

A NATIONAL CORAL REEF MANAGEMENT STRATEGY FOR THAILAND

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ABSTRACT

The National Coral Reef Management Strategy is a policy reform initiative of the Thailand Coastal Resources Management Project (CRMP). The objective of the CRMP is to develop national policies based in part on the experience of locally-implemented demonstration projects.

The purpose of the National Coral Reef Management Strategy project is to identify and formulate the policy reforms and guidelines necessary for effective coral reef management in Thailand. This is being undertaken as a first step in building agency and local support for practical coastal habitat management policies. Central implementing agencies such as the Department of Fisheries, the Royal Forestry Department, and the Harbor Department as well as provincial governments, reef users and the private sector are playing a key role in defining the Strategy with the Office of the National Environment Board coordinating the policy development process.

This paper reviews coral reef management issues in 12 coastal provinces of Thailand, describes current management initiatives and highlights the approach being used to formulate an effective national strategy.

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BACKGROUND

Coral reefs are living underwater communities found in tropical marine areas where the water is warm, shallow and clear such as in the lower Gulf of Thailand and the Andaman Sea. Along with mangroves, lagoons, beaches and other coastal habitats, coral reefs are part of the natural resource base that is supporting the economic development now taking place in Thailand's coastal zone.

Baseline studies undertaken in 1988 indicate that Thailand has lost extensive and valuable coral reef areas during the last two decades (ASEAN-Australia Cooperative Programme on Marine Sciences, 1989). Should they continue, these trends will have serious negative implications for fisheries and tourism in many coastal communities.

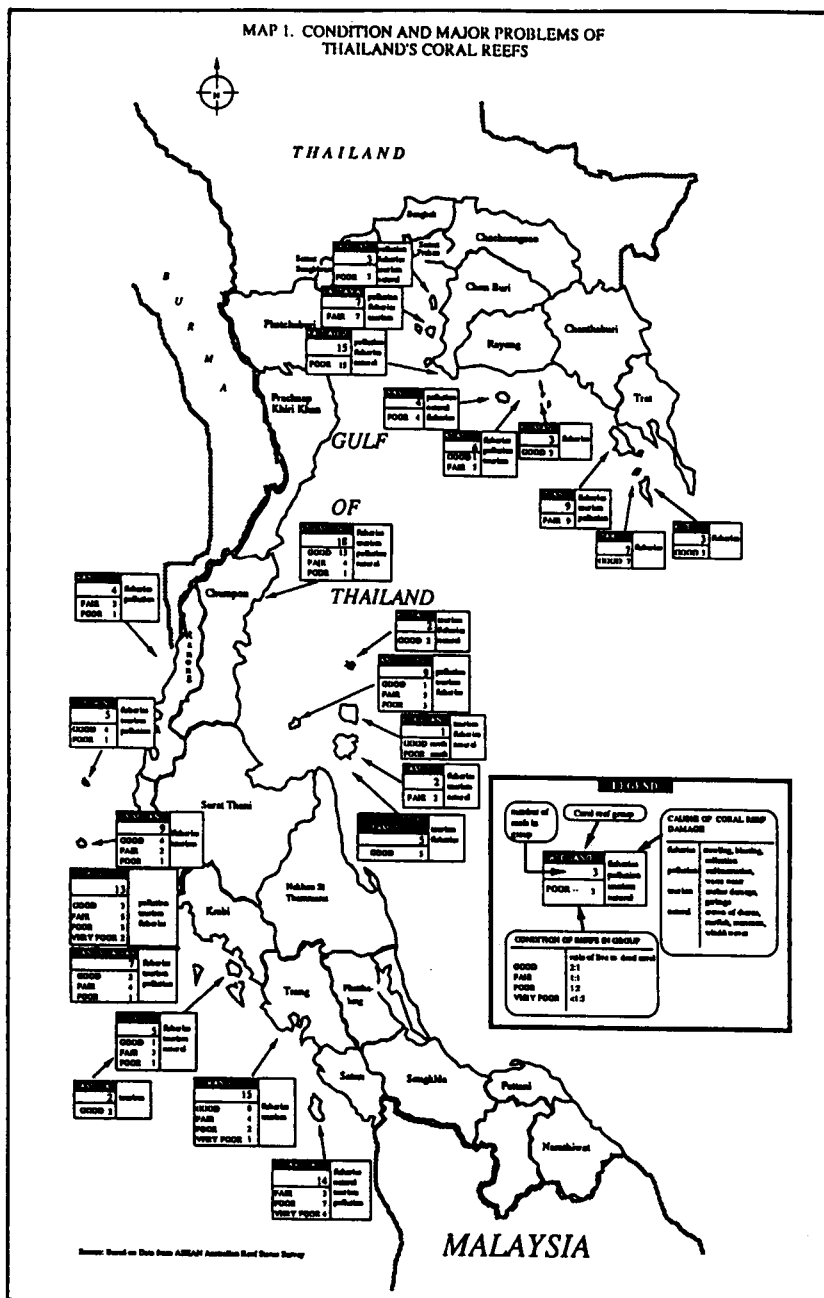
Recently, the Government of Thailand has undertaken several projects in an effort to reverse trends in coral reef degradation. Activities have included a nation-wide baseline study, regional planning studies, the designation of marine national parks and the support of community-based habitat management activities in Phuket, Surathani and other coastal provinces (Lemay and Chansang, 1989; Sudara et al., 1989). These activities have been accompanied by a major public education campaign that has resulted in broad support - both within and outside government - for a National Coral Reef Management Strategy.

