

# Protected Areas on the Gulf of Aqaba, Egypt: A Mechanism of Integrated Coastal Management

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## Abstract

Recognition of the close link between coral reefs and associated ecosystems and ambitious tourism development objectives for southern Sinai, prompted the Government of the Arab Republic of Egypt to establish a network of marine and terrestrial protected areas to conserve critical natural resources and thereby support national economic development policies. The declaration of networked protectorates on the Gulf of Aqaba has in effect established a large marine protected area over 250 km of the coastline. Government conservation objectives supported by the Commission of the European Union are being realised, the Gulf of Aqaba is now fully protected, zero discharge policy is strictly enforced, coastal alterations are prohibited, artisanal fisheries are regulated, and consensus on management issues with resident communities and stakeholders has been achieved. The Gulf of Aqaba Protectorates Development Programme owes its success to proper integrated coastal zone management, strong legislation, unwavering Government support and the establishment of functional partnerships with the local community. This experience on the Gulf of Aqaba is going to be repeated by the Government of Egypt with strong support from the Red Sea Governor and investors by the declaration of the 'Great Red Sea Marine Park'.

## Background

### GEOGRAPHIC CHARACTERISTICS

The Gulf of Aqaba is a small, semi-enclosed branch of the Red Sea, 180 km long and 5 to 26 km wide, forming part of the Afro-Syrian Rift system. The Egyptian littoral occupies most of the western Sinai coast stretching along the Gulf for about 250 km northward from Ras Mohamed to Taba.

The coastal plain is narrow with granitic mountains descending almost directly into the sea. This topographic feature is broken by several large alluvial fans now targeted for either urban or tourism development. All shorelines, with the exception of areas subjected to periodic flash floods, are fronted by well developed and easily accessible fringing reefs. Monospecific stands of mangrove (*Avicennia marina*) are found on shorelines at Nabq and Ras Mohamed Protectorates.

The Gulf has steep walls dropping to a great depth (almost 2000 m in places) and is separated from the Red Sea proper by the 6 km-wide Straits of Tiran. There are two major marine basins in the Gulf, the northern one extending to a position opposite Nuweiba with a depth of 1000 m, and a southern basin extending to the Straits of Tiran with a depth of 1800 m. The Gulf region is arid with an average temperature from 14°C in January at Taba up to 45°C in August at Sharm El Sheikh. Water temperature in the Gulf remains constant: 21.5°C below a depth of 200 metres and varying from 20°C in January to 27°C in August at the surface. Tides are semi-diurnal with a range from 30 to 100 cm. Salinity is almost 40 parts per thousand. This high salinity is due to the high rate of evaporation and the slow rate of water exchange between the Gulf and the main body of the Red Sea.

ITMEMS 1998  
Proceedings

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## MARINE AND TERRESTRIAL ECOLOGY

Though a relatively small body of water, the Gulf of Aqaba hosts an extraordinary diversity of corals and related marine life. Over 50% of the Gulf's shoreline is fringed with coral reefs. Approximately 210 scleractinian hard coral species and 120 species of soft coral have been recorded in the Gulf. In areas where coastal mountains rise steeply from the shoreline, corals reside primarily on narrow fringing reefs (less than 30 m wide) with steep, sloped fore reef of excellent coral cover to depths exceeding 100 m. Recent baseline studies identified 268 species of tropical and semi-tropical fish from samples taken in the Protectorates. Other studies have estimated that the Gulf harbours between 700 and 1000 species of reef associated and pelagic fish.

## HUMAN ACTIVITIES AND THREATS

Tourism development on the Gulf of Aqaba has resulted in an increased resident population in urban areas. Support infrastructure required to cope with the increasing transient and permanent population is insufficient. Existing solid waste disposal facilities, sewage treatment plants, and water desalination systems are currently being upgraded and their number increased. Clearly this increase in population and tourism demand can and does affect the health and integrity of coastal resources. The Egyptian Environmental Affairs Agency (EEAA) is effectively mitigating the consequences of tourism development and population increase through a strong and well-conceived management policy, enforcement of environmental laws and public awareness targeting stakeholders and the population.

