

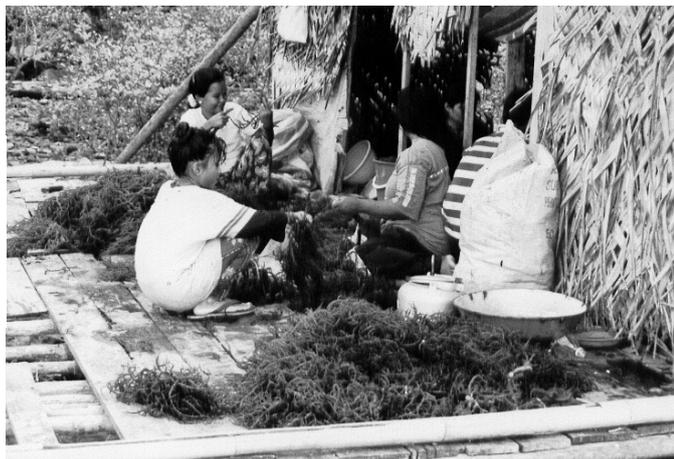
## PART 8

# MANAGING USE OF NATURAL RESOURCES

### SUMMARY

- This section makes recommendations for managing the use of marine and terrestrial resources within the Semporna Islands Park. It covers extractive use (e.g. fishing, collection of forest products) and non-extractive use (mariculture, cultivation and harvesting of fruits and coconuts).
- Resource use will be governed by Park regulations and allowed only under permit. Permits will be non-transferable, subject to annual renewal, and will stipulate conditions and regulations to be met. Regulations will be drawn up in consultation with local communities and other interested parties and reviewed at regular intervals.
- Recovery and sustainable use of resources will be achieved by regulating and monitoring harvesting in all zones, and by setting aside some areas where removal of living resources is prohibited (Sanctuary and Preservation Zones). Destructive methods of harvesting will be prohibited throughout the park. Designation of no-take zones could be a staged process. More crucial reef areas could be protected first, followed by other areas as acceptance of the concept among the community grows.
- Seaweed cultivation should continue in the park, but not be expanded further. The pearl farm is likely to re-open, in which case it should be carefully managed to benefit conservation and local communities. A pilot giant clam farm is recommended as a way of re-stocking the reefs and providing alternative incomes and other opportunities.

Figure 82. Seaweed cultivation has little environmental impact and provides a reasonable income. provides



- Cultivation and harvesting of fruits and coconuts provides employment and valuable products, and should continue in designated areas – the aim being to ensure maximum benefit to local people and minimum environmental impact.

## 8.1. INTRODUCTION

A major objective for the Semporna Islands Park is to have a plan for sustainable use of the area and its resources that will benefit local communities and also help promote conservation. All sustainable use activities need to be integrated with each other and be compatible with the primary conservation objective for the park.

Figure 83. People living in the park need to be able to use the area and its resources in a sustainable way.



Azimah Jumatli

Resource use in the park has been discussed during the course of the Semporna Islands Project, and both extractive and non-extractive uses are considered acceptable within limits, *provided* that they are properly managed and regulated.

By its nature, extractive use is bound to have some effect on the resource being targeted. This is particularly the case on and around the Semporna Islands, where the number of people seeking the same resource has been high for many years. Non-extractive use may also have an impact, depending on how carefully it is managed.

Extractive, unmanaged, use of marine resources has led to a serious decline in many fish and other edible species on the Sempornai sland reefs. This is causing hardship to fishermen and is threatening biodiversity.

Extractive use of terrestrial resources has had similar impacts and consequences. Some wild animals have been hunted to local extinction on the islands and there has been a decline in populations of timbers to the extent that nearly all now have to be acquired from the mainland.

Opportunities and constraints for resource use at different localities in the park are discussed in the following pages, and recommendations made for management.

## 8.2. FISHING AND OTHER EXTRACTIVE USES OF MARINE RESOURCES

### Introduction

Fishing and harvesting of other marine resources is currently one of the most important activities within the proposed park. Marine resources are renewable, provided extraction is properly managed. The coral reefs and other marine ecosystems around the Semporna Islands can support harvesting up to a certain level. However, it is clear that over-exploitation and destructive fishing methods have caused a decline in populations of edible species and damage to the health and integrity of the coral reefs.