The need to reform policies and coordinate action for coral reef management nation-wide was selected as one focus of the national policy formulation component of the Thailand Coastal Resources Management Project (CRMP). This was a timely opportunity to for the Royal Thai Government to work with provincial governments, resource users and the private sector to develop effective measures and an overall process for coastal habitat management.

THAILAND'S CORAL REEFS

Major reef groups are found in twelve of Thailand's twenty-three coastal provinces (Figure 1). Approximately 55% of Thailand's major coral reefs groups occur in the Andaman Sea. These are predominantly fringing reefs seldom extending beyond 50m depths or 1km offshore. Approximately 20% of Thailand's major reef groups occur in the western Gulf of Thailand in the provinces of Chumphon and Surathani. Another 25% of the reefs are located in the eastern Gulf of Thailand, mainly in the provinces of Chomburi, Rayong, and Trad.

There are marked climatic and oceanographic differences between the Andaman Sea and the Gulf of Thailand which affect coral reefs. Reefs in the Andaman Sea are subject to semi-diurnal tides and are exposed to predominant southwest monsoons. Reefs in the Gulf of Thailand are more affected by cyclonic weather and are subject to diurnal tides. Natural sedimentation is greater in the Gulf of Thailand due to its shallow depths and coastal river discharges.



NEED FOR A NATIONAL STRATEGY

There are three compelling reasons why Thailand needs to adopt and implement a coral reef management strategy at this time:

1. Thailand's coral reefs are important for the national economy, for maintaining local lifestyles and as an essential part of southeast Asia's natural heritage. An effective management strategy can ensure that the people of Thailand will continue to benefit from these values.

Recreational and Tourism Benefits

Thailand's coral reefs have a scenic and recreational value which makes them a major coastal attraction for tourists. In general, reefs located close to beach resorts along the mainland or on major islands are used intensively for tourism-related activities - snorkeling, diving and glass-bottom boat tours. In 1989, tourism-related activities were the predominant uses in 40% of all major reefs in Thailand. Reefs in the Phuket area, Pattaya, Ko Samui and Ko Samet are subject to the heaviest tourism pressures.

