on means of transportation to, and utilisation methods of, the National Park must be provided.

#### **2.3.4. Primitive state of the National Park**

The value of the Ulu Temburong National Park lies in the primitive nature of the tropical rain forests being maintained intact.

Development of the forests is approaching the periphery of the National Park area. Land for management and utilisation facilities must be expanded as the users of the National Park increase in the future.

Caution must be exercised at that time, not to destroy the primitive nature of the National Park area. The primitive state must be maintained particularly near the entrance to the National Park, which is particularly attractive as development land. The area near the entrance symbolises the value of the National Park, and is an important object of observation when the water level is low.

Except for those on a small scale, the management and utilisation facilities of the National Park should preferably be installed outside the National Park area. If this is not possible, land must be located deep inside where it cannot be viewed from the Temburong River. In this case also, facilities should preferably be small in scale, so as not to cause gaps in canopies which may accelerate the falling of trees. Forests and rivers are always united, in other words, they are inseparable. Actions taken which might bring changes to the river environment will damage the primitive state of the National Park, as well as the ecosystem of river bank forests and the scenery of National Park. The rare value of the National Park will be halved by such an actions. Indeed the charm of the Ulu Temburong National Park will always exist with its primitive river, the Temburong River. Furthermore, it is very important that the management of National Park provides an environment in which visitors can learn the importance of "going back to nature and observing the law of nature". Therefore, National Park

management should stress thoroughly the ideal of ecotourism "observe nature without destroying it". The purpose of a management plan for the National Park, is to maintain its primitive state, which is of inestimable value.