The Gulf of Aqaba is an important and difficult shipping route for vessels servicing both Jordan and Israel. It is estimated that approximately 6000 vessels of different kinds transit the Gulf each year. The International Maritime Organization (IMO) has plotted the boundaries of the marine protected areas on the navigation maps as areas to be avoided. In spite of these efforts, some accidents have happened resulting in damage to coral reefs. A damage evaluation system has been developed on an economic basis. The EEAA applies the principle 'polluter/owner pays' to all accidents.

There is no oil exploration or extraction in the Gulf of Aqaba. Industrial development on the Egyptian littoral is absent. Commercial fishing has been traditionally limited to artisanal, subsistence methods practised by Bedouins who concentrate their activity only on the back reefs. As a result, coral reefs have suffered some damage due to these practices. However, after education, fishermen have now accepted and participated in a fisheries management program to include respect of fishing seasons, monitoring and collection of catch data.

## Integrated Management

### EXPANSION OF PROTECTED AREAS IN THE GULF

The Gulf of Aqaba Protectorates consists of a network of three distinct units linked by protected coastlines, thereby creating a continuous length of protected shorelines on the Gulf of Aqaba stretching from Taba to Ras Mohamed at the southern extremity of the Sinai Peninsula. The declaration in 1983 of the Ras Mohamed Marine Protected Area marked the beginning of a process that was to eventually establish management over all coastal marine environments on the Gulf of Aqaba.

The Ras Mohamed Marine Protected Area existed as a 'paper park' until 1988 when the Government of the Arab Republic of Egypt instructed EEAA with the task of developing and managing this internationally significant coral reef resource in line with the tourism development strategy. With technical assistance from the Commission of the European Union, a program was started in 1989. Immediate actions included expansion of existing boundaries from 97 km<sup>2</sup> to 210 km<sup>2</sup> and designation as a National Park. Indicative management objectives, together with the prestige value of developing Egypt's first national park, were key elements in the decision to adopt a policy designed to mitigate immediate pressure on the site due to excessive tourism development in adjacent areas and unregulated semi-commercial fisheries within its declared boundaries. The Ras Mohamed National Park Development Project successfully implemented management measures that established Egypt's first national park, regulated artisanal fisheries, and initiated a process whereby stakeholders were provided partnership opportunities.

Support for management policies implemented in Ras Mohamed led to the declaration of two additional Protectorates on the Gulf of Aqaba in 1992. These areas are known respectively as the Nabq and Abu Galum Managed Resource Protected Areas. In 1994, those protected areas were linked together with the Ras Mohamed National Park through protecting all coastlines. Thus the Ras Mohamed National Park Sector was established. It consists of 1470 km<sup>2</sup> of marine and terrestrial habitats and 52% of Egypt's littoral on the Gulf of Aqaba. The Commission of the European Union continued its support to the EEAA and over the next three years, jointly implemented a programme that expanded management activities in Ras Mohamed and a multidisciplinary management programme targeting specific issues in Nabq and Abu Galum. Management of the Ras Mohamed National Park Sector successfully regulated tourism development activities and ensured that both coastlines and coastal marine resources remained integral.

Successful results of EEAA actions on the Gulf of Aqaba, coupled with strong support from many investors and stakeholders, led the Government to declare in 1996 the remainder of Egypt's littoral on the Gulf of Aqaba as extension to the Abu Galum Managed Resource Protected Area. Landwards expansion was realised through the St. Katherine Protectorate. Finally, the Taba Natural Monument was declared in March 1998. The EEAA has now established the South Sinai Protectorates Management Sector consisting of over 12 000 km<sup>2</sup> of linked marine and terrestrial protectorates.

#### MANAGEMENT OBJECTIVES

Management objectives favouring the development of the Gulf of Aqaba Protectorates are directed to respond to and mitigate the consequences of rapid development of a tourism-based economy in southern Sinai.

Proximity of the south Sinai Peninsula to the European tourism markets, coupled with the wealth of marine and terrestrial natural resources, outstanding landscapes, a rich cultural heritage and coral reefs of international significance, have acted as a catalyst and promoted investment in the Region. Since 1988 tourism capacity on the Gulf of Aqaba has expanded from 1030 beds to over 16 000 beds. Development ceilings have been set at 160 000 beds and these numbers are expected to be reached by 2017. The task of the EEAA in that respect is to conserve natural resources, regulate massive development projects and establish partnerships with stakeholders and investors and educate them about the close links between resource conservation and the long-term value of their investment.

