National Report of Israel for COP 7

National Report prepared for the 7th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar, Iran, 1971)

San Jose, Costa Rica, 10-18 May 1999

Implementation of the Ramsar Convention in general, and of the Ramsar Strategic Plan 1997-2002 in particular, during the period since the National Report prepared in 1995 for Ramsar COP6 and 30 June 1998

Contracting Party: ISRAEL

Designated Ramsar Administrative Authority

Full name of the institution: **Ministry of the Environment**

Name and title of the head of the institution: **Adv. Ron Komar, Director General**

Mailing address for the head of the institution: **P.O.B. 34033, Jerusalem 95464, Israel**

Telephone: **972-2-6553720** Fax: **972-2-6535939** Email: **mankal@environment.gov.il**

Name and title (if different) of the designated contact officer for Ramsar Convention matters:

Dr. Eliezer Frankenberg, International and Academic Relations, Nature and National Parks Protection Authority

Mailing address (if different) for the designated contact officer: **78 Yirmeyahu Street, Jerusalem 94467, Israel**

Telephone: **972-2-5005444** Fax: **972-2-5383405** Email: **eliezerf@vms.huji.ac.il**

Scientific Focal Point: Dr. Reuven Ortal, Director, Aquatic Ecology Department, Nature and National Parks Protection Authority

Telephone: **972-2-5005444** Fax: **972-2-5383405** Email: **ortala@vms.huji.ac.il**

Ramsar Strategic Plan - General Objective 1
To progress towards universal membership of the Convention.

1.1 Describe any actions your government has taken (such as hosting regional or subregional meetings/consultations, working cooperatively with neighboring countries on transfrontier wetland sites) to encourage others to join the Convention.

Although Israel has not taken direct action to encourage others to join the Ramsar Convention, it has participated in several regional activities which are consistent with the principles laid out in the Ramsar Strategic Plan, especially within the framework of the Middle East peace process.

Israel has taken an active part in the Mediterranean Wetland Initiative (MedWet) and participated in the MedWet meeting held in Venice in 1996. In recent years, Israel has also been involved in the Mediterranean Wetlands Committee (MedCom), and as a government member, has taken part in the first two regional meetings which took place in Thessaloniki in 1998 and Valencia in 1999.

Israel has also taken a lead in regional and international initiatives on migrating birds including waterfowl. In September 1997, it hosted an international seminar on the subject "Migrating Birds Know No Boundaries." During the course of the seminar, the following subjects were specifically discussed: bird migration research in the Middle East, educational initiatives and preservation of resting and feeding grounds, mainly wetlands, in Israel and the Middle East. Representatives of over 20 countries attended the seminar including the Interim Secretariat of the African-Eurasian Waterbird Agreement.

(For further information on regional cooperation see 7.1-7.5)

Ramsar Strategic Plan - General Objective 2
To achieve the wise use of wetlands by implementing and further developing the Ramsar Wise Use Guidelines.

2.1 Has a National Wetland Policy/Strategy/Action Plan been developed, or is one being developed or planned for the near future? If so:

One. What are/will be its main features?

Israel is inherently poor in water bodies (about 90% of the area of the country is dryland) and about 97% of its wetlands have been drained. Some 60% of the country is covered by the Negev desert, consisting of arid and semi-arid areas, while the rest of the country is dry Mediterranean. Therefore, a specific national policy or strategy on wetlands has not been developed in Israel, but rather has been integrated into the country's biodiversity strategy and into the overall sustainable development policy which is currently being formulated for the country.

Legal Framework for Nature Conservation

Israel's conservation policy is grounded in a variety of laws. Following is a brief glimpse at some of the specific laws governing nature protection, in general, and wetlands, in particular:

- ***National Parks, Nature Reserves, Memorial Sites and National Sites Law, 1998*** **(henceforth Nature Reserves Law)*:* This law, first enacted in 1963 and revised in 1992 and 1998, provides the legal structure for the protection of natural habitats, natural assets, wildlife and sites of scientific, historic, architectural and educational interest in Israel. It establishes systems for declaring nature reserves, marine protected areas and national parks and for listing protected natural assets which include many families and species of flora and fauna. This legal protection extends to many taxa, originating within or outside of Israel. The law establishes a new and united Nature and National Parks Protection Authority which replaces the previous Nature Reserves Authority and National Parks Authority as separate entities. A National Parks, Nature Reserves and National Sites Council, composed of all relevant stakeholders and appointed by the Minister of the Environment, advises the relevant ministers on implementation of the law.**
- ***Wildlife Protection Law, 1955:*** **This law, which was amended in 1990, authorizes the Minister of the Environment to restrict the hunting of wildlife, to issue hunting permits and to appoint inspectors to enforce the law. The law defines protected wildlife as any animal that has not been designated as "pest" or "game." In effect, it declares all vertebrates (with the exception of fish) as protected wildlife species with the exception of three avian and eight mammalian species (none marine), which are legally considered pests and may be exterminated. The law also lists game species (one mammalian and seven waterfowl species) which may be hunted under license. Recent regulations (1994) incorporate the provisions of the Washington Convention (CITES) into the Wildlife Protection Law.**
- ***Fisheries Ordinance, 1937*****: This ordinance is enforced by the Fisheries Board of the Ministry of Agriculture. The ordinance requires a license to fish with the exception of fishing from shore with hook and rod. It sets conditions and restrictions on a wide range of subjects including prohibitions on use of explosives or poisons to catch or kill fish, prohibitions on fishing methods which may damage or threaten the survival of fish species, prohibitions or limitations on fishing in certain areas or during certain seasons, size limits for species of fish, and size and caliber of mesh of fishing nets. Other regulations prohibit fishing of marine turtles and restrict fishing of sponges. Regulations were further amended in 1998.**
- ***The Antiquities Law, 1978:*** **This law is enforced by the Antiquities Authority of the Ministry of Education. The law protects all artifacts of human civilization prior to the year 1700. No collecting, selling or disturbing of such artifacts is permissible anywhere in Israel, including territorial waters.**
- ***Streams and Springs Authorities Law, 1965*****: This law authorizes the Minister of the Environment to establish authorities for the management of specific streams, springs or other water sources. Among a long and varied list of duties, a stream or spring authority is responsible for the protection of the stream and its banks, prevention of pollution, and reclamation, development and management of rivers and riverside parks. Two river authorities, for the Yarqon and Qishon Rivers, were set up under this law.**
- ***Prevention of Marine Pollution by Oil Ordinance, 1980, Prevention of Marine Pollution (Dumping of Waste) Law, 1983, and Prevention of Marine Pollution from Land Based Sources Law, 1988:*** **These three marine pollution prevention laws prohibit the pollution of the marine environment by oil, by dumping and by discharge of pollutants from land based sources. Within the framework of these laws, the marine environment is inclusive of its biological diversity.**

- ***Water Law, 1959*: This law establishes the framework for the control and protection of Israel's water resources. It states that all water sources are public property and that every person is entitled to use water, as long as such use does not cause the salination or depletion of the water resource. The law prohibits the pollution, or any act that is liable to cause pollution, of freshwater. *Inter alia*, the law defines "pollution" as harming the biological diversity of freshwater habitats. The Water Commissioner is responsible for prescribing norms for the quantity and quality of water and for promulgating regulations concerning "protective strips" around water sources. In recent years, the Minister of the Environment has promulgated several regulations under the law for the purpose of preventing pollution of water sources. These include prohibitions on pesticide discharge into water (1991), discharge of brines to water sources (1998) and sewage disposal from vessels (1998).**
- ***Plant Protection Law, 1956*: The law authorizes the Minister of Agriculture, following consultation with an advisory interdisciplinary committee, to regulate the movement of "pests" and to regulate the import, sale, distribution and packaging of pesticides, fertilizers and other materials.**
- ***Planning and Building Law, 1965*: This law sets the legal framework for all development and land use in Israel, and serves as the basis for environmental policy in Israel. All development is subject to the approval of statutory planning boards, on the national, regional and local levels.**
- ***Planning and Building Regulations (Environmental Impact Statements), 1982*: These regulations under the Planning and Building Law mandate the preparation of an environmental impact statement when the planning authority considers that significant impacts may occur as a result of a plan or project. The regulations can be utilized as an important tool in protecting and using wetlands. Any proposed project which is liable to affect Israel's wetlands may be subject to the preparation of an environmental impact statement according to specific guidelines issued by the Ministry of the Environment. Project approval is dependent on the conclusions of the environmental impact statement, which may recommend that the project should not be approved at all, or that the plan be subjected to certain conditions.**

Israel's nature protection laws establish three categories of protected biota species in aquatic environments in the country:

- **All taxa, as well as fossils and minerals, are protected within the limited boundaries of nature reserves;**
- **Special taxa are protected within declared protected marine belts under the protected natural assets regulations. This category has been used to enhance the legal protection for certain taxa when the procedure for the declaration of a new nature reserve is too protracted;**
- **Specific taxa are protected throughout the country, also outside of nature reserves.**

Outside the bounds of nature reserves, protected species of aquatic ecosystems in Israel include the following:

a. Vertebrata - Under the Wildlife Protection Law, all wetland and marine mammals, birds, reptiles and amphibians are fully protected, except for seven species of waterfowl which may only be hunted under license in designated areas during the hunting season (1 September to 31 January) : *Anas platyrhynchos* (mallard), *Anas crecca* (teal), *Anas querquedula* (garganey), *Anas clypeata* (northern shoveler), *Aythya ferina* (pochard), *Aythya fuligula* (tufted duck) and *Fulica atra* (European coot).

Under the National Parks, Nature Reserves, Memorial Sites and National Sites Law, also all reptiles including the following marine turtles are protected: *Caretta caretta, Chelonia mydas, Eretmochelys imbricata, Dermochelys coriacea.* The following inland water turtles

are also protected*: Trionix triunguis* and *Mauremys caspica rivulata.* Many marine fish taxa are also protected in the Mediterranean and Red Seas including sharks - Order Sellachii *(*only this order from the Class Chondrichthyes*)*, and the Teleost families Acanthuridae, Labridae, Bleniidae, Gobidae, Monocanthidae, Balistidae, Anthiidae, Pseduchromidae, Pomacemathidae, Holocentridae, Chaetodontidae, Pomacentridae, Scorpaenidae, Tetradontidae, and Diodontidae.

b. Invertebrata - Phylum Coelenterata (including all coral and sea anemones species), Phylum Echinodermata, Phylum Mollusca (all the species), and the genus *Tanulirus* (Crustacea: Decapoda) which are protected everywhere by Israeli law.

Israel has very few registered hunters relative to its population size. Of a total population of about 6 million, fewer than 4,500 people hold a valid hunting license (less than 0.1% of the population). Of these, relatively few view waterfowl hunting as their primary game. The most popular game species hunted is the chukar partridge (*Alectoris chukar*).

Waterfowl hunting is allowed in most of the northern part of the country, but not in areas where most migratory waterfowl congregate (e.g., Hula Valley, Bet She'an Valley, Western Galilee and Carmel coast fishpond areas).

Preliminary Wetland Conservation Policy

The preliminary strategy for wise use of wetlands, which has been developed within the framework of Israel's overall conservation strategy, is based on the following elements:

- **Prioritization of the declaration of nature reserves, national parks and biosphere reserves in wetlands and marine ecosystems.**
- **Rehabilitation and restoration of wetlands and conservation of the few remaining remnants of swamps, streams and springs throughout the country.**
- **Construction and maintenance of dozens of rain pools (vernal pools) in the Mediterranean region of the country.**
- **Characterization, classification and delineation of wetlands in Israel.**
- **Preparation of management plans for all wetland reserves; development of national management plans for vernal pools in the Mediterranean region, rock pools in the Negev area, desert oases, and springs; conservation of amphibians and aquatic insects; and determination of appropriate water allocations to water bodies.**
- **Completion of the national inventory of wetland invertebrates and flora.**
- **Enhancement of stopover sites for migratory waterfowl and other avifauna species using the Levantine flyway over the country.**
- **Adoption of special management programs for marine turtles, marine mammals, inland water mammals, waterfowl, inland water reptiles, amphibians, fish species and some aquatic invertebrates.**

One. Was it, or is it, intended that the Policy/Strategy/Action Plan be adopted by the whole of Government, the Minister responsible for Ramsar matters or through some other process. Please describe.

The Nature and National Park Protection Authority (NNPPA), under the responsibility of the Minister of the Environment, is the government agency in charge of nature and wetland conservation. The NNPPA oversees 444 nature reserves (proposed and declared) which span over 624,000 hectares. About one third of the reserves are primarily aquatic environments. The NNPPA is also responsible for 14 Mediterranean coastal parks

(landside only), amongst 129 national parks which encompass 37,611 hectares throughout Israel.

As stated, since most of Israel is dryland, it is unlikely that a specific wetlands policy or strategy will be approved by the government as a whole. It is envisioned that the Ministry of the Environment will adopt a wetlands policy within the framework of the ministry's overall nature conservation and biodiversity strategy. The policy will be implemented through the local and district planners of the ministry who are members of local and district planning committees.

c. How does it relate/will it relate to other national environmental/ conservation planning initiatives (e.g., National Environmental Action Plans, National Biodiversity Action Plans, National Conservation Strategies)?