In the last five years, coral reefs have become an important feature for promoting international tourism in provinces such as Phuket, Krabi, Surathani and Chomburi. There are an estimated 5,000 small businesses such as tour boat operators, shell shops and dive shops that are dependent on the recreational uses of coral reefs (ONEB, 1990). In addition, many hotel resorts and large tour companies benefit indirectly from the scenic values of coral reefs.

Benefits to Small-Scale Fishermen and Traditional Lifestyles

Reefs located in remote rural areas are used for small-scale fisheries, gleaning, and shell and ornamental fish collection. In such locations, reef fisheries and products are still an important traditional source of income and food. Ranong, Trang, Satun, Chumphon and Trad are all provinces where harvesting activities (both small-scale fisheries and subsistence harvesting) continue to be the dominant reef use.

Thailand's coral reefs provide food and shelter for fish and shellfish of high commercial value such as grouper and lobster. While small compared to the industrial fisheries catch, reef fisheries do provide an added source of income to coastal villagers.

In the last decade, there have been significant changes in reef use patterns, with small-scale or traditional fisheries gradually being replaced by tourism-dependent activities. Local fishermen have converted their boats into small tour boats and shell collection for the souvenir trade has increased. This shift in coral reef use is taking place in many parts of the country including Trad, Pang-nga, Trang, and Surathani provinces.

Other Values and Benefits

Thailand's coral reefs are a natural heritage that is significant both within the region and internationally. As other countries in southeast Asia, Thailand is located near the center of highest coral diversities in the world. There are reports of rare species found in remote reefs and new species are still being identified. Serving much like underwater tropical forests, Thailand's coral reefs are an important reservoir of marine biological diversity.

In addition, many reefs are contained within Thailand's system of Marine National Parks - one of the most extensive networks of marine protected areas in the ASEAN region. These coral reefs are destined to play an important role in research, marine education and the testing of innovative marine conservation techniques.

2. The condition of Thailand's coral reefs is affected by a variety of problems and the overall quality of the resource is deteriorating at an accelerating rate. Yet, there remain many unspoiled reefs of great significance.

Coral Reef Conditions

Over 60% of all major reef groups in Thailand are either in poor or fair condition (Table 1). Less than 36% are in good or very good condition. The widespread deterioration of coral reefs in Thailand is a recent event associated with the introduction of bottom-trawlers and the use of explosives in the early 1960's and the expansion of beach resorts in the late 1970's.

TABLE 1: REEF STATUS BY REGION

CONDITION	WESTERN GULF	EASTERN GULF	ANDAMAN SEA	% OF ALL REEFS IN THAILAND
Very good/good	58 %	24 %	34 %	36 %
Fair	29 %	37 %	32 %	33 %
Poor/very poor	13%	39 %	32 %	30 %

Reefs in predominantly good or very good condition occur in the coastal provinces of Trad, Trang and Pang-nga. The coastal provinces where reef degradation is most severe due to human-related activities are: Chomburi, Satun, Rayong, Phuket and Surathani.

Causes of Reef Degradation

The principal causes of coral reef degradation in Thailand are:

Fisheries-related problems

Dynamite fishing
Trawling
Overharvesting

Pollution problems

Land-based sedimentation
Wastewater discharges
Offshore sediments (tin-mining)

Tourism-related problems

Anchor damage
Groundings and trampling
Littering and solid wastes

Natural causes

Storm damage
Crown-of-thorns infestations
Extreme tides

Geographic patterns in coral reef deterioration reflect patterns in use. Reefs used heavily for tourism and in proximity to large beach resorts are affected primarily by pollution and anchor damage. This is the case for the reefs along the west coast of Phuket and those located offshore from Pattaya. Reefs located in remote or predominantly rural areas, such as in Chumporn and Satun provinces, tend to be damaged mostly by reef blasting and trawling.