This is causing hardship to fishermen and is threatening biodiversity. It is quite possible for certain highly desirable species to become locally extinct as a result of intense fishing pressure. The ecology of the reefs may also be substantially altered. Decisive action needs to be taken to reverse this situation.

### Management objectives

- ❑ To ensure that extraction of marine resources is sustainable, does not threaten biodiversity, compromise the integrity of the park or interfere with other legitimate uses.
- ❑ To ensure that the fisheries management strategy meets the traditional, social, economic and cultural needs of local island communities.

### Opportunities

- a) Many species of value occur throughout the area, including fish, octopus, clams and sea cucumbers.
- b) The reefs are sufficiently healthy to sustain harvesting to a certain level, provided this is properly managed.

### Constraints and threats

- a) The lagoon is semi-enclosed and could easily be over-exploited.
- b) Over-exploitation has already occurred on the outer reefs, where stocks of most edible species are low.
- c) Damaging fishing methods (especially use of explosives) has already caused damage and change to reef habitats, almost certainly resulting in lower productivity.
- d) Fishermen generally have a low income with few other alternative methods of earning a living.

## Recommended actions

Firstly, it is recommended that a '*Fisheries Management Forum*' is established to promote continuing discussion about harvesting of marine resources in the park. This should include Sabah Parks, fishermen and women, and the Fisheries Department. The aim of the forum would be to ensure fair access to local communities, increase awareness of conservation issues, develop policies for managing fishing activities, and organise a system for recording catch and monitoring stocks.

Two strategies are recommended to reduce the impacts of exploitation and promote conservation and recovery of targeted species:

- A. Set aside 'No-take' Zones where extractive use is strictly prohibited.
- B. Introduce fishing regulations in the other zones.

### A. Establishment of Sanctuary and Preservation (no-take) zones

Size and location of these zones is important, with many factors coming into play. In the case of the Semporna Islands Park, the aims should be:

- i. To conserve biodiversity by ensuring that the no-take areas include representatives of major habitat and community types where conservation action is most urgently required.
- ii. To ensure that the sanctuaries will function effectively, for example by being located 'upstream' and so be able to export larvae to 'downstream' reef sites.
- iii. To make the Sanctuaries as easily enforceable as possible by relating to visible features such as the reef edge (demarcation of boundaries in the open sea is very difficult).
- iv. To cause as little hardship and disruption as possible to people who currently harvest the area.

These aims can be achieved by establishing *Preservation* and *Sanctuary Zones* (Figure 80).

The lagoon area has in effect been a no-take area for many years, because of the presence of the pearl farm, Police Field Force and Sabah Parks. Thus retaining it as such will not cause disruption to current fishing practices.

Closure of the outlying areas (Church reef, Sibuan reef, Mantabuan reefs, Kapikan reef and parts of the Southern Rim Reef) may be more difficult to accept, because they are currently freely open to all. However, the outlying areas tend to be visited less often, mainly because the fishermen are constrained by having small boats either without engines, or with outboard engines less than 15hp.

It will be very important to continue to raise awareness about the potential benefits of 'no-take' areas and also to provide those currently engaged in fishing activities with alternative incomes so that the necessity to fish is reduced. Designation of no-take zones could be a staged process. More crucial reef areas could be protected first, followed by other areas as acceptance of the concept among the community grows (see section 11).

## Sanctuary ('no-take') marine zones

'No take' areas are proving to be effective in resource management, especially in the marine environment. Positive aspects are considered to outweigh negative aspects, especially as many of the latter can be solved.

### Positive aspects

#### *Biological benefits*

- Protects community/ecosystem structure and maintains biodiversity.
- Encourages more rapid recovery, especially in marine areas where generation time is faster and so populations of over-exploited species may be replaced more quickly.
- In the case of the marine environment, allows fish to reach maturity and establish breeding populations.
- Provides the potential for maintaining/enhancing adjacent areas through outward spread of gametes, larvae, and mobile adults.

#### *Management/social/economic*

- The concept is easily understandable by users and the public and more easily accepted than some other management strategies.
- Applies to everyone equally and so reduces the temptation to violate laws.
- Simple to run because data collection needs for management are reduced and management occurs without complete information and understanding of population parameters of every species, or of interactions between species.
- Surveillance and enforcement are simplified.
- Boosts the potential of the area for tourism use, which in turn brings economic benefits.
- Provides unexploited areas and populations for educational use and scientific research.

