



TAMAN MARIN TUN SAKARAN

## Sustainable Use and Conservation of Biodiversity in the Tun Sakaran Marine Park

# Action Plan and Proposed Regulations

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## Action Plan and Proposed Regulations

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## 1. INTRODUCTION

The management goal for the Tun Sakaran Marine Park (TSMP), as stated in the Management Plan, is to 'Protect and conserve the natural features, habitats and species of the Park whilst providing for ecologically sustainable use of the area and its resources'.

The programme to promote sustainable use and conservation of biodiversity in the TSMP is now being developed within the framework of the Semporna Islands Darwin Project (SIDP), and is an ongoing process. The strategies that are being proposed will need to be underpinned by regulations, and the sooner these can be introduced, the sooner active management of the Park can begin.

A key feature of the TSMP is that the local community and other stakeholders are fully involved in the formulation of management strategies and Park regulations. Consultation and feedback are a major part of the SIDP programme, and since the project began in May 2005 there have been two Local Community Workshops in Semporna and three four-day Boatshows. These Boatshows entailed travelling round all the settlements in the Park with information and inviting people to participate in discussions and provide feedback. There has also been a Stakeholder Meeting in Kota Kinabalu, involving a wide range of government agencies.

The strategies and draft regulations circulated at the beginning of the SIDP programme have been modified several times in response to feedback from the local community and other stakeholders. The stage has now been reached where there is a consensus on many of the strategies that need to be adopted to achieve the objectives for the TSMP. A broad set of regulations has also been agreed, although some of details still have to be decided.

The aim of this Action Plan is to present the latest management strategies and proposed regulations. In some cases (for example the Zoning Plan), there has been a considerable amount of discussion, and the rationale behind the evolution of the plan is also included.

The recommended regulations to be included in the Schedule for the TSMP are at the end of each section and have also been extracted and put together in the Annex.

## 2. ZONING PLAN AND CONSERVATION OF BIODIVERSITY

### 2.1. Introduction and objectives

Zoning is an accepted tool in park management, as demonstrated by the highly successful Great Barrier Reef Marine Park in Australia. Other marine parks in Sabah and Malaysia have areas set aside for recreational activities such as swimming or boating, but the Tun Sakaran Marine Park will be the first to introduce a zoning scheme that covers the whole Park and all types of activity.

The main objectives of Zoning are as follows:

- To promote conservation of biodiversity
- To allow for sustainable use
- To minimise potentially conflicting activities
- To make management more straightforward

### 2.2. Zoning Plan for TSMP: original concept

A zoning plan was prepared during the Semporna Islands Project (1998-2001) following consultations with stakeholders, and was included in the draft Management Plan for the site, published in 2001. The Management Plan was approved prior to the park being established in June 2004, and the concept of zoning formally accepted. The Gazette Notice specified only the outer boundary of the Park and not the boundaries or regulations for the individual zones. This was intentional because it had been agreed that the recommended zones would be discussed in more detail before final decisions were made and regulations brought into force.

Four zones were recommended in the Plan. Two of these (*Pelagic Use/Buffer Zone* and *General Use Zone*) allow for a variety of sustainable use activities, including fishing, seaweed farming and recreation. The *Sanctuary* and *Preservation Zones* are *biodiversity conservation zones* where activities such as recreation are allowed under permit, but extractive use of natural resources is not permitted (i.e. they are no-take zones). The Preservation Zones differ from the Sanctuary Zones in being 'no-entry', except for essential research. The aim is to keep these small representative areas completely undisturbed to act as a 'control' sites.

### 2.3. Biodiversity Conservation (no-take) Zones

A separate section is included on the Biodiversity Conservation (no-take) Zones because they are seen as the most critical and also probably the most challenging part of the overall zoning strategy.

The most important feature of the *Biodiversity Conservation Zones* is that extractive use of natural resources (dead or alive) is not allowed by any person (local people, visitors or Park staff). Establishment of these 'no-take' areas is considered essential for promoting recovery of over-exploited natural resources, ensuring conservation of biodiversity and allowing ecosystems to function naturally. The TSMP is one of the most important reef areas in Malaysia, but its value has been reduced by over-exploitation of marine resources and damaging fishing methods. Some of the forest areas have also been degraded because of unregulated exploitation. Establishing the no-take areas within the Park is one of the key strategies in promoting recovery, particularly for the coral reefs.

There are now many examples from around the world of the effectiveness and advantages of setting up no-take areas that are protected from all forms of extractive use. For example:

- No take areas protect the 'natural' state, where there is no interference to ecological processes as a result of harvesting of natural resources.
- The no-take areas sustain fisheries in adjacent areas by acting as refuges for spawning fish that year-on-year produce increasing numbers of eggs (bigger fish produce more eggs). They also export eggs, larvae, juveniles and adults, so helping to replenish stocks and boost catches in nearby areas.
- No-take zones also greatly increase the attractiveness of the area for reef-based tourism. For example, at Sipadan, where there has been no fishing for about 15 years, there are now large numbers of big fish which have given the reef an international reputation and bring in large revenues. This could also happen in the TSMP.

### Selection criteria

There are no absolute 'golden rules' for selecting marine no-take areas, but a number of key points can be used to help in the decision-making process (see Roberts & Hawkins, 2000), for example:

- Small no-take areas can be effective, but the larger they are, the greater the range of species and habitats will benefit.
- A network of smaller no-take zones in a protected area is generally better than one or two large ones, because the network spreads benefits more widely over the area being managed.
- When setting up a network of no-take zones it is important to consider the degree of connectivity (e.g. current flow, distance apart). For example, they need to be strategically placed in order that dispersal and migration can occur from one to another, so helping in the build-up of populations on a wider scale.
- If the no-take zone is too small it may not be very effective for fish which range widely, because it will not give them adequate protection from fishing (for example jacks and groupers range over hundreds of metres).
- Large no-take zones, or a network of small ones, provide greater insurance against unexpected disturbances than a single small one.
- From a biodiversity conservation perspective, it is important that the no-take zones represent the range of habitats and communities found within the TSMP.
- The no-take areas are unlikely to be effective in re-building stocks of over-exploited species if the habitat is degraded or stressed.
- Fishermen's interests need to be fully considered when deciding the size and location of the no-take zones. Enforcement will be easier if they support the plan.
- The potential of the site for non-extractive economic activities such as recreational diving is another factor. Populations of fish will build up in no-take zones, making them attractive to divers. The tourism industry can provide jobs for fishermen that provide them with a better income than that from fishing.

## Areas selected

Taking the criteria above into account, the following areas were recommended as Biodiversity Conservation Zones (BCZs):

### **Bodgaya lagoon**

A unique and ecologically sensitive area of high biodiversity value. The Bodgaya lagoon became a no-fishing area during the time that the Pearl Farm was operating (up until 1992), and since then has been an 'unofficial' no-fishing zone, particularly in the eastern sector.

### **Bodgaya southern reef rim: eastern sector**

This adjoins the lagoon BCZ and incorporates a section of the Bodgaya outer reef from the southern point of Boheydulang to the extreme southern point west of the 'Dead End Channel'.

### **Kapikan and Mantabuan reef systems**

These reefs form a linked unit to the east side of the Park. Apart from the fishery benefits, these reefs also have considerable potential for recreational diving if biodiversity is maintained. Because of their distance from Semporna their closure for fishing should have less of an impact.

### **Church and Sibuan reefs**

These reefs form a linked unit in the north-west of the Park, and the predominately southerly current flow should help to feed the large General Use Sebangkat-Selakan reef with fish larvae. Church and Sibuan reefs also have considerable potential for recreational diving if biodiversity is maintained.

## 2.4. Community and stakeholder feedback: key points

[Full analyses are in the Boatshow, Workshop and Stakeholder Meeting reports]

### **General**

The overall concept of zoning within the TSMP has been widely accepted, and there has been agreement about having four main zones. However, use of the word 'Sanctuary' for one of the zones has caused some confusion, because it implies 'no-entry'.

### **Boatshows**

During the first Boatshow, answers to the questions about the Zoning Plan were generally positive, with about 75% of the local community respondents (n=102) agreeing to the location of the zones, including the no-take zones. The other respondents were mainly in the 'not sure' category. On average, less than 2% were in disagreement.

During the second Boatshow, more people were interviewed (n=243) and a larger majority (86%) agreed with the zoning plan. Those who were unsure or disagreed were either unclear about the point of having a zoning scheme, or were worried about losing traditional, productive fishing grounds.

Although the Bodgaya lagoon is meant to be 'off-limits', fishermen still use the western part, and requested that it was not closed immediately because this would cause hardship.