The Gulf of Aqaba Protectorates management objectives were identified as follows:

- To provide for the full protection, conservation and management of natural resources, biodiversity, landscapes, seascapes, cultural heritage, historical sites, ecosystems, habitats and natural processes essential to their preservation as hereditary resources for future generations;
- To maintain the integrity of natural systems to protect and conserve their biodiversity;
- To provide for the protection of natural coastlines recognising that these are critical to the stability and health of coastal marine ecosystems;
- To manage desert ecosystems, landscapes and their biodiversity as areas of natural and economic significance;
- To provide for the full integration and protection of indigenous people resident in, or adjacent to, declared protectorates;
- To provide the means to ensure that resource harvesting is sustainable and in harmony with the objectives of the protectorates;
- To ensure that economic development activities are executed in accordance with the general objectives of the protectorates, and to encourage the establishment of compatible economic development activities;
- To provide opportunities for a full range of recreational activities ensuring that these are both socially acceptable and ecologically sustainable;
- To ensure that all actions likely to impact on the protectorates are subjected to proper evaluation according to the relevant legal instruments; and
- To prevent all actions that are likely to result in resource degradation, loss of scenic beauty, loss of amenity value, loss of biodiversity, reduced public access, or any other consequence likely to affect the value of the protectorates and their contained hereditary resources.

To a great extent the Gulf of Aqaba Protectorates have achieved most of the abovementioned objectives. The driving forces behind this achievement have been a combination of strong legislation, unwavering support from the EEAA, and the establishment of functional partnerships with private sector interests in areas adjacent to declared protectorates.

#### LEGISLATION

*Law 102 of 1983 for Protected Areas* provides the EEAA with a strong legislative tool to manage Egypt's protectorates. The law and its accompanying decrees stipulate that EEAA is the competent administrative authority to regulate and coordinate the actions of all other government authorities and ministries when these are likely to endanger or compromise the value, integrity or natural resources of any declared protectorate. The law specifically prohibits any action that may lead to the extermination, damage or alteration of any organism, system or formation considered as a habitat for the living terrestrial and marine resources of the protectorate. It also prohibits the introduction of exotic species and the removal of any organisms or materials found in the protected area.

The law also forbids any activities, actions or experiments in areas adjacent to a protected area that would affect the environment of the protected area or the processes within it without the express permission of the concerned administrative body.

*Law 4 of 1994 for the Environment* includes three main chapters concerning air, land and the water environment and two special sections concerning EEAA responsibilities and penalties.

The main articles concerning development and environment are those stipulating that an Environmental Impact Assessment (EIA) is obligatory to obtain a license for projects and establishments. The EIA should follow the guidelines determined by EEAA in agreement with the administrative authority.

On the Gulf of Aqaba *Law 102*, which is a powerful executive law, is applied. The wide range of articles of *Law 4*, which is a coordinating law, are exploited. By enforcing the two laws, all the main coastal activities can be regulated and proper integrated coastal management objectives are implemented.

#### OPERATIONS

The Protectorates staff implement all management, educational and enforcement measures required by the law to ensure that the conservation objectives specific to each protectorate are achieved. To that end staff are responsible for the following activities:

- identification of immediate and long-term management needs for each protectorate;
- preparation of access tracks and visitor management infrastructure;
- preparation of reef access points to limit damage to coral reef areas;
- public awareness and preparation of educational information materials;
- development and maintenance of natural trails;
- resource monitoring;
- marine and terrestrial patrols;
- installation and maintenance of vessel mooring points at all diving sites;
- evaluation of Environmental Impact Assessments for all developments inside and adjacent to the protectorates;
- continuous inspection of development sites to ensure compliance with existing regulations, and as a mechanism to develop partnerships with investors and management groups;
- enforcement of environmental legislation and protectorates regulations;
- continuous assessment and management of commercial and artisanal fisheries;
- provision of services to resident Bedouin communities;
- provision of free consultancy services to developers and investors to avoid destructive practices and maintain resource integrity, recognising that these are common property protected resources administered by the EEAA; and
- care and maintenance of equipment essential to protectorates operations.