Wetland conservation and development are integrated into the country's National Biodiversity Strategy. The general objectives of this strategy, as specified in Israel's report on implementation of the Convention on Biological Diversity (December 1997), include:

- **Increasing efforts to preserve biological diversity and sustainable development of biological resources;**
- **Initiating an ecological approach to management which is based on an understanding of ecosystem functioning, biological inventory, reliable data, integrated planning and monitoring systems;**
- **Increasing public participation in planning, developing and implementing biological diversity policies;**
- **Striving to achieve an optimal balance between regulatory action and education in order to promote responsible public behavior;**
- **Contributing to the international effort to preserve biological diversity.**

Israel hopes to meet its goals through the implementation of a number of targets:

- **Developing and implementing a comprehensive plan for preserving biodiversity and for sustainable use of its components;**
- **Establishing a network of protected areas for the preservation of ecosystems, species and genetic resources which are capable of functioning ecologically and which are related to other open spaces;**
- **Rehabilitating damaged ecosystems in order to promote biodiversity;**
- **Coordinating the implementation of the plan among all stakeholders including governmental and non-governmental bodies, the private sector, community groups and other target populations;**
- **Utilizing legislation, rules and procedures, budgetary allocations and other regulatory measures to establish methodologies for conservation of biological diversity and sustainable use of resources;**
- **Advancing public awareness concerning the advantages of biodiversity conservation and sustainable development;**
- **Promoting knowledge and expertise through formal and non-formal education, ongoing research, and increased institutional capabilities;**
- **Harmonizing national action with international and regional conventions, activities and plans;**
- **Implementing the precautionary principle approach through measures intended to forecast, prevent and combat the causes for reduction or loss of biodiversity at source;**
- **Integrating traditional knowledge on the conservation of biodiversity.**

The central components of the strategy include the following:

- **Declaration of at least 10% of each ecosystem as a nature reserve;**
- **Preservation of 20% of all open spaces as scrubland, half of which will be natural scrubland;**
- **Establishment of regulatory and other controls on the use of biological resources;**
- **Implementation of an environmental impact assessment system to control pollutants which threaten to damage ecosystems;**
- **Protection of the diversity of domesticated races;**
- **Monitoring and establishment of a database to assess the condition of species and ecosystems and to establish priorities for conservation;**
- **Incorporation of such considerations as natural resource conservation and ecological functioning of ecosystems in development decisions;**
- **Promotion of regional and international cooperation.**

An essential part of the national biodiversity strategy is the setting of priorities for action. In Israel, the following criteria have been set for selecting ecosystems for preservation:

- **wealth of biodiversity;**
- **high level of endemism;**
- **representative value;**
- **undisturbed status;**
- **presence of important species;**
- **critical ecological value (path of migration, nesting, food, hydrological significance to the ecosystem).**

The following criteria have been set for selecting species for preservation:

- **genetic importance;**
- **ecological importance;**
- **economic and social importance;**
- **level of risk and damage.**

Israel began preparing its national strategy for sustainable development in 1996 within the framework of a Coastal Area Management Programme (CAMP) signed between Israel and the Mediterranean Action Plan. As part of the project, seven target groups were organized, one of which is specifically concerned with biodiversity and open space development. The groups are composed of a wide range of stakeholders including national government, local government, the private sector, academics and NGOs. Over the past two years, each of the target groups has met in order to prepare a preliminary sustainable development strategy for its sector using the consensus building approach. It is anticipated that the final documents will be published in late 1999 and that the draft strategy will later be presented to the directors general of Israel's government ministries for adoption and referral to the government for approval.

2.2 If a policy is in place, how much progress has been made in its implementation, and what are the major difficulties being encountered in doing so?

Israel's efforts are focusing on protecting its few wetlands, largely through their declaration as nature reserves, on protecting Mediterranean marine and coastal ecosystems and restoring the country's remaining coastal swamps, on conserving the unique coral reefs in the Red Sea, on rehabilitating the Hula Valley, on studying Israel's saline wetlands, on restoring the country's polluted streams, on protecting water quality in Lake Kinneret (Sea of Galilee), on conserving invertebrates and amphibians, on developing ephemeral ponds, and on maintaining artificial water bodies.

The major difficulties which have been encountered in implementing this policy relate to conflicts between conservation and development. Over the past fifty years, Israel has been transformed from a sparsely populated country—with a population of 800,000 and a population density of 43 per square kilometer—to one of the most densely populated countries in the world (excluding the Negev desert) with a population of 6 million. While average population density is about 265 per square kilometer, 92% of the population lives in an area which covers only 40% of the state's land. In the Tel Aviv district alone, population density exceeds 6600 per square kilometer. Population growth, accelerated development, pollution, habitat degradation and destruction, and conflicts with agricultural, industrial, residential and recreational activities, have made it difficult to conserve plant and animal species and their habitats in such areas as the densely populated coastal plain. Another major impediment to the declaration of nature reserves has been the relative lack of scientific data. Most of the country's proposed and existing reserves were selected on the basis of scenic considerations and general impressions of their ecological value rather than on accepted criteria for selection of protected areas for nature reserves. Therefore, it is imperative that resources be found to monitor and assess wetland systems in order to provide the basic knowledge necessary to evaluate and select those areas best fitted to serve as protected areas. Such a program should monitor environmental (abiotic and biotic) parameters that provide indications of ecosystem function and community structure.

Following is a brief description of the progress made in the conservation and wise use of wetlands in recent years:

<u>Mediterranean Marine Ecosystems</u>
There are four types of nature reserves along the Mediterranean: marine reserves (proposed and declared), coastal reserves (proposed and declared), islet reserves, and protected natural asset belts. Declared reserves have full legal protection while proposed reserves have a limited level of protection until they are declared.

Israel has 14 proposed marine reserves, with a total area of about 2,500 hectares. In addition, it has 20 coastal reserves with an area of about 3500 ha, 16 of which are proposed and four declared. Marine reserves are declared up to the mean high tide level, while coastal reserves are declared down to the mean low tide line, providing overlap at the waterline. Because the cross-shore borders of the two types of reserves are not always congruent, only about 2/3 of the shoreline of the marine reserves has a parallel coastal reserve. Nevertheless, coastal reserves are important for the preservation of both the aquatic and the littoral environments, as they prevent shoreside development.

The third type of reserve is the islet reserve. Israel currently has two islet reserves comprised of small islands with a total area of about 33 ha. These islet reserves will be incorporated within the proposed larger marine reserves in order to enlarge the number of protected islets along the Israeli coast. Most of the islets are in proposed marine reserves and five islets are already declared as nature reserves.

In addition, there are more than two dozen small islets (totaling over 15 ha) which represent tiny remnants of kurkar (sandstone with calcite matrix) ridges which were preserved in close proximity to the shore. None of the islets are inhabited or subject to any human usage, and therefore they have not been impacted by coastal development. The vermetid reefs, a unique Levantine ecosystem, has been well preserved in these islets, and elevate their importance for conservation. Although little ecological research has been carried out on the islets, it is well accepted that they are unique and important micro-ecosystems. They provide nesting sites for marine birds and an important wintering roost

for thousands of great cormorants (*Phalacrocorax carbo*). Special efforts have been taken to include as many islets within nature reserves as possible.

The fourth type of reserve is the protected natural asset belt. There are two such belts with a total area of about 1,200 ha, most of which will be included in the proposed marine reserves (i.e. 8.7 km out of 11 km of the natural assets belts). All fish, molluscs and most marine invertebrates are fully protected in these belts. Protected belts are as important as declared reserves because they provide protection for the following taxa: Class Polycheata, Sub-class Decapoda and all teleost (class Teleostei) species (all species of bony fishes).

In recent years, special efforts have been dedicated to three Mediterranean reserves–Rosh HaNiqra, Shiqmona and Dor-HaBonim–in order to declare them as Ramsar sites and as SPAMIs under the Specially Protected Areas Protocol of the Barcelona Convention.

(For further details, see tables in 6.2)

As stated, one of the primary aims of Israel's marine management policy is to protect its unique vermetid reefs, a globally rare phenomena that occurs only on the eastern coasts of the Mediterranean, and may be found, in addition to Israel, at a few narrow and limited stretches in Sicily, Spain and North Africa. Vermetid reefs are small-rimmed intertidal structures which developed in the subtropical marine water of the southern Levant and the Atlantic (Bermuda) coasts at about the same latitude. They are also known as "serpulid reefs", although in both areas they are mainly built by molluscs: *Dendropoma spp.* in both places and *Vermetus triquetrus* only in the Levant. The reefs can exist only where soft and erodable coastal rocks rise at an appropriate rate relative to the marine erosion. The rim of *D. petraeum* is about 10 cm high, creating an interface shallow lagoon where dense algal meadows develop with diverse and rich intertidal fauna.

Israel's marine management policy also seeks to investigate and protect the unique phenomenon of recent ongoing migration of Red Sea species through the Suez Canal to the Eastern Mediterranean and then to other parts of the Mediterranean.

Israel's marine reserves are stretched along the country's 200 km Mediterranean coast and include tens of islets. They are the backbone of Israel's conservation policy.

<u>Coastal Swamps</u>

The main coastal wetlands in Israel today are En Afeq (one of Israel's Ramsar sites and the largest remaining area of swampland on the coastal plain), the remnant of the Kebara swamp and the Tanninim River (Crocodile River), and Enot Gibbeton (Soreq catchment). This is a poor remnant (less than 1%) of a rich coastal freshwater swamp system which once extended over 10,000 ha. The main causes for the disappearance of aquatic landscapes in the coastal plain include the struggle against waterborne diseases in the end of the last century, conversion of wetlands into agricultural areas, lowering of the groundwater table due to over-utilisation of coastal aquifers and pressures for residential, tourist and industrial development.

Israel expects to help solve part of its water scarcity problem by effluent reuse and seawater desalination programs. It is expected that by the year 2010, treated wastewater will contribute about one third of Israel's agricultural requirements. Various initiatives have been launched in recent years to integrate sewage treatment with river restoration. The Ministry of the Environment has launched a new program for the use of highly treated wastewater for the restoration of streams (see below). In another initiative,

constructed wetlands for the treatment of secondary effluents prior to discharge to rivers have been investigated at the Alexander River Basin. This was the first attempt to use any type of wetlands for water purification in Israel.

Recent restrictions on overpumping of groundwater in the coastal plain should also help to protect the existence of the last remaining natural springs in the reserves of Tel Gibbeton, Tanninim River and En Afeq. The still existing smaller seasonal springs belonging to the former swamps are likely to be revived with the restoration of the coastal wetlands.

Recent years have also witnessed increased efforts to preserve and protect the country's remaining open spaces along the coastal plain. Prevention of urban sprawl along the coastal belt is a first requirement for the restoration of the coastal wetlands. Present efforts focus on the development of wetlands for tourism and recreational purposes.

It is expected that the development of larger restored wetlands for recreation will help shift part of the present human load from the small wetland reserves in the coastal area. Furthermore, the development of restored wetlands for recreation by the agricultural sector will answer an economic need and will help prevent the urbanization of open space areas. The first site to rehabilitate drained land back to wetland may be the Kebara region, near the Tanninim River.

If Israel's coastal wetlands are to be preserved, the following steps must be taken:

- **Wetlands of the coastal plain have to be sustained by the implementation of a carefully prepared program which will be part of the national plan for water management.**
- **Former wetlands of the coastal plain must be protected from urbanization and must be protected by a wetlands-water management plan.**
- **The existing national scheme for developing stream corridors ("green lungs") in the coastal belt needs to be enlarged to include the wetlands of the former wet landscapes as well as marginal river flood plain, local depressions, rain pools, seepage and springs.**
- **Wetlands should be viewed as means of providing continuous water supply in the right quality for restored streams and wet areas for recreation**

<u>Rivers</u>

The impoundment of most springs in Israel has resulted in the drying of nearly all perennial and ephemeral streams and their transformation into sewage conduits. This affected not only aquatic and riparian biodiversity but also the terrestrial biodiversity adjacent to the springs and streams, including animals with an amphibian life style. For years, the NNPPA, the Ministry of the Environment, and the Water Commission have monitored Israel's ailing streams, collecting data on water quality, identifying sources of pollution, and compiling information on flow rates, water sources, and flora and fauna. Concomitantly, efforts and resources were invested in sewage treatment, effluent reuse in agriculture and groundwater recharge. Where possible, cleanups were initiated and riverbanks developed for recreational purposes, especially in the congested central region of the country.

These and other individual efforts culminated in the establishment of the National River Administration in November 1993. Initiated by the Ministry of the Environment, the Administration serves as a coordinating body between the numerous agencies which deal with nature protection and rivers in Israel and oversees the restoration of the country's rivers and the preservation and renovation of natural and historic sites along riversides.