## Workshops

Feedback from the first Workshop showed good support for the zoning plan in TSMP, with 90.5% of respondents (n=21) either agreeing or strongly agreeing with the zones suggested. 9.5% were unsure, but no-one was against the idea.

During the second Workshop, more detailed questions were asked about each of the proposed no-take Zones, and there was more uncertainty, with 50-60% of respondents 'not sure' about the proposals at Church Reef, Sibuan, Mantabuan and Kapikan, and the rest fairly evenly split between agreement and disagreement. There were requests that the Sanctuary Zones at Sibuan and Mantabuan should be made smaller by having a section designated as 'General Use'.

There were fewer concerns about the proposed Bodgaya lagoon no-take zone, with 54% in agreement, 32% not sure and 14% disagreeing. Those who disagreed wanted fishing to be allowed in part of the lagoon.

Many of the Workshop participants also felt that the 'no-take' regulations should be relaxed for 'legitimate land owners' i.e. that they should be given special rights because of their status.

The workshop participants recommended sub-zones within the main zones (e.g. seaweed farming zone within the General Use Zone).

## Stakeholder Meeting

The phased approach to introducing the no-take zones was agreed, but it was felt that the timing between each change was too short, and that it would be easier if the changes were introduced at the beginning of each year.

The irregular shape of the zone boundaries was questioned and it was suggested they should be more regular.

## 2.5. Recommended policies following analysis of feedback

- a) **Zone types** Keep the four zones, but change the name *Sanctuary Zone* to *Conservation Zone* in order to avoid confusion/misunderstanding.
- b) **Zone Boundaries** Keep the irregular 'ecological' boundaries for the zones because they reflect the underlying management needs and will be more easily understood and recognised by local users. For example, fishermen can locate themselves in relation to the reef edge, but do not have navigation equipment to determine their geographic position (e.g. if the zones are bounded by N-S and E-W boxes).
- c) **Pelagic use/Buffer Zone**  
Keep the area as shown in the draft map (no objections).
- d) **General Use Zone**  
Keep the General Use areas as in the draft map (no objections).
- e) **Conservation (Sanctuary) Zone**
  - Land** Keep the terrestrial Conservation Zones as in the draft map, but with special permits allowing collection of named flora and fauna at specified locations according to Native Customary Rights.
  - Sea** **General**  
The idea of 'Partial' no take zones (e.g. 'legitimate residents' having special dispensation and being allowed to fish in the no-take zones) is

not recommended because 'half-measures' will not allow stocks to build up and will not meet conservation targets. It would also be difficult to implement (it is easier to keep *all* fishermen out than having to check whether who goes in is 'legitimate').

The revised plan is to spread the implementation of the Conservation areas over three years, with the first one introduced on January 1<sup>st</sup> 2006 and the others in stages at the beginning of each year. This will enable people to become familiar with the concept and will also give more time to develop alternative livelihoods. Full implementation to be completed by January 2009.

The following revisions have been made, based on community feedback and suggestions made during the Stakeholder Meeting.

**Bodgaya lagoon: revised plan**

Eastern part of the lagoon to be designated as a Conservation Zone with immediate effect.

Western part of the lagoon to function as a General Use Zone (fishing with hook and line only) until designation as a Conservation Zone in January 2009.

**Southern Rim Reef: revised plan**

Delay designation of the Southern Rim Reef until January 2008.

**Kapikan Reef: revised plan**

Same area, but delay implementation of the Conservation Zone until January 2007, to allow time for education/awareness.

**Church Reef: revised plan**

Same area, but delay implementation of the Conservation Zone until January 2007, to allow time for education/awareness.

**Mantabuan reefs: revised plan**

Target is for same area, but need to review in 2007 and possibly set aside a sector where local community can fish with hook and line. Delay implementation of the Conservation Zone until Jan 2008, to allow time for education/awareness and development of alternative livelihoods.

**Sibuan reef: revised plan**

Target is for same area, but need to review in 2008 and possibly set aside a sector where local community can fish with hook and line. Delay implementation of the Conservation Zone until Jan 2009, to allow time for education/awareness and development of alternative livelihoods.

**e) Alternative livelihoods**

It will be very important to proceed with plans to introduce alternative livelihoods for local fishermen, in order that they do not suffer hardship when the closures take place.

Another reason for promoting alternative livelihoods is to reduce the likelihood of additional pressure being put on the areas that are still open to fishing (particularly the General Use Zone, which includes large areas of coral reef).

**f) Education and awareness**

An intensive public awareness campaign will be needed to explain the reasoning behind the plans and to inform people about the zones and permitted activities.

## PROPOSED ZONING PLAN

	Name of zone	Primary function(s)	Selection criteria	Principal regulations
1	Pelagic use/ buffer zone	Sustainable use.	Open water 500m from reef crest or 50m+ water depth	a) Open access. b) Pelagic fishing by local community under permit.
2	General use zone	Sustainable use.	Areas of reef and land important for local use	a) Open access. b) Use of living resources by local community under permit.
3	Conservation zone	Conservation of biodiversity.  Limited, non- extractive use.	Representative areas of high biodiversity importance.	a) Access with permit. b) No extraction of living or non-living resources. c) Recreational use under permit.
4	Preservation zone	Preservation of natural state.	Sensitive and representative areas of high conservation value.	a) No access expect for limited monitoring under permit.

ACTIVITY MATRIX Activities	Zones			
	1	2	3	4
Entry	Yellow	Yellow	Yellow	Black
Construction and development	Yellow	Yellow	Black	Black
Fishing and collection of marine resources	Yellow	Yellow	Black	Black
Seaweed farming	Black	Yellow	Black	Black
Mariculture and sea ranching	Black	Yellow	Black	Black
Hunting of birds and terrestrial animals	Black	Black	Orange	Black
Cultivation and harvesting of plants and fruits	Black	Yellow	Orange	Black
Recreation (land and sea)	Yellow	Yellow	Yellow	Black
Research	Yellow	Yellow	Yellow	Black

Key

Allowed with a permit	<span style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></span>
Not allowed	<span style="display: inline-block; width: 15px; height: 15px; background-color: black; border: 1px solid black;"></span>
Not allowed <i>except</i> in accordance with customary rights	<span style="display: inline-block; width: 15px; height: 15px; background-color: orange; border: 1px solid black;"></span>

**PROPOSED STAGED IMPLEMENTATION OF ZONING SCHEME**

	2006	2007	2008	2009
<b>Sea areas</b>				
Open water				
Sebangkat-Selakan & Maiga reef				
Bodgaya outer reef				
Sibuan reef				
Mantabuan reef				
Mantabuan north east reef sector				
Kapikan reef				
Church reef				
Western part of Bodgaya lagoon				
Eastern part of Bodgaya lagoon				
Bodgaya lagoon east sector				
<b>Islands</b>				
Sebangkat, Selakan, Maiga				
Bodgaya, Boheydulang (agricultural plots)				
Bodgaya, Boheydulang, Tetagan (forest)				
Bodgaya forest east sector				
Mantabuan				
Sibuan				