## IMPLEMENTATION OF SUSTAINABLE TOURISM DEVELOPMENT

- Development is controlled and regulated by EEAA staff who concentrate on the following items.
- All development and infrastructure projects are screened. Any proposal considered inappropriate is rejected. This includes any proposal containing elements that would alter coastlines, damage coral reefs or other marine resources, privatise the coast or coral reef areas, discharge effluents without prior treatment or which might affect neighbouring properties.
- Environmental Impact Assessments are requested from all developers. Once approved by EEAA, the Protectorates staff ensure that there is no deviation from the agreed development plan and inspect all properties on a regular basis to verify that regulations are strictly respected.
- Regular communication with all investors is maintained and functional partnerships are established with them. This process leads to the understanding that they too have a stake in the eventual success of conservation programmes and that these represent their best guarantee for continued sustainable returns on their investment.
- Hotel developments are regularly inspected and any actions that could lead to deterioration of coastal habitats are prevented beforehand. A prototype of dry or perched beaches, that causes minimal impact, has been introduced to some developments, and is being sufficiently utilised thus creating more beach areas without any modifications to existing shorelines.
- The local Bedouin communities are integrated through regular meetings called to present management programs to different Bedouin groups. The EEAA Nature Conservation Sector also employs a number of Bedouins and some of them have been upgraded to Ranger and Protectorate Superintendent level.
- Due to the fact that the narrow fringing reefs of the southern Gulf of Aqaba and Ras Mohamed attracted approximately 500 000 users in 1997, and as a result of statistics showing that snorkellers currently represent 60 per cent of all tourists, a number of access points and walkways over the back reef were constructed to reduce the cumulative damage to high-frequency visitor areas due to trampling of the reef.
- At present, a strictly implemented dive site management plan regulates the number of boats and divers/snorkellers that can access main dive areas and distribute pressure over a wider range of traditionally-used, and newly-opened, dive sites. Scientific reserve areas are kept closed to all activities for future reference and scientific research. Intensively used areas which are affected will be closed for rehabilitation if this solution is considered necessary. The use of anchors has been prohibited in the area to minimise physical damage to coral reefs, and mooring buoys have been installed. Fish feeding, which affects fish behavior and upsets the ecological balance on the reef, has been prohibited. The collection of coral, shells or any natural marine element is strictly prohibited.
- An effective public education program targeting visitors, local authorities and Bedouins has been implemented. Increased awareness levels within those target groups supports the Protectorate management policies on the Gulf of Aqaba. This programme is accomplished through regular meetings with user groups, producing interpretative materials, hosting university and school groups as well as organising educational seminars for tour operators, dive guides and hotel staff, especially the beach boys.

## Capacity Building

### MANPOWER

Donor-assisted projects in Egypt normally operate on the principle of secondment whereby staff assigned to each project by the State are seconded from an existing civil service post for the duration of the activity. This procedure, with its inherent problems, often leads to failure once the donor terminates assistance. The EEAA, with the support of the Commission of the European Union, initiated procedures that permitted the recruitment and training of staff specific to the immediate needs of both the Protectorates Development Programmes and its Nature Conservation Sector. Since its inception in 1989, the Protectorates Programme has recruited and trained professional and technical staff to ensure that the programmes are fully sustainable and that the administrative and operational structures remain after donor-assisted programmes have been concluded.

The Nature Conservation Sector of the EEAA has adopted a recruitment policy favouring an internal advancement procedure whereby staff are well selected, trained and targeted to assume specific management responsibilities. Three categories of staff are recruited: rangers trained to assume area management and later senior management positions; scientific rangers trained to assume direction of monitoring and research specific to the needs of management, and technicians trained to provide support and assume responsibilities such as Area Superintendent. This internal promotion system is currently operational and staff recruited during the early years of program implementation are now assuming senior management positions. It should be noted that rangers in the Arab Republic of Egypt must be university graduates in any discipline and must have a second language.

Some of the Gulf of Aqaba Protectorates staff are now prepared for top management positions through postgraduate training in European universities and training programmes at the Great Barrier Reef Marine Park Authority in Townsville, Australia.

### RESTRUCTURING OF THE NATURE CONSERVATION SECTOR (NCS)

After ten years of experience with the management of the Gulf of Aqaba Protectorates, a new structure has been developed for the Nature Conservation Sector of EEAA which suits the actual needs of management of protected areas and the preservation of biodiversity in Egypt. The EEAA is compiling this structure within its new organisation which is under development and will set priorities for its implementation.

The main concept of the structure is to provide the NCS with means of semi-autonomy to perform a wide span of activities (over 15% of the country as protected areas), the capability to manoeuvre with mobile units and to maintain self-motivation at different levels of management.