The Administration is dedicated to fulfilling the following aims:

- **Rehabilitation of the country's rivers through cleanups and restoration of water quantity and quality;**
- **Preservation and rehabilitation of landscapes, ecosystems, and fauna and flora in the rivers and their watershed basins;**
- **Development of rivers on the basis of existing and potential nature and landscape values for purposes of recreation, tourism, education and research;**
- **Promotion of the ability of rivers to serve as drainage channels for flood prevention.**

In order to attain these goals, the Administration has committed itself to:

- **Formulate an integrated national policy for the protection, cultivation and development of Israel's rivers, taking into account both consumer needs and the unique features of each river;**
- **Prepare a national masterplan for river rehabilitation;**
- **Classify Israel's rivers according to a scale of priorities for rehabilitation;**
- **Promote the establishment of regional river authorities and river administrations for Israel's major rivers, and transfer responsibility for river rehabilitation and management to these bodies;**
- **Encourage, guide and aid local and municipal bodies and other entrepreneurs to undertake measures which can help achieve the Administration's goals;**
- **Collect and compile data in order to establish a database on natural resources, sites and landscapes in rivers;**
- **Formulate and supervise the implementation of professional criteria for river rehabilitation;**
- **Catalyze the planning and implementation of river rehabilitation projects and the development of landscape parks and riverside trails in accordance with set criteria and priorities;**
- **Increase public awareness and participation in river rehabilitation and landscape protection.**

Over the past few years, the Administration has formulated a model for river rehabilitation and established criteria for setting priorities for river rehabilitation (e.g., magnitude of the nuisance, potential for tourism and recreation, natural and landscape resources, land and water availability, feasibility, availability of funding). In addition, ecological and environmental surveys have been initiated or completed for most of the rivers earmarked for priority action. Within the framework of these surveys, data are collected on water and pollution sources along the river (including plans for solving pollution problems), hydrology (including plans for the regulation and stabilization of river banks), water quality (physio-chemical monitoring and hydrobiology), land, flora and fauna (including mapping of protected or rare species and unique ecosystems), historical and archeological sites, landscape sites, walking paths, land uses and environmental nuisances (such as quarries, waste sites). The data are then summarized and mapped to serve as a basis for assessing the rehabilitation potential of the river.

The landscape surveys and evaluations provide planners with the necessary background information to ensure that development will not destroy the ecosystem, wildlife and landscape features of the river. In areas in which unique natural resources may be irreversibly damaged by development, conservation or minimal development are called for. In less sensitive spots, more intensive development may be possible. In addition to such essential considerations as water quality and quantity, the planning process endeavors to make the river more prominent in the landscape, to designate areas for recreation and tourism, and to establish walking paths alongside the rivers. Once

completed, the masterplan for rehabilitation of the river and its corridor is presented to the relevant planning commission for statutory approval.

The goal of the Administration is to entrust actual restoration work to local stakeholders while serving as a catalyst, coordinator and professional guide. So far, regional river administrations have been set up for more than ten rivers and masterplans have been prepared for over half. One prominent example is the Alexander River Administration which launched an integrated and comprehensive rehabilitation program in 1995, with the establishment of a fifteen-member regional administration and a planning team. As a result of effective coordination and cooperation, real progress has already been achieved including the completion of an eco-environmental survey and a comprehensive masterplan. Recommendations relate to conservation and development options along the river, to monitoring requirements, and to the establishment of micro reserves along the riverside which will serve as shelters for fauna and flora especially during times of intensive tourism. Special attention is granted to the Nile soft-shell turtle (*Trionyx triunguis*) and to the preservation of its breeding sites along the river. With the exception of the Alexander River, this protected rare species has nearly disappeared from Israel's coastlines as a result of deteriorating water quality and water scarcity.

To further advance river rehabilitation, a computerized database on pollution sources in several rivers has been prepared by the Ministry of the Environment. Monitoring of the microbial quality in Israel's rivers is undertaken on a monthly basis in many rivers and more frequently in the summer and holiday seasons. Chemical monitoring is twice yearly. Surveys have recently been launched on the sludge composition in some of the country's major coastal rivers.

The riparian ecotone forms an integral part of the stream ecosystem, and is functionally important for the riverine as well as riparian biota. Recent programs for stream restoration and afforestation emphasize the importance of "stream corridors" and "green borders" or "buffer zones" crossing the coastal megalopolis perpendicularly to the coastline.

Until 1991, all the bodies involved in wetland rehabilitation were convinced that the prerequisites for rehabilitation were the elimination of all effluents and flow of fresh water only. However, the realities of water scarcity made it clear that Israel's rivers, in which 300-400 million cubic meters once flowed annually, will completely dry out if other means are not taken to replace or supplement fresh water. Following a comprehensive review, the policy was amended to allow for the discharge of high-quality effluents into riverbeds when fresh water allocations are unavailable. The discharge of highly-treated effluents is meant to ensure water flow, the subsistence of ecosystems and the development of recreation and leisure activities. Effluent discharge is contingent on strict control measures and is prohibited if the river is designated for abstraction of water, bathing or fishing. In order to implement the program, effluent standards for each river are being set for such physical, chemical and microbial parameters as suspended solids, organic load, nitrogen concentrations, and indicators for pathogenic microorganisms.

Conservation and sustainable use of Israel's wetlands will be further advanced as a result of a three-year grant (1997-1999) to the Ministry of the Environment by the European Union for the joint financing of two nature conservation and biodiversity related projects in the framework of LIFE II programs. (See 2.11 below).

<u>Eilat's Coral Reef</u>

Since the founding of the State of Israel in 1948, the coral reefs of Eilat have been viewed as a national treasure. In 1956, the first warden, working on behalf of the Society for the Protection of Nature in Israel, was appointed to protect the coral reefs in Eilat under the Fisheries Ordinance which declared some corals, sponges and shellfish as "protected fishes." In 1959, most of the commercial venture of collecting corals and other species was stopped.

The marine habitats of the Red Sea are important not only for the coral reefs and other forms of marine life they contain, but also for continental fauna that use it as an important staging habitat. The area is the major bottleneck flyway for over 200 species of migratory birds, which include representatives from most avian families. Many of the waterfowl and pelagic species use the calm waters offshore to feed and to rest, prior to continuing their journeys. Without these resources, some of the long-distance avian migrants, which comprise part of the breeding populations of Europe and Asia, would not survive.

To protect this unique and sensitive area, two marine nature reserves and two coastal reserves have been proposed (one of which has already been declared). They extend over 4 km on the marine side and 3.6 km along the Israeli Red Sea coast respectively. These reserves are subject to the same restrictions on activities as all nature reserves in Israel. For example, entrance to fenced areas is permitted only to paying visitors, and collection or damage to natural assets is prohibited.

In light of the sensitivity of this ecosystem, major efforts are invested in patrol, inspection and enforcement of regulations prohibiting the collection of natural assets such as coral, molluscs and/or other protected invertebrate organisms (alive or dead), fishing from boat, shore or with spear gun of any protected fish species or fishing in the nature reserve, boating in the prohibited parts of the reef, disorderly behavior such as littering, and illegal entrance into the fenced nature reserve area from the coastal or marine side (scuba divers). In addition, the Ministry of the Environment operates a Pollution Control and Response Center north of the coral reserve to prevent potential oil spills from reaching the reserve.

Yet another pollution concern is the rapid development of fish culture. Currently fish culture is carried out in cages where nutrients are released directly into the environment. Various institutions are currently investigating the geochemistry and ecology of sediments beneath commercial fish farms in order to better understand and quantify the processes associated with this nutrient enrichment. The Ministry of the Environment has called for the preparation of an environmental impact assessment of sea cage technology, it has incorporated stringent environmental conditions in the business licenses of the fish cage farms, and has established a committee to investigate the impact of offshore fish cages on the Gulf of Eilat ecosystem.

Public awareness plays an important part in protecting the coral reef ecosystem. The NNPPA is actively involved in a special outreach program to enhance the protection of the delicate coral reef ecosystem. A Gulf Watch Forum was initiated by the Eilat Field Study Center of the Society for the Protection of Nature in Israel (SPNI) in 1996 to promote the conservation of the coral reef. Members of the forum include a wide array of educational, pollution control, enforcement, research, and commercial bodies including, among others, the Ministry of the Environment's Marine Pollution Control and Response Center, the International Bird Watching Center and the Underwater Observatory.

Three forms of restoration and rehabilitation work are currently in progress along the coral reef habitat of Israel's Red Sea coast:

- **Propagation of reef fragments: This joint project of the NNPPA and the Coral World Underwater Observatory involves rescuing damaged coral fragments and transferring them to open-circulation aquarium tanks where they receive proper temperature, light and nutrient regime to enable recovery and growth. Fragments are then re-attached to the reef in areas of accidental boat damage.**
- **Artificial reefs: Several projects aim at expanding the coral reef ecosystem outside of the nature reserves by providing artificial substrates ("nurseries") for coral growth. For example, researchers at Tel Aviv University have created large artificial reefs of steel to attract coral growth. In addition, the Israel Diving Federation recently sunk an unused naval vessel offshore to provide a platform for coral growth.**
- **Natural rehabilitation of sensitive reef areas: Within the Hof Almog Nature Reserve, some portions of the reef have been closed to divers and snorkelers in order to facilitate reef recovery.**
- **Research of initiated coral restoration ("coral gardening"): Research studies are focusing on investigating methods of restoring the original coral fauna through the reintroduction of extinct coral species.**

<u>Hula Wetlands</u>

One of the most pressing environmental problems in Israel has been the exploitation of water resources and the drainage of swamps. The Hula swamps (part of the Jordan River catchment in northern Israel), which covered more than 6,000 hectares, were drained in the 1950s in order to eradicate malaria and make the land suitable for agriculture. The only remnant of the former site is a 300-hectare nature reserve, Israel's first nature reserve, which was set aside in 1964 for preservation as a result of conservation efforts by a dedicated group of nature lovers and scientists, later to form the SPNI. Their campaign helped preserve some of the indigenous vegetation, animal and bird life at this unique meeting point of tropical and temperate climate zones. The Hula Nature Reserve, one of Israel's Ramsar sites, is the largest aquatic nature reserve in the country.

Drainage of the swamps led to such unanticipated consequences as disappearance of indigenous flora and fauna, decline of the waterfowl population, oxidation of the peatlands, spontaneous underground fires, and subsidence of the land. According to Israeli scientists, some of the Hula's endemic species disappeared altogether, including such species as the frog *Discoglossus nigriventer*, the fish *Acanthobrama hulensis* and two dragonflies.

In an effort to solve some of these problems, a long-range plan to restore the Hula wetlands was first initiated in 1971 and a four-year restoration project was completed within the nature reserve to improve its water regime. More recently, in 1992, it was decided that a part of the larger drained Hula area (outside of the reserve) should be restored to its original wetland state. The soil works were completed in the late autumn of 1993 and the area was reflooded in April 1994. Jordan River waters were once again allowed to flow into a reconstructed part of the drained area at the heart of the Hula as part of the first stage of the rehabilitation project. The reflooding and restoration project extends over 800 hectares and includes a 110-hectare lake (Lake Agmon) at the center of what is designated to be a combination of wetlands and tourist area. Environmentalists see the reflooding as a chance to recreate a similar ecosystem, enabling many species to repopulate the Hula, while allowing others to be reintroduced once the former water system has been recreated. The entire restoration program is meant to implement the principle of sustainable use which sees the management of wetlands as part of a complex system which transforms wetlands into assets rather than obstacles to sustainable development.

As an integral part of the Hula wetland rehabilitation, a three-year, multi-disciplinary research program was initiated in 1994. The program was divided into five main fields of research: soil, eco-tourism development, agriculture, water and recreational development. Soil research focused on problems of peat-soil fertility and manganese treatment. Eco-tourism included surveys of shade trees and grass for open areas, introduction of large herbivores (water buffalo) and recolonisation by birds, mainly waterfowl. The agricultural research aimed at finding the best crops and cultivating methods for peat soils, including different vegetable species and "organic agriculture." The water section included detailed hydrological and geochemical surveys, chemical, microbial, zoo- and phytoplankton monitoring programs and special systems for the recolonisation and monitoring of the former vegetation, invertebrates and fish. Recreation research concentrated on the special development needs in wetlands.

The preliminary results of the multidisciplinary research program have shown positive results. The biota, flora and fauna appear to have established a complicated and relatively stable food web which includes the following major components: phytoplankton, zooplankton, benthic communities, macrophytes, fish and waterfowl. In addition, there is a high diversity of the different assemblages which ensures ecological stability and management.

The Hula wetland rehabilitation represents an important test case for reflooding areas in an arid region. It has been more successful than predicted given the high rate of recolonisation of native fauna and flora. On the other hand, the rehabilitation has taken place too late for some aquatic species which were globally eliminated and have not recovered.

The Hula Nature Reserve (Ramsar site) is still plagued by low quality water supply which is nutrient enriched from several pollutants, especially agricultural drainage and fishpond effluents. The problem continues to threaten the nature reserve and its capacity to protect aquatic fauna and flora species.