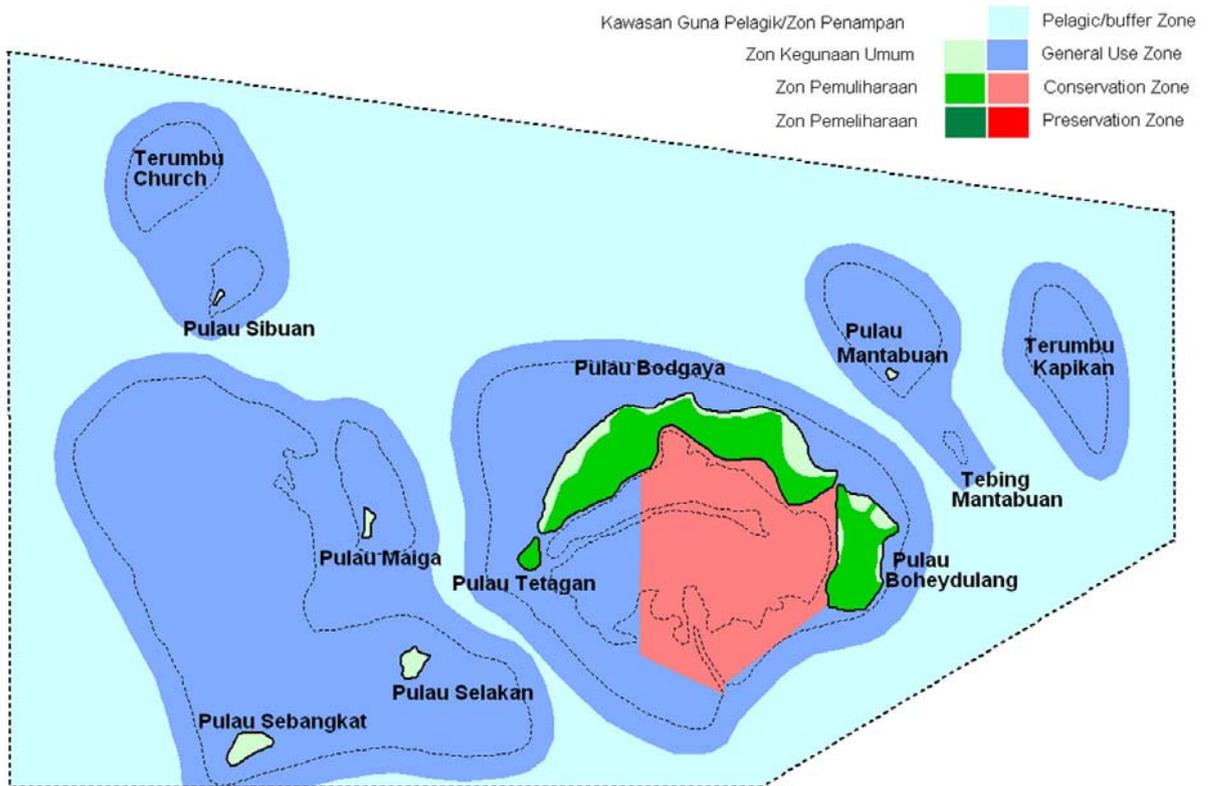
**Key**

	Land	Sea
Pelagic/Buffer		
General Use		
Conservation		
Preservation		

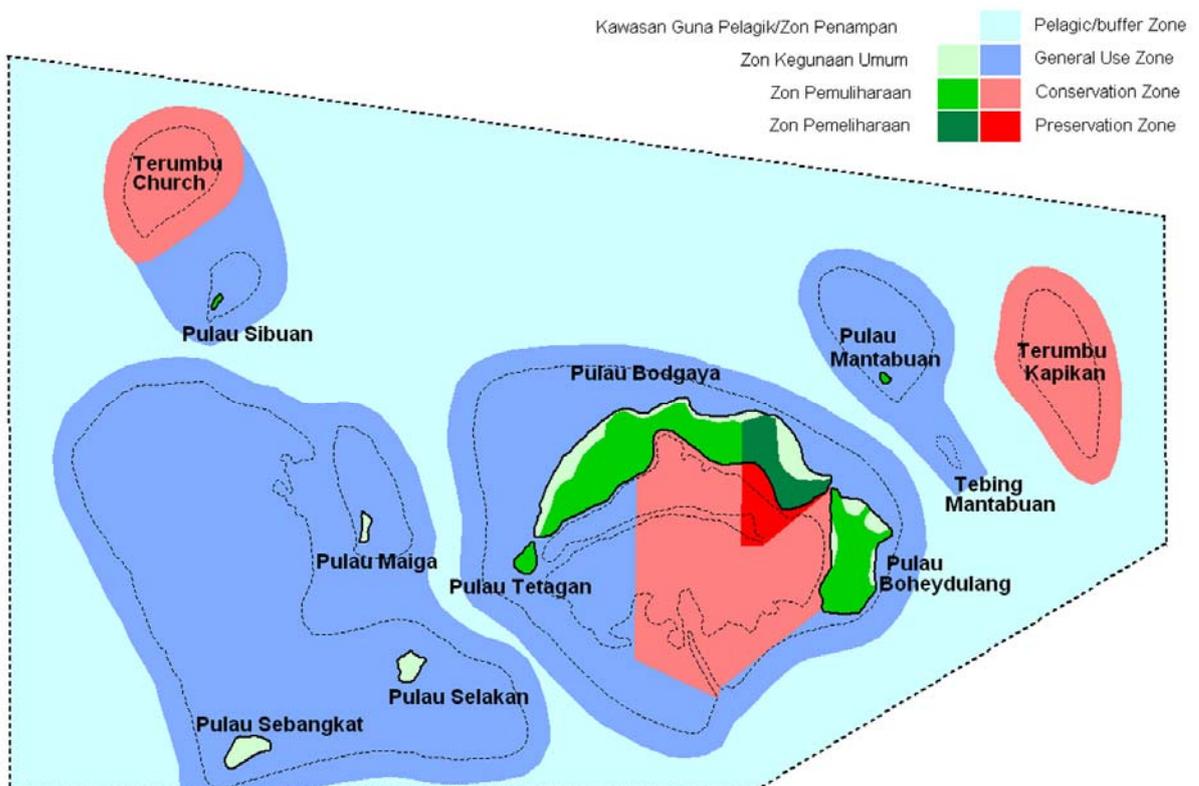
**Summary regulations: Zoning**

- 1) The TSMP is a multiple-use Park, with specified activities allowed in the prescribed zones.
- 2) There are four main zone types, named: Pelagic/Buffer Zone; General Use Zone; Conservation Zone and Preservation Zone.
- 3) The prescribed activities for each zone are shown in the Activity Matrix.
- 4) Sabah Parks may, in consultation with the local community, establish Special Management Sub-Zones within the main zones if the need arises.
- 5) Each Zone is represented by one, two or several separate areas within the TSMP.
- 6) The Pelagic Use Zone is operational from January 2006
- 7) The General Use areas are operational from January 2006, with the exception of the Conservation and Preservation Zones in 8) below.
- 8) The Conservation and Preservation Zone areas will be introduced in stages in order to allow the local community and other stakeholders to adjust to the new management strategy. The dates of introduction are as follows:
  - i. January 2006 Conservation Zone: Tetagan, Bodgaya & Boheydulang  
Conservation Zone: Eastern part of Bodgaya lagoon
  - ii. January 2007 Conservation Zone: Kapikan and Church reefs  
Preservation Zone: Bodgaya lagoon eastern sector & Bodgaya forest east sector.
  - iii. January 2008 Conservation Zone: Mantabuan reefs\* and island
  - iv. January 2009 Conservation Zone: Sibaun reefs\* and island  
\* possibly with a sector set aside for fishing with rod and line by local community.
- 9) The zone regulations come into force only when the specified area has been designated.
- 10) Other Conservation Zone areas can be set up at the request of the local community.

