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A NATIONAL CORAL REEF STRATEGY FOR THAILAND

**Volume 2:
Policies and Action Plan**

Thailand Coastal Resources Management Project

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THAILAND COASTAL RESOURCES MANAGEMENT PROJECT
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ADOPTION OF THE THAILAND NATIONAL CORAL REEF MANAGEMENT STRATEGY

The National Coral Reef Management Strategy as described in this document was considered at two national workshops held in Jom Tien, Chonburi province in July 1991. At the first workshop it was reviewed at a technical level by representatives of concerned agencies. With minor adjustments, this group fully endorsed the strategy. The strategy was then presented to a workshop of all concerned national agencies and coastal province governors. They also endorsed the coral reef management strategy.

In March 1992, the Thailand Cabinet adopted a resolution approving the strategy and allocating 51 million baht—approximately \$2 million U.S.—for initial implementation efforts. The Cabinet also established an interagency working group, co-chaired by the Office of National Economic and Social Development Board and the Office of the National Environment Board, to oversee and advocate for the strategy's full implementation. The only major change made to the proposed strategy as it reached Cabinet approval was to reduce the number of coral reef classifications to three by combining the General Use and the Local Needs and Benefits classifications into a single classification (See Policy 1).

INTRODUCTION

WHY A NATIONAL CORAL REEF MANAGEMENT STRATEGY?

The accelerating pace of development in Thailand's coastal areas has led to an urgent need to manage the Kingdom's coral reefs. Major changes in uses and reef condition are occurring even in the most remote offshore locations.

In its *Statement of Need for a National Coral Reef Management Strategy* (Volume 1), the Royal Thai Government concluded that there were three compelling reasons for a national commitment to coral reef management. These are:

- Thailand's coral reefs are important to the national economy, to maintaining local lifestyles, and as an essential part of southeast Asia's natural heritage;
- Thailand's coral reefs are deteriorating at an accelerating rate; and
- Thailand has few effective policies, laws, or programs that recognize the importance of coral reefs. A strong national commitment and a management strategy are needed to ensure that coordinated and effective national and local actions are taken to encourage the sustainable use of coral reefs.

Immediate and sustained action is required if Thailand is to meet the challenge of maintaining its remaining pristine reefs and continue to enjoy benefits from its more heavily utilized reefs.

FORMULATING THE STRATEGY

The Royal Thai Government initiated the development of a national coral reef management strategy in 1989. This initiative built on widespread support for coral reef protection among government agencies, resource users, the private sector, and the scientific community. Recent events have demonstrated this national commitment:

- Direct action taken by local communities and volunteer groups to protect coral reefs in Phuket, Krabi, Surathani, and

Chumporn provinces;

- Increasing media coverage of the value of coral reefs and threats to their sustainable use; and
- Cabinet approval of urgent measures designed to control immediate sources of damage.

The scope and objectives of the national strategy were first discussed and endorsed by representatives of concerned agencies and national coral reef experts at a meeting held in October 1990. The Office of the National Environment Board, serving as the policy-coordinating agency, continued consultation with implementing agencies to further refine the strategy in the months that followed.

The consultative process culminated in the July 1991 National Coral Reef Workshop, co-hosted by the Office of the National Environment Board and the Department of Fisheries. Workshop participants discussed and refined the measures and actions of the National Coral Reef Management Strategy. Decisions were made on how the responsibility for management should be shared among government agencies and the private sector. The results of the National Coral Reef Workshop have been incorporated in Volume 2. Elements of the national strategy were also consolidated into a formal resolution presented to Cabinet and approved in October 1991.

NATIONAL CORAL REEF MANAGEMENT STRATEGY GOAL AND OBJECTIVES

The goal of the National Coral Reef Management Strategy is to strive for optimal use of one of Thailand's important marine habitats. Its purpose is to better manage the Kingdom's reefs so that they can be used on a sustainable basis to support multiple uses, including fisheries, tourism, conservation, education, and research.

To achieve this purpose, the national strategy has the following objectives:

- Manage coral reefs according to their different ecological and economic values in order to maintain a balance of uses.
- Reduce the degradation of coral reefs to maintain their multiple benefits and uses.
- Protect those coral reefs that are of outstanding value to the national heritage.
- Define and coordinate the actions required of national and local government and the private sector to achieve the objectives of the national strategy.

- Build and strengthen the national commitment and capability both within and outside government to implement coral reef management actions.

The policies and action plan included in this document provide national guidance on how to meet the challenge of sustainable use of Thailand's coral reefs. The strategy provides a framework and a process for ensuring that on-site management actions are carefully tailored to local conditions in the twelve coastal provinces where major reef groups occur. It establishes principles and objectives for reef management. It then states, through six policies (Table 1), what the government intends to do to meet its objectives. Measures and actions under each policy describe how the policy will be achieved, and who has responsibility for taking action (Annex 1). The final section of this volume highlights the initial steps for implementation.

TABLE 1: THAILAND CORAL REEF MANAGEMENT STRATEGY POLICIES

POLICY 1: Manage coral reefs according to their different ecological and economic values to maintain a balance of uses.

POLICY 2: Reduce degradation of coral reefs by increasing the effectiveness of existing laws and measures.

POLICY 3: Build and maintain strong and broad public support for the management of Thailand's coral reefs.

POLICY 4: Make essential revisions and additions to existing laws, administrative directives, and institutions so that effective management is feasible.

POLICY 5: Monitor and evaluate progress in accomplishing the objectives of the National Coral Reef Strategy.

POLICY 6: Support management through scientific research and innovation.

THE MANAGEMENT FRAMEWORK

PRINCIPLES

In formulating the National Coral Reef Management Strategy and in selecting measures and actions to implement policies, the Government of Thailand has recognized the following principles:

Maintain a balance in the intensity and variety of coral reef uses:

The people of Thailand are best served if coral reefs are used for a diversity of purposes, ranging from fisheries conservation, recreational diving and snorkeling, underwater photography, and the conservation of unique species and habitats, to applied research. In order to meet the needs and expectations of all users, some reefs must be maintained in good condition with low levels of use. Other reefs must be managed to accommodate increasingly higher levels of use, or must be restored.

Consider both national economic priorities and local needs:

National economic priorities for continued growth of coastal industries and tourism must be balanced with the basic needs of coastal communities for food, alternative sources of income, and with their aspirations for the future.

Rely on both regulatory measures and nonregulatory measures to achieve management objectives: Much can be accomplished through the voluntary actions of communities, local organizations, and businesses working together with government to protect coral reefs. Voluntary efforts promote local stewardship of coral reefs and other habitats. Such voluntary efforts, however, must be reinforced with clear, enforceable regulations. Therefore, the actions included in this strategy are of several types, including:

- Regulations such as general and site-specific prohibitions for uses known to cause coral reef degradation;
- Direct habitat enhancement and restoration, such as the installation of permanent mooring buoys;
- Extension to disseminate the use of environmentally sound practices and technology among resource users;
- Public education, including the dissemination of information materials and the conducting of community events and workshops;
- Administrative review procedures such as the environmental assessment review of major coastal developments;

- Monitoring to detect changes and trends in reef condition and use and to follow progress in implementing the strategy;
- Research to understand the ecological processes underlying reef degradation and to improve the techniques for protection and restoration; and
- Institutional strengthening such as technical training and inter-agency coordination to enhance the capacity to carry out the strategy.

Create incentives for coral reef management: In order to be sustainable, coral reef management programs must offer clear incentives for participation and support by local government and by those people most affected by the management measures.

Aim for a cooperative management approach: Achieving the goal of sustainable use of Thailand's coral reefs is a shared responsibility. Implementation of the national strategy will require unprecedented cooperation between national and local government, and among government, communities, the private sector, resource users, and academic institutions.

Make management decisions based on the best available data on reef condition, uses, and carrying capacity: Thailand is fortunate in that it possesses a solid data base on the status of its coral reefs, largely the legacy of its marine research institutes. A continued investment in acquiring and interpreting reliable information will enable government to make informed management decisions.

These principles are reflected in all aspects of the national strategy and will continue to guide its implementation.

THE MANAGEMENT CLASSIFICATION OF THAILAND'S CORAL REEFS

Underlying the National Coral Reef Management Strategy is the recognition that coral reefs, like other habitats, must be managed according to the specific conditions—the ecological status, uses, and development potential—that exist at a site. For this reason, the policies and measures of the strategy are organized around a coral reef classification system. This classification system is similar in concept to the watershed classification system used for approving rural land-use development in Thailand (ONEB, 1989).

All major reef groups in Thailand have been assigned to one of four management categories as follows:

Reefs managed for local needs and benefits: This category includes coral reefs in good or fair condition located in primarily rural areas. These reefs are used by villagers for fisheries, traditional reef harvesting, and small-scale tourism. Due to limited access and infrastructure, current development potential is low, with a focus on locally-owned businesses. The predominant causes of damage are associated with illegal fishing practices, including dynamite fishing and trawling. Sedimentation and anchor damage are secondary problems. Some of the reef groups assigned to this category are already included in fisheries sanctuaries or marine national parks, and there are reported conflicts between traditional activities and protected-area regulations.

Reefs managed for national tourism and recreation: This category includes coral reefs used intensively for tourism, or with high potential for tourism. These reefs are further divided into two subcategories: Intensive tourism and Ecotourism.

Intensive tourism reefs are sites in poor or fair condition located close to major beach resorts, and are intensively used by tourists. These reefs are the most popular year-round destinations for tour boats, snorkelers, and divers. There are widespread signs of reef damage from anchoring, groundings, and littering. The effects of increasing recreational use are compounded by sedimentation associated with poor land use practices in nearby coastal watersheds that are being developed for tourism.

Ecotourism reefs are sites in fair to good condition, with moderate but increasing use for nature-oriented tourism. These sites are becoming increasingly popular among experienced divers and nature-oriented tourists because of their remote locations and high scenic quality. Based on tourism development trends in the province, significant increases in recreational use are expected. Existing reef conditions are at risk from increasing incidences of anchor damage, boat groundings, and sedimentation from coastal development. Many of these reef groups are already included in marine national parks, but are not actively managed. There are reported conflicts between park regulations and tourism businesses.

Reefs managed for national ecological and scientific benefits: This category includes coral reefs of outstanding ecological value,

or of known scientific interest. Generally in good or very good condition, these reefs are located around remote offshore islands with no permanent settlements, or with low existing use. Despite their isolation, these sites are not without problems. There are immediate threats from dynamite fishing, ornamental fish and shell collection, and encroachment on publicly-owned reef islands by illegal bungalows and other infrastructure.

Reefs managed for general use: This category includes scattered and small coral reefs that are either in fair or poor condition, or are poorly formed due to natural oceanographic conditions. The reefs are of limited significance to local economic activities. The potential for tourism development is low or unconfirmed. Because of coastal development, these reefs are subject to a wide range of impacts, including sedimentation from industrial and municipal sources; eutrophication from urban wastewater discharges; and physical damage from groundings, anchoring, and storms.

Criteria for assigning major reef groups to the four management categories were developed in consultation with national coral reef experts, local officials, and the private sector. The classification criteria are as follows:

- Existing reef conditions based on 1988 data from the ASEAN-Australia Cooperative Program on Marine Science;
- Current use, dominant causes of reef damage, and local context based on ONEB/CRMP provincial surveys; and
- Potential reef use and development opportunities based on expert judgement and ONEB/CRMP provincial surveys.

There are marked differences in the management objectives of each category. The objectives and classification criteria for each management category are shown in Table 2.

Assignment of a reef group to one of the four categories has fundamental management implications regarding:

- Activities that are either prohibited, restricted, or allowed;
- The site planning process used to implement actions; and
- The types of site-specific actions implemented.

A variety of uses may take place within each reef management category, as long as they are consistent with the overall objectives. However, certain reef uses and human activities are prohibited or

TABLE 2. THAILAND CORAL REEF MANAGEMENT CATEGORIES, OBJECTIVES, AND CLASSIFICATION CRITERIA

| Reef Management Category | Reef Management Objectives | Reef Condition | Classification Criteria | | Development Potential |
|---------------------------------|--|-------------------|---|---|---|
| | | | Current Use | | |
| | | | Fisheries | Tourism | |
| Local Needs and Benefits | <ul style="list-style-type: none"> Strengthen local capability to develop and manage reefs. Manage reefs to reduce conflicts between traditional uses and other uses based on locally-determined priorities. | Good to poor | <ul style="list-style-type: none"> Moderate or high for local fisheries Small fishing villages nearby | <ul style="list-style-type: none"> Low to moderate Tourism operations are locally owned | Low to moderate potential for small-scale tourism |
| National Tourism | | | | | |
| <i>Intensive</i> | <ul style="list-style-type: none"> Sustain a variety of high-quality recreational opportunities that contribute to the nation's tourism industry. | Fair to poor | <ul style="list-style-type: none"> Low Fisheries are not a dominant use | <ul style="list-style-type: none"> High Located close to major beach resorts, used for daily excursions | High potential for nature-oriented tourism |
| <i>Ecotourism</i> | <ul style="list-style-type: none"> Anticipate and resolve conflicts between recreation, tourism development proposals, and conservation. | Good to fair | <ul style="list-style-type: none"> Low to moderate use for fisheries Local economy shifting away from fisheries | <ul style="list-style-type: none"> Low to moderate Coastal tourism is increasing | High potential for intensive recreational development |
| Scientific Reserve | <ul style="list-style-type: none"> Preserve significant examples of coral reefs in an undisturbed state to maintain their biological diversity and scientific value. Maintain existing low levels of use and allow no infrastructure other than that required for research and monitoring. | Good to very good | Low to moderate | Low to moderate | Low |
| General Use | <ul style="list-style-type: none"> Manage general use of coral reefs to control avoidable causes of degradation. Mitigate damage associated with new coastal development. | Fair to very poor | Low | Low | Low |

restricted because of their potential impacts on reef condition or use (Table 3).

Prohibited activities include prohibitions already in effect under existing Thai law (such as the prohibition against the collection of coral), as well as recommended new prohibitions tailored to each category. **Activities of concern** are restricted by way of permit conditions, seasonal closures, gear limitations, concessions, and other measures designed to control potential impacts from the activity. As a general rule, scientific reserves are subject to the greatest number of prohibitions and restrictions, whereas reefs managed for local use and benefits, intensive tourism, ecotourism, and general use have fewer prohibitions and restrictions.

The focus of management is also distinct for each category. These differences are reflected in the site-specific actions and projects recommended for each category (Annex 2). For example, site-specific projects at reefs managed for local use and benefits focus on fisheries conservation and locally-operated tourism. Projects for sites classified for ecotourism or intensive tourism center on recreational uses, safety, and resources. Most of the projects recommended for scientific reserves involve research and monitoring, with little or no development of infrastructure.

Finally, there is a distinct planning process for each management category, tailored to the different public and private sector interests involved in reef management. For example, at locations classified for local use and benefits, provincial governments must do everything they can to facilitate the participation of local residents and users in the selection of projects, the development of zoning schemes, and the implementation of fisheries conservation schemes. For reefs classified for ecotourism and intensive tourism, national government agencies such as the National Park Division, coastal municipalities, and business associations need to play a more active role in planning and management. The scientific community is expected to play a major role in planning for scientific reserves.