<u>Lake Kinneret (Sea of Galilee)</u>

Lake Kinneret (the Sea of Galilee) is an ecosystem intensively managed to serve as the major operational reservoir supplying water of drinking quality to most parts of Israel. The lake, with a surface area of 170 km^2, divides the upper and lower portions of the Jordan River system and is the only fresh water lake in Israel. During the past 50 years, several changes made in the catchment basin of the Kinneret have modified the balance of the lake's ecosystem. Draining of the Hula wetlands in the 1950s caused sediments and nutrients to flow directly into the lake while increased population and agricultural activity in the watershed area have led to contamination by different pollutants, especially pesticides, fertilizers and dairy farm wastes.

The need to manage environmental quality in the lake and its watershed and to protect them from nutrient overload, agriculture, grazing, sewage and tourists has led to the organization of an effective management system, coordinating research with practical administration and long-range planning. In 1968, the Kinneret Limnological Laboratory was established and four years later, partially stimulated by the initial research at the laboratory, the Kinneret Authority was established. The latter is responsible for formulating and implementing overall management policies, as well as for regulating and monitoring development in and around the lake and its catchment area with the aim of minimizing environmental pressures on the Kinneret ecosystem and maintaining water quality.

In the catchment area, a concerted effort was made to lower nutrient load by changing agricultural and irrigation practices, and by introducing new management techniques. Sewage treatment plants were improved and a new drainage network that recycled much of the polluted water within the watershed was constructed. Around the lake, public and private beaches and recreation areas with appropriate sanitary facilities were developed. Pollution and sewage from settlements, dairy farms and fishponds in the Kinneret watershed basin were treated and diverted from the lake. The "Bateiha," a unique area of shallow lagoons and wetland in the northeastern corner of the lake that is of special importance as a breeding and nursery site for the indigenous and commercially valuable St. Peter's fish (tilapid species) was declared a nature reserve. Salinity in the lake has been alleviated by diverting several major saline inputs at the northwest shore of the lake into a "salt water canal" leading to the southern Jordan River. Current chloride concentrations (ranging from 205-230 mg chloride/l) are half their level in the late 1960s.

As a result of these efforts, the levels of pathogenic organisms, toxic substances and heavy metals in Lake Kinneret have dropped over the past twenty years. Moreover, during most of this period, the algal population was characterized by general stability despite changes in some chemical and biological parameters in the lake. Studies of Kinneret water quality have shown that overall water quality in the lake has not deteriorated and that eutrophication has not taken place during the past twenty years. Improvement in water quality is expressed in a reduction in water salinity and a rise in the concentration of dissolved oxygen and pH of the epilimnion.

Beginning in 1994, monitoring data have revealed that the patterns of annual phytoplankton development in the lake have shifted and that the previous stability of the lake ecosystem has been disturbed. Most conspicuous have been the fluctuations in the dinoflagellate blooms and the relative increase of undesirable cyanobacteria in the phytoplankton. This phenomenon, coupled with the growing popularity of Lake Kinneret as a tourism, recreation and fishing site, on the one hand, and as a major source of drinking water, on the other hand, precipitated a government decision to evaluate the carrying capacity of the lake for a variety of uses. The first stage of the project assessed the carrying capacity of Lake Kinneret for the operation and maintenance of boats. Special efforts are now being invested in understanding how the lake may react to present and future environmental pressures, and various management options for future operation of the lake are now under consideration.

The case of the Kinneret serves as an excellent example of what effective basin management can achieve in preventing pollution and enhancing environmental quality. The cooperative efforts of the Kinneret Authority, the Kinneret Limnological Laboratory and the Ministry of the Environment have proven invaluable in preserving the wellbeing of the lake. In 1997, a framework plan for the treatment and disposal of wastewater in the Kinneret watershed basin was published by the Water Commission. The plan formulates a policy for pollution prevention in the Kinneret for the next 20 years which will help ensure that the lake continues to serve as a major source of potable water for a large part of the population.

In addition, an interministerial team, headed by the Ministry of the Environment, is preparing a plan to control all pollution sources into the Kinneret, including such measures as improved monitoring, supervision and enforcement and financial support of pollution abatement projects. One recommendation calls for the determination of 11 indicative parameters each year to check water quality in the lake. Another calls for a halt to all new activities which threaten to endanger water quality in the lake. No further development that may adversely impact water quality will be permitted in Lake Kinneret and its watershed.

Dead Sea

The Dead Sea, Israel's second lake, is the lowest point on earth lying about 408 meters below sea level. The water of the Dead Sea, like that of all inland lakes with no outlet, has become increasingly saline and today registers the highest salt content in the world. Both Jordan and Israel, who share the Dead Sea, have diverted its resources. On the southern shores of the Dead Sea, both countries have set up enterprises to produce and sell potassium, salt, bromine, magnesium and medicinal salts.

The increasing water requirements of the industrial, agricultural and tourism ventures in the southern Rift Valley and Dead Sea are rapidly exhausting the water resources available in the area and threaten to further lower the water level. The former area of the lake once spanned over 940 km^2. Today, the southern part of the lake (south of the Lisan Peninsula) has been drained and transformed into saltern ponds for the production of potash for the benefit of both countries.

Initial activities are concentrated on the preparation of a masterplan for the entire region and on cooperation among all stakeholders. The unique environment of the Dead Sea whose water contain salts of therapeutic value and whose majestic surroundings are dotted with remnants of ancient people is a major tourist attraction. Nature conservation bodies support tourism development which will be concentrated in a few defined loci which leave an undisturbed continuum of wide natural areas between them. Specifically, nature conservation bodies have called for preserving the biotic and zoological variety of the area and protecting the environment, the scenery and the cultural heritage related to it and for leaving natural, undisturbed spaces in this region for the benefit of future generations.

Saline Wetlands (salinas and their surroundings)

There are five salinas in Israel, four of which cover 360 hectares and are operated for salt production by a private company. They are located at Atlit on the Mediterranean coast; Qalya at the north end of the Dead Sea, and at Evrona and Eilat on the Red Sea coast. The fifth salina is managed as evaporation ponds for potash production and is located at Sedom on the southern part of the Dead Sea, which was drained completely and currently extends over 14,500 hectares.

The NNPPA has published a report on the status of salterns in Israel which relates to flora such as vegetation and algae and to faunistic components such as bacteria, insects, fish and vertebrates including amphibians, reptiles, mammals and aves. A few of the salt marshes were almost completely destroyed before any research was conducted on the composition and zonation of the vegetation. Others, such as the Atlit and Eilat salinas are expected to be drained in the next five years in order to develop their area for tourism. The Evrona salina will be enlarged by about 200 hectares, but it is not yet clear to what extent it can substitute for Eilat as a rich biotic site.

Located near the northern tip of the Red Sea, the Eilat sabkha may serve as an example of the fate of Israel's salterns. The depression on the Israeli side extends over an area 4 km long and about 3 km wide, covering an area of about 1200 hectares. Its southern part is covered by the tourist city of Eilat and the salt ponds. The major part is cultivated by a nearby kibbutz. Less than 2% of its area forms a Bird Sanctuary Nature Reserve (23.7 hectares). The sanctuary is a rehabilitated garbage dump site and serves as a resting site for about 280 migratory bird species which pass over Eilat on their route to Africa, along the Levantine flyway. The salina located close to the city of Eilat extended over 90 hectares.

The last natural remnant of the Eilat sabkha (not included in the nature reserve) was destroyed in 1997. As a result, some 4 hectares of Seablite forest (about 2-3 meters in height), the last remnant of the previous 1200 hectares, was abandoned.

Policy on Invertebrate Conservation

Invertebrates are endangered by such threats as habitat destruction, environmental pollution, exploitation and introduction of alien species. Israel's strategy for protecting these endangered species aims at combating all these threats, through the preservation of the ecosystems which sustain them. Implementation of the program for insect preservation requires additional research within the bounds of nature reserves in order to better understand both the inventory and the life cycles of insects within these reserves.

The following recommendations were forwarded by the NNPPA for the conservation of invertebrates in Israel:

1. **To prepare lists of species belonging to selected invertebrate groups along with their level of threat according to IUCN categories.**
2. **To conserve and declare nature reserves in habitats which are at high risk level in Israel including inland water habitats, coastal sands, mountains and coastal cliffs (including coral reefs) in the Gulf of Eilat and the Mediterranean Sea.**
3. **To rehabilitate and restore extinct habitats (e.g., reflooding the Hula).**
4. **To formulate a management plan for protection of associations of invertebrates in nature reserves.**
5. **To update lists of invertebrate species designated for declaration as protected natural assets.**
6. **To encourage amateurs in different frameworks to take part in follow-up, reporting, registration and computerization of data on invertebrate distribution.**

Several species of invertebrates are protected within declared and proposed nature reserves. Outside nature reserves, taxa declared as protected natural assets are protected throughout Israel or a specific part of it. The list of protected natural assets is updated from time to time and published as required. It now includes a small number of taxa of invertebrates, mostly marine fauna. Only two groups of invertebrates which include inland species have been declared natural assets: all molluscs in Israel and one group belonging to the crustaceans.

In 1987, the NNPPA appointed an expert committee to prepare a listing of the groups of insects designated for declaration as protected natural assets. A recommended new list of taxa was presented in 1991, and included, as a starting point, the group of Lepidoptera: Ropalocera. A recent publication provides a new list of inland and inland water molluscs in Israel which includes 229 species (including 29 exotic species) of which 156 are inland species and 73 are terrestrial species. In Israel's original listing of 200 species, 97 species (48.5%) were defined as threatened, and 15 (7.5%) as extinct, most of which are inland water species which were originally found in the coastal rivers and swamps of the coastal plain and the Hula Valley.

Construction of Rain pools and Amphibian Distribution Surveys

Israel's Mediterranean region once boasted some 1,200-1,500 rain pools (or vernal pools) which were largely maintained by villagers and shepherds. Until the early 1950s, the rain pools played an important role as water supply sources for animal watering in the fields and human use in villages. The wide development of cultivated lands, water supply systems and urbanization caused a major decline in the number of rain pools in the Mediterranean region of Israel. About a hundred rain pools are left today, of which a few dozen have been declared as small nature reserves. However, these rain pools suffer from pollution as their drainage basin is subjected to cultivation or urbanization.

Six amphibian species exist in Israel today: two urodeles and four anurans. The seventh species which once existed in Israel is now considered extinct. *Discoglossus nigriventer* was known to exist in one site (Hula Valley) and has not been reported since 1955. All six species breed in rain pools and small ponds and are distributed in the Mediterranean region of Israel. It is widely assumed that all the amphibians in Israel, although declared protected natural assets by law, are on the verge of extinction as a result of habitat degradation and deterioration. Three species which reach their southernmost global distribution in Israel, are more prone to extinction: the *Salamandra* in the mountains of the Galilee and the Carmel; the *Triturus* in the mountains of the Galilee, Carmel and Judean hills and along the coastal plain and the *Pelobates syriacus* in the Golan, Galilee and coastal plain.

In order to promote amphibian conservation, the NNPPA published a special booklet in 1995 which identifies the main threats to amphibian life, especially the degradation of wetlands. Furthermore, in order to maintain these habitats, the NNPPA initiated a 5-year plan in 1994 to create 60 artificial rain pools in nature reserves throughout Israel. About 10 artificial rain pools are created every year. To date, about 15 rain pools were renovated and another 30 earthen rain pools were dug in nature reserve areas in the Central Galilee, Western Galilee, Carmel, Ramot Menashe and the Judean Hills. Most recently, a special concrete rain pool was constructed in the Mt. Carmel area as a reproduction site for the relic salamander population in the region.

In the past two years, a few surveys were initiated in the coastal plain, Mt. Carmel area, the Golan Heights, the Hula Valley and the Galilee in order to monitor the recent distribution of the amphibians and the results of creating artificial rain pools in reserves in order to maintain the invertebrates and amphibian species. Results have already led to efforts to construct some artificial rain pools in a nearby reserve for the type-locality of *Pelobates syriacus*.

<u>Artificial Wetlands</u>

Beginning in the late 1930s, pond fish breeding began in Israel. Today, fishponds present an alternative habitat for some of the wetland species whose habitat has disappeared. Over 30 km^2 of fishponds exist in Israel today, mostly in northern Israel and the coastal plain. The remnants of the first fish farm are included in the Ramsar site of En Afeq Nature Reserve. In addition, Israel began to construct water reservoirs in the 1970s to collect floodwater and treat sewage water and spring water for irrigation in summer. Today some 450 water reservoirs exist in Israel spanning an area of 45 km^2. Both fishponds and reservoirs create a favorable habitat for several species of animals. Other artificial water bodies which exist in Israel include wastewater treatment facilities (5 square kilometers), and other irrigation ponds and water facilities (20 square kilometers). It is estimated that the length of regulated water courses which run through Israel is approximately 4,000 km. About half of these are natural riverbeds which were dredged, channelized and maintained by the river drainage authorities and only short sections declared as nature reserves and national parks. The other 2,000 km are mainly drainage channels or water supply channels.