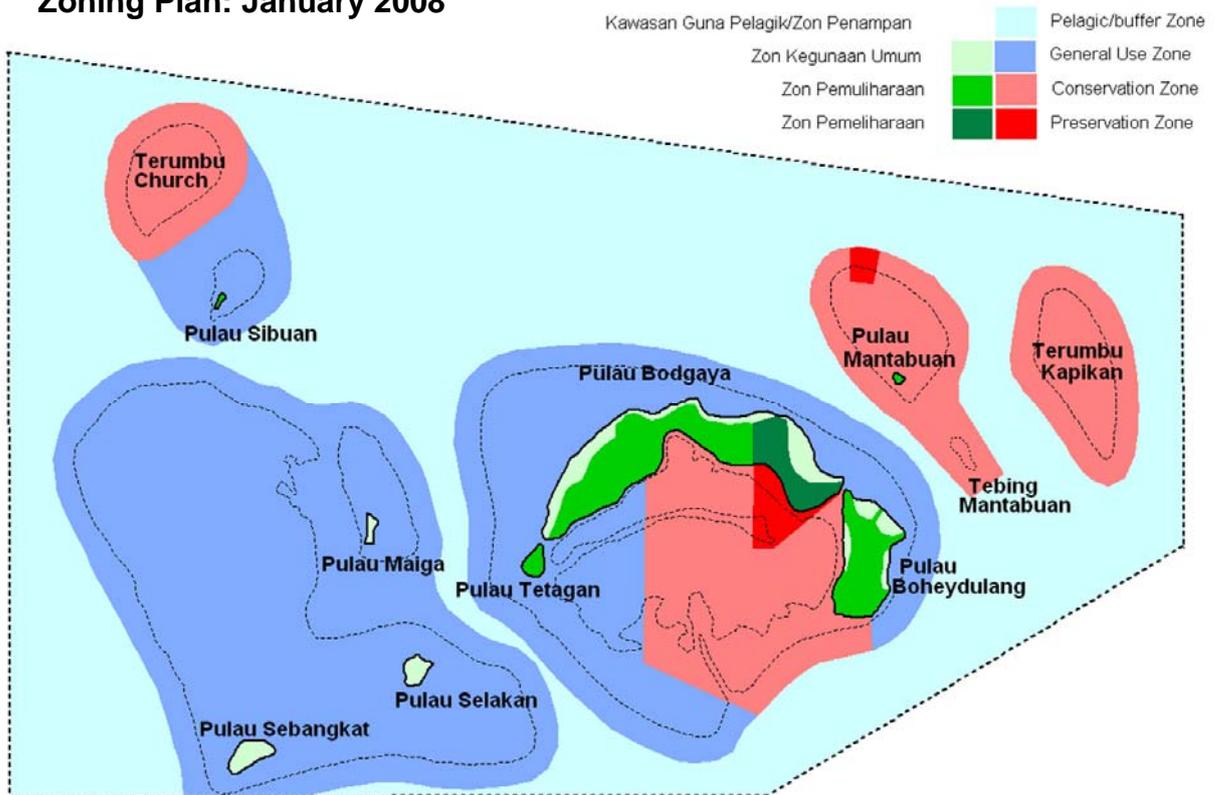
## Zoning Plan: January 2006



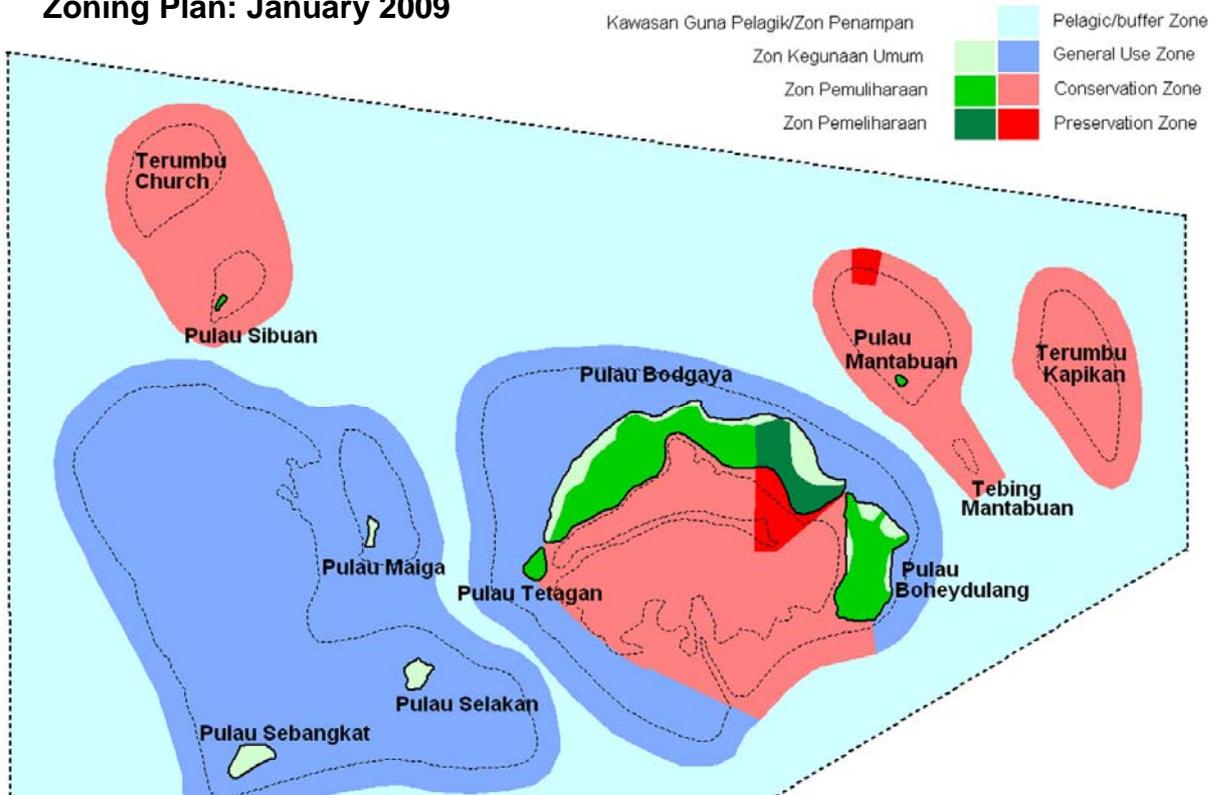
## Zoning Plan: January 2007



## Zoning Plan: January 2008



## Zoning Plan: January 2009



## 3. PROTECTION MEASURES FOR SPECIES AND HABITATS

### 3.1. Introduction

One of the main reasons why the TSMP was established was because of its exceptionally high biodiversity. The site is of regional, national and local importance, and conservation of biodiversity is a high priority.

The site supports a greater diversity of marine species than recorded elsewhere in Malaysia, with over 600 species of fish, at least 250 species of coral and 130 species of sponge. Both on land and in the sea there are a number of rarities and species not known from other sites in Malaysia, and several species new to science. This genetic diversity needs to be protected.

Also within the TSMP are many important marine and terrestrial habitats, some of which are poorly represented elsewhere in Sabah or Malaysia. If the conservation of these species and habitats is neglected then they may decline or even disappear. Decline or loss of species and habitats can have wide-ranging and long term biological/ecological impacts because of the many linkages within reef and island ecosystems.

There may also be economic and social impacts because of the way that people interact with, or are dependent on the ecosystems and their living communities of plants and animals.

### 3.2. Objectives

- To have measures in place that will ensure species and habitats 'at risk'\* are fully protected throughout the Park.

\*In the context of the TSMP, 'at risk' is used to describe a species or habitat that is vulnerable to over-exploitation or damage, or is already in decline, and that requires special conservation measures. The cause of the threat or decline might be fishing pressure, recreation, pollution, changes in water quality or many other factors, including climate change or naturally low populations.

- To have measures in place to ensure that all other species and habitats have adequate protection measure to ensure their survival in the TSMP.

### 3.3. Strategies

#### a) Protection through the Zoning Plan and Resource Use Regulations

Under the Zoning Plan there are representative areas set aside where removal of living and non-living resources is prohibited, and developments are carefully controlled to minimise environmental damage. These are the Conservation and Preservation Zones (No-take Zones). Once these zones become operational they will provide a high level of species and habitat protection.

Fishing, harvesting and other types of resource use will be permitted in the General Use and Pelagic (Buffer) Zones, but will be regulated in order to try and prevent over-exploitation and habitat damage (for example from destructive fishing methods). Again, this will provide some overall measure of protection for species and habitats.

## b) Complete protection through listing on TSMP Schedule

Designation of a species or habitat for complete protection would mean that collection or disturbance was not allowed anywhere within TSMP.

### 3.4. Feedback

Following a presentation at the first Workshop, participants were asked to consider which species or habitats they felt should be the focus of special measures (for social, cultural or economic reasons). These suggestions (see Report of First Workshop), combined with knowledge of the global and local conservation status of the species and habitats concerned, led to a recommended list of species and habitats being drawn up. This was subsequently discussed at the second Workshop and Boatshows and at the Stakeholder Meeting.

Local community participants at the second Workshop showed strong support for the listing procedure of the proposed species and habitats at risk. Of the 22 who responded to the questionnaire, 64% agreed or strongly agreed, 36% were uncertain, but no-one disagreed.

However, requests were made for limited collection of wild broodstock of humphead wrasse, giant clams and seahorses as broodstock for mariculture, and for personal traditional medicine with a special permit. An open and closed season to catch rays and sharks was also suggested.

During the second Boatshow consultation (number interviewed =243), the majority of respondents (90%) agreed with the proposed list. The main issue raised by those who were unsure or disagreed was that some of the proposed species have a high market value and are abundant only in TSMP, so the restriction to prohibit the catch of these species will affect local community livelihoods.

These concerns have been taken into consideration in preparing the regulations (below). One recommended change is to have a staged approach in order to allow time for an awareness and education programme to be run, and for people to adjust.

However, an open and closed season for fishing of shark, manta and eagle rays is not considered appropriate for the foreseeable future because of the extremely low populations in TSMP. Also collection of broodstock of humphead wrasse is not recommended for the TSMP because of the potential environmental impact of culturing and ranching fish (in addition, culture of humphead wrasse is technically very difficult).

### 3.5. Regulations

- 1) The species and groups of animals listed in Tables 1 and 2 are designated as protected species.
- 2) Further species or groups can be added by Sabah Parks, subject to the agreement of the local community.
- 3) Disturbance, damage or collection of any of the species or groups in Table 1 is prohibited with immediate effect (none of these species or groups - with the exception of swift nests- are regularly utilised by the local community, and their protection will not cause hardship).

- 4) Disturbance, damage or collection of any of the species or groups in Table 2 will be prohibited following awareness and education campaigns. Three months notice will be given prior to the protected status for any of these species or groups being introduced.
- 5) Damage to the habitats listed in Table 3 is prohibited with immediate effect.