### ENVIRONMENTAL FUND

*Law 102 of 1983 for Protected Areas* stipulates the establishment of a Protectorates Fund which is the main component of the Environmental Fund of EEAA. This fund receives the entrance fees of protectorates, fines for violations and accidents, as well as donations. This fund is available to support and develop the management of the protected areas network in Egypt, in addition to the support of other environmental programs.

The income generated by fees of the Gulf of Aqaba Protectorates exceeds the operation and recurrent costs, making them the first fully self-financing protectorates in Egypt.

### EQUIPMENT AND INFRASTRUCTURE

Qualified staff provided with essential equipment is the cornerstone of Protectorates management. The European Union donation provides the Gulf of Aqaba Protectorates with proper equipment needed for activities such as patrolling on land and sea (vehicles, motorbikes and fast boats), monitoring (laboratory facilities, field units, GIS, etc.), environmental education and public awareness (visitor centre facilities, materials), maintenance of tracks (loaders, graders) and a communications network.

*Case Studies:  
Coastal  
Development*

The Government of Egypt is responsible for the infrastructure of roads, electricity, water supply, sewage system, construction of jetties in Protectorates and buildings for laboratories, visitor centres, workshops, diving centres and proper accommodation for rangers to avoid them leaving for more attractive jobs.

Maintenance of equipment, facilities and establishments is an essential element in keeping them in good condition and for their sustainable use.

#### COMMUNITY SHARING

Continuous and proper links between the Protectorates and all stakeholders — governmental, private, Bedouins and NGOs — is an efficient means to achieve functional and equitable large-scale coastal zone management objectives.

Education and public awareness of local communities is a multidirectional process in the form of seminars, meetings, workshops, education in visitor centres, shared diving trips by rangers, informal visits for tourist groups, communications with dive centres, and the distribution of materials, films and regulations in several languages. The Protectorates management encourages voluntary work for the conservation of the natural heritage that includes clean-up campaigns, monitoring, scientific inspections, installation of moorings, production of educational films, photos, publicity, etc.

### Research and Monitoring

#### MONITORING PROGRAM

The Gulf of Aqaba Protectorates have established resource baselines for all major coastal and marine features focusing on coral reefs, associated ecosystems, reef fish communities, mangroves and adjacent coastal ecosystems.

Since 1995, a monitoring program has been started with support from international scientists. The initial outcome of this program has been the collection of data on ship groundings to determine reef recovery rates from 25 permanent and 12 further stations. The program will now concentrate on mapping all reef resources on the Gulf of Aqaba and will gradually expand to include 80 stations between Taba and Ras Mohamed.

In addition to coral monitoring, species associated with coral reefs are also monitored. The program focuses on macro-invertebrate species, molluscs (such as *Tridacna*), reef fish populations and crown-of-thorns starfish (*Acanthaster planci*). Mangroves located in the Nabq and Ras Mohamed Protectorates, considered to be the most northerly in the Red Sea–Indian Ocean complex, are permanently monitored as part of management efforts to protect this important monospecific stand.

Two main outbreaks of crown-of-thorns starfish have been detected and controlled. The first outbreak in 1994 was evaluated in cooperation with the Great Barrier Reef Marine Park Authority and approximately 800 starfish were removed. In 1998, a major outbreak was concentrated in reef islands of the Straits of Tiran. Previous experience was used and up to 60 000 animals were collected. The results still need to be assessed. The collection campaign was carried out by volunteers from all the dive centres under Protectorates staff supervision, and specific formats for collecting information were applied.

A regular survey process is being carried out for all development projects on the coastline. All information is mapped using GIS by experts from the south Sinai Protectorates Sector. GIS is considered an efficient tool to assess land-use plans and the environmental status of the Gulf of Aqaba. In addition, GIS is used to map habitats and physiographic information collected during monitoring and surveys. More data are now collected from partner institutions such as the Geological Survey, Remote Sensing, the Biodiversity Unit and literature. A lot of work is promising in that regard.

The South Sinai Protectorates Sector is making use of the data collected through the National Monitoring Network of the Environment which is now being developed in Egypt.