Today, there are about 100 km^2 of artificial water bodies in Israel. These small water bodies, which are separated from one another, have replaced the relatively large wetlands of the past (especially the Hula Valley). These changes have had their impact on the functionality of wetlands in Israel and have led to the decrease or actual disappearance of several endemic species. On the other hand, most of Israel's waterfowl whose habitats require lakes and ponds have adopted the artificial water bodies which have largely

replaced natural wetlands over the past few decades. Therefore, these water bodies have an important role in the protection of waterfowl in Israel today.

2.3 If a Policy/Strategy/Action Plan is in place, is the responsibility for implementing it with :

a. a single Government Ministry,

b. a committee drawn from several Ministries, or

c. a cross-sectoral committee?

Please provide details.

The Ministry of the Interior, which is responsible for national planning and building, is empowered to designate and declare new protected areas. The designation of protected areas is made by the Minister of the Interior after a long process of approval by all levels of national planning–local, regional and national–and after consultation with the National Parks, Nature Reserves and National Sites Council which is a broad collegiate body with advisory power. The Council is composed of government, local government and public representatives as well as experts in zoology, botany, ecology, archeology, geology, geography, history, economics, landscape architecture and conservation.

Responsibility for implementing nature conservation policy rests with the Nature and National Parks Protection Authority (NNPPA) under the responsibility of the Minister of the Environment. The NNPPA is dedicated to achieving its goals through the following activities:

- **Identifying sites for the establishment of nature reserves and national parks;**
- **Initiating, planning or changing nature reserves and national parks;**
- **Establishing, administering, maintaining, operating and enhancing nature reserves and national parks;**
- **Protecting and rehabilitating natural assets within and outside of nature reserves;**
- **Supervising and inspecting nature reserves, national parks, natural assets and heritage sites for the purpose of law enforcement;**
- **Enforcing the Wildlife Protection Law and hunting regulations and participating in the enforcement of 28 additional laws and regulations in open space areas, including the Fisheries Ordinance;**
- **Compiling, documenting and registering data on nature protection including preparation of files on each nature reserve and national park in a manner to be determined by the Minister of the Environment;**
- **Initiating and promoting education, information and guidance on nature conservation and natural and heritage assets, including activities to increase awareness of the public, in general, and students and youth, in particular;**
- **Promoting international scientific contacts on nature conservation and natural assets;**
- **Preparing and promoting research on nature conservation and natural assets.**

The NNPPA fulfills its nature conservation goals through various departments and with the aid of its regional rangers and managers. It has developed a computerized database on protected natural assets, sites, species, endemic plants and fauna. Its scientists study different habitats in nature reserves, explore the relationships between flora and fauna and their environment, collect data on plant and animal behavior and examine potentially harmful influences. Their findings are used to determine how to best preserve, cultivate and rehabilitate the natural assets found in nature reserves. A special department in the NNPPA,

the Aquatic Ecology Department, is responsible for the conservation and wise use of wetlands in Israel.

Several environmental NGOs in Israel take an active part in promoting wetland conservation and policy (see 9.1-9.6).

2.4 For countries with Federal systems of Government, are there Wetland Policies/Strategies/Plans in place, being developed or planned for the provincial/state or regional levels of Government? Yes/No

If yes, please give details.

Not applicable to Israel

2.5 Has a review of legislation and practices which impact on wetlands been carried out, and if so, has this resulted in any changes which assist with implementation of the Ramsar Convention? Please describe these.

Standards and regulations are continuously revised and updated based on the results of monitoring and inspection systems and on international experience.

Several measures have been integrated into Israel's environmental legislation in recent years in order to achieve environmental goals and increase deterrence. These include such measures as implementation of the "polluter pays principle," incremental daily fines for continuing violations and doubling of fines for recurring violations or for corporations, establishment of offenses as strict liability offenses, imposition of personal liability on corporate managers and heads of local authorities, administrative injunctions by the Ministry of the Environment to prevent, stop or minimize nuisances or to take steps to restore previous conditions (cleanup orders), and institution of finable offenses which enable the offender to pay a fine and dispense with the need for court proceedings.

The resources invested in deterrence and enforcement in recent years have had a major impact, both direct and indirect, on the environmental conduct of local authorities and industrial plants throughout the country. Furthermore, more and more suits have been presented by the Environment Ministry and by others against mayors and municipalities charged with environmental offenses, especially water pollution.

The Nature Reserves Law has been revised several times since its first enactment in 1963 as have the regulations on protected natural assets. New nature reserves and national parks are continuously being declared, new species are added to the list of protected natural assets and water allocations for springs and streams are updated in order to allow them to function for tourism and recreation purposes. In addition, lists of species permitted and prohibited for hunting, including waterfowl, are constantly revised on the basis of ongoing research, surveys and annual census results. For example, the Wildlife Protection Law was recently amended to protect all vertebrates (with the exception of fish) so that all amphibians are granted special protected status under the law. Since Israel is party to a number of international conventions on nature protection, it drafts or amends its national legislation to allow it to implement the provisions of international law. Thus, the protected status which was recently granted to sturgeons under the Convention on International Trade in Endangered Species, is being enforced in Israel through special conditions issued by the NNPPA, as the administrative authority for CITES in Israel, to importers of all larvae for aquaculture in order to prevent biotic pollution. The synergistic effect of the different international conventions which are under the same

national authority is providing comprehensive control and protection of aquatic ecosystems in Israel.

In 1998, in a further effort to protect coastal resources, the Ministry of the formulated a draft coastal law aimed at preserving and restoring the coastal environment and its fragile ecosystems, reducing and preventing coastal damages and establishing principles for the management and sustainable development of the coastline.

Finally, major reviews of practices which impact on wetlands have been carried out within the framework of the rehabilitation plan for the Hula Valley and the national river rehabilitation project. Both these projects have greatly assisted with the implementation of the Ramsar Convention.

2.6 Describe the efforts made in your country to have wetlands considered in integrated land/water and coastal zone planning and management processes at the following levels:

a. national
b. provincial
c. local

Israel utilizes the land use planning system as an effective framework for implementing nature protection policy. Environmental considerations, including conservation of aquatic ecosystems, are integrated into all relevant national schemes and are at times the dominant considerations. Several national plans are targeted at protecting specific natural resources considered to be of high value as part of the natural and cultural heritage, such as plans for nature reserves and national parks and forested areas. Other plans address particularly sensitive areas warranting special attention such as plans for the Mediterranean coastal area, Sea of Galilee (Lake Kinneret) shores and the Gulf of Eilat. National planning requires the integration of environmental and ecological considerations from the earliest stages of planning until final formulation of the planning documents which are presented for approval to the statutory planning agencies.

The National Masterplan for National Parks, Nature Reserves and Landscape Reserves (National Outline Scheme - NOS 8), approved in 1981, is a legally binding national plan setting aside specific areas as national parks or nature reserves. The purpose of the plan is to designate areas for nature conservation, protect areas of high scenic value from unsound development and preserve areas with high recreation and tourism potential. The scheme constitutes an initial safeguard and is backed by another legal procedure—declaration of areas as nature reserves or national parks through the Nature Reserves Law. Over one-quarter of the country's land area is designated for these purposes in the masterplan.

In recognition of the national value of Israel's coastline, the National Planning and Building Board, the top level of national planning, ordered the preparation of national plans for all of the country's sea and lake shores: the Mediterranean Sea, the Red Sea, the Sea of Galilee and the Dead Sea. The first stage of the National Masterplan for the Mediterranean Coast (NOS 12), which was approved by the government in 1983, includes protection of large sections of the coastline as nature reserves, national parks and coastal reserves and allocation of coastal areas for tourism and recreation. The masterplan includes a clause prohibiting development within 100 meters of the coastline.

To help provide a comprehensive long-term guide to planning policy, the National Board commissioned a more detailed document for the resource management of the Mediterranean coastline for tourist and recreation activities. The coastal management plan, prepared by the Environment Ministry, was approved in principle by the National

Board. It bases development policies on principles of suitability and sensitivity of coastal resources based on geological, vegetation and landscape surveys. Multidisciplinary teams prepared ecological guidelines for the plan which included recommendations on the conservation of rare and unique habitats, rocky shore habitats which are rich in invertebrate life, important biotic features and habitats such as breeding and nesting grounds of migrating and non-migrating birds (particularly near fish ponds and around river mouths) and egg-laying habitats of sea turtles, and areas adjacent to nature reserves and sensitive habitats.

The National Masterplan for the Kinneret Watershed and Coasts is also a resource protection and management plan. It defines land uses along the lake's shores and guides development activities in the catchment basin in order to safeguard the quality of the lake shores.

The National Masterplan for Forests and Afforestation (NOS 22), in force since 1996, grants certain areas legal status as forested areas, and thus protects them from development. The main purpose of the scheme is to protect existing "man-made" and natural forests and to designate areas for future afforestation to meet ecological and recreation goals. It designates 162,000 hectares for the development and conservation of forest lands in Israel and includes eight categories of forest including coastal park forests and riparian plantings. Tree planting along rivers for recreational purposes is an important component of this masterplan.

The National Outline Scheme for Building and Development (NOS 35), now nearing completion, is an integrated development plan which gives strong emphasis to environmental management principles and to the protection of areas of high natural and landscape value such as wetlands. Among other provisions, it calls for the protection of open space both in the periphery and in the densely populated central area of the country where "buffers" along riverbeds will separate urban concentrations.

Israel's long-range masterplan, "Israel 2020", was launched in 1991 for the purpose of preparing comprehensive and non-statutory strategic documents which will form a framework for national plans for the next 30 years. An assessment of the sensitivity of open space in Israel, including aquatic ecosystems, was an important element in formulating the preferred alternative for integrated planning of the state's future developments. Green buffers, open spaces and preservation of natural assets are important elements in this long-range plan.

Many of the country's regional masterplans, which implement the objectives of national outline schemes in each district, are currently being updated and amended to include environmental elements. On the local level, various wetlands including the Hula Valley, fishponds, and other water bodies are accorded special protection in local and regional land-use plans and are required to apply to the Water Commissioner for water allocations. Hunting is prohibited in wetlands such as fish ponds as well as in the entire southern region of the country which constitutes more than half of the land area of the country (12,000 km^2).

Wise use of wetlands is an important component of Israel's integrated coastal zone management strategy. In light of intensive development pressures on Israel's Mediterranean and Red Sea coastlines, major emphasis has been placed on coastal area management. In 1996, Israel and the Mediterranean Action Plan signed a Coastal Areas Management Programme which is oriented to the creation and promotion of the process of integrated coastal planning and management. Its major components include development of a national strategy for sustainable development, assessment and

management of coastal resources and hazards, economic instruments, remote sensing and integrated coastal area management.

In 1997, the Ministry of the Interior initiated an integrated coastal zone management (ICZM) approach in a policy document which was recently drafted under the responsibility of the Territorial Water Committee, a statutory committee on the national level of planning which is responsible for approving all offshore structures. The policy document relates to both natural and anthropogenic processes which impact the coastal area. The document relates to oceanography and marine geology, flora and fauna, fishing, pollution sources, marine structures, tourism and economic factors. The main purpose of the proposed approach is to provide the conditions likely to facilitate sustainable development while protecting the environment. Its major aims are to protect, conserve and rehabilitate the diversity, quality, quantity and function of natural systems and to ensure integrated management of coastal resources.

The complexity of water supply issues in Israel has led to a decision to prepare a masterplan for the water economy. Its main aim is to protect Israel's water sources, and it is based on hydrological sensitivity maps of the various areas of the country for various types of land uses. Subjects that will be incorporated in the plan will include, *inter alia*: adequate allocations to water bodies and rivers, preservation of open spaces around Lake Kinneret, Israel's rivers and the Hula Valley, and administrative cooperation among the different authorities responsible for water planning. Most of the wetland reserves approved by the NNPPA have already been granted official water supply permits from the Water Commissioner (including rain pools for their natural runoff) in order to maintain their water. Over the past five years, efforts have been invested in obtaining similar water supply permits for other small wetlands which have survived outside nature reserves (rain pools, small springs, etc.) in order to protect them from diversion, drainage, and other water utilization schemes.

2.7 Have there been any publications produced, or practices documented, which could assist other countries to promote and improve the application of the Ramsar Wise Use of Wetlands Guidelines? Yes/No

If Yes, please provide details and copies.

Several publications and documents have been prepared in recent years on the restoration, conservation and development of Israel's wetlands. Special attention has been paid to documentation on Israel's river rehabilitation project, water and watershed management in the Sea of Galilee and the Hula reflooding and restoration project. Most of the publications are in Hebrew.