Taxonomic group or species	Potential or existing threats within TSMP.	Abundance/conservation status Reason for listing
Reef corals. All scleractinians and other species with a calcareous skeleton	Damage from fish blasting and other destructive fishing methods.	Reef corals are globally threatened and are listed in Appendix II of CITES*. In TSMP abundance varies greatly. Hard corals play a vital ecological role.
Sea fans, sea whips, black corals	In some locations (not in TSMP) these species are collected for sale as curios or to make jewellery.	Black corals are listed in Appendix II of CITES. In TSMP abundance of these groups varies with species, but generally slow growing and vulnerable to damage/over-exploitation.
<i>Nautilus</i> species	Valued for meat and shell. Caught with baited traps in deep water.	Insufficient known about populations in TSMP. Risk of over-exploitation.
Horseshoe crab <i>Tachypleus tridentatus</i>	Unknown	Rare. High value of live specimens for visitor interest.
Coconut crab <i>Birgus latro</i>	Unknown	Rare. High value of live specimens for visitor interest.
Sea snakes (all species)	Disturbance to nesting areas on the islands.	Uncommon in TSMP. High value of live specimens for visitor interest.
Monitor lizard ( <i>Varanus</i> species)	Unknown, but probably hunted.	Uncommon in TSMP. High value of live specimens for visitor interest. Listed in Schedule 2 of the Sabah Wildlife Conservation Enactment 1997.
Otters (all species)	Probably not targeted for food, but vulnerable to disturbance and habitat loss.	Rare in TSMP, with only localised populations. Listed in Schedule 2 of the Sabah Wildlife Conservation Enactment 1997.
Dolphins	Targeted by some fishermen	Seldom recorded in TSMP. Listed in Schedule 2 of the Sabah Wildlife Conservation Enactment 1997.
Dugong	Not reported for TSMP, but vulnerable to fishing and disturbance.	Globally threatened. Listed in Schedule 1 of the Sabah Wildlife Conservation Enactment 1997.
All bat species	Unknown	Small populations in TSMP. Valuable species for visitor interest.
All forest birds, including megapodes, hornbills and swifts (except where Native C Rights apply)	Several species targeted for food, plumage, eggs etc	Populations of many species have been reduced through hunting. Most species of forest bird are listed in Schedule 2 of the Sabah Wildlife Conservation Enactment 1997.

Table 1. List of species and groups for immediate protection

Taxonomic group or species	Potential or existing threats within TSMP.	Abundance/conservation status Reason for listing
All species of giant clam (except broodstock for mariculture with permit)	Collection for food and for the shell. Habitat damage is caused during collection of some species.	Globally threatened and listed in Appendix II of CITES. <i>Tridacna gigas</i> is virtually extinct locally. Populations of all other species, with the exception of the crocus clam ( <i>Tridacna crocea</i> ) is low or very low.
Giant triton <i>Charonia tritonis</i>	Collected for its shell and meat.	Rare, with naturally low population in TSMP. Important ecological role in controlling populations of coral-eating crown-of-thorns starfish.
Cowries ( Cypraeaidae) & egg cowries (Ovulidae)	Collected for their shells (not food)	Reported to be 'not easy to find', probably as a result of over-collection.
Marine turtles (all species), including eggs	Adult turtles are captured, usually accidentally, by being tangled in fishing gear. Eggs are collected.	Globally threatened and occur only in low numbers in TSMP. Listed in Appendix II of CITES and in Schedule 2 of the Sabah Wildlife Conservation Enactment 1997.
Sharks (all species)	Targeted by fishers	Globally threatened. Badly over-exploited in TSMP. Large specimens are not seen; occasional small ones reported.
Manta ray, eagle ray (all species)	Targeted by fishers	Seldom seen in TSMP, possibly due to over-exploitation.
Seahorses (all species)	Collected for medicinal use	Globally threatened and listed in Appendix II of CITES. Status in TSMP uncertain, but restricted amount of suitable habitat
Napoleon or bumphead wrasse <i>Cheleinus undulatus</i>	Targeted by fishers	Globally threatened and listed in Appendix II of CITES. Over-exploited in TSMP; large, mature individuals are rare and young fish uncommon.

Table 2. List of species and groups for protection following awareness campaign and three months advance notification.

CITES: Convention on International Trade in Endangered Species. Listing on Appendix II means that international trade is monitored and that licences are required for all exports and imports.

Species listed in Schedule 1 of the Sabah Wildlife Conservation Enactment 1997 are completely protected. Those listed in Schedule 2 cannot be hunted

Habitat	Recommended protection measures for TSMP
Coral habitat	No anchoring or other physical damage allowed; no structures to be erected which would damage or disturb the coral habitat.
Seagrass beds	No anchoring or other physical damage allowed; no structures to be erected which would damage or disturb the seagrass habitat.
Mangrove	No removal or clearance of mangrove trees

Table 3. Proposed list of marine habitats for special protection measures

## 4. MANAGEMENT OF FISHING AND EXTRACTION OF MARINE RESOURCES

### 4.1. Introduction

Other marine parks in Sabah prohibit all hunting, capture and removal of living resources except for fishing with hook and line, which can be carried out without a licence. The Tun Sakaran Marine Park (TSMP) is a special case and a new concept for Sabah Parks, because it has a resident local community who depend on harvesting and fishing of marine resources to meet their everyday needs.

The management strategy adopted for TSMP, and ratified in the Management Plan, is for a multiple use Park in which the local community is allowed to continue to fish in certain areas, with specific types of gear.

Although fishing will continue, a comprehensive set of regulations is needed to ensure that it is sustainable and is not threatening biodiversity. Marine resources in TSMP have dwindled to a low level because of heavy fishing pressure and destructive fishing methods. This over-exploitation needs to be addressed because it is causing hardship to local communities and loss of biodiversity.

Marine resources are a common heritage for the State, and not owned by any person or agency. The responsibility for managing them in the TSMP now lies with Sabah Parks, and the aim is to do this in consultation with local communities and other agencies.

### 4.2. Current usage: summary features

The marine resources of the area that is now the Park have been exploited at least since the late 1880s, when people migrated to the area from the southern Philippines. A number of studies have now been carried out at the site, in order to gain a better understanding of the way that resources are used and the issues that need to be addressed. With this information, it is then possible to formulate appropriate regulations.

Fishing is carried out by people who live in the Park and others who come in from nearby islands, the mainland or further afield. Locally, there is a strong tradition of fishing amongst both Bajau and Suluk communities, and the sea-faring lifestyle of the Bajau Laut means that they rely particularly heavily on marine produce both for their own consumption and to sell or barter for staples such as rice.

The extent of fishing is illustrated by the results of a survey of 102 people (70 men, 32 women) living in the TSMP (carried out during the second Boatshow) which showed that fishing was the primary occupation for 48% and the secondary occupation for 33%. This and other studies have shown the importance of fishing for household consumption as well as for sale. Women may occasionally go out fishing in small boats, but generally their involvement is in hand collecting (gleaning) on the back reef.

Large boats, using gear such as purse seines, operate in the open water areas of the Park, and generally employ fishermen who work full time. In contrast, reef fishing mainly involves boats less than 4m in length and is a mixture of part time and full time effort. Hook and line is the most commonly owned fishing gear, used by just over 94% (n=117) of fishermen interviewed in 2004 and by 97% (n=251) interviewed in 2006 (*Semporna Islands Darwin Project* unpublished data). However, the majority of fishermen use a range of other gears in addition to hook and line, including trolling lines, nets, traps and spears.

Blast fishing is common in the area and is unlikely to abate until effective enforcement measures are in place. According to the local community, most of those engaged in fish blasting come from outside the Park. Fishing with cyanide for the live reef fish trade is also carried out in the Park.

In terms of species targeted, virtually everything is of value, and probably nothing is discarded. The market at Semporna sells a wide range of species, even including small reef fish such as damselfish. Other produce on sale include seaweeds (*Caulerpa*), sea anemones (mainly *Stichodactyla*), lobsters, crabs, clams and sea cucumbers. Some of this produce undoubtedly comes from the TSMP.

It has not yet been possible to determine total fishing effort or catch for the site because of the complex mixture of part-time/full-time working and visiting/local fishermen, and the variable fishing patterns depending on weather, tide and moon phase, fuel and ice supply, seasonal variation of targeted species and market demands.

### 4.3. The overall plan for fisheries management in TSMP

#### Objectives

- To ensure that fishing and harvesting of marine resources is sustainable in the long-term i.e. that it is set at a level that ensures the same level of catch with the same amount (or less) effort.
- To ensure that fishing and harvesting of marine resources is not having a negative impact on conservation of biodiversity and ecosystem function.