TABLE 2: DOMINANT CAUSES OF CORAL REEF DAMAGE

CAUSES	TYPES OF DAMAGE	% OF REEFS IN THAILAND
Fisheries damage	Dynamite fishing, trawling Overharvesting	71%
Pollution damage	Sedimentation Wastewater discharges	14%
Tourism damage	Anchor damage, groundings Trampling, littering	14%

Dominant causes of reef deterioration are shifting in many provinces as tourism replaces small-scale fisheries as the major economic sector in the coastal zone. Reef blasting is reported to be on the decline in several provinces but damage associated with trawling is on the increase. Sedimentation and wastewater pollution are recent and increasing problems in all regions including offshore islands. Patterns in reef degradation are often linked to more fundamental but complex socio-economic issues such as poverty and lack of alternative low-cost fisheries technology, lack of effective coastal land use controls and limited awareness among the private sector of the linkages between resource condition, use and economic viability.

Implications of coral reef degradation for a coastal community range from the loss of traditional sectors of employment and changes in coastal lifestyles to a decline in recreational potential which may affect businesses dependent on tourism. The effects of habitat

degradation are often most accutely felt by the poorest segments of a coastal community who depend on subsistence sources of food.

3. Thailand currently has few policies, laws or programs that recognize that coral reefs are valuable coastal habitats. A strong national commitment and a strategy are needed to ensure that coordinated and effective national and local actions are taken to encourage the sustainable use of coral reefs.

Coral reef management in Thailand rests on laws and regulations that apply to all coral reefs, additional measures applicable only to marine protected areas, and non-regulatory actions aimed at improving coral reef conditions through restoration, preventive measures and education.

Regulatory Measures

Three laws are used to protect coral reefs in Thailand: the Fisheries Law of 1947; the National Park Act of 1961; and the Enhancement and Conservation of National Environmental Quality Act (NEQA) of 1975.

The Fisheries Act establishes the regulations governing marine fisheries in Thailand's coastal and offshore waters. Under this Act, all coral reefs in Thailand are either classified as Public Areas or Protected Areas. The latter are sanctuaries where fishing or any activity likely to disturb the fisheries habitat are prohibited. There are four such sanctuaries containing approximately 2000 km² of coral reefs.

Several Ministerial Regulations and Notifications have been issued pursuant to the Fisheries Act including a prohibition of the possession or use of explosives, toxic substances, or electricity for fishing; prohibition of the sale of fish caught by illegal practices; prohibition of the collection or export of corals; and a prohibition of trawling and push-net operations within 3 km from shore. These regulations are enforced by the Department of Fisheries which has officers in shore-based offices and a new offshore patrol base in the western Gulf of Thailand.

There have been problems in enforcing regulations for coral reef protection. First, the area over which these regulations apply is too broad when compared to the manpower and equipment available for enforcement. Second, the Department of Fisheries has had to focus its surveillance and enforcement activities on commercial offshore fisheries rather than inshore fisheries because of limited personnel and patrol boats. Third, the language of the law is often unclear. This makes it difficult to pursue violators or to impose penalties.

There is also evidence that awareness and acceptance of fisheries regulations among small-scale fishermen is low (Tokrisna and Rowchai, 1990). Fisheries extension programs in rural areas have not been used effectively to address habitat conservation issues.

Nine of the 15 Marine National Parks in Thailand include significant coral reef groups. Most of the parks containing reefs have been designated in the Andaman Sea with only three sites designated in the Gulf of Thailand. Together with the Fisheries Sanctuaries, about 60% of all coral reefs in Thailand are included in some type of protected area.

Several institutional and operational constraints have, however, limited the effectiveness of Thailand's network of marine national parks in preserving coral reef habitat. Among them:

- The size of the marine areas designated has been too large and the boundaries have not corresponded to resource protection priorities;
- There have been serious conflicts between park designation and traditional uses of reefs such as fisheries;
- Local economic and social priorities have been overlooked in the park planning and development process;
- Jurisdiction over marine resources is unclear and there have been conflicts with fisheries regulations; and
- The focus of marine park management has been on accommodating visitor use due to limited resources and trained staff for resource protection.