The classification system offers a geographic framework that will assist key implementing agencies in deciding what management actions (including enforcement and habitat restoration measures) should be undertaken in specific locations. It also provides clear guidance to developers and resource users as to where coastal development and activities that affect coral reefs are most appropriate, and will be encouraged or allowed, and where such activities

TABLE 3. ACTIVITIES PROHIBITED AND OF CONCERN, BY REEF MANAGEMENT CATEGORY (Recommended)

| ACTIVITY | CORAL REEF MANAGEMENT CATEGORY | | | | |
|--|--------------------------------|-----------|------------------|------------|--------------------|
| | General Use | Local Use | National Tourism | | Scientific Reserve |
| | | | Intensive | Ecotourism | |
| Collection and export of coral | EP | EP | EP | EP | EP |
| Possession or use of explosives, toxic substances, and electricity for fishing | EP | EP | EP | EP | EP |
| Sale of fish caught illegally | EP | EP | EP | EP | EP |
| Trawling and push nets (3 km)** | EP | EP | EP | EP | EP |
| Possession and sale of coral | P | P | P | P | P |
| Solid waste disposal | P | P | P | P | P |
| Anchoring on coral reefs | P | P | P | P | P |
| Mineral Extraction | | | | | |
| • new tin mining concessions (1 km) | P | P | P | P | P |
| • new oil and gas leases | P | P | P | P | P |
| • tin mining operations (1 km)** | C | C | P | P | P |
| • oil and gas operations (1 km) | C | C | P | P | P |
| Dredging/spoil disposal (1 km) | C | C | P | P | P |
| Shoreline barriers (1 km) | C | C | C | P | P |
| Effluent outfalls (1 km) | C | C | C | P | P |
| Commercial shell and ornamental fish collection | NR | C | C | P | P |
| Offshore structures | NR | C | C | C | P |
| Construction of hotel resorts on offshore islands | NR | C | C | C | P |
| Commercial fisheries and mariculture | NR | C | C | C | P |
| Mooring of cruise ships in vicinity of reefs (1 km) | NR | C | C | C | P |
| Recreational fisheries | NR | NR | NR | C | P |
| Research | NR | NR | NR | NR | C |
| Mooring facilities | NR | NR | NR | NR | C |

EP = Existing prohibitions P = Proposed prohibition C = Activity of concern* NR = No regulation proposed

*Activities of concern signify that use restrictions are recommended including permit conditions, seasonal closures, gear limitation, concessions, and other measures.

**Distance shown in parentheses represents radius from reefs within which the use prohibition or restriction is recommended to apply.

will be discouraged and restricted. As such, the classification should help reduce problems associated with conflicting policies and programs for the use of both coastal lands and coral reefs.

POLICIES AND MEASURES



POLICY 1: Manage coral reefs according to their different ecological and economic values to maintain a balance of uses.

The intent of Policy 1 is to achieve sustainable use of coral reefs by allowing for a balanced mix of management objectives and uses. A practical step towards achieving sustainable reef use in Thailand is to set aside representative portions of the habitat for different purposes as reflected in the four reef management categories. This allows for varying levels of development, ranging from strict protection to intensive use. The number and type of activities that are regulated varies from one major reef group to another, as do the management measures, public education, monitoring, and research undertaken at each site.

The coral reef classification is an innovative measure adapted to Thailand's institutional and socio-economic context. In order to gain experience in its implementation, the Government of Thailand will carry out pilot demonstration projects in four pilot areas, each representing a management category. In this way, the regulatory and nonregulatory measures recommended for each category can be refined before being implemented nationwide. These pilot projects will yield valuable insights into the real costs and benefits of different management techniques.

The end result of applying the classification to all major reef groups is that a full spectrum of use opportunities will be accommodated in the Andaman Sea and the Gulf of Thailand. At the same time, resource managers in local and central government, nongovernment organizations, academic institutions, and the private sector will learn how to best manage reefs for local benefits, for national tourism, as scientific reserves, or for general use. In time, the people of Thailand will strengthen their commitment to responsible stewardship of this essential part of their natural heritage.

The Government of Thailand will rely on two measures to achieve its policy of sustainable multiple use: applying the coral reef classification to all major reef groups; and implementing demonstration projects for each of the four reef management categories.

RATIONALE

Thailand's coral reefs vary considerably in their values, uses, and conditions. The socio-economic causes leading to reef degradation also vary from one location to another. In its *Statement of Need for a National Strategy*, the Royal Thai Government concluded that each set of circumstances calls for management approaches that are carefully tailored to local conditions.

By assigning all reefs to one of the four management categories, the Government provides guidance for the future use and management of reefs. The classification represents a clear statement of intent, based on national consensus, of how different types of reefs should be managed in order to meet the goal of sustainable use of this habitat.

DESCRIPTION

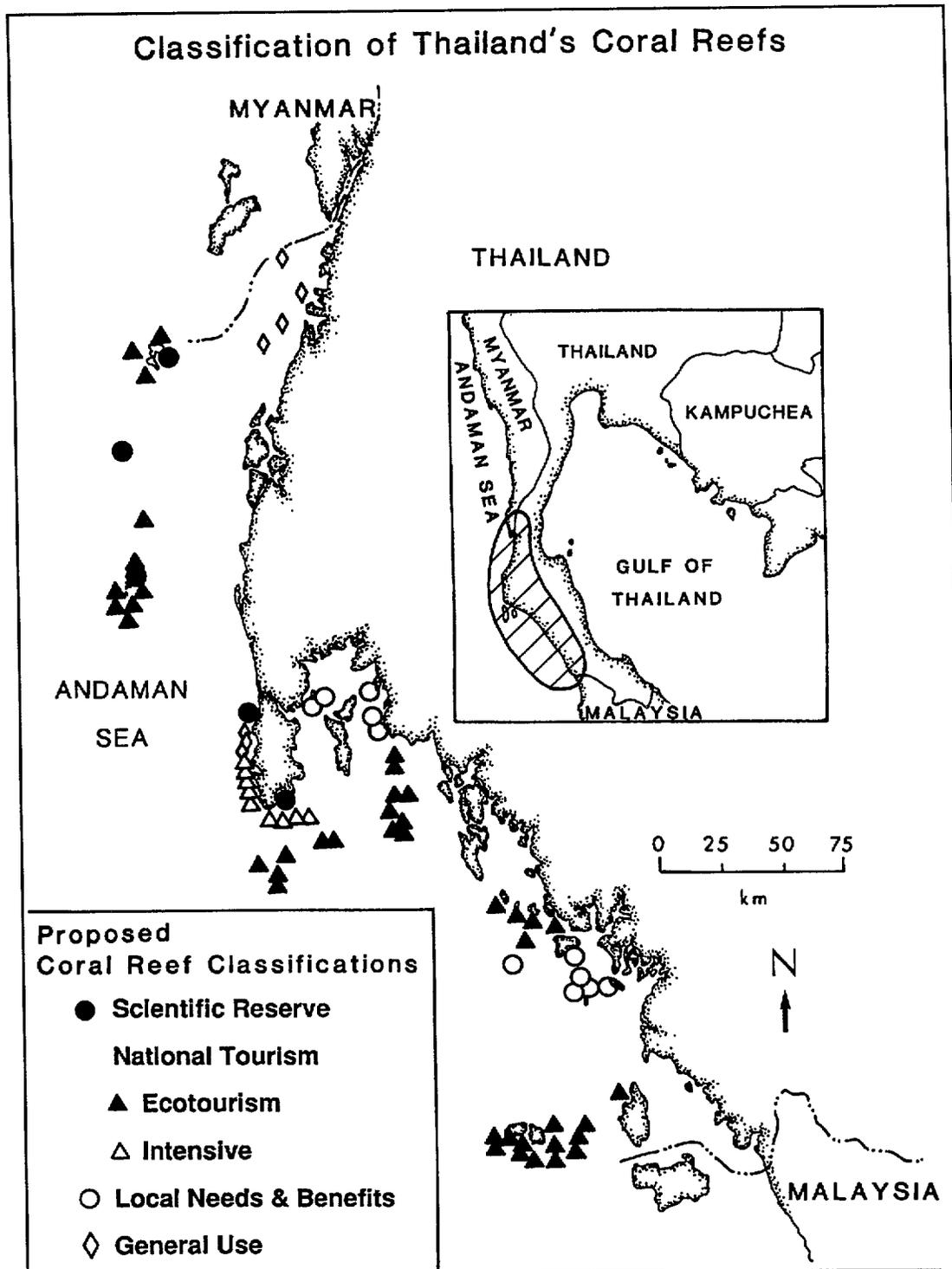
All major reef groups in Thailand are provisionally assigned to one of four management categories as follows:

- Reefs managed for local needs and benefits;
- Reefs managed for national tourism and recreation
 - Intensive tourism
 - Ecotourism
- Reefs managed for national ecological and scientific benefits; and
- Reefs managed for general use.

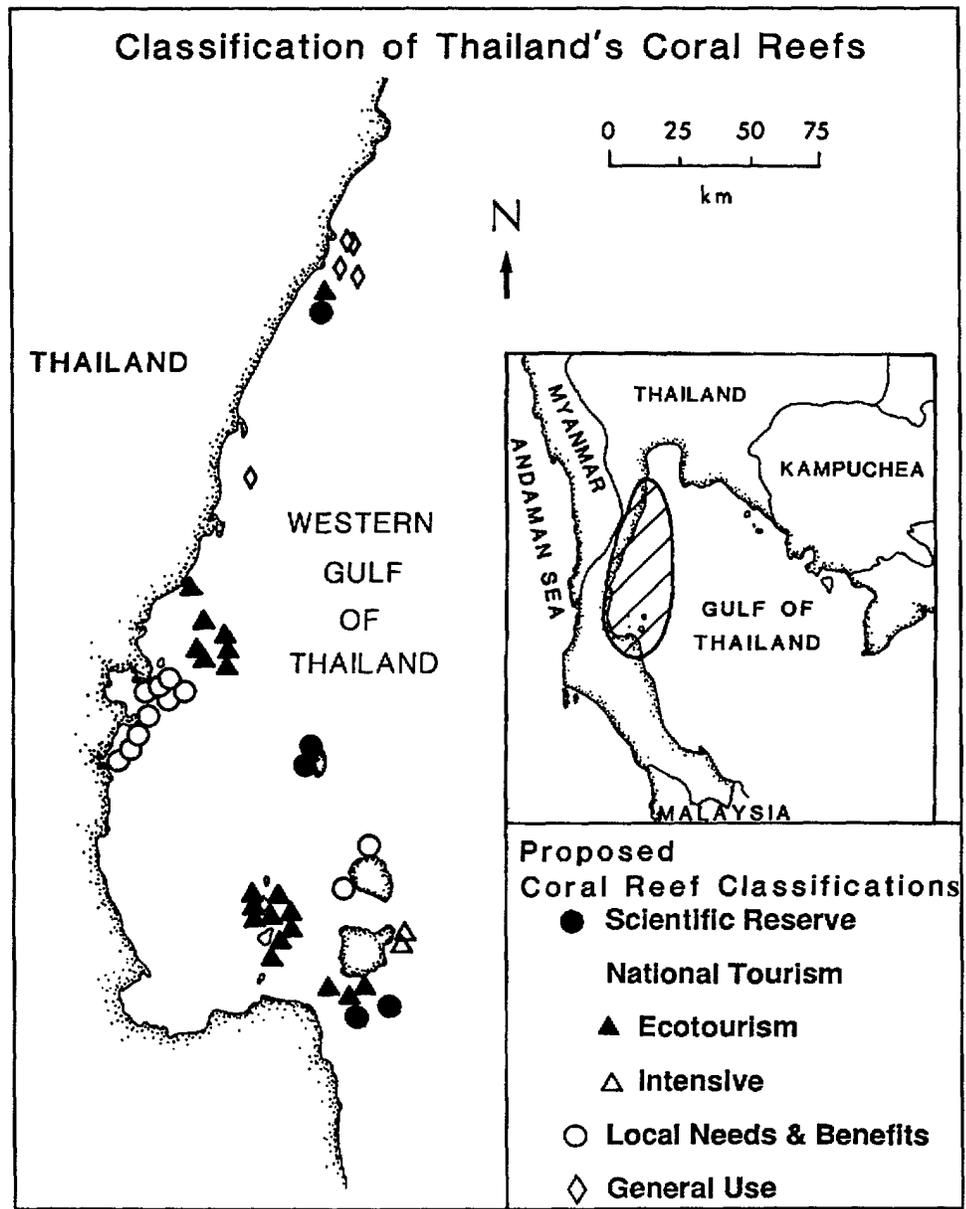
During the July 1991 National Coral Reef Workshop, a provisional assignment of major reef groups in the Andaman Sea and the Gulf of Thailand was agreed upon by concerned agencies. This provisional assignment is illustrated in Maps 1 to 3 and a listing of all reefs and their classifications is provided in Annex 3. This assignment was based on information on reef use and condition summarized in Volume 1: *A Statement of Need*.

The majority (51 percent) of Thailand's coral reefs are classified as national tourism reefs, with most being managed for ecotourism (Table 4). Another 20 percent are designated as reefs set aside for

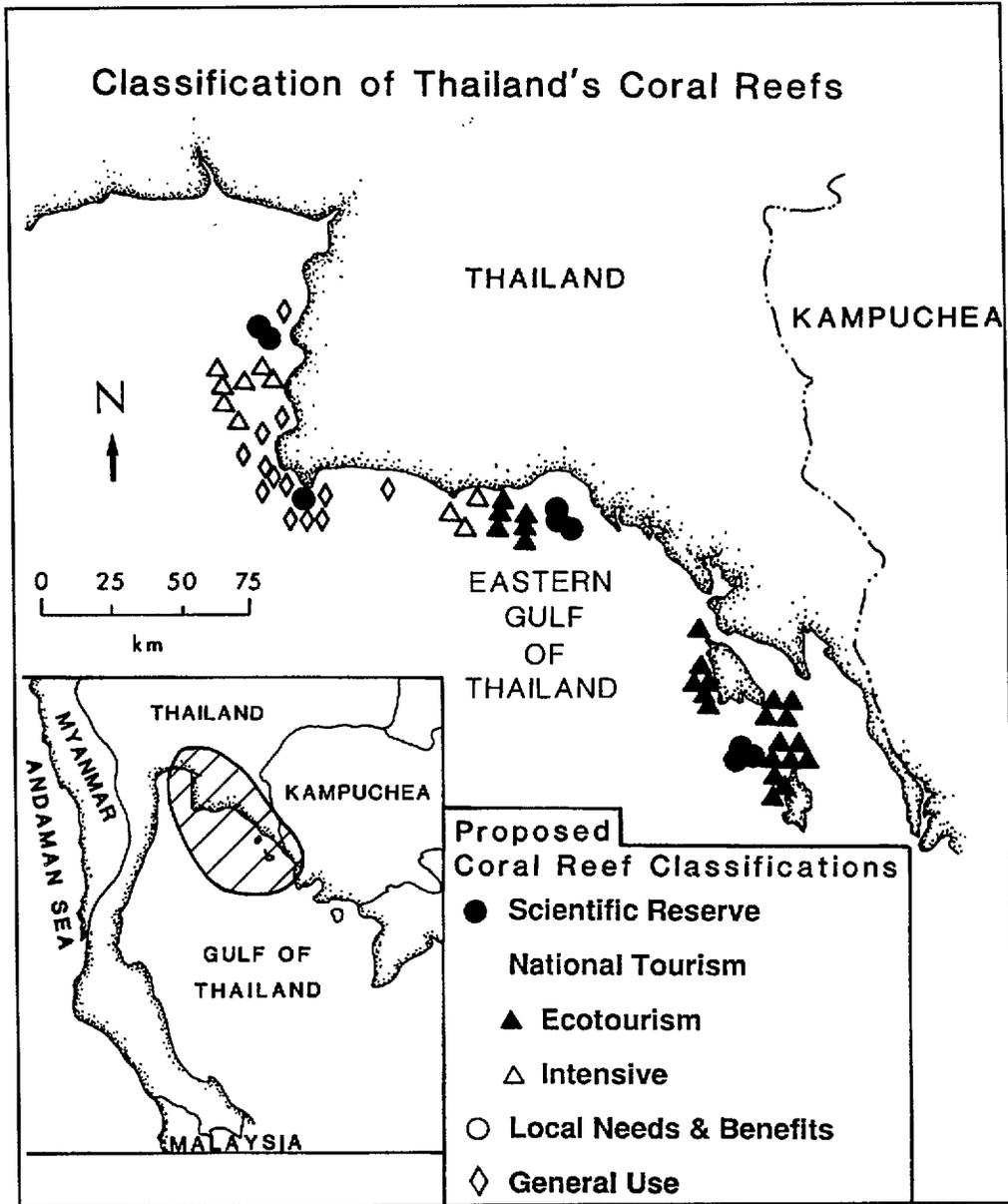
MAP 1. RECOMMENDED CLASSIFICATION OF CORAL REEFS IN THE ANDAMAN SEA



MAP 2. RECOMMENDED CLASSIFICATION OF CORAL REEFS IN THE WESTERN GULF OF THAILAND



MAP 3. RECOMMENDED CLASSIFICATION OF CORAL REEFS IN THE EASTERN GULF OF THAILAND



local use and benefits. Twelve percent are classified as scientific reserves where there will be significant restrictions on development. At least one major reef group in each region has been designated as a scientific reserve.