Following is a partial list of some of the publications which have been issued in recent years:

- ***Our Country's Rivers*: a quarterly on river rehabilitation activities in Israel published by the Ministry of the Environment, Jewish National Fund and National River Administration (with the aid of a grant by the European Union, within the framework of its LIFE II program) (Hebrew);**
- **Proceedings of annual symposia on such topics as conservation and development of the Lake Kinneret watershed basin, coral reefs, Mediterranean coast, fish, etc. (mostly in Hebrew);**
- ***The Jordan River – Restoration, Conservation and Development*: A proposal for rehabilitation of the Jordan River as a focal point of Israeli-Jordanian cooperation published by the Ministry of the Environment, Water Commission, National River Administration (1995, Hebrew with English abstract);**

- **Annual reports on water monitoring in Israel's rivers published by the Ministry of the Environment (Hebrew);**
- ***Israeli National Report on Nature Conservation and the Coral Reef Ecosystem in the Israeli Part of the Gulf of Aqaba*: Prepared for the Middle East Regional Meeting of the International Coral Reef Initiative (September 1997) by the Ministry of the Environment (English);**
- ***Conservation and Sustainable Use of Biological Diversity in Israel:* Report of the State of Israel to the Convention on Biological Diversity (December 1997);**
- **Papers on the restoration and conservation of the reflooded Hula wetlands in *Preservation of Our World in the Wake of Change*: Proceedings of the Sixth International Conference of the Israeli Society for Ecology & Environmental Quality Sciences (July 1996) (English).**

2.8 Noting COP6 Recommendation 6.14 relating to toxic chemicals and pollution, please advise of the actions taken since then "to remedy and to prevent pollution impacts affecting Ramsar sites and other wetlands" (Operative paragraph 9).

Israel's Water Law prohibits any person from throwing or discharging any liquid, solid or gaseous substance into or near a water resource. Penalties imposed for directly or indirectly causing water pollution have been raised significantly in recent years and include additional daily penalties in case of a continuing offense. If a suspicion arises that an offense has been committed, the court may, in response to a request by the prosecutor, issue a temporary court order to prevent, stop or reduce water pollution, even before an indictment has been served. In addition, where the Water Commissioner is satisfied that water pollution has been caused, he may order the person responsible to stop the pollution or restrict it. A court may require the following, in addition to the fine or imprisonment sentence: payment of clean-up expenses and an order to take all measures to stop the pollution, restore prior conditions, and prevent the recurrence of the pollution.

The legal framework for water protection in Israel is constantly being expanded. Regulations pursuant to the Water Law include prohibitions on the rinsing of containers used for spraying of chemical or biological substances into water sources and prohibitions on aerial spraying of chemical and biological agents for agricultural purposes near water sources.

The enactment of the Hazardous Substances Law in 1993 provides for "cradle to grave" supervision and management of hazardous substances. The administrative enforcement means established by the law include a permit requirement for any premise dealing with a hazardous substances. A 1997 amendment to the law has strengthened it by providing for the introduction of conditions into the permit, enlarging penalties up to a maximal fine of $300,000 and maximum imprisonment periods of between six months and three years, widening judiciary powers to issue performance orders, adding powers to issue administrative eviction orders, imposing personal liability on company directors and applying obligations and responsibilities on the state and its organs. In recent years, courts have imposed maximal penalties on individuals and corporations which have discharged toxic chemicals into water bodies.

2.9 Describe what steps have been taken to incorporate wetland economic valuation techniques into natural resource planning and assessment actions.

The incorporation of economic valuation techniques into natural resource planning and assessment actions is only beginning in Israel. Nevertheless, the subject has been accorded priority for research by the Chief Scientist of the Ministry of the Environment. One of the studies currently being conducted by the Natural Resources and

Environmental Research Center and the Institute of Evolution at Haifa University is entitled "Valuing Irreversible Biodiversity Loss." This interdisciplinary study, combining economic and ecological research, will propose an economic model for estimating potential irreversible damage to species diversity which may result from development decisions. The study is expected to serve as a methodological basis for future applied work, especially in connection with environmental impact assessment.

Israel's emerging sustainable development strategy also advocates incorporation of the economic valuation of resources, including wetlands, into decision making. Israeli ecologists believe that since Israel is poor in aquatic ecosystems, a higher score should be attributed in the valuation of biodiversity to areas that contain aquatic ecosystems. In general, it is proposed that an area should be valued by three criteria: its ability to provide ecosystem services, the number of species of potential or existing economic benefit that it harbors and its ability to absorb anthropogenic disturbances without losing biodiversity and its potential for rehabilitation following disturbance.

Development of the Hula wetlands rehabilitation scheme included forecasts of the expected recreational benefits of the project. Researchers used the Contingent Valuation Method in which individuals are induced to state the maximum sum of money they would be willing to pay as entrance fee to a similar park. Based on a survey conducted in neighboring parks in the Upper Galilee, some 87% of the respondents expressed their interest in visiting the proposed park and stated they would be willing to spend about $10 per adult for entrance fees. The preliminary results indicate that the park has significant potential as a recreation area.

2.10 Is Environmental Impact Assessment for actions potentially impacting on wetlands required under legislation in your country? Yes/No

Israel's EIA regulations were promulgated in 1981. The regulations specifically enumerate the following types of plans, among others, for which planning authorities may require EIAs: marinas, national water supply arteries, dams and reservoirs and wastewater treatment plants. EIA requirements are also incorporated into the regulations of a number of masterplans including coastal masterplans. In addition, a planning authority or a ministerial representative on a planning authority may require an EIA, at any stage of the planning process prior to the plan's approval, on any plan expected to have significant environmental impacts, including impact on wetlands. Over the years, EIAs have been required for new marinas and proposed hydroelectric power plants.

A recent review has revealed that some 10% of all EIAs have related to water issues. Many projects, for which an EIA is required, relate to water and to the potential adverse impact of projects on water resources. These include plans for power plants, landfills, recreation and tourism and residential areas. In several cases, siting of a potential project is largely evaluated according to its sensitivity to water pollution. An analysis of EIAs required since 1982 shows special focus on the Kinneret drainage basin. Of 120 EIAs required in the northern region of Israel, about 25% have related to this specific region.

To further refine and improve the EIA process, the Ministry of the Environment has prepared a draft amendment to the regulations which will bring additional projects and policies under the EIA umbrella, will further open the EIA to public review and public hearing, and will require EIAs for development projects in environmentally areas which include natural assets or resources including coasts, infiltration sites, water sources or adjacent areas.

2.11 Is wetland restoration and rehabilitation considered a priority in your country? Yes/No.

If Yes, describe the actions that have been taken to identify wetlands in need of these actions and to mobilise resources for restoration or rehabilitation.

Wetland restoration, coral reef rehabilitation and river rehabilitation are gaining increasing importance in Israel today, due to growing environmental awareness, on the one hand, and mounting development pressures which threaten the few remaining open spaces in the country, on the other hand. In recent years, both governmental and non-governmental bodies have initiated projects to classify Israel's open space landscapes, including wetlands, into landscape units according to such criteria as ecological function, cultural and historic importance, rarity, regeneration capacity, landscape and aesthetic function and potential for leisure and recreation. Based on the carrying capacity for development of each landscape unit, guidelines for planning and land use have been defined.

The NNPPA is preparing a so-called "Open Landscape Plan" for Israel whereby vegetation data is compiled, evaluated, mapped and incorporated with DTM, geological and geomorphological data, using a Geographical Information System. The result will be a database archive for ecosystem assessment of the remaining open natural landscapes in Israel. It will include an evaluation of each area based on such criteria as unique or rare elements, biodiversity in terms of species and communities, and potential for sustainability based on size and connectivity to other areas.

More recently, a study has been initiated to characterize and delineate wetlands in Israel based on about 500 wetland plant species and their common habitats. The study accords special attention to rare habitats and endangered species and includes a "Red List" of endangered species and recommendations for their preservation. Each species was classified separately according to variables which include physical conditions (water affinity levels and salinity types), wetland types as specified for Ramsar sites and wetland habitat types in Israel, distribution and chorotype, life form, and abundance level. In addition, a detailed description of the types of habitats which support wetland plants in Israel is included. The main objective of this classification is to create a preliminary database for research and management on wetland plant species, especially rare and endangered species, which will facilitate the development of the country's wetlands inventory and set priorities for protection. Mapping and Geographic Information Systems will play an important role in assessment and evaluation of threatened wetlands.

Surveys and monitoring of plant and animal species, and especially of waterfowl and of fish, have long been carried out in Israel in order, *inter alia*, to identify wetlands in need of restoration. Most of the monitoring activities are performed by researchers from various institutions who share their efforts with the NNPPA. At present, the NNPPA's small research budget does not suffice for basic research on wetland areas, but rather for small scale surveys only.

On the Mediterranean Sea, the following types of research and monitoring activity are regularly undertaken:

- ***Patella* (Mollusca) is used as a bioindicator for human activity in the littoral belt. A five-year MEDPAN project in which Israel, Italy and Spain participated helped evaluate the use of limpets as indicators of the effect of human load on Mediterranean marine reserves.**
- **Monitoring of algal communities in 25 sites along the 200 kilometer coastline.**
- **Ichthyofaunistic surveys of the shallow coast waters (0-10 meter depth).**

- **Macroinvertebrate fauna in three representative reserves (Dor-Habonim, Shiqmona and Rosh HaNiqra reserves).**
- **Surveys of marine turtle landings and nesting on the Israeli coastline as part of an action plan for turtle conservation. Two main Mediterranean turtle species are found in the Western Galilee and Carmel beaches: loggerhead turtle (*Caretta caretta*) and green turtle (*Chelonia mydas*). All eggs found along the shore are delivered to "hatching farms" which are fenced and guarded, mainly during the hatching period.**
- **Surveys and monitoring of bird populations including common and little terns, great cormorants, raptor nesting sites and migrating birds especially in the Eilat and Hula bottlenecks. Waterfowl censuses have been carried out since 1965 as part of an international effort. Recently, the data of the past 30 years has been summarized and analyzed to identify changes in waterfowl species over the years and to determine the relation between type of aquatic habitat and presence and number of different species. In recent years, some 200,000 individuals, belonging to 90 species, have been counted in each census. The results confirm the importance of Israel's artificial water reservoirs, which were created in recent decades, for the waterfowl population.**
- **Long-term monitoring of the Israeli Cetacea by the Israeli Marine Mammal Research and Assistance Center of Haifa University. This includes monitoring of some tens of dolphins living in the territorial water (Bottlenose dolphin, Striped dolphin and Common dolphin).**

Israel conducts a marine monitoring program in its 20 coastal nature reserves, 14 marine reserves and 2 islets on the Mediterranean coast and in one marine and coastal reserve in the Red Sea. The program is carried out in shallow water (0-10 meter depth) and largely relates to human load in the coastal region.

In the Eilat coral reef reserve, a comprehensive monitoring and research program is conducted. Monitoring includes the following elements among many others:
- **Daily visitor numbers (the upper limit in the closed reserve has been set at 800/day).**
- **Long-term monitoring stations for the evaluation of the impact of human activity on the coral reef includes underwater filming of known colonies and measuring the growth rate with an image analyser.**
- **Monitoring of algal communities in terms of taxonomy and biomass in order to detect algal growth which may lead to death.**
- **Monitoring of tourist submarine, glass-bottomed boats and scuba diver activities and compilation of daily, month and annual data to determine the effect of regulations.**
- **Monitoring of snorkeling activities.**

Israel has applied both to the Ramsar Small Grants Fund for Wetland Conservation and Wise Use and to the Life II Project of the European Union for aid in carrying out important wetlands projects. (see 7.5 below)

Israel is now seeking the financial resources to initiate additional studies to better understand the faunal and floral composition of wetlands in order to promote better management of its nature reserves and wetlands. Of special importance is the unique vermetid reef of Shiqmona, probably the most diverse littoral ecosystem in the Mediterranean coast of Israel. The combination of this temperate biogeographic region with subtropical hydrological conditions (high temperature and salinity), which was originally inhabited by Atlanto-Mediterranean biota and exposed to the invasion of Red Sea intruders, has formed a unique marine biotic community in this vermetid reef, with up to 30 species of fish with a density of over a thousand fish per 100 m^2. A better knowledge of the faunal composition of the littoral community, the annual dynamic of the individual species and the community as a whole, the food web, breeding season and

partitioning of niches, will enable more effective management of the Shiqmona Nature Reserve. Studies are needed to gather data for characterization of the benthic macrofauna of this area in order to provide firm scientific background for justifying the declaration of this area as a marine nature reserve and declaring it as a Ramsar site.

Israel currently seeks the resources to classify and characterize the eastern Mediterranean marine habitat which differs from the western and central Mediterranean in order to undertake the necessary measures to protect and manage these unique resources. It may be also be necessary to develop a different list of key species (native and invasive) for the Levantine basin due to the Indo-Pacific invasion through the Suez Canal. A project for the western and central Mediterranean was recently carried out by the expert panel of the Specially Protected Areas (SPA) Protocol under the Barcelona Convention.

2.12 Describe what actions have been taken to "encourage active and informed participation of local communities, including indigenous people, and in particular women, in the conservation and wise use of wetlands." (refer to Actions 2.7.1-4 in the Strategic Plan).