Thailand does not have an effective regulatory program for maintaining coastal water quality. Under NEQA, the Office of the National Environment Board (ONEB) has published "Coastal Water Quality Guidelines" for the west coast of Phuket. Special restrictive guidelines have been set for several coral reef areas for preservation and conservation purposes. These guidelines have not, however, been adopted by any implementing agencies nor been used to affect coastal development patterns (Tasneeyanond and Rubthong, 1990).

Non-regulatory measures

Public support for coral reef management has increased dramatically over the last three years. This support has come in part from the extensive media coverage of the scenic quality of coral reefs. But the attention has also grown in response to direct action taken at the national and local levels to reverse trends in coral reef degradation.

At the national level, the ONEB has overseen the ASEAN-Australian baseline study, the first nation-wide data base on the distribution and condition of coral reefs. The Office has also undertaken a national coral reef public awareness campaign as part of the Thailand CRMP. At the local level, the ONEB, in cooperation with provincial and local groups, has supported a community-based reef management program in Phuket as part of the Thailand CRMP (see below).

Other national activities include the Department of Fisheries' coral reef research program at the Phuket Marine Biological Center. The Center has conducted a reef monitoring program in the Andaman Sea as well as research on the effects of tin mining and crown-of-thorns. Also at the national level, the Royal Forestry Department has completed the preparation of management plans for Tarutao and Mu Ko Phi Phi Marine National Parks (Kasetsart University, 1990).

PRIORITIES FOR NATIONAL POLICY FORMULATION

While the challenge of conserving Thailand's reefs is considerable, it is not insurmountable. There are still many reefs in either good or very good condition particularly in the offshore waters of Trad, Trang, and Chumporn provinces. Thailand also possesses a complete data base on the status of its coral reefs, enabling the Government to establish geographic priorities and make informed decisions about management.

There have been successes with local demonstration projects, but many national-level policy issues remain such as:

- A lack of effective enforcement of existing laws;
- A tourism development process where the carrying capacity of coastal habitats such as coral reefs has been overlooked;
- Delays and constraints in implementing a national system of marine protected areas; and
- Problems in anticipating and resolving conflicts between coral reef protection and coastal land use, particularly development that degrades nearshore water quality.

As current development trends continue over the next decade in Thailand's coastal areas, the demands placed on coral reefs for fisheries, tourism and recreation, research and conservation are likely to increase. The benefits derived from coral reefs are easily overlooked in the coastal development process. A National Strategy offers a mechanism whereby all values and opportunities linked to Thailand's reefs are recognized and incorporated in the process of making decisions about coastal land use, fisheries management and tourism development. Thailand has the opportunity to become among the first countries in Southeast Asia to have such a national program.

DEVELOPING THE STRATEGY

The Royal Thai Government has initiated the development of a National Strategy on the basis of the widespread support for coral reef protection found both within and outside government. This support has been confirmed by recent events in Thailand including direct action taken by local communities and the recent Cabinet approval of "urgent measures" for coral reef protection.

Lessons learned from Local Demonstration Projects

A community-based habitat protection program began in Phuket in 1987 as part of the Thailand CRMP. During the early stages of the demonstration project, the CRMP team worked with Phuket residents to identify practical management actions aimed at resolving selected coral reef protection issues such as anchor damage. Solutions were suggested by local people, including teachers, hotel operators, divers and tour boat operators. Along with suggestions came offers of help to carry out the projects (Lemay and Chansang, 1989).

After obtaining community endorsement in 1988, several small projects were implemented which involved local residents and encouraged partnerships between private and public sectors (see inset box). Similar projects were undertaken at Ko Samui as part of the Upper South Project (Sudara et al., 1989). The results of these demonstrations were reported in both local and national media. By 1989, local efforts to protect coral reefs were extended beyond the demonstration areas to Krabi and Chumporn provinces.

PHUKET COMMUNITY PROJECTS FOR CORAL REEF PROTECTION

As part of a community-based coral reef protection program, Phuket residents and businesses undertook these projects...