The Department of Fisheries and the National Park Division are compiling a set of detailed maps showing the boundaries of major reef groups within and outside marine national parks and fisheries protected areas. The provisional assignment of reefs to the management categories appearing in Annex 3 will be refined once the maps are completed. The assignment will also be periodically verified and revised to incorporate the latest results from the ASEAN-Australia Cooperative Program on Marine Science (Phase II).

The Office of the National Environment Board (ONEB) will hold regional workshops for provincial and local governments and community representatives to review and modify the provisional assignment of coral reefs to the four management categories. Similar in format to the workshops held for the Thailand watershed classification system, this regional-level consultation will be an opportunity to verify and update information on reef uses, issues and development potential.

The ONEB will coordinate the interdepartmental review of the reef classification. The assignment of reefs, as shown on detailed maps, and a schedule for final adoption, will be submitted by ONEB for review by the following interagency committees: the Department of Fisheries' Coral Reef Committee, the Royal Forestry Department's Marine Park Subcommittee, and the ONEB Coastal Management Subcommittee. The final classification will be incorporated into a cabinet resolution.

TABLE 4. REEF MANAGEMENT CATEGORIES BY COASTAL REGION

| REGION | No. of Major Reef Groups | CORAL REEF MANAGEMENT CATEGORY | | | | Scientific Reserve |
|--------------------------|--------------------------|--------------------------------|------------|------------------|-------------------|--------------------|
| | | General Use | Local Use | National Tourism | | |
| | | | | <i>Intensive</i> | <i>Ecotourism</i> | |
| Western Gulf of Thailand | 45 | 11% | 29% | 4% | 44% | 11% |
| Eastern Gulf of Thailand | 58 | 27% | 10% | 17% | 30% | 15% |
| Andaman Sea | 73 | 12% | 22% | 8% | 48% | 9% |
| All Thailand | 176 | 17% | 20% | 10% | 41% | 12% |

NOTE: Percentages based on number of major reef groups.

After formal approval by Cabinet, the ONEB will be responsible for informing all relevant agencies and interest groups of the classification. The ONEB will offer training for concerned-agency staff in the routine application of the coral reef classification.

POLICY 1
Measure 2

Implement pilot demonstration projects for each of the four reef management categories.

RATIONALE

The national strategy calls for innovative techniques that will have to be adjusted on the basis of the current ecological, economic, and social conditions found in different parts of Thailand. Implementation is likely to be a gradual learning process that will require experimentation and increasing numbers of skilled resource managers with field experience.

A cost-effective way of gaining experience with different reef management approaches is to carry out pilot projects in a small set of reefs that represent each of the management categories. Such projects not only provide excellent settings for on-the-job training and experimentation, they also produce convincing results for local and national educational campaigns. As government officials, community organizations, and scientists acquire skills working in an initial set of reefs, this experience can be applied to other reefs.

DESCRIPTION

Technical assistance and funds will be made available for the implementation of demonstration projects in coral reef management over the next five years. There will be at least one demonstration project for each of the management categories described in the previous section.

The first set of localities recommended for demonstration projects is as follows:

- **Local Needs and Benefits:** Ko Phangan, Surathani province
- **Intensive Tourism:** Pattaya reef group, Chonburi province

- **Ecotourism:** Mu Ko Similan Marine National Park, Pang Nga province
- **Scientific Reserve and Ecotourism:** Ko Tao, Surathani province

The ONEB will offer technical assistance to provincial governments, municipalities, and sanitary districts in designing and preparing detailed proposals and budget requests for each demonstration project. These proposals will be submitted for interagency review by the Coral Reef Committee of the Department of Fisheries and the Marine Parks Subcommittee.

Typical activities to be undertaken as part of the initial four demonstration projects are listed in Annex 2.

The main theme of the demonstration project for **reefs managed for local use and benefits** will be community-based reef management. Provincial governments responsible for these types of reefs will receive assistance and funds for activities that promote local involvement in resource management such as:

- Fisheries conservation and extension services
- Community organization for resource management
- Volunteer patrols
- Experimental aquaculture
- Installation of small artificial reefs
- Improvements in the manufacture of local handicrafts and alternative sources of income for fishermen.

The demonstration projects for this category may lead to proposals for designating sites as marine biosphere reserves, or as provincial reserves similar to the municipal reserves established in the Philippines.

The major focus of the demonstration project for **reefs managed for intensive tourism** will be the field trial of measures needed to restore scenic quality and enhance the recreational use of reefs within carrying capacity. Initially, local governments will work with ONEB and the Tourism Authority of Thailand to develop a site-specific plan for reef restoration and recreational services. Topics to be addressed in the site-specific management plan include:

- Zoning scheme in accordance with the zoning guidelines appearing in Annex 4

- Mooring buoy installation plan
- Restoration measures
- Pollution control measures
- Proposed facilities for recreational safety and education
- Activities and events for public awareness and education
- Monitoring program

Execution of the demonstration project will require active involvement of local government, local tourist-business associations, recreational clubs and the media. Typical activities will include media campaigns promoting pollution control, run in cooperation with hotel owners, tour companies, and boat operators; mooring buoy installation and maintenance; and volunteer patrols by local dive operators.

The main theme of the demonstration project for **reefs managed for ecotourism** will be the formulation and initial implementation of a management plan for Mu Ko Similan Marine National Park, in close consultation with park users. This project will build on the experience gained during the preparation of management plans for Tarutao and Hat Nopharathara-Mu Ko Phi Phi Marine National Park (Kasetsart University and National Park Division of Thailand, 1990). Measures aimed at maintaining recreational use of reefs within carrying capacity and encouraging a nature-oriented experience will be tested. For example, training in marine interpretation and conservation techniques will be provided to marine national park rangers, superintendents, and naturalists. This demonstration project will also include an investigation of the socio-economic benefits and costs arising from the establishment, marine resources management, and operation of the Mu Ko Similan Marine National Park.

The main theme of the demonstration project for **reefs managed as scientific reserves** will be the formulation and initial implementation of a cooperative reef research and monitoring plan for the selected site. The Department of Fisheries will convene a scientific advisory committee to assist in the design of the plan, thus ensuring the active participation of the academic community in the identification of research priorities. International funding will be sought for research on marine biological diversity.



POLICY 2: Reduce the degradation of coral reefs by increasing the effectiveness of existing laws and measures.

A cost-effective way of improving management is to make better use of existing regulatory and nonregulatory measures to prevent avoidable damage to coral reefs. This is the intent of Policy 2.

The growth and diversity of coral reefs are affected by direct physical damage, changes in coastal water quality, and harvesting pressures on reef organisms. These impacts are often associated with fishing practices, recreational use, offshore industrial activity, and coastal development. The range of impacts associated with such activities is shown in Table 5. Research worldwide has shown that the rate of degradation of coral reefs can be reduced by controlling these activities and that the habitat can recover over time. The key is to prevent known and avoidable sources of damage.

Progress has been made in identifying potential sources of damage and trying to prevent reef degradation in some parts of Thailand. As demonstrated in locations like Phuket and Ko Taen, there are tools and techniques available to control impacts. These include environmentally sound technology such as mooring buoys, extension services for conservation, preventive enforcement, and promotion of coastal development that is more environmentally appropriate.

Under this policy, six measures are recommended for strengthening or expanding existing programs such as on-site damage prevention, offshore enforcement, environmental impact assessment (EIA) of coastal developments, and provincial natural resource management planning.

***POLICY 2
Measure 1***

RATIONALE

The Government of Thailand has successfully supported on-site management projects in an attempt to reverse trends in reef degradation. Implemented by local communities, nongovernment organizations, and the private sector, these projects have tested practical

Expand the use of on-site management techniques for the prevention of damage to, and restoration of, coral reefs.

TABLE 5. HUMAN ACTIVITIES AND THEIR IMPACTS ON CORAL REEFS

| ACTIVITIES | IMPACTS OF CONCERN | | | | | | |
|-------------------------------------|--------------------|---------------|-----------------------|-----------|------------------|-------------------------------------|----------------------------------|
| | PHYSICAL DAMAGE | POLLUTION | | | | BIOLOGICAL PRODUCTIVITY & DIVERSITY | |
| | | Sedimentation | Nutrients & Pathogens | Chemicals | Salinity Changes | Depleted Stocks | Decline of target (rare) species |
| Fisheries & Harvesting | | | | | | | |
| Coral harvesting | X | | | | | | |
| Dynamite fishing | X | X | | | X | | |
| Trawling | X | X | | | X | | |
| Ornamental fish & shell collection | | | | | | X | |
| Recreation | | | | | | | |
| Boat anchoring | X | | | | | | |
| Cruise ship mooring | X | X | | | | | |
| Trampling | X | | | | | | |
| Spearfishing | | | | | | X | |
| Specimen collection | | | | | | X | |
| Offshore Industrial Activity | | | | | | | |
| Offshore mining | X | X | | | | | |
| Sand mining | | X | | | | | |
| Oil spills | | | | | | | |
| Ship groundings | X | | | | | | |
| Solid waste disposal | | | | | | | |
| Coastal Development | | | | | | | |
| Sewage outfalls | | X | | | | | |
| Stormwater runoff & outfalls | | X | | | X | | |
| Dredge and fill | X | | | | | | |
| Industrial outfalls | | | | | X | | |
| Motel construction | | X | | | | | |
| Deforestation | | X | | | | | |
| Dams/irrigation projects | | X | | | X | | |
| Golf courses | | | X | | X | | |

Sources: Carpenter and Maragos, 1989; White, 1987.

solutions for controlling impacts and restoring highly damaged areas.

Common causes of damage to coral reefs, such as anchoring and littering, are easily avoided if simple low-cost preventive measures are taken. Permanent mooring buoys, marker buoys for safe navigation, wayside signs, and cleanup campaigns can help coral reefs accommodate increasing levels of use. Other on-site management techniques such as temporary closure areas, removal of crown-of-thorns starfish, restocking of benthic organisms, and coral and seagrass transplants are still experimental, but expanded field trials, coupled with monitoring, could lead to improvements.

The number of locations where proven on-site management techniques are used must be increased, and experimental techniques improved. Field trials in different parts of Thailand will help adapt management techniques and establish guidelines for successful operations. In time, the widespread use of on-site management techniques will help accommodate increasing levels of use. These field activities also enhance the awareness of local communities and businesses of the need and benefits of on-site reef management.

DESCRIPTION

The ONEB, working with the Department of Fisheries and other concerned agencies, will provide technical assistance for the on-site protection and restoration techniques listed in Table 6.

Technical assistance will include on-site planning and surveys, training of local volunteers, provision of specialized equipment, field trials, and assistance in identifying funding sources from the private sector. This assistance will be available upon request to provincial and local governments, and to community organizations. Funds will be available for applying these techniques as part of the reef management demonstration projects described under Policy 1.

TABLE 6: REEF PROTECTION AND RESTORATION TECHNIQUES

| Management Technique | Damage Prevention |
|--|---|
| Mooring buoys | Reduces physical damage from passenger-vessel anchors dropped on coral. |
| Marker buoys | Reduces sedimentation from moored cruise ships when used to demarcate mooring areas. Avoids groundings on reefs. |
| Wayside reef conservation sign | Warns tourists against tramping on reefs, littering, and taking coral. |
| Small-scale sediment and nutrient control technology | Reduces sediment and nutrient loading from small hotel and bungalow operations (e.g., on offshore islands). |
| Artificial reefs | Increases habitat for reef fish in areas where reefs have been destroyed. |
| Temporary reef-collection closures | Helps accelerate the recovery of depleted species (i.e., of rare shells and fish). |
| Experimental restocking of benthic organisms | Helps restore depleted stocks of rare shells. |
| Reef cleanup | Restores degradation from littering. |
| Coral and seagrass transplants | Restores physical damage from storms and groundings. Helps accelerate reef recovery. |
| Small-scale zoning of reefs | Reduces or controls conflicts in reef use. |

RATIONALE

Sedimentation and pollution from effluent discharges contribute to reef degradation in all locations where reefs occur in proximity to major coastal developments. Experience has shown that restoration of reefs heavily affected by pollution is a lengthy and costly process. The best approach to management is to anticipate and avoid damage. The environmental impact assessment (EIA) process for coastal project proposals is the principal tool available to anticipate and mitigate such impacts.

Under the National Environmental Quality Act (NEQA), EIAs are required for major developments that have the potential to significantly affect Thailand's natural environment. This applies to types of projects or activities above a threshold size (Table 7). When located in coastal areas or on offshore islands, such projects can lead to significant impacts on coral reefs.

The ONEB directs and reviews the preparation of EIAs. As part of its review, ONEB can recommend that mitigation and monitoring measures appear as conditions to development permits issued by other agencies such as the Harbor Department or the provincial governments. Until now, the EIA review process has not been used to prevent impacts from major coastal developments on coral reefs.

While not without limitations, the EIA process under NEQA is the only formal mechanism available to curtail major pollution impacts on Thailand's remaining healthy reefs. With the adoption of this measure, the potential impacts of proposed developments on coral reefs will be clearly identified. By strengthening and applying improved technical guidelines, the ONEB will notify permitting agencies of the importance of coastal conservation and will be able to recommend monitoring and mitigation measures specific to coral reefs. This measure will also enhance the awareness of major developers and investors of the practical benefits of coastal conservation.

TABLE 7: TYPES AND SIZES OF PROJECTS OR ACTIVITIES REQUIRING EIA REPORTS (under National Environmental Quality Act)

| Type of projects | Size |
|--|----------------------|
| Dam or reservoir | > 100,000,000 cu. m. |
| Irrigation | > 12,800 hectares |
| Commercial airport | all |
| Hotel or resort facility | > 80 rooms |
| Mass transit and expressways | all |
| Mining | all |
| Industrial estates | all |
| Commercial ports and harbors (reclamation) | all |
| Thermal power plants | all |

DESCRIPTION

The ONEB will revise its guidelines for preparing EIAs for hotel and resort projects and for reclamation projects. The revised guidelines will include a detailed list of mitigation and monitoring measures designed to protect coral reefs within the area of influence of proposed projects in coastal regions.