#### Strategies:

It is clear that steps have to be taken to reduce the amount and type of fishing if the objectives for the Park are to be met. The following strategies have been agreed in principle:

**Area restrictions:** Under the zoning system for the TSMP, some areas will be set aside as no-take areas (Conservation Zone and Preservation Zone: see Zoning Plan) where fishing or harvesting of any living or non-living resources is prohibited. These are areas of high biodiversity that will act as refuges and seed areas for the rest of the park.

**Gear and catch restrictions:** Fishing and harvesting of marine resources in the other zones (Pelagic and General use Zones) will be allowed, but only under permit, and according to regulations laid down by Sabah Parks. These regulations will list permissible gear and may specify amounts and species that can be taken. Certain fishing methods and gears will be banned because they are destructive, unselective or encourage over-exploitation.

**Permits:** A permit will be required for all fishing and harvesting of marine resources in the TSMP. All individuals wishing to fish or use living marine resources in the Park will need to complete an application form and submit it to Sabah Parks for consideration.

**Recording catch and effort:** A log book scheme will be developed so that data can be collected for management purposes.

**Surveillance and enforcement:** Regular patrols by Park staff will be needed to check fishing activities and permits. Local community wardens may also be involved in surveillance.

#### 4.4. Feedback

Draft regulations covering '*prohibited gear/methods*' and '*gear/methods allowed with a permit*' were presented for discussion at the First Workshop and Boatshow. The proposals were generally well received, and useful feedback was obtained which was then incorporated into the second draft of the regulations prior to further consultation at the Second Workshop and Boatshow.

During the second Boatshow, 243 members of the local island community were interviewed and the majority (93%) agreed with the proposed list of prohibited fishing gears and methods. One of the main reasons behind the disagreement or uncertainty was that some of the proposed prohibited gears are considered traditional gears used frequently by local fishermen.

There was also a high level of agreement (90%) with the proposals concerning types of fishing gears and methods that would be allowed in the Park with a permit. Only 9 respondents (3.7%) disagreed with the proposal while 16 people (6.6%) were not sure. Reasons given for disagreement or for ticking the 'not sure' category included not understanding the permit system or feeling that the permit cost would burden small scale fishermen.

At the second Workshop, no-one disagreed with the proposed regulations, but 50% of the respondents were not sure about the proposals. The rest agreed with the proposals. One of the main areas of discussion was in relation to who should be eligible for fishing permits.

Further small amendments were made to the lists before discussion at the Stakeholder Meeting. Here the main debate revolved around whether it is appropriate to allow use of nets in the TSMP. They are not permitted in Sabah's other State Parks (only hook and line is allowed), but TSMP is a special case because the needs of the local community have to be met. Currently, nets are widely used in the TSMP, and fishermen would face hardship if they were banned outright. However, there are concerns about the use of nets because they can lead to overfishing, bycatch (e.g. of turtles) and habitat damage. It is thus recommended that the long-term aim should be to discontinue the use of nets throughout the Park, but that the ban on different types of net will be introduced in stages, following education and awareness campaigns.

Feedback and comments have been taken into consideration in the preparation of the third draft of the regulations, presented below.

#### 4.5. Regulations

- 1) The following list of fishing appliances and methods are prohibited throughout all zones of the TSMP with immediate effect:
  - a) Explosives
  - b) Fish poisons
  - c) Trawling
  - d) Electric fishing
  - e) SCUBA and hookah gear
  - f) Powered spear gun
  - g) 'Muro ami'/Pa-aling type of gears
  - h) All types of nets in shallow coral areas (less than 5m depth)
  - i) Trammel nets
  - j) Targeting or capture of any species on the protected list

- 2) The fishing appliances and methods in the list below will be prohibited in stages, following education and awareness campaigns. Six months notice will be given before the restriction for any of these gears is introduced. Temporary permits for use in the appropriate zone will be required until the banning orders come into force (use in Conservation and Preservation Zones is prohibited).
  - a) Gill net/drift net  
Temporary permits will specify not more than 2 nets per person/permit. Mesh size 0.5 inch - 4 inch. Net dimension not exceeding length 31m, height 2.2m.  
The nets cannot be set on the bottom or used in shallow coral areas (less than 5m depth)
  - b) Seine net  
Temporary permits will specify no more than 2 nets per person/permit. Mesh size 0.5 inch - 4 inch.  
The nets must not touch the bottom and cannot be used in shallow coral areas (less than 5m depth)
  - c) Purse seine
  - d) Floating or moveable lift net
- 3) The fishing appliances and methods listed in Table 4 (next page) can be used in the TSMP, but only within the prescribed zones (and not in the Conservation or Preservation Zones).
- 4) After January 2007, any person fishing or harvesting marine resources in the TSMP will need to be in possession of a permit from Sabah Parks.
- 5) The permit will have conditions attached (type of gear and boat etc) and will be non-transferable and subject to annual review.
- 6) Once the permit scheme is in operation, fishing without a permit will incur penalties (as specified elsewhere in the Schedule).

Gear type		Pelagic use zone	General use zone	Limits to use
Hook and line	Hand lines for fish (pancing)	Permit	Permit	No more than 3 lines per person/permit. Each line max of 3 hooks. Hook size 8 - 14
	Hand line with lure for octopus or squid	Permit	Permit	One per person and by season
	Bottom long line (rawai tenggelam)	Permit	No	One line per person/permit. Line length max 60 meters. Hook size: 7 - 9. Max no hooks per line: 50
	Trolling lines for tuna/pelagic fish	Permit	No	One line per person/permit. Line length max 100 meters. Hook size: 5 - 10. Max no. hooks per line: 20
Traps	Fish stakes (bungsud, kilong)	N/A	Permit	Front opening Size: 150 meters. Catch bag mesh size: 1 inch (1 unit per operation)
	Fish, crab & lobster traps (bintur, panggai, bubu)	N/A	Permit	Small traditional bamboo or rattan trap; mouth opening size max 25 cm dia. Body cubic size c. 70 x 40 x 28 cm (Max 40 units per operation). Large traps 4m max diameter; special permit
Spears	Hand spear (serapang)	Permit	No	Depending on target species
Fish aggregating devices		Permit	No	Issue of permit depends on design, number, width, height, materials (only biodegradable, non-toxic) and area of deployment. The device should not obstruct marine traffic.
Hand collecting		N/A	Permit	Depending on target species Collection of shells is restricted to edible species for personal/family consumption and excludes those on the protected list.

Table 4. Fishing appliances and methods that can be used in the Tun Sakaran Marine Park with a permit and within the prescribed zones.

## 5. SEAWEED FARMING

### 5.1. Introduction

Seaweed culture in Semporna has a long history since its inception in the late 1970s. It was given priority by the Department of Fisheries Sabah as a supplementary income-generating activity among the fishing community with the establishment of a demonstration farm on the Sebangkat reef top in 1980. More people have gradually become involved in seaweed farming. For example, the residents of Pulau Selakan began seaweed farming in mid-1994, and since then it has grown and is flourishing as it provides a good income. Many of the Bajau here have switched from fishing to seaweed cultivation.

The main species cultured used to be *Euchema cottonii* and *Euchema spinosum*, but farmers have stopped culturing the latter as exporters prefer *E. cottonii* because it fetches better prices.

### 5.2. Current situation

At least four enterprises/agencies are currently involved in seaweed farming within the TSMP area, including large areas run by the LKIM - The Malaysian Fish Development Board. The culture plots are found mostly on the extensive 'reef top platform' to the north of Sebangkat and Selakan, where they cover an area of approximately 2,150 ha (5,312 acres; based on examination of aerial photographs taken in 1998). Smaller plots are located off Bodgaya and Boheydulang (Figure 6). There have been plots off Sibuan and Maiga but these are not currently operating.