### Constraints and negative aspects

#### *Biological*

- Recovery may still be slow, despite complete protection.
- Reserves are unlikely to be useful for wide-ranging or migratory species.

#### *Management/social/economic*

- There is likely to be resistance from people who currently use natural products from the areas suggested for closure. Acceptable alternatives need to be provided for current legitimate users.
- Exploitation may increase in the non-reserve areas, in order to compensate for closures. However, if the areas available for resource use are open only to local communities using traditional methods (see sections 7 & 9) then this should not be too much of a threat.
- The measures have to be initiated and/or supported by local communities. Otherwise, intensive surveillance and enforcement is required to prevent poaching which, logistically, may be difficult.

Adapted from Russ, G. 1994. p. 72-75 in J.L. Munro and P.E. Munro (eds). *The Management of Coral Reef Resource Systems*. ICLARM Conference Proceedings 44.

## B. Fishing regulations in the other zones

Use of marine resources from the reef and sea areas around Selakan, Sebangkat, Maiga and the outside of Bodgaya and Boheydulang will be allowed, but within limits.

Two zones are recommended:

### a) *General Use Zone*

This zone includes all the reef areas not included in the Preservation and Sanctuary Zones. The boundary of the General Use Zone is 500 m from the outer reef edge, so as to incorporate the entire reef from the shore to the deep slope. Fishing and harvesting of marine resources will be permitted under licence, using specified gear.