Mitigation and monitoring measures will be routinely recommended by the ONEB Division of Environmental Impact Evaluation to permitting agencies, as conditions for issuing and renewing permits. The ONEB will issue and circulate an administrative directive to permitting agencies, explaining its standard mitigation and monitoring requirements for major actions affecting coral reefs and other coastal habitats.

Seminars will be held with hotel and resort associations to inform them of standard requirements for monitoring and mitigation. In a further attempt to familiarize the private sector with mitigation measures, the ONEB, in cooperation with the Tourism Authority of Thailand, will develop an operator's manual for bungalow and resort developments in coastal areas and on offshore islands.

RATIONALE

Recreational activities such as diving, snorkeling, and sightseeing from tour boats are the fastest growing uses of coral reefs in Thailand. Signs of degradation from trampling, collection of shells and coral, and littering have increased dramatically on reefs close to popular beach resorts.

Past surveys in Thailand and worldwide indicate that most of the recreational use that causes damage to coral reefs results from a lack of environmental awareness and knowledge. Such behaviors are more readily changed by a positive educational approach than by punitive enforcement. There is an urgent need to promote a voluntary reef "code of conduct" among tourists and recreational users.

Increased voluntary compliance with existing laws will reduce the number of enforcement patrols required in intensively used areas. The preventive voluntary approach is more likely to be successful with tourists and tourist businesses than enforcement.

DESCRIPTION

The ONEB, in cooperation with the National Park Division and the Tourism Authority of Thailand, will prepare and disseminate a voluntary "code of conduct" for recreational use of coral reefs (Table 8). This environmental etiquette should be formulated and disseminated in close consultation with target groups to incorporate their suggestions. These groups include hotel and tour boat operators, tour companies, divers, commercial shell shops, and tourists. The "code of conduct" will serve as the basis for nationwide information campaigns and training (see Policy 3).

TABLE 8: REEF CODE OF CONDUCT

For snorkelers and divers...

- Follow sand channels when snorkeling in the shallow parts of the reef
- Do not touch corals, rest on them, or kick them
- Avoid kicking up the sand
- Do not spearfish
- Leave all corals and reef animals where they are

For boat operators...

- Never anchor on corals
- Navigate with care in reef waters and maintain slow speeds
- Do not throw your litter overboard; stow it

For souvenir hunters...

- Never buy coral or sea fans
- Do not buy shells that are labelled as rare. The more that are bought, the more rare they become
- Enjoy beachcombing instead

POLICY 2
Measure 4

Expand local extension programs in fisheries habitat conservation and alternative livelihoods.

RATIONALE

Fisheries are a predominant use, as well as a cause of degradation of, coastal habitat in rural parts of Thailand. Conflicts between fisheries practices and reef conservation objectives are most severe in economically depressed areas such as in Satun and Chumporn provinces and Pang-Nga Bay. In these areas, small-scale fishermen and villagers harvesting reef products are among the poorest segments of Thai society. Fishing families burdened with declining catches and increasing operating costs are compelled to resort to highly efficient, but destructive, fishing techniques such as push nets and explosives. Small-scale trawlers harvest within three kilometers from shore, often disturbing reefs. There are limited job opportunities in these rural coastal areas, and fishing communities do not have access to alternative sources of income.

There is evidence that awareness and acceptance of fisheries regulations among small-scale fishers is low (Tokrisna and Rowchai, 1990). Until now, fisheries extension programs have promoted technological improvements (e.g., artificial reefs). But there is now a need for innovative extension programs that promote habitat conservation linked with income-generating schemes. This measure should help reduce conflicts between illegal fisheries practices and reef conservation objectives, by offering economically viable alternatives to fishing communities.

DESCRIPTION

The Department of Fisheries will undertake an innovative community-based extension program to service communities where destructive fishing practices prevail. The focus of the program will be fisheries habitat conservation and the promotion of alternative sources of income, aimed at reducing harvesting pressure on reefs and adjacent waters. Services will be targeted to small-scale fishermen and reef harvesters in the provinces of Surathani, Chumporn, Satun, Trang, Krabi, and Pang-Nga.

The program will have the following components:

- Intensive training for Department of Fisheries extension officers in reef fisheries conservation and in the promotion of alternative livelihoods for fishermen.
- Field trials and demonstrations of fisheries habitat conservation techniques and income-generating schemes developed in cooperation with regional fisheries research centers and universities. Activities could include designation of local fisheries reserves, experimental restocking and reef aquaculture, improvements in local handicrafts as an alternate source of income, and enhancing job and income opportunities from coastal tourism.
- The assignment of trained fisheries extension officers to selected fishing communities. The officers will help undertake community-based projects and organize meetings to enhance local support of reef fisheries conservation measures.
- The production and distribution of educational materials on reef fisheries conservation.

The Department of Fisheries will also commission a socio-economic study of the local significance of reef harvesting and of alternative occupations or products for artisanal fishermen on

offshore islands. Implementation of this measure could be funded in part by international development assistance.

The Department of Fisheries and the Royal Forestry Department will coordinate the development of incentives for coral reef protection in economically depressed coastal areas. Priority will be given to small-scale fishermen, shell collectors and artisans, collectors of ornamental fish, and small-scale tour boat and bungalow operators. Incentives will vary with target groups (Table 9), and will be administered by the provincial governments. The incentive measures will be tested during the demonstration projects described under Policy 1.

TABLE 9: EXAMPLES OF DIRECT INCENTIVES FOR REEF PROTECTION

| | |
|--|--|
| Incentives for fishermen | <ul style="list-style-type: none"> • Technical assistance in small-scale fisheries and aquaculture • Improvements in post-harvest techniques • Decreasing losses in ornamental fish collection • Alternatives to rare shell collection and handicrafts • Community involvement in fisheries management decisions • Community reef reserves • Training and skill development aimed at expanding employment opportunities for small-scale fishermen |
| Incentives for the tourism industry | <ul style="list-style-type: none"> • Technical assistance and subsidies for water pollution control and solid waste disposal • Training and skill development for nature-oriented tours • Ecotourism marketing assistance for small operators • Boating and diving safety promotion programs • Local concessions for marine national parks |

*POLICY 2
Measure 5*

Enforce more effectively existing laws against illegal activities, especially reef blasting, near-shore trawling, coral trade, and the untreated discharge of pollutants.

RATIONALE

Compliance with existing regulations that provide protection to coral reefs is low. Under rules and ministerial notifications pursuant to the Fisheries Act (FISHA) (see inset), activities such as dynamite fishing

are prohibited, yet these activities continue even within protected areas and national parks.

The responsibility to enforce FISHA regulations rests primarily with the Department of Fisheries. Officers of the National Park Division also have the authority to enforce the Fisheries Act within the boundaries of marine national parks. In a resolution issued in 1991, Cabinet directed the Ministry of Agriculture to deputize the Harbor Department and the Navy to enforce the Fisheries Act.

Existing Fisheries Act Prohibitions that Protect Coral Reefs

- Prohibition of the possession or use of explosives, toxic substances, or electricity for fishing;
- Prohibition of sale of fish caught by illegal practices;
- Prohibition of the collection or export of corals;
- Prohibition of the collection of sea turtle eggs or sea turtles except by permit; and
- Prohibition of trawling and push net operations within three kilometers from shore.

The Navigation in Thai Waters Act (NTWA) administered by the Harbor Department prohibits the discharge of pollutants into navigable waters and the construction of infrastructure along the seashore without a permit (Tasneeyanond and Rubthong, 1991). This Act provides authority to control sources of reef degradation such as pollution and littering at sea, and illegal dredging and filling. The NTWA also requires permits for any seabed structure such as mooring buoys. Until now, NTWA enforcement responsibility has rested solely with the central administration of the Harbor Department (Tasneeyanond and Rubthong, 1991).

The enforcement of these existing rules and regulations has been limited by: insufficient delegation of enforcement responsibility to provincial authorities; a lack of sufficient capacity to patrol nearshore waters by enforcement units; the relatively low priority assigned to conservation issues; and inadequate interagency coordination. There is a need for an expanded enforcement program with clear geographic priorities and greater resources. When combined with preventive measures such as extension services and public education, improved enforcement will help reduce reef degradation associated with prohibited activities. By calling for coordinated patrols in nearshore waters, this measure ensures more cost-effective use of government enforcement staff and equipment.

DESCRIPTION

The Department of Fisheries, the National Park Division, the Harbor and Customs Departments, and the Navy will develop an interagency agreement for a coordinated enforcement program focused on reef conservation. The agreement will specify the priorities and budget needed to adequately enforce rules against illegal activities such as dynamite fishing, trawling within three kilometers, the discharge of pollutants into navigable waters, dredging and filling without a permit, and the collection or export of coral.

The interagency enforcement plan will include the following elements:

- Geographic priorities for nearshore patrols and shore-based monitoring within the Andaman Sea and the Gulf of Thailand, consistent with the national strategy.
- Steps and a timetable to delegate responsibility to provincial authorities for enforcing all reef conservation regulations, including those under the NTWA.
- The types of, and budget for, additional vessels and safety equipment needed for expanded shore-based and nearshore patrolling.
- Identification of priority locations to install large marker buoys to delineate the three-kilometer trawling limit, and to facilitate patrols in nearshore waters (Tokrisna and Rowchai, 1990).
- Specialized training for provincial fisheries officers and other enforcement personnel to familiarize them with patrol problems and conservation priorities in near-shore waters.
- Training, for customs officers in target locations, in monitoring trade and export of coral products.

POLICY 2
Measure 6

Strengthen the capacity of local government in site planning and management of coral reefs.

RATIONALE

Provincial governments have the responsibility for preparing natural resources and environment plans under the Sixth National Economic and Social Development Plan. This initiative applies to all public lands, waterways, and marine resources outside municipalities and

sanitary districts. Central government funds are available to implement these provincial plans. As each coastal province formulates or revises its plan, there is an unprecedented opportunity to incorporate priorities for coral reef protection.

Provincial authorities, municipalities, and sanitary districts also hold the primary responsibility for issuing development permits, and monitoring compliance with permit conditions, including mitigation measures recommended under NEQA. Greater technical expertise and capacity is needed at the local level to adequately incorporate coral reef conservation measures into routine permit decisions.

This measure will ensure consistency between ongoing provincial natural resources planning efforts and the national strategy. As practical experience is gained locally, the day-to-day responsibility of overseeing the implementation of the national strategy can be delegated to provincial offices, municipalities, and sanitary districts in target provinces.

DESCRIPTION

The ONEB, in cooperation with the Ministry of Interior's Department of Policy and Planning, will offer technical assistance to provincial authorities wanting to incorporate the measures of the national strategy into their natural resources and environment plans. Technical assistance will include detailed site mapping, zoning, and the identification of appropriate field techniques for reef protection and restoration (see Measure 1, Policy 2).

Planners and staff responsible for natural resources management in provincial offices, municipalities, and sanitary districts will be eligible for specialized training in coastal habitat management, including coral reef management. Short-term practical training will be provided during regional workshops and seminars.



POLICY 3: Build and maintain strong and broad public support for the management of Thailand's coral reefs.

Policy 3 recognizes that public support is essential for any successful resource management initiative. Public awareness, education, and participation programs play a fundamental role in building such

support. Much progress has been made in Thailand through media campaigns that raise public awareness of the value and fragile nature of coral reefs. Having gained public attention, there is now an opportunity to broaden public education and participation efforts to encompass more issues and practical solutions. Informed reef users are more likely to voluntarily comply with regulations. Enhanced appreciation and understanding among decision makers, the private sector, and local residents leads to active involvement and other tangible contributions to reef management.

The Government of Thailand will use three measures to implement this policy: expanded public awareness campaigns; support for voluntary action groups; and school curriculum development.

POLICY 3
Measure 1

Launch national and local public information campaigns.

RATIONALE

Large segments of the general public and selected target groups are now aware of the value of Thailand's coral reefs as a result of the media coverage of recent years. Education and public participation campaigns have largely focused on the physical damage caused to reefs by recreational use. There is a need to broaden and accelerate information campaigns to reinforce the favorable context for coral reef management.

Broadened national educational campaigns will help sustain media, public, and political attention on the most urgent reef protection issues. Local information campaigns will reach target groups such as fishermen and businesses, using the most appropriate communication techniques and networks. These efforts will set the stage for demonstrations in reef management, and enhance voluntary compliance with regulations of the national strategy.

DESCRIPTION

At the national level, the ONEB will expand its ongoing information campaign to disseminate increasingly more focused information on the impacts of coastal development on coral reefs. In addition to

addressing anchor damage, educational messages will include the prevention of damage from pollution and solid waste disposal. Brochures, booklets, and media coverage will be directed at specialized audiences such as resource users, tourism businesses, and the industrial sector. The Tourism Authority of Thailand, national news media, and Thai nongovernmental organizations (NGOs) will be directly involved in implementing the campaign.

Technical assistance and funds will be made available for organizing educational events and producing materials at the provincial and local levels. Educators at local community colleges and regional universities, Thai NGOs, and the provincial governments will be responsible for establishing priorities and appropriate themes for these local campaigns.

*POLICY 3
Measure 2*

Encourage volunteer, user, private sector, and general public participation in reef management.

RATIONALE

Community organizations, special-interest groups, and the private sector have an inherent interest in becoming involved in some aspects of coral reef management. There is a need to encourage and guide public participation so that volunteer efforts are effective and directed towards priority issues.

DESCRIPTION

The ONEB and the Royal Forestry Department will help create cooperative partnerships among government and community groups, universities, and the private sector, to enable the active participation of the Thai people in reef management initiatives. These partnerships will take the form of joint ventures, corporate donations, volunteer action, and other ways of mobilizing people and funds for conservation.

Technical assistance, documentation, and assistance in locating funds will be provided to community groups, NGOs, and other organizations wanting to take an active role in reef management. Technical assistance will include short-term training, public workshops, extension and advisory services for organizing cleanup

Examples of volunteer reef management projects

- Cleanup campaigns
- Mooring buoy installation and maintenance
- Sign installation
- Production of educational materials
- Reef-watch programs
- Diver safety training
- Volunteer visitor surveys
- Restoration of national park facilities
- Support of local school events and outings
- Fund-raising events

campaigns, installing mooring buoys and signs, planning reef-watch programs, and other field operations. Information brochures, maps, and other documentation will be made available to volunteer groups.

This measure will gradually create a context and means that favor volunteer public action in support of the national strategy. Active public participation in the practical aspects of reef management is expected to create a sense of local and national stewardship. By developing new skills and knowledge within special interest groups, this measure is also likely to reduce demands on government staff and funds.

POLICY 3
Measure 3

Incorporate coral reef conservation into school environmental education curricula.

RATIONALE

Experience with a pilot program in Phuket has shown that there is a keen interest among educators in adding environmental topics such as coral reefs and other coastal habitats into school curricula. These topics are timely and offer excellent opportunities for multidisciplinary classroom activities.

Over time, this measure will give Thai educators practical experience in incorporating environmental education topics into formal curricula. Innovative and relevant classroom activities will help to give youth a sense of national pride in their natural heritage, and to generate interest in resource management careers.

DESCRIPTION

The Phuket Teachers' College, in collaboration with other teachers' colleges, will adapt the existing coral reef school packet (Phuket Teachers' College, 1990) for use in primary schools in other coastal provinces. Local community and teachers' colleges will be involved in testing the school packet and incorporating local material into the lesson plans.