Phuket Teacher's College developed and tested a coral reef curriculum for local schools;

Local residents and the Provincial Government organized and participated in community events such as a Coral Reef Day;

Kodak (Thailand) Limited donated signs, posters and brochures to help increase public awareness of coral reefs among tourists;

Phuket Diving Association, the Kata-Karon Diving Group, Matlang Resort, Phuket Rotary Club and the Phuket Island Resort volunteered time and donated equipment to help install mooring buoys in the Phuket area;

Phuket Aquarium developed new coral reefs exhibits.

The local demonstration projects provided the Royal Thai Government valuable experience in the techniques and the process for coral reef management. Important lessons learned were:

- Focus on priority problems: The success of the first "planning" phase involved sorting immediate, visible and relatively simple reef management issues from more complex issues. Care was also taken in evaluating the socio-economic dimension of each problem, understanding reef users, and identifying target groups for community action.
- Select simple, cost-effective solutions: Both the coral reef signs and the mooring buoy installation were successful because these were simple and known technical solutions to clear and easily understood problems. The measures were perceived as tangible actions (as opposed to more studies) and installation and production offered an opportunity for involvement.
- Provide information and opportunities for local testing of techniques: In wanting to encourage local participation in coral reef management, central government agencies distributed relevant information and offered specialized training for volunteer divers and other local residents who wanted to participate in demonstration activities.
- Consider incentives and constraints to local participation: A key to securing local involvement in coral reef measures was knowing what to ask from different target groups. Users were most likely to get involved if they saw a benefit to themselves or their businesses.

National Urgent Measures: Placing Reefs on the National Agenda

A National Coral Reef Management Workshop was held in October 1989 in Bangkok to share lessons learned from local projects throughout Thailand. The concept of a national policy initiative received broad endorsement. In the months that followed, a working group of concerned agencies identified and discussed a series of urgent measures for Cabinet consideration. These meetings served to focus political and institutional attention on Thailand's coral reefs.

By mid-1990, the Thai Cabinet approved four urgent measures designed to control immediate sources of damage: authorization to delegate enforcement authority for fisheries regulations to the Navy and the Harbor Department; the acquisition of several vessels for patrolling offshore coral reefs; expanded installation of mooring buoys and educational activities; and approval of a budget to implement these measures.

National Policy Formulation Process

Having succeeded in getting coral reef management on the national political agenda, the Royal Thai Government is proceeding with the formulation of the National Strategy in three phases:

PHASE 1: Preparation and Distribution of Findings on the Status and Significance of Coral Reefs

PHASE 2: Formulation and Discussion of Policies, Measures and Actions

PHASE 3: Formal Cabinet and Agency Approval.

Consultation and participation from a wide cross-section of reef users, scientists, the private sector and concerned management agencies is an integral part of each phase. This is crucial for ensuring that the best available information on reef condition and use is considered and that the strategy balances local and national priorities for coral reef management.

To be effective, the National Strategy must complement and reinforce other environmental programs in effect in Thailand's coastal areas. Foremost among them are the provincial natural resource and environmental management plans in the 12 provinces with significant coral reefs, the ONEB's Environmental Impact Assessment procedures and water quality standards, and marine national park management plans.

Phase 1 of this process was initiated in early 1990. Three sets of activities have been crucial to this first phase:

- Analysis and validation of baseline data (ASEAN-Australia Cooperative Program on Marine Sciences, 1989) and socio-economic data collected as part of the Thailand CRMP;
- A Review of lessons learned from demonstration projects; and
- Interagency and public consultation on the priority issues that should be addressed by a National Strategy.

A document entitled A National Coral Reef Management Strategy for Thailand: Statement of Need (ONEB, 1991) has been released as the outcome of Phase 1. It reflects the common understanding of priority issues and opportunities for coral reef management in Thailand shared by reef users, scientists and resource managers as well as defines the National Strategy's objectives (ONEB, 1991).