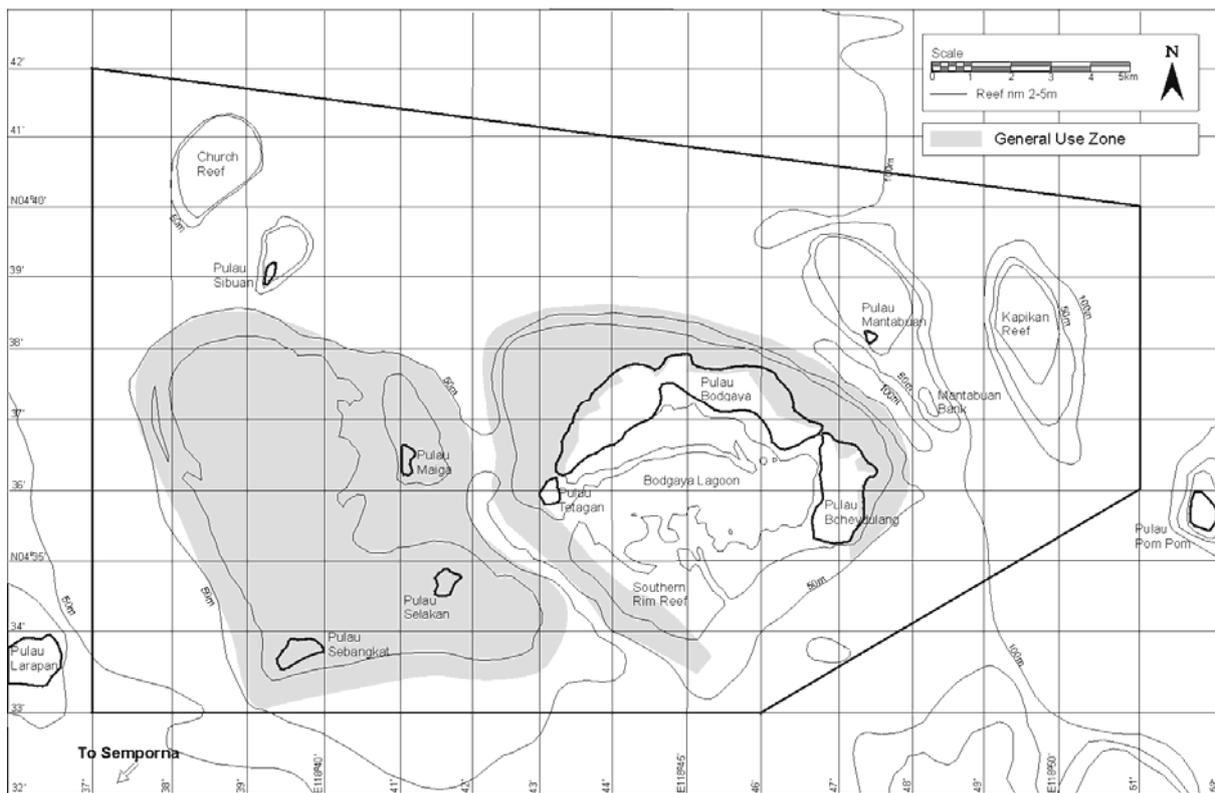


Figure 84. Map of the Proposed Park showing the General Use Zone

**b) Pelagic Use/Buffer Zone**

This zone includes all areas of ‘open sea’ outside the General Use, Sanctuary and Preservation Zones where pelagic fishing (under licence) will be the main activity, using specified gear.

Full details of proposed regulations for both these zones are in section 10.4. but the following ‘ground rules’ are recommended:

- i. A permit will be required for all fishing and harvesting. Both boats and fishermen will need a permit to use the park resources.
- ii. Trawling will not be permitted anywhere within the park.
- iii. Use of hookah or SCUBA gear for fishing will not be permitted anywhere within the park.
- iv. Existing laws on use of explosives and poisons will be strictly enforced.
- v. Log books will be prepared and introduced to record and monitor catches. These should be ‘user-friendly’, and perhaps produced in a pictorial format.
- vi. Certain rare or vulnerable species will be completely protected throughout the park.
- vii. There will be an option to introduce quotas on certain species if this is considered necessary.
- viii. There will be an option to close certain areas (e.g. spawning aggregation sites) for specified periods (e.g. the breeding season).

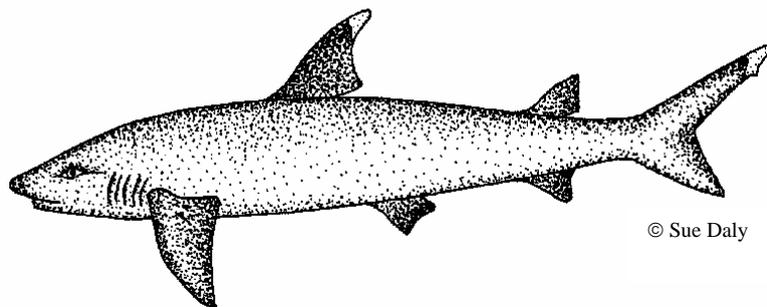


Figure 85. Capture of fish such as sharks in the General Use and Pelagic Use/Buffer Zones needs to be discussed by the Fisheries Forum in order to see if a moratorium or quota is needed to reduce pressure on already over-exploited populations.

## 8.3. MARICULTURE

### Introduction

Mariculture could be beneficial because it provides jobs and income and so may be successful in encouraging people to turn away from fishing and thus take pressure off wild stocks. It may be possible to cultivate those species that are heavily targeted and whose populations on the reef have declined. Mariculture is already established in the proposed park, but is currently restricted to seaweed.

A Japanese pearl culture station operated on Boheydulang for many years, and there are plans for the operation to be re-established. This could provide employment and incomes for a number of local people.

There is also scope for other low impact mariculture such as the farming or 'ranching' of giant clams, winged oysters, pearl oysters, sea grapes, brown mussels, donkey's ear abalone, corals and sea cucumbers (Komilus *et al.* 1999). All potential schemes will need to be properly assessed because there can also be negative aspects. However, if they are integrated into the park and carefully managed, all these operations could also become valuable resources for tourism, education and research.

### Objectives

- To maintain and develop mariculture enterprises that are consistent with the conservation objectives for the park, have minimal environmental impact, maximum benefit to local communities, and are fully integrated with other activities.

### Opportunities

- a) Conditions are suitable for seaweed cultivation. Cultivation is already well established on the extensive Sebangkat-Selakan reef top and has been started up in pockets at other locations.
- b) Pearl culture is known to be feasible and a new lease on an area of the lagoon has recently been re-negotiated.
- c) The potential for giant clam culture has been investigated and several islands within the park have been recommended as providing suitable conditions. Apart from use of the clams for food and shells, the scheme could also provide specimens for re-stocking the reefs.
- d) Each of the above should, if properly run, have minimal adverse environmental impacts.