The ONEB will initiate discussions with the Ministry of Education to assess the feasibility of adding coast-related topics into the science and social studies curricula at the secondary school level in coastal

provinces. (Coral reefs could serve as the first classroom module). In addition, technical assistance and documentation will be made available to community colleges wanting to use coral reefs as an example of coastal habitats in Thailand.



POLICY 4: Make essential revisions to existing laws, administrative directives, and institutions, so that effective coral reef management is feasible.

The policies and measures described above represent a significant step forward in the management of Thailand's coral reefs. Their implementation falls within the mandate of government, and the work can be carried out pursuant to existing laws. There are nonetheless a number of critical gaps in the legal and institutional framework which, if unresolved, will prevent effective implementation of the national strategy.

The legal authority to conserve coral reefs in Thailand is found in three laws: the Fisheries Act of 1947, the National Park Act of 1961, and the Enhancement and Conservation of National Environmental Quality Act (NEQA) of 1975. However, the intent of these laws, and corresponding ministerial proclamations, is not always consistent or clear. Other laws such as the Navigation in Thai Waters Act and the Tourism Authority of Thailand Act (TATA) of 1979 also provide for limited or indirect authority to control activities that can impact coral reefs, but that authority has not yet been used (Tasneeyanond and Rubthong, 1991).

The existing institutional framework for managing coral reefs in Thailand includes agencies with a direct responsibility for coral reefs—the Department of Fisheries and the National Park Division of the Royal Forestry Department—and those agencies that have responsibility for encouraging, reviewing, and/or permitting activities of concern that affect coral reefs. These agencies include ONEB, the Royal Harbor Department, TAT, National Economic and Social Development Board (NESDB), and the Changwat governments under the Ministry of Interior. Responsibilities of each agency for coral reef management are shown in Table 10. There are areas of overlapping jurisdiction among these agencies, as well as aspects of reef management where lead responsibility has not been articulated until now.

TABLE 10: CORAL REEF MANAGEMENT RESPONSIBILITIES OF CONCERNED AGENCIES

| Department | Primary responsibilities |
|---|---|
| Department of Fisheries (DOF) | <ul style="list-style-type: none"> • Enforcement of fisheries regulations under FISHA • Fisheries extension for conservation purposes • Designation of protected areas under FISHA • Coral reef research and monitoring |
| Royal Forestry Department (RFD) | <ul style="list-style-type: none"> • Designation and operation of marine national parks • Visitor services • Enforcement of national park regulations |
| Office of the National Environment Board (ONEB) | <ul style="list-style-type: none"> • Coordination of multiagency environmental management efforts • Administration of NEQA • Review of EIAs for coastal developments • Leadership of coastal management initiatives |
| Harbor Department | <ul style="list-style-type: none"> • Administration and enforcement of NTWA |
| Tourism Authority of Thailand (TAT) | <ul style="list-style-type: none"> • Tourism promotion • Administration of TATA |
| Ministry of Interior (MOI) | <ul style="list-style-type: none"> • Administration of provincial and local government • Issuance of coastal development permits |

The intent of Policy 4 is to initiate the legal and institutional reforms necessary to achieve the objectives of the national strategy. Policy 4 will be implemented through five measures: amendments to the Fisheries Act; site-specific regulations; assignment of trained staff to habitat management units in key agencies; the establishment of a system of marine national parks; and interagency coordination.

*POLICY 4
Measure 1*

Amend the Fisheries Act.

RATIONALE

The Fisheries Act of 1947 (FISHA) puts coral under the management category of aquatic animal. As such, FISHA is too narrowly focused on coral as a fisheries product rather than coral reefs as ecosystems

serving multiple functions. There is a need to clarify the intent of the act through regulations and, in several instances, to amend the act to facilitate enforcement actions. These reforms will help clearly establish authority to conserve coral reefs as habitats, and expand regulatory control to impacts other than those strictly related to fishing practices.

Since FISHA is still the major legal instrument for protecting coral reefs in Thailand, strengthening its provisions will help control threats from coastal development, and lead to more cost-effective enforcement. Acceptance of the recommended additional prohibitions will require cooperation from the private sector, continued public education, and training of enforcement and customs officers.

DESCRIPTION

Additional prohibitions pursuant to FISHA will be enacted either by royal decree or by ministerial notification (see Table 11). The scientific, ecological, and administrative evidence supporting these new prohibitions is now available, and legal drafting will begin immediately. The Coral Reef Committee of the Department of Fisheries is responsible for preparing the justification for these legal reforms.

TABLE 11. RECOMMENDED NEW PROHIBITIONS UNDER FISHA

| Prohibition | Justification |
|--|---|
| <ul style="list-style-type: none"> Prohibit the possession, stockpiling, destruction, sale or export, and attempt to sell or export, hard and soft coral specimens. | <ul style="list-style-type: none"> Existing prohibition (only on collection) is difficult to enforce; Prohibition of sale or possession can be monitored and enforced more cost-effectively; Prohibition is consistent with regulations in force worldwide; and Ecological impacts of continued coral trade are significant, while economic benefits are limited. |
| <ul style="list-style-type: none"> Prohibit the export of selected species of ornamental fish. | <ul style="list-style-type: none"> Prohibition of export will limit market and harvest pressures on rare species; Fish collection damages reefs; Survival rate of exported specimens is very low; and Ecological impacts of continued ornamental fish exports are significant, while economic benefits are limited. |
| <ul style="list-style-type: none"> Prohibit the export of selected species of shells | <ul style="list-style-type: none"> Prohibition of exports will limit market and harvest pressures on rare species. |

Simultaneously, a legal review will be undertaken by the Fisheries Department to verify the scope of authority for fisheries habitat conservation under FISHA. The review will recommend amendments needed to clarify the Department of Fisheries' authority for:

- Prohibiting and/or controlling all sources of direct physical damage to coral reefs as fisheries habitats; and
- Controlling dredging, filling, and point sources of pollution entering areas designated as protected areas pursuant to Section Six of FISHA.

*POLICY 4
Measure 2*

Promulgate site-specific reef protection regulations consistent with the national strategy.

RATIONALE

The existing legal framework for coral reef management can be strengthened by issuing site-specific regulations pursuant to existing laws. The National Park Act, FISHA, and NEQA all include provisions for such regulations, but that authority is seldom used (Tasneeyanond and Rubthong, 1991). There is an opportunity for concerned agencies to adapt their current procedures to ensure consistency with the objectives of the national strategy.

These reforms will result in habitat management regimes that are geographically specific and consistent with the reef classification system. Training of government staff and a widespread promotional effort directed at the private sector will be required to ensure that the reforms are effective.

DESCRIPTION

The following modifications to administrative rules and procedures are recommended in order to ensure compliance with the objectives of the national strategy:

The Department of Fisheries will issue site-specific use regulations for protected areas that include coral reefs, to ensure that their management is consistent with the classification system and the national strategy. Management plans will be prepared for each site in consultation with local populations. A list of the existing fisheries

protected areas that encompass coral reefs, and their management classifications, is found in Annex 3.

The Royal Forestry Department will issue site-specific regulations for all marine national parks to ensure that their management is consistent with the classification system and with the national strategy. Management plans and zoning schemes will be prepared for each site in consultation with local populations.

The ONEB will extend its coastal water quality standards under NEQA to locations with coral reefs, consistent with the coral reef classification system. Water quality at all reefs must meet ONEB standards for coral reef conservation or swimming.

The environmental impact assessment review process coordinated by ONEB will address the potential impacts of proposed coastal developments on coral reefs. To facilitate the EIA process, coral reefs will be added to the list of "sensitive areas" being compiled by ONEB.

POLICY 4
Measure 3

Designate departmental units and staff for habitat protection within key central government agencies.

RATIONALE

The commitment to improved coral reef management must extend to the assignment of trained government staff to carry out and monitor the measures described above. Until now, many coral reef efforts have been undertaken by departmental staff assigned to work on international assistance projects such as the USAID-sponsored Coastal Resources Management Project and the ASEAN-Australia Cooperative Program in Marine Science. Coral reef management and protection must become a routine responsibility of government; specialized units should be created, and liaison staff assigned.

This measure will help create the institutional capacity for coral reef management within key agencies, ensuring that trained personnel will be available to implement the tasks outlined in the national strategy. In time, a corps of trained government officials will be able to apply their practical experience to the management of other coastal habitats.

DESCRIPTION

The Department of Fisheries will assign staff in the Fisheries Conservation Division to coordinate the Department's involvement in implementing the National Coral Reef Management Strategy. The staff, which will eventually form a fisheries habitat protection unit, will be trained in marine habitat management. The unit will report regularly to the Interagency Coral Reef Committee and provide technical assistance upon request to provincial officers in the twelve provinces with coral reefs. This unit will formulate management plans for protected areas designated under FISHA, contribute to marine national park management plans, and oversee the execution of demonstration projects. The staff will also liaise with the Department's operations in extension, research, and enforcement.

The Royal Forestry Department will assign staff in the National Park Division to coordinate the Department's involvement in implementing the national strategy. The staff, which could eventually form a marine national park management unit, will be trained in marine environmental protection and visitor management. The unit will report regularly to the Marine Parks Subcommittee and provide technical assistance to park superintendents. This unit will formulate management plans for marine national parks, and oversee the execution of demonstration projects. The staff will also liaise with the Department's operations in interpretation, wildlife conservation, and enforcement.

The ONEB will assign staff to monitor implementation of the national strategy and continue to coordinate policy among central agencies. The staff, which can be part of ONEB's Coastal Management unit, should be trained in coastal and marine resources management. Specific responsibilities include technical assistance to provincial governments, NGOs, and community groups; public information campaigns and consultation; and the review of site-specific management plans for fisheries protected areas and marine national parks.

A representative in the following concerned agencies will be appointed to provide a liaison on coral reef management issues: the Tourism Authority of Thailand, the Harbor Department, the Navy, and the Ministry of Interior.

RATIONALE

Nine of Thailand's 15 marine national parks include significant reef areas. Over half of all reefs are included within the boundaries of a national park. Yet, many operational and institutional constraints have limited the effectiveness of this network of protected areas in protecting coral reef habitat. In addition to unresolved jurisdictional issues between the Department of Fisheries and the Royal Forestry Department, urgent issues include:

- Severe conflicts between local economic and social priorities and the park planning approach;
- The lack of resources and attention directed at marine resource conservation when compared to visitor services; and
- The need for detailed and realistic management plans developed with the support of communities dependent on the parks (Chettamart, et al., 1991).

There is an urgent need for significant progress in establishing Thailand's marine national parks. If well-managed, Thailand's marine national parks can serve as demonstration sites for sustainable use of coastal habitats, as well as protect the national heritage. Through careful zoning, community organization, on-site preventive techniques, education, and enforcement, each park can offer international tourists a unique recreational and educational experience while also generating income for nearby coastal communities.

DESCRIPTION

The Royal Forestry Department, in cooperation with the Department of Fisheries, ONEB, and the Tourism Authority of Thailand, will develop a system plan for Thailand's system of marine national parks. The issues to be addressed by this plan and its scope have been assessed in a policy paper presented and discussed at the July 1991 National Coastal Management Workshop (Chettamart, et al., 1991).

Major components of the system plan include:

- National policies, laws, and park-specific regulations pertaining to all marine national parks;
- Institutional responsibilities and formal mechanisms for interagency coordination, including cooperative agreements for enforcement, research, and other operations;
- Priorities for new site designations;
- A proposal for a revised management classification of marine national parks;
- Guidelines for management planning; and
- Human resources, financial arrangements, and other administrative measures in support of the system.

The system plan will form the basis of a request for international, technical, and financial assistance for marine park management. As a prerequisite to the system plan, the Ministry of Agriculture must proceed with urgency in formalizing the necessary agreement between the Department of Fisheries and the Royal Forestry Department to clarify marine resource management authority within park boundaries, and to promote cooperative management.

POLICY 4
Measure 5

Cabinet will adopt the National Coral Reef Management Strategy and direct ONEB to provide interagency leadership and coordination.

RATIONALE

The long-term success of the national strategy requires political leadership, regular progress reports on the implementation of measures, and a mechanism to negotiate and resolve interagency issues. It is only with clear and consistent support from Cabinet that the ambitious goals of the national strategy can be met.

Implementation of the national strategy will require that the actions undertaken by a wide range of agencies be closely monitored and coordinated. This role is best served by ONEB as the Royal Thai Government's lead agency for the formulation of environmental policy. To further ensure coordinated action, Cabinet must also direct all other agencies to carry out their responsibilities as specified in the national strategy.

DESCRIPTION

As a first priority, a clear and unequivocal Cabinet resolution must be sought directing every concerned agency to take the necessary actions to incorporate the national strategy into its programs and plans.

As a second priority, the Ministry of Agriculture must proceed with urgency in seeking a cooperative agreement between the Department of Fisheries and the Royal Forestry Department. The agreement will explicitly call for shared responsibility in coral reef management within marine national parks.

Following definitive approval of the national strategy, continued oversight and policy coordination will be provided by three existing interagency committees:

- The Coral Reef Subcommittee within the Department of Fisheries;
- The Marine Parks Subcommittee within the Royal Forestry Department; and
- The Coastal Resources Subcommittee within the National Environment Board.

All three committees will be asked to consider and formulate additional interagency agreements for coral reef management, research, monitoring, and enforcement. The committees will also deliberate on cross-sectoral policy issues that affect implementation of the national strategy, such as coastal ecotourism and the provision of services at offshore islands.

The ONEB will consolidate the annual reports of each committee and prepare a summary annual report to Cabinet.



POLICY 5: Monitor and evaluate progress in accomplishing the objectives of the National Coral Reef Strategy.

Policy 5 recognizes that effective resource management programs require reliable data to evaluate the results of habitat management efforts and to set priorities for action. Already, the Government of Thailand has made a sound investment in this direction by participating in the ASEAN-Australia's Cooperative Program in Marine Science. This study produced a baseline of information on coral reef

conditions in the Andaman Sea and the Gulf of Thailand. It also compared results using standardized approaches for monitoring reefs and adjacent habitats such as seagrass beds and soft-bottom communities. These early results, although incomplete, were invaluable to the formulation of the national strategy.

To benefit fully from its investment, the Government of Thailand must continue to monitor progress and change on many fronts. This includes not only the ecological status of coral reefs, but also their uses and socio-economic values. Information on habitat conditions must be made available to central and local government officials that review coastal development proposals and issue permits. Periodic reporting of status and trends to Cabinet, appropriate ministries, and the general public helps maintain reef conservation on the national agenda.

This national strategy is the first integrated coastal resources management program of its kind in Thailand. Monitoring progress is key in drawing lessons and developing expertise that can be applied to the management of other coastal habitats.

POLICY 5
Measure 1

Institute a national monitoring program for coral reef condition and use.

RATIONALE

As Thailand's tourism sector and coastal infrastructure continue to expand in the next decade, dramatic changes are expected in coastal land use patterns and resource uses. These changes are likely to affect conditions for coral reefs, particularly water quality. Nationwide monitoring and assessment of reef condition and uses can help detect emerging problems and issues in different regions of the country. There is a consequent need to put in place the cooperative agreements between agencies, and with academic institutions, for carrying out a national monitoring program.

Until now, much of the information on coral reef condition and uses has been contained in scientific reports that were not readily available or interpreted by resource managers within local and central government agencies. There is a widespread need to make this information available in a form that is useful for policy and habitat management purposes.

DESCRIPTION

The purpose of the National Coral Reef Monitoring Program will be to establish a nationwide baseline of information on reef condition, economic uses, and sources of damage. The baseline data will be periodically updated through a cooperative effort involving central and provincial governments, Thai universities, and volunteer organizations.