ELEMENTS OF AN EFFECTIVE STRATEGY

Thailand's recent experiments have shown that an effective national approach to coral reef management is one that will:

- Balance the needs and expectations of local communities with national development priorities for sectors such as tourism;
- Tailor management objectives and the planning process to actual reef values, conditions and uses;
- Set geographic priorities for management measures;
- Combine regulatory and non-regulatory measures and forge effective partnerships among national and provincial governments and the private sector;
- Have built-in short-term and long-term incentives for implementation and encourage local participation in management; and
- Provide for a monitoring system and dissemination of monitoring results.

Experience also shows that some actions are more effective if implemented at the local level while others can only be implemented at the national level. For example, national guidance is needed to set overall habitat management priorities, particularly where they relate to national economic development policies and for allocating national resources (e.g., government funds, scientific expertise, enforcement personnel). Strengthening legal authority to manage coral reefs and the development of agreements for sharing management responsibility among national, provincial and local authorities is also best undertaken at the national level.

Measures best implemented at the local level include sorting immediate and long-term habitat problems and identifying practical solutions that can rely on human and logistical resources available locally. On-site measures are also most effective if monitored at the local level.

Objectives of the National Strategy

The purpose of a national coral reef management program is to manage reefs so that they can be used on a sustainable basis to support multiple uses, including, for example, fisheries, tourism, conservation and research. The aim is to strive for optimal use of one of Thailand's important marine habitats.

To achieve this purpose, the National Strategy must guide future management actions to meet the following objectives:

- Manage coral reefs according to their different ecological and economic values in order to maintain a balance of uses.
- Control and 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 by both 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.

Today, a more active and harmonious approach to managing Thailand's coral reefs has become imperative. The National Strategy, which is scheduled for release in mid-1991, will enable all concerned agencies to agree on priorities for action. It creates mechanisms for inter-agency cooperation and encourages all levels of government to solve problems in partnership with local communities and the private sector. And above all, the National Strategy heralds a strong national commitment for coral reef protection.

REFERENCES

- ASEAN-Australia Cooperative Programme on Marine Sciences. 1989. Coastal Living Resources (Final Report). Office of the National Environment Board.
- Kasetsart University and National Parks Division of Thailand. 1990. Hat Noppharathara - Mu Ko Phi Phi National Park Management Plan: 1990-1994. Thailand Coastal Resources Management Project. Royal Forestry Department and Office of the National Environment Board.
- Lemay, M.H. and H. Chansang. 1989. Coral Reef Protection Strategy for Phuket and Surrounding Islands. Thailand Coastal Resources Management Project. Office of the National Environment Board, University of Rhode Island and U.S. Agency for International Development.
- Office of the National Environment Board. 1990. Results of a Provincial Survey of Coral Reef Condition, Uses, and Management (Final provincial analysis tables). Thailand Coastal Resources Management Project. Office of the National Environment Board, The University of Rhode Island and the U.S. Agency for International Development.

- Office of the National Environment Board. 1991. A National Coral Reef Management Strategy for Thailand: Statement of Need. Thailand Coastal Resources Management Project. Office of the National Environment Board, The University of Rhode Island and U.S. Agency for International Development.
- Sudara, S., S. Bunpapong, R. Dobias, I. Baker and A. White. Management Plan for Coral Reefs, Beaches and Island Environments in Ban Don Bay, Surathani. ASEAN/U.S. Coastal Resources Management Project in Thailand. Office of the National Environment Board.
- Tasneeyanond, Panat and Somnuk Rubthong. 1990. The Legal Framework to Achieve Adequate Environmental Protection on Phuket Island. Thailand Coastal Resources Management Project. Office of the National Environment Board, The University of Rhode Island and U.S. Agency for International Development.
- Tokrisna, Ruangai and Sukhum Rowchai, 1990. Management Plan for Fishery Resources, Phangna Bay, Thailand. ASEAN/US CRMP.