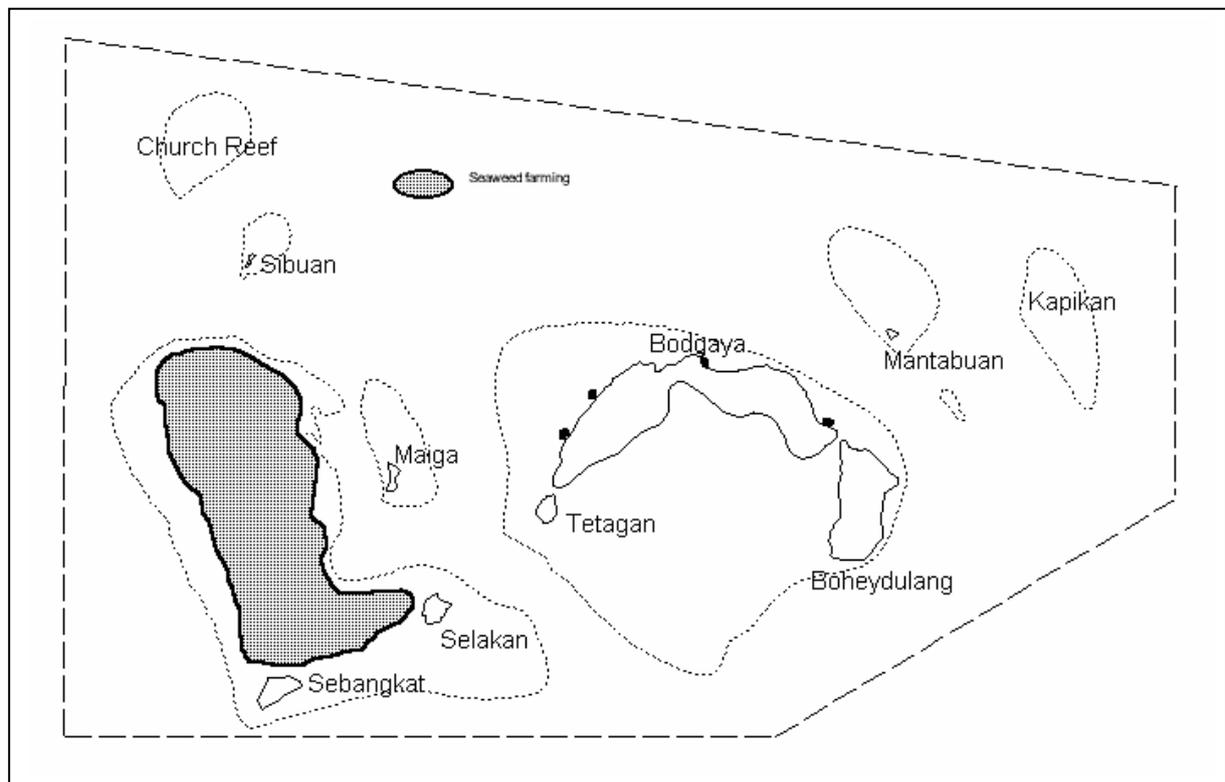


Figure 1. Main seaweed farming areas in the Tun Sakaran Marine Park

Prior to the establishment of the TSMP, a person or company wishing to start seaweed farming had to apply for a TOL (Temporary Occupation Licence) and a licence for carrying out seaweed cultivation within that area. The application went through the Fisheries Department before being presented to the relevant local authority (District Office) for final approval.

Now that the Park has been gazetted, applications have to be submitted to Sabah Parks, who will be responsible for issuing permits. However, although Sabah Parks is the ultimate management authority for seaweed cultivation, policies and regulations will, as recommended in the Management Plan, be developed jointly with local communities and other stakeholders (e.g. Fisheries Department, LKIM).

### 5.3. Community and stakeholder feedback: key points and agreed objectives

Seaweed farming is strongly supported by the local community. The objectives, as agreed by SIDP/Sabah Parks and the local community can be summarised as follows:

- a) To maintain or develop seaweed farming so that it directly benefits the local community.
- b) To ensure that the local community has equal opportunities to develop seaweed farming.
- c) To promote small scale, community-based seaweed farming approaches.
- d) To follow 'best practice' guidelines in order to ensure that operations are conducted in an environmentally-friendly way, so that the marketed product can be certified as meeting international '*green standards*'.
- e) Where possible, to integrate seaweed farming with sea ranching of marine invertebrates.

### 5.4. Policies and strategies

- a) Seaweed farming will be continued within the TSMP because it is beneficial to the local economy and helps to take pressure off the reefs by providing fishermen with alternative livelihoods.
- b) Cultivation will be restricted to the General Use Zone and not be expanded beyond the areas that were in use when the Park was gazetted, thus maintaining a balance, and ensuring conflicts with other uses of the reef are minimised.
- c) The amenity, landscape and environmental impact of existing large-scale constructions on the Sebangkat reef top will be reviewed and some of the structures may be removed.
- d) Construction of additional stilt houses and infrastructure in TSMP will be allowed only under permit.
- e) Seaweed farming will be carried out only under permit, and permits will be granted preferentially to traditional, small-scale community-run operations where the farmer sells to a local co-operative or direct to a trader.

- f) Seaweed farmers will be asked to follow 'Best Practice' in order to ensure minimal damage to the environment and reef habitats: see below.
- g) Seaweed farming will, if possible, be integrated with mariculture of invertebrates.

#### RECOMMENDATIONS FOR BEST ENVIRONMENTAL PRACTICE

The target for seaweed farming in TSMP is that future operations will be conducted in an environmentally-friendly way, so that the marketed product can be certified as meeting international '*green standards*'. This approach will not only have environmental benefits, but should also help to promote the commodity and upgrade its price.

The cultivation method currently being used in the TSMP is non-intensive and does not appear to be causing environmental damage or other impacts on reefs and adjacent habitats (apart possibly from the construction of houses and drying platforms, and the increased risks of pollution from the presence of the seaweed farming workforce).

Research will continue into 'best environmental practice', but the initial advice to farmers is that they follow these guidelines:

- Continue to place the floating long lines the same distance apart as they are now (about 1m) and the seedlings at the same interval (about 50cm) because at this density there is no apparent shading effect on the corals beneath.
- Ensure that the ropes used to secure the floating long lines are not tied around living corals. If necessary use concrete anchor points laid on the sandy bottom.
- Do not discard seedlings or mature growths of seaweed on the reef top or allow them to become detached because they may smother living corals.
- Ensure that floats and ropes no longer in use are removed from the sea for safe disposal.

#### 5.5. Regulations

- 1) Seaweed farming will be allowed only under permit issued by Sabah Parks, and only in the General Use Zone.
- 2) Any individual, group or company intending to farm seaweed in TSMP must apply for a permit from Sabah Parks with immediate effect.
- 3) Seaweed farmers in TSMP will be required to follow 'Best Practice' in order to ensure minimal damage to the environment and reef habitats: see above.

## 6. MARICULTURE AND SEA RANCHING

### 6.1. Introduction

One of the key objectives for the TSMP is to reduce pressure on marine resources so that biodiversity is protected and populations of over-exploited species can recover. The policy of limiting fishing effort in the Park and establishing no-take areas will have an impact on the fishing community unless steps are taken to provide fishermen with alternative livelihoods. The Park will, in the long-term, bring numerous opportunities. Many new jobs will be created in sectors connected to the administration, development, and day-to-day operation of the park and its facilities. Other opportunities lie in tourism development, which will require a sizeable workforce.

The alternative livelihoods mentioned above will take some years to come 'on stream' and will also entail a significant amount of training to ensure that local people have the skills required for the wide range of different jobs that will become available. Currently, emphasis is being placed on the expansion of community-based, low-impact mariculture, because this activity suits people already familiar with working in the marine environment. The concept is strongly supported by the local community - for example 92% of fishermen (n= 117) stated in a feedback exercise that they would like to be trained and participate in alternative livelihoods of this type.

There is a strong tradition of use of marine invertebrates in the Semporna area, and as a result populations of sea-cucumbers, crustaceans, giant clams and other molluscs have declined. Low impact culture and sea ranching of some of these groups could bring employment and economic benefits for local people, and could also bring direct conservation benefits by re-stocking the reefs with cultured specimens. A feasibility study has been carried out using juvenile *Tridacna squamosa* and *T. gigas* from the Philippines, in order to introduce local communities to ranching techniques. Fishermen were taught how to construct, deploy and maintain the cages, and to monitor the health and growth of the clams. At the end of the first year survival of clams at all sites combined was 48% for *Tridacna gigas* and 40% for *Tridacna squamosa*. Clam growth has been particularly high in *Tridacna gigas*. Specimens have, on average, doubled in size in one year, from an average of 9cm to 20cm.

A hatchery is now under construction and once this is complete, trials on culture of abalone, top shells, oysters and other marine invertebrates of value will begin.

### 6.2. Objectives

- To provide alternative livelihoods for local fishermen, so reducing fishing pressure on the reefs.
- To establish a community-based operation that will bring new skills and economic benefits to local people.
- To operate the mariculture and sea-ranching programme in such a way as to ensure it has no detrimental environmental impact.
- To enhance wild populations of the ranched species (where appropriate e.g. giant clams) through a programme of reef replenishment.
- To use the culture and sea ranching programme to promote education and public understanding.

### 6.3. Strategies

- A hatchery will be constructed at Boheydulang with the aim of producing seed marine invertebrates for ranching.
- Research and training schemes will be put into operation in order to ensure that local communities are fully involved and benefit from the sea ranching programme.
- Best practice guidelines will be developed for the culture and sea ranching operations.
- A permit will be required for all mariculture projects within the park (including any existing ones). Permits will be issued only if the impact assessment is favourable.