Concerned agencies and cooperating academic institutions will agree on a standardized protocol for monitoring reef condition based on the recommendations of the ASEAN-Australia Cooperative Program in Marine Science and similar programs established worldwide. Parameters for monitoring reef condition and evidence of human-induced damage will include: environmental parameters; surveys of benthic organisms and finfish; and records of damage from crown-of-thorns, pollution, breakage, disease, and bleaching.

Concerned agencies and cooperating academic institutions will formally establish a network of permanent monitoring stations in the Andaman Sea and the Gulf of Thailand. The scientific reserves designated under the Fisheries Act will serve as control sites, providing areas of minimally disturbed reef communities. Funds will be made available for the systematic collection of monitoring data on reef condition, a responsibility that will be shared among government agencies and academic institutions.

The Department of Fisheries will assume lead responsibility for compiling monitoring data on reef condition. The department will establish a centralized geographic data base for all major reef groups. It will compile, maintain, and distribute detailed maps of reef location. The information will be used to undertake periodic analyses of nationwide status and trends in coral reef habitat.

The ONEB and the National Park Division will undertake a pilot program to identify key parameters and practical guidelines for monitoring reef uses with the participation of local volunteer groups and the private sector. The National Park Division will assume responsibility for maintaining data on reef-dependent uses and benefits within marine national parks. Periodic assessments of trends will be undertaken.

The ONEB will rely increasingly on the results of site-specific monitoring to assess the effects of coastal development on coral reefs (see Policy 2). Impact studies will be used by the ONEB as a

basis for discussion with permitting agencies and proponents on the need for improved mitigation measures.



POLICY 6: Support management through scientific research and innovation.

Research on reef ecology and related areas of scientific investigation provides the knowledge essential to the formulation of sound management solutions. Several Thai research institutions are making significant contributions to our basic understanding of reef ecosystems in the Andaman Sea and the Gulf of Thailand. Research programs such as the ones administered by Chulalongkorn and Bang Saen Universities and the Phuket Marine Biological Center also play an important role in training new generations of marine biologists and managers in field research. The continued efforts of these research institutions are key to the long-term success of the national strategy.

Our understanding of the economic and social implications of coastal habitat management in Thailand is limited by a lack of data and proven analytical methodologies. The lack of information on the economic benefits generated by reef use in Thailand hinders the government's ability to justify public investments in reef management or to seek international funding. This is despite the fact that coastal tourism is an important and growing sector of the national economy. Healthy coral reefs and unpolluted coastal waters are a known factor in maintaining Thailand's appeal in a highly competitive international tourism market.

New areas of scientific investigation are pointing to possible innovative uses of reef products for aquaculture, and for pharmaceutical and industrial purposes. There are unprecedented opportunities for linkages between Thai research centers and specialized research institutions worldwide, as interest in experimental aquaculture and marine biotechnology grows.

The intent of Policy 6 is to encourage and enable Thailand's scientific community to take an active role in working towards the goal of sustainable use embodied in the national strategy. The formulation of a national coral reef research program is foreseen as the first step towards achieving this policy.

POLICY 6
Measure 1

**Strengthen Thailand's
National Coral Reef Re-
search Program.**

The ONEB, working in cooperation with the Department of Fisheries, will undertake the development of a multidisciplinary research program focusing on Thailand's coral reefs and other coastal habitats. The ONEB will assume lead responsibility for the social sciences component of the research program, while the Department of Fisheries will provide oversight for the physical and biological sciences.

The advisory group of scientific experts created for the ASEAN-Australia Cooperative Program in Marine Science will be convened and asked to develop the National Coral Reef Research Program. The membership of the advisory group will be modified to include Thai experts in natural resource economics.

The research program will include the following components:

- Research priorities in the applied physical, biological, and social sciences that relate to the ecology, use, and development potential of Thailand's coral reefs;
- A formal process for soliciting and approving research proposals addressing the above priorities;
- Initiatives and responsibilities for seeking funding for basic research; and
- Incentives for private sector investments and research in the pharmaceutical applications of marine products.

Known priorities for biological research include: comparative analyses of coral reef biodiversity in the Andaman Sea and the Gulf of Thailand; continued research on the response and recovery rates of hard corals to various sources of sedimentation; and comparative analyses of different techniques for crown-of-thorns eradication.

Priorities for social and economic research include: comparative analyses of the economic benefits and costs associated with the establishment and operation of marine national parks; the cultural and socio-economic importance of traditional reef harvesting activities; and methodologies to assess the recreational carrying capacity of offshore reef islands for tourism development.

As part of this initiative, measures will be taken to improve the dissemination of and access to scientific results among government, university, and private sector laboratories.

The government of Thailand will continue to encourage Thai research institutions to collaborate with other countries and international organizations to ensure timely access to technological and scientific developments in reef research.

A VISION OF THE FUTURE

WHAT WILL STRATEGY IMPLEMENTATION ACHIEVE?

During the last five years, teachers, divers, youth groups, fishermen, hotel owners, and many others have demonstrated their commitment to improved coral reef management in Thailand. Action has been taken by the public and private sectors in many parts of the country. A vibrant and shared vision of the future is emerging from this broadened commitment, one where coral reefs are a key asset for sustainable coastal development in Thailand.

The next 10 years of sustained action will place Thailand in a position of leadership in coral reef management. Implementation of the national strategy will produce concrete and much-needed results as follows:

- A small but strategic network of marine scientific reserves will be created. These reserves will ensure effective protection of unique and ecologically representative coral reefs. They will also provide the setting for innovative ecological research, and serve as control sites for monitoring by government research centers working closely with universities and international conservation organizations.
- Coastal communities will be actively involved in maintaining and protecting coral reefs as one basis for their economic development and well-being. Community groups, small tourism businesses, and fishermen's associations will have ready access to technical assistance and reliable information on how to manage reefs and encourage sustainable fisheries and recreational use.
- A significant proportion of Thailand's coral reefs will be managed within a system of fully operational marine national parks. At these sites, national and international visitors and school groups will discover the wonder and value of coral reefs in a pristine coastal setting. Educational and safety programs will ensure that recreational divers, snorkelers, boaters, and sightseers enjoy an ecotourism experience of the highest quality. Sustainable use of these parks will generate income and employment for nearby coastal communities and the nation.

- Provincial governments, working in partnership with national government, will have undertaken a significant first step in assuming responsibility for coastal habitat management. A corps of skilled and experienced government staff will provide technical assistance, develop and apply new techniques in reef management, and monitor progress. Over time, this practical experience gained in coral reef management can be extended to Thailand's other coastal habitats.

The National Coral Reef Management Strategy was formulated out of the recognition that a significant national effort had to be launched to reverse trends in habitat degradation. The national strategy provides the policy framework and the means to realize this vision of the future. Its commitment to local participation in management, the geographic focus given to management, and its emphasis on tangible action will help ensure that the challenge of effective management of Thailand's coral reefs is met with purpose and equity.

INITIAL STEPS FOR IMPLEMENTATION

Thailand's environmental agenda for the next decade is likely to be complex and full. Realistic priorities are essential, as significant demands will be placed on the human resources and funds available for natural resources management in Thailand. This raises the question of how to begin implementation of the national strategy. Four initial steps are essential.

Formalize the national commitment to improved coral reef management. The ONEB must seek Cabinet approval of a resolution that incorporates the key elements of the national strategy, as agreed at the National Coral Reef Workshop in July 1991. Simultaneously, the Department of Fisheries, the Royal Forestry Department, and other central agencies must seek ministerial approval for their programs.

Begin to mobilize staff, funds, and interagency agreements for vigorous and coordinated action. Concerned agencies, including the Department of Fisheries, the Royal Forestry Department, the Harbor Department, the Ministry of Interior, and the ONEB must assign staff and request funds for carrying out their responsibilities under the national strategy. Concerned agencies must initiate the process of revising or amending administrative procedures and rules that affect coral reefs. Interagency agreements for enforcement,

research, and other operational aspects must be developed. Technical assistance, extension services, training, and education must gradually be made available to provincial governments and coastal communities.

Undertake demonstration projects in implementation. The ONEB, working with provincial governments, the Department of Fisheries, and the Royal Forestry Department must initiate four to five pilot implementation projects — one for each of the reef management categories. Recommended sites for the pilot demonstration projects are as follows: (a) Mu Ko Similan Marine National Park (Ecotourism); (b) Ko Tao (Scientific Reserve); (c) Ko Phangan (Local Benefits); (d) Pattaya reef group (Intensive Tourism). A prototype demonstration project for each category is described under Policy 1, Measure 2 and in Annex 1.

Solicit and secure continued international funding and assistance. There is growing international support for the protection and sustainable use of coral reefs, which now rank high as a shared concern of tropical developing countries, international development organizations, and environmental interest groups. As the Royal Thai Government proceeds with the long-term measures described for each policy, there is an unprecedented opportunity to seek international assistance for a few discrete short-term projects contained in the national strategy. In the upcoming year, the ONEB, in close coordination with the Department of Fisheries, the Royal Forestry Department, and Thai academic institutions should develop and submit formal requests for international funding and assistance to implement the national strategy.

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ANNEX 1: Actions, Projects, and Responsibilities for National Strategy Implementation

POLICY 1: MANAGE CORAL REEFS ACCORDING TO DIFFERENT ECOLOGICAL AND ECONOMIC VALUES TO MAINTAIN A BALANCE OF USES

| | Actions and Projects | Implementing Agencies |
|---|---|---|
| Measure 1: Coral reef classification | <ul style="list-style-type: none"> • Detailed mapping of reef distribution within and outside marine protected areas. • Finalize assignment of reefs to management categories. • Cabinet approval of classification. | ONEB DOF RFD MOI/Provincial |
| Measure 2: Pilot demonstration projects for the four management categories. | <ul style="list-style-type: none"> • Provide funds and technical assistance for a demonstration project at Ko Phangan (Reefs managed for local use). | ONEB/DOF Surathani provincial government |
| | <ul style="list-style-type: none"> • Provide funds and technical assistance for a demonstration project at Pattaya reef group (Intensive tourism). | ONEB/TAT Municipality of Pattaya |
| | <ul style="list-style-type: none"> • Provide funds and technical assistance for a demonstration project at Mu Ko Similan Marine National Park (Ecotourism). | RFD ONEB |
| | <ul style="list-style-type: none"> • Provide funds for research and monitoring project at Ko Tao, Surathani Province (Scientific reserve). | ONEB DOF Academic institutions |

POLICY 2: REDUCE REEF DEGRADATION BY INCREASING THE EFFECTIVENESS OF EXISTING LAWS AND MEASURES

| | Actions and Projects | Implementing Agencies |
|--|--|---|
| Measure 1: On-site reef protection and restoration | <ul style="list-style-type: none"> • Install and maintain mooring buoys at priority reefs (Eco-tourism and Intensive tourism). • Provide technical assistance and training at local level for reef protection/restoration measures including: <ul style="list-style-type: none"> - permanent mooring buoys - sediment/nutrient control - Crown of thorns eradication - artificial reefs - temporary reef-collection closures - reef fisheries conservation measures - reef cleanup - contingency plans for oil spills and accidental discharges • Fund and implement community-based marine resource management projects at priority sites (Local-use reefs). • Select and fund experimental reef-restoration projects at priority sites (Intensive tourism). | DOF RFD MOI/Prov ONEB (technical assistance) TAT Private sector and NGOs |
| Measure 2: Prevent impacts from new coastal developments | <ul style="list-style-type: none"> • Prepare and adopt improved technical guidelines (including specific mitigation measures) for the EIA review of reclamation and hotel development projects in areas adjacent to reefs. • Promote compliance with improved EIA technical guidelines by implementing agencies and private sector. • Extend NEQA coastal water quality standards to other areas consistent with the reef classification scheme. • Add coral reefs to ONEB's proposed list of sensitive areas for EIA process. | ONEB MOI/Prov |
| Measure 3: Reef "code of conduct" | <ul style="list-style-type: none"> • Prepare a voluntary "code of conduct" for recreational and fisheries use of reefs, in cooperation with target groups. • Disseminate the voluntary "code of conduct" within the private sector. | ONEB RFD TAT Harbor Department Private sector NGOs |

| | | |
|---|---|--|
| <p>Measure 4: Expand local extension programs in fisheries habitat conservation</p> | <ul style="list-style-type: none"> • Train DOF extension officers in reef fisheries conservation. • Assign DOF extension officers to communities dependent on local-use reefs. • Conduct community-based reef fisheries demonstration projects, local meetings, and seminars to enhance local understanding and support of reef fisheries conservation measures (Local-use reefs). • Development and distribute educational materials on reef fisheries conservation. • Conduct socio-economic study of the local economic significance of reef harvesting and alternative occupations/products for small-scale fishermen on offshore islands. • Create small artificial reefs for habitat enhancement. | <p>DOF MOI/Prov Local academic institutions Harbor Department Private sector</p> |
| <p>Measure 5: Enforce more effectively existing laws against illegal activities.</p> | <ul style="list-style-type: none"> • Specialized training of all enforcement officers of implementing agencies on offshore patrol problems and techniques. • Preparation of a coordinated offshore patrol plan which sets geographic priorities for reef conservation. • Provide increased budget, additional vessels, and safety equipment for offshore patrols to provincial fisheries offices. • Technical assistance to provincial fisheries officers in marine conservation regulations and their enforcement. • Technical assistance to community groups for volunteer patrol programs. | <p>DOF RFD Harbor Department Navy Marine police</p> |
| <p>Measure 6: Strengthen the capacity of local government in site planning and management.</p> | <ul style="list-style-type: none"> • Training of provincial government planners in coastal and marine resources management. • Technical assistance to provincial governments to incorporate reef classification in provincial natural resources plans. | <p>DOF MOI/Prov RFD ONEB</p> |

POLICY 3: BUILD AND MAINTAIN STRONG AND BROAD PUBLIC SUPPORT

Measure 1: Launch national and local public information campaigns.

- Expand national public awareness campaign (news media, brochures, handbooks) to focus on pollution-related damage to reefs, and to promote the objectives of the National Coral Reef Strategy.
- Organize and hold regional workshops and seminars for senior government officials and private sector groups to promote understanding of the national strategy.
- Disseminate to provincial governments, community groups, and NGOs data on the status and economic value of reefs in their localities.
- Provide technical assistance and funds to provincial government officers to conduct local reef awareness campaigns, and to promote reef management objectives for their localities.
- Support the creation of forums and community organizations that allow participation in reef management decisions.

ONEB
MOI/Prov
RFD
TAT
Private sector &
NGOs
Local academic
institutions

Measure 2: Encourage volunteer groups, user and public participation in reef management.

- Encourage community groups, NGOs, and recreational clubs to organize local events, to participate in volunteer cleanup and monitoring, and to develop fund-raising programs for reef management.
- Promote private sector financing of reef protection measures.
- Promote tourism sector involvement in the design and marketing of nature-oriented offshore excursions (diving "ecotours") for reefs classified for ecotourism.
- Feasibility study of tourist user fees and other fund-raising measures.
- Adjust and distribute primary grade coral reef curriculum (Phuket) in other coastal provinces.
- Design and distribute multidisciplinary coral reef curriculum for secondary levels.

Private sector
NGOs
RFD
ONEB
TAT
MOI/Prov
Academic institutions

Measure 3: Coral reef curriculum in schools and colleges

- Design and offer short training courses in coastal ecotourism and marine interpretation for the tourism sector at community colleges.
- Study the feasibility of offering an "ecotourism" module in university-level programs in business and architecture.