## RESEARCH AND COOPERATION WITH THE COMMUNITY AND SCIENTIFIC INSTITUTES

The main scientific activities of Protectorates staff are concentrated on monitoring. However, much research work has been done in collaboration with the Egyptian universities and some international institutes. Research work that is of benefit to the management programs of the Gulf of Aqaba Protectorates is encouraged. Protectorates staff cooperate in research at different levels.

A central laboratory that serves for monitoring and research work done in the South Sinai Protectorates Sector has been established in Ras Mohamed National Park. The central laboratory consists of four main laboratories: for marine, geological, biological and physical analysis. In addition a field monitoring unit can be dispatched for specific scientific work and inspection.

## Review (Performance Evaluation)

### VERIFICATION OF ACHIEVEMENTS

This originates from the expansion of protected areas and declaration of new ones on the Gulf of Aqaba and in the south Sinai Governorate. Ras Mohamed was the first area to be protected in Egypt in 1983. Its area was of 97 km<sup>2</sup> which was expanded in 1989 to 210 km<sup>2</sup>. The two protected areas of Nabq and Abu Galum were declared in 1992, and were interconnected in 1994. The protection was extended to the whole Gulf in 1996. Two other terrestrial protected areas were declared in South Sinai, at St. Katherine and Taba. The area of the five protected areas is now 12 000 km<sup>2</sup> which represents 42% of the Governorate.

The Government of Egypt declared these protectorates as a result of the successful return of resource conservation on tourism activities, employment and the economy of the area. This can also be evaluated by the tourism development expansion from 1030 beds in 1989 up to 16 000 beds in 1998, which has increased the value of assets. The number of visitors to Sharm El Sheikh increased from a few thousand in 1989 to half a million in 1998. The number of visitors to Ras Mohamed grew from hundreds in 1989 to 150 000 in 1998.

As the Government of Egypt recognised the close link between sustainable development and the environment, it gave directives in 1997 that existing and future protectorates should be plotted on the National Investment Map in order to be considered by all development projects.

The management system of the Gulf of Aqaba is considered suitable for integrated coastal management on the Red Sea. The Egyptian Environmental Affairs Agency, the Tourism Development Authority, the Red Sea Governorate and investors have requested the declaration of the Red Sea Marine Park.

### ENFORCEMENT OF LEGISLATION

Developers on the Gulf of Aqaba now recognize the existence of the protectorates and guarantee not to alter or damage coastlines or to discharge any effluent. Owners, managers and dive centres make their guests respect conservation regulations enforced by EEAA rangers. The number of violations of hotels are now very limited due to awareness of the community and effective patrolling.

All developments now apply Environmental Impact Assessment (EIA) by law, which after agreement is considered as a commitment by developers from which they should not deviate. The number of acceptable EIAs received is increasing as a result of the understanding by investors that conservation programs are the best guarantee for continued sustainable returns on their investment.

Enforcement is essential to the success of natural resources protection. All ship and boat accidents are prosecuted, and fines are evaluated by the Protectorates staff based on the economic value of the damaged resources. Those accidents are decreasing due to the declaration of the boundaries on maritime maps, facilities for navigation in the Straits of Tiran and applying environmental laws on pollution or any damage to coral reefs. Any other incidents such as the collection of marine resources, fishing in marine reserves, or infringement to regulations are also prosecuted. The number of such cases is decreasing.

## HEALTH OF CORAL REEFS AND ASSOCIATED ECOSYSTEMS

In order to assess the success of the management and regulatory measures applied through the Protected Areas Program, and to determine the impact of tourism and related development activities on coastal ecosystems, monitoring activities are designed to respond both to long- and short-term objectives.

The long-term monitoring includes fixed transects, permanent photo-monitoring stations, physical parameters, dynamics and interactions of coral reefs, and mangrove and seagrass systems. The short-term monitoring deals with the study and control of abnormal phenomena (crown-of-thorns starfish, diseases, etc.), beach dynamics, flash floods, assessment of artisanal fisheries and their effect on reef areas.

The collected information of the monitoring programs is encouraging and the level of reef degradation is decreasing. The system is now under development for contribution from staff and scientists.

## MANAGEMENT PERFORMANCE

The increased number of well-trained staff to accomplish the sound planning objectives of programs, of proper inventory of data base information and analysis, the rational use and maintenance of equipment, the self-discipline of the personnel, and the timing of decisions are the main factors of proper management.

An annual work plan of all activities is prepared by the Nature Conservation Sector and approved by the EEAA chairman, and then followed up monthly. Annual financial auditing is applied to the Sector and Protectorates by a neutral body.