### Constraints and threats

- a) Mariculture operations (particularly seaweed cultivation) may interfere with access to the islands and reefs due to the floats and ropes. These operations are also visually obtrusive.

- b) Sites for seaweed cultivation have to be selected carefully in order to ensure there is no shading of corals beneath.
- c) The strings have to be anchored, and currently there is some use of coral heads to do this, which may be causing damage.
- d) Space required for all of these operations is also of potential high value for recreation and tourism.
- e) In the case of giant clams, spawning stock has to be taken from the wild, which has conservation implications.
- f) Fish grow-out or culture is not appropriate for the park because of the high risks from pollution.

### **Recommended actions**

- a) Seaweed farming should be allowed to continue on the Sebangkat-Selakan reef top. Sabah Parks should work closely on this with the Fisheries Department, other relevant agencies and local communities to ensure that there are maximum benefits and minimum environmental impact.
- b) Seaweed farming around all the other islands should continue for the time being, but there should be no further expansion. It would be sensible to review these operations in about 5 years. By this time, it may be that other jobs have become available and seaweed cultivation around Bodgaya and Bohedulang can be phased out.
- c) Measures should be taken to ensure that the new Pearl Farm (if it becomes operational) is fully integrated into the park and benefits local communities. The old farm needs to be completely dismantled.
- d) Government or other assistance should be sought to establish a pilot giant clam cultivation scheme in the General Use Zone, either on Pulau Selakan or Pulau Maiga.
- e) A permit will be required for all mariculture projects within the park (including the existing ones). Permits will be issued only if the impact assessment is favourable.

## 8.4. EXTRACTIVE USE OF TERRESTRIAL RESOURCES

Terrestrial resources are widely used, especially on the central islands. Plants are particularly important, with a total of 127 'useful' species recorded in the survey conducted in 1998 by the Sabah Museum (Guntavid & Galaip, 1998). Their importance is as medicinal, edible, ritual and ceremonial plants, house and boat-building materials, fuel and for making baskets, mats, fish traps and other miscellaneous items.

The main impact appears to have been on hardwood species. A wide range of primary and secondary forest species have been used, and populations of species of trees used for timber have been reduced so much that nearly all now have to be acquired from the mainland. The extent of mangrove has also declined, almost certainly due to extraction over many years.

Animals such as deer and wild boar have been hunted in the past, and populations have either been exterminated or have declined to such an extent that people no longer bother to go out hunting (Guntavid & Galaip, 1998).

Other natural resources of value include water and clay.

### Objectives

- ❑ To regulate extraction of terrestrial resources and ensure it is sustainable, does not threaten biodiversity, compromise the integrity of the park or interfere with other legitimate uses.
- ❑ To ensure that the management strategy for terrestrial resources meets the traditional, social, economic and cultural needs of local island communities.

### Opportunities

- a) The central islands in particular support a wide range of natural resources of value for a variety of uses.
- b) Trees suitable for collection of firewood, poles etc are present on the smaller, outlying islands.

### Constraints and threats

- a) The relatively small size of the islands means that populations of timber trees, mangrove, megapodes, hornbills and other species present at relatively low density could easily be over-exploited unless measures are taken to prevent this.

### Recommended actions

- a) Certain parts of the high islands are designated as Preservation Zones and Sanctuary Zones where extractive use of resources is prohibited.
- b) Use of resources (e.g. medicinal plants) outside the fully protected Sanctuary and Preservation Zones can be allowed under permit issued by Sabah Parks.

- c) Certain rare or vulnerable species will be completely protected throughout the park (e.g. timber trees, otters, hornbills and others).
- d) Local communities (including Bajau Laut) and those with customary rights (see Part 10) will be the only ones considered for a permit.
- e) Records should be kept of resource use, and monitoring carried out to investigate impacts on the environment. This will entail close collaboration between Sabah Parks, local communities and the Forest Department.



Figure 86.  
Local materials from the islands are an important resource – for example for making traditional items such as fish traps. It is important that this should be allowed to continue, provided that use is regulated and monitored.