POLICY 4: REVISE ROYAL THAI GOVERNMENT LEGAL, REGULATORY, AND INSTITUTIONAL FRAMEWORK

| | | |
|--|---|--|
| <p>Measure 1: Amend the Fisheries Act</p> | <ul style="list-style-type: none"> • Prohibit possession, stockpiling, destruction, sale, and attempt to sell hard and soft coral specimens. • Prohibit the export of selected ornamental fish and shells. | <p>DOF</p> |
| <p>Measure 2: Promulgate site-specific reef protection regulations consistent with the national strategy</p> | <ul style="list-style-type: none"> • Revise the administrative procedures for issuing site-specific regulations and zoning under the Fisheries Act and for national parks. • Issue and enforce site-specific regulations and zoning for reefs included in "fisheries sanctuaries" and in marine national parks consistent with the reef classification • Revise the administrative procedures for issuing site-specific regulations for reefs not included in protected areas, to ensure that management is consistent with reef classification. • Formulate and disseminate technical guidelines and operator's manual for bungalow and resort developments on offshore islands. | <p>DOF RFD ONEB MOI/Prov Harbor Department TAT</p> |
| <p>Measure 3: Designate departmental units and staff for habitat protection</p> | <ul style="list-style-type: none"> • Appoint liaison officers for reef conservation issues and coastal development impacts in implementing agencies. • Train departmental staff in habitat management. • Create an ecotourism unit responsible for the formulation of a national policy and guidelines for coastal ecotourism. | <p>ONEB DOF RFD TAT</p> |
| <p>Measure 4: Develop marine national park system plan</p> | <ul style="list-style-type: none"> • Complete management plans and zoning for marine national parks containing major reef groups. • Develop and implement a national system plan for marine national parks. | <p>RFD</p> |
| <p>Measure 5: Provide interagency leadership and coordination</p> | <ul style="list-style-type: none"> • Maintain the interagency working group as the forum to advocate for and monitor implementation of the national strategy. • Assign ONEB staff to coordinate implementation of the national strategy and to monitor progress. • Prepare annual report to Cabinet on progress in meeting the policies and objectives of the strategy. | <p>ONEB</p> |

POLICY 5: MONITOR AND EVALUATE PROGRESS

Measure 1: National monitoring program

- Confirm national reef-condition monitoring protocol and permanent monitoring stations, based on recommendations of the ASEAN-Australian Marine Science Program.
- Undertake a cooperative study to identify key parameters and protocol for monitoring reef uses, with the participation of volunteer local groups.
- Fund long-term reef monitoring program under cooperative agreements with research institutions.

DOF
Academic/research institutions
ONEB
RFD
NGOs

POLICY 6: SUPPORT MANAGEMENT THROUGH SCIENTIFIC RESEARCH AND INNOVATION

Measure 1: Reef research program

- Design a national cooperative reef research plan.

DOF
Academic/research institutions

ANNEX 2: Implementation Projects by Reef Management Category

| Priority Project/Action | Implementing Agency | Supporting Organizations |
|--|----------------------------|--|
| REEFS MANAGED FOR LOCAL USE AND BENEFITS | | |
| <u>Cooperative Planning and Management</u> | | |
| Community-based marine resources management demonstration projects (with actions selected and implemented by local villages). Each demonstration could include some or all of the other projects listed below. | Provincial government/DOF | Communities |
| <u>On-Site Management</u> | | |
| Establishment and training of a volunteer community organization to participate in reef patrols and monitoring. | Provincial government/DOF | Communities |
| Small reef fisheries management projects (experimental aquaculture, improvements in collection techniques of reef products, installation of small artificial reefs). | DOF/Provincial government | Local fishing associations/ research institutions |
| Volunteer installation and maintenance of permanent mooring buoys. | ONEB/DOF | Private sector |
| Experimental reef replenishment areas (i.e., three-year closure of areas to fishing and collection to allow reef resources to replenish). | DOF | Research institutions |
| <u>Research/Monitoring</u> | | |
| Cooperative research to improve reef fisheries management (for target species and sites identified in consultation with island communities). | DOF | Research institutions |
| Socio-economic study of the local significance of reef-related activities (fisheries, shell collection). | DOF | Research institutions |
| <u>Education/Extension</u> | | |
| Technical assistance and environmental awareness campaign for hotel and bungalow operators. | ONEB/Provincial government | TAT/Private sector |
| Production and dissemination of environmental guidelines/operator's manual for small hotel and bungalow operators (dealing with the specific constraints of operating on offshore islands). | ONEB/Provincial government | TAT/Private sector |
| Fisheries conservation extension program (training of DOF extension officers, extension materials, technical support to local fishing associations, promotion of appropriate fishing techniques). | DOF | Local fishing associations |
| <u>Economic Incentives</u> | | |
| Improvements in the manufacture of local handicrafts and alternative sources of material for shell handicrafts. | DOF/Provincial government | Private sector |

| Priority Project/Action | Implementing Agency | Supporting Organizations |
|---|--------------------------------|---|
| NATIONAL TOURISM: ECOTOURISM | | |
| <u>Planning</u> | | |
| Preparation and approval of management plans for marine national parks. | RFD/Provincial government | Private sector |
| Preparation of contingency plans for catastrophic spills and accidents at most vulnerable marine national parks. | ONEB/RFD | Harbor Dept. |
| Preparation of site-specific zoning plans | DOF/RFD | Provincial government Private sector |
| <u>On-Site Management</u> | | |
| Volunteer crown-of-thorns eradication program. | DOF | Research institutions Private sector Private sector |
| Mooring buoy installation, maintenance, and volunteer patrols in cooperation with dive shops and tour operators. | RFD/Provincial government/ONEB | |
| Experimental reef restoration projects. | DOF/RFD | Research institutions |
| Dive tour-boat registration program for marine national parks. | RFD | Private sector |
| Tour concession program for marine national parks. | RFD | Private sector |
| <u>Research/Monitoring</u> | | |
| Monitoring of reef condition and recovery at permanent stations. | DOF/RFD | Research institutions |
| Study of socio-economic benefits and costs arising from the establishment, marine resources management, and operation of marine national parks. | RFD/Provincial government | Research institutions |
| <u>Education/Extension</u> | | |
| Cooperative training program in the promotion of coastal ecotourism for TAT and private sector. | RFD/ONEB/TAT | Private sector/ Provincial government |
| Production and dissemination of environmental guidelines/operator's manual for small hotel and bungalow operators (dealing with the specific constraints of operating on offshore islands). | ONEB/Provincial government/TAT | Private sector |
| Production of reef conservation materials for tourists. | RFD/ONEB/TAT | Private sector |
| Installation of reef conservation signs, billboards, and information booths at access points for marine national parks in cooperation with the private sector. | RFD/TAT | Private sector |
| Training of tour guides and tour boat operators in reef "code of conduct." | ONEB/TAT/RFD | Private sector |
| <u>Institutional Strengthening</u> | | |
| Training of marine national park (MNP) rangers and superintendents in marine interpretation and conservation techniques. | RFD | |
| <u>Economic Incentives</u> | | |
| Design and promotion of "ecotour" diving packages—diving excursions with a reef natural history theme, accompanied by a trained diving naturalist— in cooperation with local dive shops, TAT, and RFD . | Private sector | RFD/TAT |

| Priority Project/Action | Implementing Agency | Supporting Organizations |
|---|--------------------------------|-----------------------------------|
| NATIONAL TOURISM: INTENSIVE | | |
| <u>Cooperative Planning and Management</u> | | |
| Establishment of a volunteer conservation group (private sector) in cooperation with tourist business associations, to participate in reef management activities. | Business associations | Provincial government/TAT/ONEB |
| Preparation of site-specific zoning plans | DOF/RFD | Provincial government |
| <u>On-site Management</u> | | |
| Beach and reef cleanup campaigns with the support of tourist business associations, dive shops, and tour operators. | Provincial government | Private sector |
| Mooring buoy installation, maintenance, and volunteer patrols in cooperation with dive shops and tour operators. | Provincial government/ONEB | Private sector |
| Installation of demarcation buoys for safety in recreational snorkeling areas. | Provincial government/ONEB | Private sector |
| Experimental reef restoration projects. | DOF | Research institutions |
| <u>Research Monitoring</u> | | |
| Survey of socio-economic and business benefits associated with reef-related recreation. | ONEB | Research institutions |
| Study of the effects of nutrient loading on reef-health indicator species. | ONEB | Research institutions |
| Monitoring of nutrient loading and transport of highly degraded reefs. | ONEB/Provincial government | Municipalities/Sanitary districts |
| Monitoring of visitor-use patterns at heavily used reefs. | ONEB | Research institutions |
| <u>Education/Extension</u> | | |
| Public education campaign for pollution control in cooperation with hotel industry, tour companies, tour boat operators, and national media. | ONEB/Provincial government/TAT | Private sector/media |
| Production and dissemination of a brochure and handbook for beach hotel operators on water pollution control. | ONEB/TAT | Private sector |
| Production of reef conservation materials for tourists. | TAT/ONEB | Private sector |
| Installation of reef conservation signs and billboards. | TAT/ONEB | Private sector |
| Training of tour guides and tour boat operators in promoting the reef "code of conduct." | ONEB/TAT | Private sector |

| Priority Project/Action | Implementing Agency | Supporting Organizations |
|--|---------------------|-------------------------------------|
| SCIENTIFIC RESERVE | | |
| <u>Planning</u> | | |
| Preparation of site-specific zoning plans | DOF | Research institutions |
| <u>On-Site Management</u> | | |
| Volunteer diver-registration program | DOF | TAT/Private sector |
| <u>Research/Monitoring</u> | | |
| Cooperative basic reef research program. | DOF | Research institutions |
| Baseline inventories and monitoring of reef diversity and condition. | DOF | Research institutions ONEB |
| Preparation of a proposal for a "reef habitat biodiversity" research project for international funding. | DOF | Research institutions |
| <u>Economic Incentives</u> | | |
| Design and promotion of "ecotour" diving packages in cooperation with local dive shops, TAT and RFD (diving excursions with a reef natural history theme, accompanied by a trained diving naturalist). | DOF/TAT | Private sector |
| GENERAL USE | | |
| <u>Education/Extension</u> | | |
| Local public awareness and education campaigns. | ONEB | Universities/Teachers' College/NGOs |
| <u>Research/Monitoring</u> | | |
| Research to study the impacts of different types of coastal developments on reef condition. | DOF | Research institutions |
| Monitoring of effectiveness of mitigation measures for coral reef protection (conditions required of new coastal developments). | ONEB/DOF | NGOs |

ANNEX 3. Recommended Classification of Coral Reefs by Coastal Province¹

| Major Reef Group | Proposed Classification | Management Status ² |
|------------------------------|-------------------------|--------------------------------|
| A. ANDAMAN SEA | | |
| <u>Ranong province</u> | | |
| 1. Ko Chang | General Use | Not included |
| 2. Ko Payan | General Use | Not included |
| 3. Ko Kang Kao | General Use | Not included |
| 4. Ko Kun Group | General use | Not included |
| <u>Pang-Nga province</u> | | |
| Pang-Nga Bay: | | |
| 1. Ko Rawa Yai | Local Use | Not included |
| 2. Ko Panak | Local Use | Not included |
| 3. Ko Dok Mai | Scientific reserve | Not included |
| 4. Ko Kai | Scientific reserve | Not included |
| Mu Ko Surin ³ : | | |
| 1. Ko Stok | Ecotourism | Surin N.P. |
| 2. Ko Pachum Ya | Ecotourism | Surin N.P. |
| 3. Ko Surin | Scientific reserve | Surin N.P. |
| 4. Ko Torinya | Ecotourism | Surin N.P. |
| 5. Ko Tasai | Scientific reserve | Proposed fisheries sanctuary |
| Mu Ko Similan ³ : | | |
| 1. Ko Bon | Ecotourism | Not included |
| 2. Ko Bang Ngo | Ecotourism | Similan N.P. |
| 3. Ko Similan | Scientific reserve | Similan N.P. |
| 4. Ko Paboo | Ecotourism | Similan N.P. |
| 5. Ko Miang | Ecotourism | Similan N.P. |
| 6. Ko Han | Ecotourism | Similan N.P. |
| 7. Ko Payan | Ecotourism | Similan N.P. |
| 8. Ko Hoo Yong | Ecotourism | Similan N.P. |
| <u>Phuket province</u> | | |
| 1. Nai Yang | Scientific reserve | Hat Nai Yang N.P. |
| 2. Surin | General use | Not included |
| 3. Ao Bang Tao | General use | Not included |
| 4. Kamala | General use | Not included |
| 5. Patong | Intensive tourism | Fisheries sanctuary |
| 6. Kata | Intensive tourism | Not included |
| 7. Karon | Intensive tourism | Not included |
| 8. Nai Harn | General use | Not included |
| 9. Rawai | General use | Fisheries sanctuary |
| 10. Ko Hae | Intensive tourism | Fisheries sanctuary |
| 11. Raja Noi | Intensive tourism | Not included |
| 12. Raja Yai | Intensive tourism | Not included |
| 13. Shark Point | Ecotourism | Not included |

| Major Reef Group | Proposed Classification | Management Status ² |
|-------------------------------|-------------------------|--------------------------------|
| <u>Krabi province</u> | | |
| Ko Hong Group: | | |
| 1. Ko Kamid | Local use | Not included |
| 2. Ko Pakbia | Local use | Not included |
| 3. Ko Hong | Local use | Not included |
| Mu Ko Phi Phi: | | |
| 1. Ko Damhok | Ecotourism | Mu Ko Phi Phi N.P. |
| 2. Ko Damkwan | Ecotourism | Mu Ko Phi Phi N.Pp |
| 3. Ko Phi Phi Don | Ecotourism | Mu Ko Phi Phi N.P. |
| 4. Ko Phi Phi Le | Ecotourism | Mu Ko Phi Phi N.P. |
| 5. Ko Bida | Ecotourism | Mu Ko Phi Phi N.P. |
| 6. Ko Pai | Ecotourism | Mu Ko Phi Phi N.P. |
| 7. Ko Yung | Ecotourism | Mu Ko Phi Phi N.P. |
| Small islands south of Krabi: | | |
| 1. Ko Ngai | Ecotourism | Not included |
| <u>Trang province</u> | | |
| Hat Chao Mai: | | |
| 1. Ko Chuak | Ecotourism | Hat Chao Mai N.P. |
| 2. Ko Vien | Ecotourism | Hat Chao Mai N.P. |
| 3. Ko Muk | Ecotourism | Hat Chao Mai N.P. |
| 4. Yonglong Beach | Ecotourism | Hat Chao Mai N.P. |
| 5. Ko Kradan | Ecotourism | Hat Chao Mai N.P. |
| 6. Chao Mai Beach | Ecotourism | Hat Chao Mai N.P. |
| 7. Ko Ma | Ecotourism | Hat Chao Mai N.P. |
| 8. Ko Khao | Ecotourism | Hat Chao Mai N.P. |
| South of Hat Chao Mai: | | |
| 9. Ko Rok Nai | Local use | Not included |
| 10. Ko Rok Nok | Local use | Not included |
| 11. Ko Libong | Local use | Mu Ko Petra N.P. |
| 12. Ko Nai | Local use | Mu Ko Petra N.P. |
| 13. Ko Petra | Local use | Mu Ko Petra N.P. |
| 14. Ko La Ling | Local use | Mu Ko Petra N.P. |
| <u>Satun province</u> | | |
| Tarutao Group ⁴ : | | |
| 1. Ko Tarutao | Ecotourism | Tarutao N.P. |
| 2. Ko Klang | Ecotourism | Tarutao N.P. |
| 3. Ko Phai | Ecotourism | Tarutao N.P. |
| 4. Ko Tarang | Ecotourism | Tarutao N.P. |
| 5. Ko Passes | Ecotourism | Tarutao N.P. |
| 6. Ko Adang | Ecotourism | Tarutao N.P. |
| 7. Ko Kata | Ecotourism | Tarutao N.P. |
| 8. Ko Lee Peeh | Ecotourism | Tarutao N.P. |