The Hula rehabilitation project, launched in 1994, is an example of the participation of local communities in the conservation and wise use of wetlands. The ill-effects of draining some 6,000 hectares of swampland for farming purposes in the 1950s clearly indicated the need for a rehabilitation plan. Given the scope and complexity of the problems, a Hula Valley Administration was established under the auspices of the Jewish National Fund, the Ministry of Agriculture and the region's local authorities. For planning purposes, the aims of all the users of the area and its resources were fully defined. These aims then served as guidelines for the Hula planners and were translated into engineering plans and activities. Five principal systems were identified: the agricultural system which represented the main users of the Hula lands, the national water system which included the Jordan River and Sea of Galilee, the flora and fauna landscape, the water supply and drainage system and the organizational network which consisted of dozens of kibbutzim and moshavim with cultivated fields in the area. Broad agreement was initially reached on two objectives: to preserve the peatlands for posterity and to protect the Sea of Galilee against pollution emanating from the peatlands. Engineering solutions had to ensure economic viability for their users–the residents of the Galilee. A review of agricultural and agro-tourism options was then initiated and resulted in a decision to opt for the latter. To arrive at an operative program, representatives of the systems using the area were asked to compromise on their original aims for the good of the project as a whole. Farmers agreed to relinquish some of their land allocations for the creation of the tourism strip. Green bodies allowed the plan to integrate some commercial elements. Economic and tourism sectors agreed to balance commercial development with the conservation of open spaces. Water bodies agreed to restore some of the Jordan River water originally diverted from the Hula Valley. Once the program's goals were agreed upon, it was possible to achieve consensus and a detailed engineering program.

The reflooding and rehabilitation project has placed a 110-hectare lake at the center of what will be a combination of wetlands and tourist area. Tourism development may include the lake, boating facilities, canals and islands in a marshland setting, a wildlife park, grazing land and open breeding grounds for unique, rare marsh fowl and animals, site-specific vegetation and vacation facilities. Each stage will be carefully monitored to study the impacts before the next stage is initiated.

The combination of the flooded areas and the surrounding agricultural fields in the Hula Valley has created a variety of habitats attracting many birds. Five globally endangered

species winter in the valley: the Imperial Eagle, Spotted Eagle, Black Stork, Common Crane and Pygmy Cormorant. All these species rely on the agriculture in the valley as their source of food. Several projects have been initiated in the valley which focus on the conservation of these species, with the cooperation of local inhabitants.

In one project, local farmers and youth take part in a conservation project for the endangered Imperial and Spotted Eagles in the Hula Valley. The Israel Ornithological Center of the SPNI and local land users have begun working together to minimize the use of pesticides in the area through such means as artificial nesting boxes for the Barn Owl *Tyto alba,* to erect observation poles where raptors can watch for prey, and to promote possibilities for eco-tourism. As part of the educational component of the program, students are involved in tracking the eagles marked with transmitters as part of personal school projects. The students help identify pellet contents and correlate the data with surveys they conduct on local fauna. The results are presented to the local community by the students, thereby increasing awareness of local inhabitants who are not directly involved in the conservation/education program. The project is already integrated as part of a broader Internet program where children from Israel, the Palestinian Authority and Jordan track migrating birds. (See 3.2).

A similar program is being undertaken for other key species, including the 20,000 Eurasian Cranes which winter in the Hula Valley. Both the Common Crane and the Cormorant cause a conflict with farmers–the cormorants feed from the artificial fish ponds in the valley and the cranes cause damage to the agricultural fields. One project, focusing on the Common Cranes, has been carried out by the Israel Ornithological Center with the aid of Euronatur in Germany. Special efforts are being made to involve the landowners in the results and analysis of the research concerning numbers of cranes and quantification of the damages caused. This will lead to the formulation of a management plan which is expected to benefit both sides.

A special program, instituted in 1993, seeks to reduce the conflicts between aquaculture, especially in the Bet She'an Valley with its 1600 ha of fish ponds, and some 100,000 white pelicans (*Pelicanus onocrotalus*) which cross Israel each autumn on their way to wintering grounds. As a result of the extensive damages caused to the farmers in the 1980s in terms of fish losses and a damaging fish parasite introduced by the birds, farmers often took unconventional methods to stop the damage: some stopped raising fish in winter, others chose to violate national and international law by illegally shooting the white pelicans. The new program has successfully kept most of the pelicans from extending their winter stay at the Bet She'an fish ponds by using such mechanisms as noisemakers and exploding shotgun shells to keep the birds moving southward along the migration route. Today, only a few hundred white pelicans overwinter in this area. The program, which includes round-the-clock monitoring of flock movements has effectively reduced the farmers' losses from pelicans to near-zero while ensuring that very few white pelicans are killed. The program's expenses (about $120,000 annually) are borne by the farmers, who feel that it is cost-effective in terms of the extensive losses suffered previously.

Special efforts are also being made to minimize the conflicts between cormorants and freshwater fisheries in Israel. In 1996, a total of 90 special permits were issued by the NNPPA for lethal action against cormorants (by shotgun only) at fish farms. A total of 1,866 birds were bagged under these permits. In order to help solve the problem, the NNPPA has undertaken a multi-year survey on populations of the great cormorants (*Phalacrocorax carbo*) in order to monitor their movements and review various means of reducing cormorant presence in fishing ponds in Israel. The population which currently winters in Israel numbers about 20,000 individuals which are mainly concentrated near

large water bodies. Research includes counts as well as studies on their feeding habits in order to identify alternative feeding sources other than fishponds.

The NNPPA makes every effort to minimize conflicts between animals and farmers through a number of activities including:

- **Collection and analysis of information on damages caused to agriculture by animals;**
- **Contact with farmers and recommendations on how to reduce risks and keep animals away from cultivated fields;**
- **Provision of hands-on help with pressing problems;**
- **Proposals and research designed to help farmers and animals coexist.**

In Israel's second Ramsar site, En Afeq, efforts are being made to include the Arab minority population in education and conservation activities. The existence of the wetland reserve in the open corridor between the Jewish centers of Haifa in the west and several Arab towns and villages in the east, makes En Afeq an ideal rendezvous site for the neighboring communities. The subjects of ecological awareness and responsibility are common subjects among the students and adults who live together in the same regional water basin. Mutual interactions include collection of data in the field, subsequent analysis in the lab, family tours and about 40,000 pupil days per year.

In many of Israel's nature reserves and national parks, special efforts are made to promote the collaboration and participation of local populations in management efforts. This is the case in the Tanninim River where efforts have been made to encourage the participation of local populations, in this case the children of an adjacent Bedouin village. In many cases, the rural population is given the opportunity to operate the facilities and systems related to the nature reserve.

2.13 Describe what actions have been taken to "encourage involvement of the private sector in the conservation and wise use of wetlands" (refer to Actions 2.8.1-4 in the Strategic Plan). Has this included a review of fiscal measures (taxation arrangements, etc.) to identify and remove disincentives and introduce incentives for wetlands conservation and wise use? Yes/No

If yes, please provide details.

In all 55 national parks and nature reserves which have been developed for visitors (on a minimal basis) and which charge entrance fees, local bodies, whether villages, kibbutzim or regional councils, are given the opportunity to operate the visitor facilities including restaurants and other amenities. Private factors lease the facilities and funds are then invested in further development, management and use of the sites. The involvement of the private sector generally accords with the principle that the land and buildings are owned by the NNPPA.

The coral reefs of Eilat have been viewed as a national treasure since the establishment of the State of Israel in 1948. A unique underwater observatory ("Coral World") was constructed within the declared nature reserve (Almog Nature Reserve) in 1975 and was expanded in 1991. It has become the second most popular tourist attraction in Israel, hosting over half a million visitors annually. This private venture, located within the nature reserve, is composed of an underwater observatory along with aquariums and tanks with local marine species for observation by the paying public. These aquariums have permits from the NNPPA to hold an exhibit of local coral reef fauna. There is no direct access from the site to the beach and the reef. Other commercial ventures include scuba diving centers, whose activities are controlled by NNPPA wardens.

The underwater observatory, a kiosk and a small shop in the nature reserve, are all concessions which pay annual payments to the NNPPA which are then used to maintain the reserve. The system enables the public the opportunity to visit the aquariums and observatory without directly harming natural assets. Thus, the integrated management plan takes account of tourism development in this area along with preservation of the fragile ecological habitat upon which tourism is based.

The private sector is also involved in several other projects. Specifically, the Fisheries Board has taken an active part in finding solutions to the conflicts between waterfowl (cormorants and pelicans) and freshwater aquaculture in Israel (see 2.12). Other bodies such as Tnuva (Israel's largest-scale producer of agricultural and dairy products) and the Israel Electric Corporation are active participants in various nature conservation projects largely focusing on the conservation of fauna, including waterfowl and raptors.

Ramsar Strategic Plan - General Objective 3
To raise awareness of wetland values and functions throughout the world and at all levels

3.1 Is there a government-run national programme for Education and Public Awareness in your country which focuses on, or includes, wetlands? Yes/No? If yes, what are the priority actions under this programme and who are the target groups? (Refer also to question 9.4)

The NNPPA, SPNI, Ministry of the Environment, Jewish National Fund and Ministry of the Environment are all involved in education and public awareness programs on environmental conservation. Nature Protection Week has been observed in Israel since 1964, the year in which the country's nature protection legislation was enacted. It was then determined that every year one important and relevant issue related to nature protection would be brought to the attention of the public in an effort to raise environmental consciousness in the country. In past years, Nature Protection Week focused on such themes as wildflowers, wildlife and fresh water.

This year, the week is devoted to the conservation of the marine environment, and for the first time ever, the events will be spread out throughout the entire year. Activities will include the production of an information pamphlet and a poster, a seminar and a march along Israel's coastlines. The events of the week are organized by the Ministry of the Environment, NNPPA, Ministry of Education, and Israel's nature protection bodies. This year, Israel initiated its annual Nature Protection Week on February 2, 1999, International Wetlands Day.

The Ministry of Education is responsible for formal environmental and nature protection education in Israel. The Education Ministry works with the Ministry of the Environment and with environmental education centers in local authorities throughout the country to develop formal environmental education curricula for all levels of education. The modular structure of most study programs provides teachers with maximum flexibility in choosing subjects and adapting them to the level of the students. In the early years of school, special focus is placed on the immediate environment of the students, and all program include concrete tasks in the field.

Field studies are of special importance in Israel and they frequently focus on wetland conservation. Educational programs were developed in eight nature reserves since 1981, of which several are specifically devoted to wetlands: Hula, Dan, Banias and Snir (sources of the Jordan River), En Afeq (northern coastal plain) and Eilat (Red Sea). As a result,

the annual number of pupil visits to guided visitor centers in nature reserves and national parks throughout the country rose dramatically from 40,000 in 1992 to over 150,000 today. These visits constitute only a small percentage of about 6 million paid visits per year at the 55 reserves and parks with visitor facilities (statistically one visit of each inhabitant per year). Thus, a very large proportion of Israel's population is affected by the public outreach programs which are initiated at the country's nature reserves and national parks–from billboards and information leaflets to guided tours.

The Society for the Protection of Nature in Israel (SPNI) and the NNPPA work closely with the formal school system in bringing students, at all levels, to field instruction centers. Field programs are partly subsidized by the Ministry of Education through a special system where hundreds of women soldiers devote their military service to instructing school students on nature protection within the frameworks of the SPNI and NNPPA. It is estimated that some 30% of all instructions in the field are conducted on wetlands although wetlands only constitute 3% of the country's area.

One of the largest Mediterranean field study centers is situated in En Afeq, one of Israel's two RAMSAR sites. This nature reserve is the last remnant of the swamps that once spread over Israel's northern plain. The swamps, spreading over an area of 2,000 hectares were dredged and dried in 1925.

The prime objective of the nature reserve is to conserve the wetlands and the historical structures within the reserve, namely the swamps and archeological remains. Beginning in 1992, educational activities were significantly expanded in the En Afeq Center, primarily with the aid and collaboration of GREEN (Global Rivers Environmental Education Network) and later by long-term support of the Hans Saidel Foundation, CRB Fund and other funds. Ecological education is focused on activities for both the Jewish and Arab communities in the area. The new outdoor field workshops have been prepared with the cooperation of the Ministry of Education, the nearby in-service training school for teachers and lecturers from the University of Haifa. They are specially designed to integrate with the teaching curriculum of the Ministry of Education and to supplement indoor programs taught in schools. The programs are based on fundamentals of wetland ecology.

The education center in En Afeq includes the following components:

- **An information center for nature conservation where women soldiers serve as teachers under the auspices of the NNPPA. The contents of the instruction are adapted to all age groups from nursery to high school. The activities include tours emphasizing seasonal changes, life cycles of plants, the water cycle, life styles of former inhabitants and nomadic Bedouin and field instruction in different reserves and rivers in the Galilee.**
- **An educational center in Arabic which provides services to the Arab population in the formal school system as well as workshops for teachers, summer schools and parent days.**
- **Ecological and biological center which is adapted to the curriculum of biology for seventh grade until matriculation and includes subjects such as ecology of the Na'aman River, waterfowl, adaptation of plants and animals to different habitats, and introduction of computers to biology.**

Today, with about 35,000 guided pupils every year and another 35,000 visitors per year, the nature reserve is reaching its ecological human capacity. The participation of pupils from both Arab and Jewish areas is especially noteworthy. The programs introduced during the past few years have seen an increase of Arab pupils from a few hundred to

about 8,000. Arab classes have systematically taken part in such guiding programs in nature reserves largely due to the institution of special measures to train Arabic speaking guides, to set up a biology library in Arabic and to supply programs and worksheets in Arabic.