### 6.4. Regulations

- 1) Mariculture and sea ranching will be allowed only under permit issued by Sabah Parks, and only in the General Use Zone.
- 2) Any individual, group or company intending to culture and/or ranch marine animals in the TSMP must apply for a permit from Sabah Parks with immediate effect.
- 3) Those who are involved in culture and sea ranching will be required to follow 'Best Practice' in order to ensure minimal damage to the environment and reef habitats.

## 7. MANAGING EXTRACTION AND CULTIVATION OF TERRESTRIAL RESOURCES

### 7.1. Introduction

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. 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. Other natural resources of value include water and clay.

The main impact of this exploitation 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.

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.

### 7.2. Management 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.
- 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.

### 7.3. Policies and strategies

- Ensure conservation of terrestrial resources in key areas of biodiversity importance by establishing Conservation Zones that prohibit extractive use (except in the case of Native Customary Rights).
- Protect rare or vulnerable species throughout all areas of the TSMP (see Protected Species).
- Limit and monitor extraction of terrestrial resources in other areas by introducing a permit scheme that allows named members of the local community access and limited use according to specified conditions.
- Keep records of resource use, and establish a monitoring programme to investigate impacts.
- Allow cultivation in the General Use Zones by the local community, with a permit.

- Establish a working group with 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.

#### 7.4. Regulations

- 1) Collection of wild animals and plants or any of their derivatives (dead or alive) is allowed in the General Use Zones of the islands, but only under permit\* and not including any species on the protected list.
- 2) Collection of wild animals, plants or any of their derivatives is not allowed in the Conservation Zones of the islands, except under special permit\* granted for Native Customary Rights.
- 3) Collection of wild plants, seeds, fruits or any other parts of plants is not allowed in the Preservation Zone.
- 4) Cultivation of crops, fruit trees and other plants is allowed in General Use areas with a permit\*.
- 5) Cultivation of crops, fruit trees and other plants is not allowed in the Conservation or Preservation Zones.
- 6) Extraction of water and any other non-living resources is allowed only under permit\*.
- 7) \*The permit scheme will be introduced in 2007. Conditions will apply, depending on the areas and activity.

## 8. MANAGEMENT OF TOURIST OPERATIONS AND RECREATION

### 8.1. Introduction

One of the objectives for TSMP is to maximise opportunities for sustainable use, including recreational use. The TSMP has many attributes that make it suitable for tourism development, especially in relation to experiencing and appreciating the natural environment and way of life. Growing numbers of people have been visiting the Park since it was gazetted, mainly for diving, snorkelling and picnics. However, current usage remains very low, and there are no facilities for overnight stay. This lack of development is advantageous in terms of management because it presents an opportunity to 'get it right first time', rather than have to bring in controls after activities/developments have got out of hand.

Local communities and other stakeholders generally see tourism development as an appropriate way forward for the park.

*Potential benefits include:*

- Income, economic growth and jobs
- Incentives for conservation
- Opportunity to switch from extractive to non-extractive activities.
- Opportunities to promote education and environmental awareness

It is important to recognise that recreation and tourism also bring problems, for example,

*Potential impacts and problems include:*

- Disturbance of terrestrial habitats and loss of biodiversity (e.g. from buildings, human activities).
- Degradation of coral reefs (e.g. from snorkellers and divers, water pollution and sedimentation).
- Interference with local ways of life.
- Much of the income generated by tourism may end up elsewhere, rather than benefiting the local economy.
- The 'wilderness' characteristics and serene qualities of the islands may be lost.

Generation of income and provision of alternative livelihoods are stated objectives for the TSMP, but it is vital that conservation remains the top priority and tourism development is very carefully planned and controlled. Without controls, tourism would probably expand rapidly to the detriment of the site.

Unmanaged recreation has, in many places throughout the world, led to environmental degradation and loss of biodiversity. In some cases it has destroyed the features that attracted people in the first place.

Thus it is vital to select the appropriate level and type of tourism from the start, and an 'environmentally-friendly' selection of recreational activities. The Parks Enactment makes it possible to introduce comprehensive tourism development regulations which are necessary if the attributes of the area are to be retained, enhanced and secured for the future well-being of people and the environment.

### 8.2. Objectives

- To promote appreciation and enjoyment of the natural environment of the TSMP.
- To provide alternative livelihoods for local communities.
- To be economically sustainable and channel proceeds from tourism back into Park management to support conservation initiatives and environmental protection.

### 8.3. Policies and Strategies

- Steps will be taken to ensure that tourism plans for TSMP are acceptable in the context of State and Federal government policies, such as the National Ecotourism Plan and the State Conservation Strategy.
- Tourism development will be set within the primary goal for the proposed park, which is to protect and conserve ecosystems, natural features, habitats and fauna and flora of the Park whilst providing for ecologically sustainable use of the area.
- Tourism activities will be designed to actively promote understanding and appreciation of the natural environment. If properly planned and conducted, it should help to support the conservation management plan and protection of the area.
- Mechanisms will be set in place to ensure that economic benefits from tourism are channelled back to local communities and to activities that support conservation management activities.
- All aspects of tourism development, operation of facilities and entry into the park for purposes of recreation will be coordinated and regulated by Sabah Parks. This will enable certain standards, protocols and limits to be imposed.
- Limits will be placed on the total number of visitors who can be in the TSMP at any given time. An initial rough estimate of carrying capacity is included in the Management Plan.
- Tourism and recreation will be integrated with and not conflict with other legitimate activities in the proposed park. A mechanism will be set in place to ensure that conflicts can be discussed and resolved.
- Local communities will be involved in planning for tourism, for example in discussing what kind of tourism occurs, where and when. Local people will be directly involved in operation of facilities (e.g. trained as 'nature' guides).
- Care will be taken to ensure that tourism development does not jeopardise the cultural and social values of the TSMP.
- All facilities built for tourism should be based on local designs, be in harmony with the natural environment and be operated in an environmentally friendly way.
- Promotion of the area as a tourism destination should be carried out in line with objectives and kind of tourism desired i.e. ecotourism.
- Education and awareness must be an integral part of tourism and recreational activities. The materials should include a guide to the park and its regulations, together with field guides for purchase.
- Mechanisms should be in place to monitor and evaluate tourism and recreational activities, and to make adjustments to the overall programme as necessary.

#### 8.4. Regulations

- 1) Construction and development for tourism either on state or private land can be carried out only under permit.
- 2) The application for a permit must include construction and operational details, together with an environmental impact assessment.
- 3) A permit will be considered only if the project is in accordance with the zoning plan and tourism concept for the TSMP.
- 4) Permits will not be granted for the Preservation Zone.
- 5) All tour operators (individuals, groups or companies) based either within or outside the TSMP and providing services within the TSMP will be required to have a permit from Sabah Parks. Regulations and conditions will apply.
- 6) All visitors to TSMP will be required to pay a fee.

## 9. RESEARCH AND MONITORING

### 9.1. Introduction

It is vital that management of the TSMP is adaptive and responds to changing needs and circumstances. Appropriate responses can be made only on the basis of accurate, up-to-date information, and it is for this reason that a monitoring and research programme should be set in place.

The park management regime includes various interventions aimed at conserving biodiversity while allowing for sustainable use. Some areas will be 'left alone', while others will be closed for fishing or used for specific purposes such as seaweed farming or reef recreation. The monitoring and research programme needs to cover all these aspects over a range of disciplines. Basic parameters such as climate and water quality should be monitored, and projects also need to be developed to track the use of the Park and its resources and answer questions such as 'Is the quality of the environment improving?', 'what is the impact of this development?' , and 'what is the effect of the park management regime on \_\_\_\_\_?'

### 9.2. Objectives and strategies

Design and execution of the research and monitoring programmes should be a joint effort between Sabah Parks and relevant experts and institutions, especially those who were involved in the baseline surveys. Experienced ecologists or other professionals in their field of interest should establish the protocols, train Sabah Parks staff as necessary, and ensure the monitoring is carried out regularly.

It will be very important to ensure that the results of the monitoring and research programme are interpreted and made available in a format that is useful for the Park Management team. This should help to indicate whether changes are needed in the management regime - for example, added protection for certain sites or species.

This needs to be developed, but an important component is to show the benefit of the research to the management of the area.

### 9.3. Regulations

- 1) A permit will be required to conduct monitoring and research programmes in the park.
- 2) Any individual, research group or institution intending to carry out research or monitoring in the TSMP must apply for a permit from Sabah Parks with immediate effect.
- 3) The application must be accompanied by a research proposal with full details of objectives, methodology, anticipated outputs and relevance to conservation and management of TSMP.