| Major Reef Group | Proposed Classification | Management Status ² |
|---|-------------------------|--------------------------------------|
| 9. Ko Hin Ngarm | Ecotourism | Tarutao N.P. |
| 10. Ko Rawee | Ecotourism | Tarutao N.P. |
| 11. Ko Madong | Ecotourism | Tarutao N.P. |
| 12. Ko Tagiang | Ecotourism | Tarutao N.P. |
| 13. Ko Sa Rang | Ecotourism | Tarutao N.P. |
| 14. Ko Boo Tich | Ecotourism | Tarutao N.P. |
| B. WESTERN GULF OF THAILAND | | |
| <u>Prachuap Kirikhant province</u> | | |
| 1. Ko Luk | General use | Not included |
| 2. Ko Rat | General use | Not included |
| 3. Ko E-an | General use | Not included |
| 4. Ko Luem | General use | Not included |
| 5. Ko Phiew | General use | Not included |
| 6. Ko Pang | Ecotourism | Not included |
| 7. Ko Jang | Scientific reserve | Bird nest concession |
| <u>Chumporn province</u> | | |
| 1. Ko Khai | Ecotourism | Fisheries sanctuary |
| 2. Ko Chorakae | Ecotourism | Fisheries sanctuary |
| 3. Ko Samet | Local use | Fisheries sanctuary |
| 4. Ko Matra | Local use | Not included |
| 5. Ko Lawa | Local use | Not included |
| 6. Ko Thong Lang & Lanka Jiwi | Local use | Not included |
| 7. Ko Gula | Local use | Not included |
| 8. Ko Rat | Local use | Not included |
| 9. Ko Mat Wai Yai and Ko Mat Wai Noi | Local use | Bird nest concession Not included |
| 10. Ko Hang Sua | Local use | Not included |
| 11. Ko Rang Ha | Local use | Not included |
| 12. Ko Maprao | Local use | Not included |
| 13. Hin Luk Ngam Rocks | Ecotourism | Not included |
| 14. Ko Ngam Yai | Ecotourism | Not included |
| 15. No Ngam Noi | Ecotourism | Not included |
| 16. Ko E-Rat | Local use | Not included |
| 17. Ko Kalok | Ecotourism | Fisheries sanctuary |
| <u>Surathani province</u> | | |
| Ko Tao Group ⁵ : | | |
| 1. Ko Tao | Ecotourism/SR | Fisheries sanctuary |
| 2. Ko Nang Yuan | Ecotourism/SR | Fisheries sanctuary |
| Mu Ko Ang Thong: | | |
| 3. Ko Nai Pud | Ecotourism | Mu Ko Ang Thong N.P. |
| 4. Ko Hin Dub | Ecotourism | Mu Ko Ang Thong N.P. |
| 5. Ko Norat | Ecotourism | Mu Ko Ang Thong N.P. |
| 6. Ko Samsao | Ecotourism | Mu Ko Ang Thong N.P. |
| 7. Ko Mae Ko | Ecotourism | Mu Ko Ang Thong N.P. |
| 8. Ko Phi | Ecotourism | Mu Ko Ang Thong N.P. |

| Major Reef Group | Proposed Classification | Management Status ² |
|------------------------------------|-------------------------|--------------------------------|
| 9. Ko Wua Talub | Ecotourism | Mu Ko Ang Thong N.P. |
| 10. Ko Wua Teh | Ecotourism | Mu Ko Ang Thong N.P. |
| 11. Ko Paluay | Ecotourism | Mu Ko Ang Thong N.P. |
| Ko Pa-Ngan: | | |
| 12. North Pa-Ngan | Local use | Not included |
| 13. South Pa-Ngan | Local use | Not included |
| Ko Samui: | | |
| 14. Ko Samui | Intensive tourism | Not included |
| 15. Ko Matlang | Intensive tourism | Not included |
| South of Samui: | | |
| 16. Ko Taen | Local | Not included |
| 17. Ko Wang Nai | Local | Not included |
| 18. Ko Rab | Scientific reserve | Not included |
| 19. Ko Matsum | Local | Not included |
| 20. Hin Ang Wang Rocks | Scientific reserve | Not included |
| C. EASTERN GULF OF THAILAND | | |
| <u>Chonburi province</u> | | |
| Ko Sichang Group: | | |
| 1. Ko Kang Kao | Scientific reserve | Not included |
| 2. Ko Thaye Tha Mun | Scientific reserve | Not included |
| 3. Others small reefs | General use | Not included |
| Pattaya Group: | | |
| 4. Ko Sak | Intensive tourism | Not included |
| 5. Ko Krok | Intensive tourism | Not included |
| 6. Ko Larn | Intensive tourism | Not included |
| 7. Ko Phai | Intensive tourism | Not included |
| 8. Ko Klung Ba Dal | Intensive tourism | Not included |
| 9. Ko Marn Vichai | Intensive tourism | Not included |
| 10. Ko Rin | Intensive tourism | Not included |
| Sattahip Group: | | |
| 1. Ko Kred Kaeo | General use | Not included |
| 2. Ko Khao Laem Kham | General use | Not included |
| 3. Ko Kram Nai | General use | Not included |
| 4. Ko Kram | General use | Not included |
| 5. Ao Thung Kai Tia | General use | Not included |
| 6. Poo Chao Cape | General use | Not included |
| 7. Ko Tao Mo | General use | Not included |
| 8. Ko Yor | General use | Not included |
| 9. Ko E-Lao | General use | Not included |
| 10. Ko Rat | General use | Not included |
| 11. Ko Kham | General use | Not included |
| 12. Ko Samaesan | Scientific reserve | Navy base restricted |
| 13. Ko Rong Nang | General use | Not included |
| 14. Ko Chuang | General use | Not included |
| 15. Ko Charn | General use | Not included |

| Major Reef Group | Proposed Classification | Management Status ² |
|------------------------------|-------------------------|--------------------------------|
| <u>Rayong province</u> | | |
| Muang Rayong District Group: | | |
| 1. Ko Samet | Intensive tourism | Mu Ko Samet N.P. |
| 2. Ko Hin Kan Na | Intensive tourism | Mu Ko Samet N.P. |
| 3. Ko Chan | Intensive tourism | Mu Ko Samet N.P. |
| 4. Ko Saket | General use | Not included |
| Klaeng District Group: | | |
| 5. Ko Plateen | Ecotourism | Mu Ko Samet N.P. |
| 6. Ko Kruay | Ecotourism | Mu Ko Samet N.P. |
| 7. Ko Kham | Ecotourism | Mu Ko Samet N.P. |
| 8. Ko Kudee | Ecotourism | Mu Ko Samet N.P. |
| 9. Ko Kang Tao | Ecotourism | Mu Ko Samet N.P. |
| 10. Ko Talu | Ecotourism | Mu Ko Samet N.P. |
| Ko Man Group: | | |
| 11. Ko Man Nai | Scientific reserve | Fisheries sanctuary |
| 12. Ko Man Klang | Scientific reserve | Not included |
| 13. Ko Man Nok | Scientific reserve | Not included |
| <u>Trad province</u> | | |
| Ko Chang Group: | | |
| 1. Ko Chang Noi | Ecotourism or Local | Mu Ko Chang N.P. |
| 2. Ko Chang | Ecotourism or Local | Mu Ko Chang N.P. |
| 3. Ko Rom | Ecotourism or Local | Mu Ko Chang N.P. |
| 4. Ko Yuak | Ecotourism or Local | Mu Ko Chang N.P. |
| 5. Ko Man Nia | Ecotourism or Local | Mu Ko Chang N.P. |
| 6. Ko Man Nok | Ecotourism or Local | Mu Ko Chang N.P. |
| 7. Ko Ngarm | Ecotourism | Mu Ko Chang N.P. |
| 8. Ko Mai Chi Lek | Ecotourism | Mu Ko Chang N.P. |
| 9. Ko Mai Chi Yai | Ecotourism | Mu Ko Chang N.P. |
| 10. Ko Wai | Ecotourism | Mu Ko Chang N.P. |
| Ko Mak Group: | | |
| 11. Ko Tien | Scientific reserve | Mu Ko Chang N.P. |
| 12. Ko Rang (east side) | Ecotourism | Mu Ko Chang N.P. |
| 13. Ko Thong Lang | Scientific reserve | Not included |
| Ko Kra | Scientific reserve | Not included |
| 14. Ko Rakang Nai | Ecotourism | Not included |
| 15. Ko Rakang Nok | Ecotourism | Not included |
| 16. Ko Mark | Ecotourism | Not included |
| 17. Ko Kradat | Ecotourism | Not included |
| Ko Krut Group: | | |
| 18. Ko Kut | Ecotourism | Not included |
| 19. Ko Mai Chi Lek | Ecotourism | Not included |
| 20. Ko Rat | Ecotourism | Not included |

- ¹Provisional list presented at the National Coral Reef Workshop, July 1991.
- ²States whether reef group is currently in legally-designated protected area such as National Park (N.P.) or Fisheries Sanctuary.
- ³Several reefs within this area could be managed as scientific reserves. The locations listed above are some of the sites under consideration for such designation.
- ⁴The classification of Tarutao requires a basic policy decision concerning overall park management. The reefs could be classified either as "Local use," or "Ecotourism" depending on the resolution of conflicts between local and national management objectives.
- ⁵There are problems with declaring Ko Tao as a scientific reserve because of the very high recreational diving potential, improving access, and increasing use. The presence of a DOF research station on the island could facilitate both enforcement and research. One option would be to designate a small scientific reserve area.

ANNEX 4. Coral Reef Zoning Guidelines

Rationale

For some major reef groups, it may be necessary to further designate zones where specific activities are allowed, restricted (i.e., allowed only under permit), or prohibited. For large reefs in particular, zoning may be necessary to maintain the intensity of activities and scale of development within the site's carrying capacity. Planners also use zoning to separate activities which may give rise to conflicts or public safety threats.

As such, zoning is a site-specific tool designed to achieve an equitable local balance in activities, much as the national reef classification is a tool for achieving a national balance in management objectives. Note, however, that zoning is only one of several site-specific management techniques that can be used to control levels of use within carrying capacity, and to manage reef resources. Zoning is usually most effective when used in combination with these other management techniques.

Other benefits derived from this measure are:

- Reduced local conflicts between reef uses, particularly between recreational uses, fisheries, and reef protection in areas of intensive use;
- Reduced safety hazard in areas of intensive use;
- Accelerated restoration and recuperation of highly damaged reefs; and
- Clear geographic and site-specific priorities for the preservation of unique and ecologically significant reefs.

To implement this measure, the government of Thailand is issuing the national zoning guidelines presented below. These zoning guidelines are designed to work in concert with the national classification to achieve a balance of multiple uses, both nationally and locally.

Reefs Requiring Site-Specific Zoning Plans

Site-specific zoning plans will be developed for all major reef groups located within marine national parks and fisheries sanctuaries. Priority will be given to major reef groups assigned to the following management categories:

- Reefs managed for national tourism and recreation;
- Reefs managed for local needs and benefits;
- Reefs managed for national ecological and scientific benefits.

Site-specific zoning plans will be developed where the following circumstances exist:

- There exist marked and documented conflicts between activities occurring on the major reef group;

- There is a need for seasonal control of activities (recreation or fisheries) in specific parts of the reef;
- There are unique ecological features which require special management attention;
- There are severely damaged areas which require an intensive restoration effort; and
- There is a need for a corridor or site for specialized services (e.g., anchoring area or access corridor).

Permissible Uses in Each Zone

The zoning plans will assign one of the following names to each zone or designated area:

Preservation Zone: All uses prohibited except research by permit, and nature-appreciation tours. No permanent infrastructure on reef island.

Ecotourism or Nature-Appreciation Zone: Fisheries prohibited. Nature-appreciation tours and nature-oriented recreation allowed. Permanent infrastructure limited to educational facilities and preventive measures such as mooring buoys.

Fisheries Management Zone: Areas of intensive fisheries management. Limited recreational development.

Recreational Development Zone: Areas of intensive recreational activity and development. Permanent and seasonal facilities and services for underwater recreation and for education.

General Use Zone: All reef activities allowed under general laws and regulations.

In addition, the site-specific zoning plans will have provisions for the designation of other special-purpose zones as dictated by local conditions. For example, special zones may be designated to provide for public safety, to enable fisheries stocks to recover, or for conducting research and reef restoration programs. The boundaries of each zone and the name assigned to each zone will be set out in the site-specific zoning plans.

ANNEX 5. National Coral Reef Workshop Participants (Jom Tien, Chonburi Province, July 1991)

Department of Fisheries

Mr. Urupan Boonprakob, deputy director general
Dr. Maitree Duangsawadi, director, Fisheries Policy and Planning Division
Mr. Veerat Charnsornbat, director, Marine Fisheries Division
Mr. Chirddran Amatyakul, director, Fisheries Resources Conservation Division
Mr. Somsak Charsorn, director, Eastern Marine Fisheries Development Center
Mr. Udom Bhatia, director, Marine Biological and Fishery Research Institute
Dr. Hansa Chansang, Marine Biological and Fishery Research Institute
Mr. Amnoy Thanthong, Legal Affairs Subdivision
Mr. Chawalit Larbporn, Fisheries Control Subdivision

Royal Forestry Department

Mr. Dhammarong Prakobboon, deputy director general
Mr. Chana Diewilai, National Parks Division
Dr. Chumporn Sukaseam, National Parks Division
...., Park Superintendent, Mu Ko Chang Marine National Park, Trad province
...., Park Superintendent, Laem Kao Ya Marine National Park, Rayong province
...., Park Superintendent, Mu Ko Ang Thong Marine National Park, Surathani province
...., Park Superintendent, Mu Ko Surin Marine National Park, Pang-Nga province
...., Park Superintendent, Mu Ko Similan Marine National Park, Pang-Nga province
...., Park Superintendent, Hat Nopharatthara Mu Ko Phi Phi Marine National Park, Krabi province
...., Park Superintendent, Hat Chao Mai Marine National Park, Trang province
...., Park Superintendent, Mu Ko Tarutao Marine National Park, Satun province

Harbor Department

Mr. Vichet Rajanadhornkul, director, Technical Division

Naval Operations Department

Captain Vuit Chanjin, director, Commercial Ship Control Division

Tourism Authority of Thailand

Mr. Thienchai Makamarn, director, Project Planning and Development Department

Marine Police Division

Police Colonel Thana Navee, deputy marine police commander

Office of the National Environment Board

Mr. Sunthad Somchevita, deputy secretary-general
Dr. Saksit Tridech, director, Natural Resources and Environmental Management Coordination Division
Ms. Chiravorn Pipitpoka, chief, Natural Resources Management Coordination Section
Ms. Nisansart Sathirakul, chief, Natural Resources Utilization Section
Dr. Sirikul Bunpaong, Environmental Impact Evaluation Division
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Thai Universities

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Nongovernment Organizations

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Mr. Ashley Boyd

U.S. Agency for International Development

Mr. Will Knowland, natural resources advisor

Mr. Kamol Chantanumati, interpreter

University of Rhode Island

Ms. Michele Lemay, consultant

Ms. Lynne Hale, associate director, Coastal Resources Center