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## 8.5. CULTIVATION

All the islands have been used for cultivation, but some are more productive and important than others. Various crops are grown; also fruit trees and coconuts.

Cultivation has caused habitat change and some loss of biodiversity, but on the other hand is of value in providing jobs, income, food and other useful products. It should be allowed to continue, but with appropriate management and safeguards.

### Objectives

- To ensure that cultivation of crops, fruit trees, coconuts and other useful plants is effectively managed so that it is of maximum benefit to local people, does not compromise the conservation objectives for the park and is integrated with other activities.

### Opportunities

- a) Bodgaya and Boheydulang have fertile soil. Many gardens are already established and actively tended. A wide range of fruit trees and crops are grown. Also coconuts.
- b) Tetagan has fertile soil. Gardens used to be tended, but are no longer. Fruit trees remain and the fruit is gathered.
- c) The potential for gardening on Sebangkat is unknown, but the ground is stony and difficult to work.
- d) Selakan has fertile soil. Gardens are already established and actively tended. A wide range of fruit trees and crops are grown. Also coconuts.
- e) Maiga, Sibuan and Mantabuan have well established coconut groves that are still used.

### Constraints and threats

- a) Cultivation entails encroachment into natural habitats and loss of biodiversity. The outlying islands have been greatly altered, and significant areas have been disturbed on the central high islands.
- b) Clearance for cultivation can lead to increased soil erosion and sediment run-off into the sea, with resulting pollution. The lagoon is particularly vulnerable due to the low rates of flushing.
- c) There are dangers associated with cultivation, such as use of herbicides, pesticides and fertilisers, all of which can cause pollution and damage to natural systems and wildlife.

### Recommended actions

- a) Cultivation will be allowed under permit in the General use Zones, and harvesting of fruits and coconuts permitted on Tetagan, Sibuan and Mantabuan (Sanctuary zones).
- b) Local communities and those with customary rights (see Part 10) should be the only people considered for a permit to cultivate and harvest fruit.
- c) No more areas should be opened up for cultivation on Bodgaya and Boheydulang.
- d) Discussions should be held between agriculture experts and local communities to look into the best ways of utilising the land currently under cultivation and the measures that should be taken to prevent environmental degradation.
- e) Particular attention should be given to minimizing fertiliser and pesticide use and exploring organic alternatives.

## 8.6. ALTERNATIVE LIVELIHOODS

Once the park is gazetted, implementation of the management plan can begin (see 11.9: Timetable for Implementation). This will bring about various changes. Some people who currently earn a living from fishing will have this means of livelihood reduced or removed because of the policy of limiting fishing effort in the park.

On the other hand, the park will bring numerous initiatives and opportunities. Many new jobs will be created in various sectors connected to the administration, development, and day-to-day operation of the park and its facilities. It will be important to employ local people as much as possible, rather than outsiders. The local communities want to be involved with the park, and have considerable knowledge of the area that could help make it a success.

Other opportunities lie in existing and planned mariculture operations, and in tourism development, both of which will require a sizeable workforce. It will be important to provide training as necessary to ensure that local people have the skills required for the wide range of different jobs that will become available.

Livelihood opportunities also exist in the promotion of culture and crafts. There are diverse cultures and traditions associated with the people living in the proposed park area, and fascinating legends about the islands and how they got their names. Craftwork and boatbuilding has played an important part in everyday life, and still does to some extent.

Culture, crafts and other traditions are of value in their own right and of potential interest to visitors. They could also provide a source of income for local communities. However, there has been a decline in the number of people involved in craftwork and in the volume and range of products produced, partly due to a lack in demand (Guntavid and Galaip, 1998). Craftwork may die out unless support is provided and markets for the products found. Boat-building skills are also less widely known and are not always being passed on.

It is largely up to the people living in the area as to whether they wish to maintain or re-ignite these traditions and activities, but it is recommended that government or other assistance is provided should they wish to do so. It is suggested that local people discuss the way forward amongst themselves (e.g. through the auspices of Sabah Parks and the Local Community Forum) and also with representatives from relevant Sabah government departments and institutions (e.g. the Sabah Museum).

Culture, craftwork and boat-building would all be compatible with the objectives for the park, but raw materials would need to come from sustainable sources. Timber for boat-building should not be taken from the already-depleted forests on the main islands.