Biannual special missions from the European Union are assigned to evaluate achievements on the Gulf of Aqaba. Fortunately almost all reports are positive and appreciative of management performance and progress.

One of the main activities of the Protectorates programs is to provide support to the Bedouins. This includes regular health care visits, training some Bedouins (both women and men) on first aid and providing them with necessary kits and medicines, veterinary follow-up of their domestic animals, and educational programmes for their children. All this support is performed effectively in close cooperation with the representative authorities of the Governorate. The Bedouin community is one of the main sources of information on and conservation of local biodiversity.

The Protectorates sector also offers a free consultancy service to both investors and local government authorities by studying the ecological implications of tourist development and urban planning on coastal resources. The results are used by management to either accept the project proposals or suggest modifications that will mitigate or eliminate expected impacts. This procedure creates confidence and establishes functional partnerships between the Protectorates and the investment community.

## Lessons Learned

Effective legislation and strong governmental support targeting the development and establishment of Protected Areas on the Gulf of Aqaba have been the driving force behind the successful implementation of these programs in the Arab Republic of Egypt. Key elements to their success can be defined as follows.

1. The expansion of the Protectorates network in southern Sinai could not have been achieved had the State not had the foresight and vision to craft an effective legal instrument, notable for its simplicity and strength.
2. The Protectorates Law (102 of 1983) and its accompanying Decrees provide the EEAA with executive authority over all Protectorates and their adjacent areas. Prime Ministerial Decrees provide EEAA staff assigned duties in the Protectorates with enforcement authority, and provide the Nature Conservation Sector of EEAA with full administrative authority over the Protectorates in its care.

3. Staff recruited to the Protectorates by the EEAA were selected and trained to fill specific posts with the Nature Conservation Sector of that Agency. Seconded staff from government authorities were not considered. This decision ensures that the Protectorates programs will continue after all donor assistance to the EEAA has been withdrawn.
4. Training programs were selected to provide hands-on experience from qualified experts contracted for that purpose by donor-assisted projects. Additional training was provided externally through the Great Barrier Reef Marine Park Authority, and through universities providing postgraduate training for selected staff. External placement training programmes were useful in expanding the management experience of staff, broadening their understanding of different management techniques, and permitting them to select appropriate management solutions to specific problems in Egypt.
5. Successful implementation of Protectorates programs in areas targeted for intensive tourism development can only succeed if stakeholders are fully integrated into the Protectorates management process. In southern Sinai, the EEAA has succeeded in developing functional partnerships with investors and local Bedouin communities through the provision of services and through continuous dialogue with all stakeholders. These processes have broken down the traditional barriers to the establishment of Protectorates in countries that do not have a history of environmental management or protectorates development.
6. Biodiversity conservation programmes that involve the declaration of new protected areas must have political support at the highest level from the outset if they are to achieve any measure of success.
7. The Protectorates programmes have become fully sustainable through the collection of entrance fees. The Gulf of Aqaba Protectorates could now function without subsidy from central government funding.
8. A flexible approach to management has been maintained permitting the Protectorates to respond to opportunities and problems as they arise. Such flexibility is particularly important to Protectorates development activities which must involve multiple partners, each with differing objectives.
9. The establishment of a climate of openness and transparency has been a key feature in the success of the Egyptian Protectorates Development Programme.
10. The integrity of critical coral reefs and associated marine ecosystems in the Gulf of Aqaba has been maintained despite rapid coastal development of adjacent areas. The EEAA Nature Conservation Sector has managed to enforce a zero discharge policy, regulate development of setback areas and maintain public access. In so doing, the EEAA has maintained or increased the value of this holiday destination and supported the resource-based tourism development of southern Sinai.

## Conclusion

The Gulf of Aqaba Protectorates, representing a network of interconnected multicategory protected areas, have demonstrated that large-scale coastal areas can be administered effectively using protected area legislation. Common property resources administered by the State on behalf of the stakeholders and with the implicit cooperation of the community will, in all cases, yield positive results in a climate of open dialogue and transparency.

The Gulf of Aqaba Protectorates have become a benchmark for Protectorates development in the region and are now the focus of attention for other concerned riparian states.

The Gulf of Aqaba experience can be replicated in any situation where the State has promulgated effective legislation and strongly supports its objectives.