Special efforts are currently directed toward developing a GIS (Geographical Information System) ecological management program in En Afeq for use by matriculation and undergraduate students from nearby institutes of higher learning. The proposed simulation programs in the GIS may include such subjects as:

- **Management of visitor capacity of the reserve.**
- **Grazing management of water buffaloes.**
- **Cattle grazing.**
- **Predicted water quality as a function of fresh water sources and prevailing pollution levels at the Na'aman River through biological indicators.**

3.2 Describe the steps taken to have wetland issues and Ramsar's Wise Use principles included as part of the curricula of educational institutions. Has this been at all levels of education (primary, secondary, tertiary and adult)? Please give details.

The very small wetlands which have managed to survive in Israel have largely been declared as nature reserves in which agricultural cultivation is prohibited except for controlled grazing for nature conservation purposes. The land is owned by the government and is fully dedicated to nature conservation. Parts of these wetland reserves are used to develop public awareness of wetland conservation.

The implementation of environmental education concepts into the school curriculum is a major challenge, requiring new criteria, teaching methods and innovations in the learning process. To achieve these goals, Environmental Education Centers were established throughout Israel within the framework of municipal environmental units. The centers prepare environmental curricula, conduct in-service teacher training programs, provide educational material for both teachers and interested citizens, promote informal environmental education, initiate and coordinate lectures, seminars, environmental tours and training courses and promote environmental events, including Nature Protection Week in the beginning of February which has frequently focused on conservation and wise use of wetlands.

Recent years have seen added initiatives on wetland rehabilitation, especially river rehabilitation. The polluted state of the country's rivers has catalyzed a wide range of educational initiatives. Calendars, booklets, posters and newsletters are accompanied by educational programs based on student activities in the field. A teaching center, set up on the banks of the Yarqon River, serves fourth to sixth graders as an integral part of the educational program. It is expected to develop into an instruction center for high school students, providing essential aid in the preparation of research studies on this unique ecosystem. The comprehensive program aims at increasing awareness of the river as a green area in an urban environment, promoting activities with the participation of the surrounding population and advancing cooperation among relevant organizations.

Several Israel high schools specialize in environmental studies. Some 30% of all high schools offer matriculation programs on the environment. In addition, biology students in 11th grade carry out a "biotope" project—an ecological study analyzing the interrelationships of organisms in a given ecosystem. Students in the special environmental program, carry out an "ecotope" project—a study which involves fieldwork observation, surveys and a paper on such issues as water scarcity and wetland conservation. It is estimated that some 30,000 students yearly carry out one of these

projects. In light of growing interest in environmental studies at the high school level, the Environment and Education Ministries have initiated the establishment of teacher training centers designed to help teachers guide and supervise students in the "ecotope" projects, to serve as lending centers of scientific equipment to schools, and to train students to use scientific equipment in the field.

Israel is also a partner in the Global Learning and Observations to Benefit the Environment (GLOBE) project under the responsibility of the Ministries of Education and Environment. In recent years, the project has been integrated into the curriculum of 24 schools throughout the country. Water resources, water pollution and conservation of flora and fauna are important elements in the program along with computer skills. Recently, a new element was added to the program whereby, as a joint initiative of the Ministry of Education, the Society for the Protection of Nature in Israel (Israel's largest NGO) and Tel Aviv University, the Internet is used to track, in real time, migrating birds that carry transmitters. The program, under the motto "Migrating Birds Know No Boundaries" links schoolchildren from all over the world in tracking migrating storks, eagles and pelicans via satellite. (Further information about Israel's migrating bird project can be found at the project's web site at http://bird.org.il).

Each of Israel's institutes of higher learning offers courses and programs on subjects including conservation and wise use of wetlands.

Ramsar Strategic Plan - General Objective 4
To reinforce the capacity of institutions in each Contracting Party to achieve conservation and wise use of wetlands.

4.1 Describe the mechanisms in place, or being introduced, to increase cooperation between the various institutions responsible for actions which can have an impact on the conservation and wise use of wetlands. If one of the mechanisms is a National Ramsar/Wetlands Committee, please describe its composition, functions and *modus operandi*.

In a country as small as Israel, where less than 3% of the original wetland area has managed to survive, a separate Wetland Committee has not been set up since an effective legislative, planning, inspection and supervision system already operates in the country. All land-use in the country is monitored and regulated under the Planning and Building Law, and Israel's planning authorities, at the national, regional and local levels, take account of environmental and nature protection considerations when deliberating on development plans. Furthermore, according to the Water Law, all sources of water in Israel are public property. The supervision system is made up of inspectors from several bodies including the Ministry of the Environment, the NNPPA, the Jewish National Fund, the Israel Lands Administration, and regional councils throughout the country. All are part of a so-called "green police" with the authority of police officers to enforce environmental laws including legislation related to the conservation and wise use of wetlands.

All of Israel's land and nature protection authorities work in close cooperation in Israel's open spaces. They are represented in Israel's planning bodies on the local, regional and national levels. The National Planning and Building Board, at the top level of national planning, is composed of representatives of government ministries, local government and public and professional organizations, including nature protection bodies. The National Board provides a broad and extensive forum for deliberation by all concerned bodies and

allows for the mobilization of professional input and expertise from a wide variety of disciplines.

Most of the day to day integration of nature protection considerations in the planning process is achieved by the participation of environmental planners in the deliberations of national, district and local planning authorities. In large measure, due to their advice, all development decisions take account of environmental reviews and impact assessments.

In addition, the NNPPA participates in the Species Introduction Committee of the Fisheries Department, an interdisciplinary committee which is responsible for preventing damage to ecosystems as a result of the introduction of exotic fish species into the country. A parallel committee exists in the Plant Protection Department which is responsible for the introduction of species for the purpose of biological control. Yet another committee works within the framework of the Veterinary Services for the introduction of vertebrate and invertebrate species for commercial purposes. Finally, an interministerial committee on pesticides advises the Plant Protection and Inspection Services of the Ministry of Agriculture on pesticide registration. The pesticide registration process requires a wide array of toxicity tests including impact on birds and aquatic organisms. The active participation of NNPPA in these and other interdisciplinary committees helps to ensure that aquatic and marine organisms and ecosystems are not damaged.

4.2 Of the following, indicate which have been undertaken:

One. a review to identify the training needs of institutions and individuals concerned with the conservation and wise use of wetlands Yes/No? If yes, please indicate the major findings of the review.

Two. a review to identify training opportunities for these people both within your country and in other countries. Yes/No?

c. the development of training modules or a training programme specifically for wetland managers. If yes, please give details.

d. people from your country have gained wetland-related training either within or outside the country. Yes/No? If yes, please give details.

Such reviews have not been specifically undertaken since wetland conservation and ecology are already included in the training programs offered to environmentalists and nature conservation personnel. The NNPPA, for example, conducts training sessions for its wardens in Israel and sends wardens abroad for training sessions as part of its ongoing activities. In addition, most of Israel's institutes of higher learning include wetland management as part of their environmental programs.

In addition, Israel has long been involved in the fruitful activities of the Regional Activity Center of Specially Protected Areas (RAC/SPA) within the framework of the Barcelona Convention. Activities include developing management strategies for coastal environments, training courses for managers, implementing special programs for nesting marine turtles, monitoring marine mammals and algae. The expert panel of the SPA Protocol provides the necessary tools for characterization, classification and delineation of marine habitats along with criteria for delineating marine reserves (SPAMI).

Israel has also proposed that a Regional MAP/SPA Workshop on Management of Marine and Coastal Nature Reserve be held in Israel. The workshop would be targeted at those who are actively involved in management programs of specially protected marine areas.

Ramsar Strategic Plan - General Objective 5
To ensure the conservation of all sites included in the List of Wetlands of International Importance (Ramsar List).

5.1 Of the Ramsar sites in your country, how many have formal management plans:

a. being prepared?
b. fully prepared?
c. being implemented?

Please indicate in the attached table of Ramsar sites which sites these are and what category they fall into.

Both of the Ramsar sites in Israel, the Hula and En Afeq, have formal management plans fully prepared and implemented—the Hula since 1979 and En Afeq since 1989.

5.2 Of the management plans referred to above, which ones have included a monitoring scheme or programme to allow changes in ecological character to be detected? Please indicate this in the attached table of Ramsar sites also.

Both Ramsar sites have a monitoring program for biotic and abiotic parameters included in the management plans to allow changes in ecological character to be detected.

5.3 Has there been a change in the ecological character (either positive or negative) at any of your Ramsar sites or is this likely to occur in the near future? Yes/No. If Yes, please give details.

The 300 ha Hula Nature Reserve has succeeded in maintaining its central natural assets, namely the northernmost papyrus vegetation and the rich waterfowl population. The reserve still serves as a vital stopover of the Levantine flyway route for palearctic birds. However, the reserve has lost almost all its pristine water sources and mostly relies on water supply from the adjacent wastewater and fish pond reservoir (Enan reservoir) and nearby fishponds. Water quality in the central system of the reserve therefore supports fishpond aquatic fauna and flora. Of the original fauna at the reserve, no mollusc species and only four out of 19 fish species have survived. The main problem at the site remains the low quality water (about 4 million cubic meters per year enter the reserve). At some point over the past two decades, the reserve lost an important endemic fish species, the *Mirogrex hulensis*.

In contrast, the 800 ha newly constructed Hula wetland, nearby to the Hula Ramsar site, is a man-made system, with some 12 million cubic meters of clean freshwater per year. More than 200 species of birds were recorded at the site and over 15 fish species. About 40 species of native plants were recovered. Among those were the aquatic plants observed previously in the Hula swamps. The renewed ecosystem is not the same as the previously known Lake Hula and swamps. but the majority of the recorded flora and fauna species are the same. The system will ensure an income to land owners and nutrient removal from Lake Kinneret loads to protect its water quality. (See 2.2 Hula Wetlands).

In the En Afeq Nature Reserve, a halt of all pollutant discharge into the reserve has been accomplished during the 1990s along with improved management of the water resources of the reserve with the full cooperation of the Hydrological Service and regional water authorities. As a result of the improvement in water flow and maintenance, a phenomena of self-rehabilitation has occurred and a number of snails which disappeared from the reserve in the early 1970s have returned. This is the first recorded success of self-

rehabilitation in a nature reserve in Israel of species of molluscs which disappeared in the past.

5.4 In the case of Montreux Record Ramsar sites where the Management Guidance Procedure has been applied, what is the status of the implementation of the MGP report recommendations? What is the expected time-frame for removing the site from the Montreux Record?

No Israeli sites are included on the Montreux Record.

5.5 For those countries referred to in COP6 Recommendations 6.17.1-4, "Ramsar sites in the Territories of Specific Contracting Parties", please provide advice on the actions that have been taken in response to the issues raised at that time.

Not relevant for Israel

Ramsar Strategic Plan - General Objective 6
To designate for the Ramsar List those wetlands which meet the Convention's criteria, especially wetland types still under-represented in the List and transfrontier wetlands.

6.1 Has a national inventory of wetlands been prepared for your country? Yes/No.

No

If no, are there plans for this to be done? Yes/No.

Yes

Where a national inventory exists please provide details of when it was finalised, where it is kept and what information it contains.

While research on floral and faunal species in Israel is relatively comprehensive, the country's ecosystems, including wetlands, have not been defined and divided in accordance with a standardized classification. Several initiatives have been taken in recent years to classify the remaining open natural landscapes in Israel based on such criteria as unique or rare elements, biodiversity in terms of species and communities and potential for sustainability based on size and connectivity to other areas. Some textbooks identify the main plant associations of communities of wetlands but there is no survey of implemented criteria for identifying wetlands in Israel. (See 2.11 above)

6.2 Does there exist a list or directory of "important" wetlands for your country or region? Yes/No.

Yes, the country has a list of declared wetlands as nature reserves.

If yes, please provide details of when it was finalised, where it is kept, what criteria for "important" were used, and the types of information it contains.

The published data of Israeli aquatic nature reserves (including coastal environments) which exist in different wetland directories was recently summarized. The Aquatic Ecology Department of the NNPPA has prepared a partial directory of "important"

wetlands in Israel. The directory is still being finalised and includes a wide range of information including the data in the following tables:

Table 6.2a: Wetland Areas Preserved in Israel

Reserve type	*Number*	*Area (km^2)*
Coastal reserves	*20*	*38.7*
Marine reserves	*16 (2 in the Red Sea)*	*28.6*
Wetlands	*92[4]*	*252.6*
Islets	*2[5]*	*0.03*
Total	*130[1, 4]*	*319.9[2]*

Source: Ortal, R. 1998. Marine and Wetland Conservation in Israel. Internal Report. NNPPA.

Remarks:

1. ***Wetland reserves constitute only 33% of the total number of reserves in Israel.***
2. ***The area of wetland reserves in Israel is less than 5% of the total area of reserves.***

3. Another 40 dry river-bed (wadis) reserves with a total area of about 430 km^2 were are not included in this table.

4. 76 reserves (82.6% out of the 92) have water permits signed by the Water Commissioner.

5. Some other islets (like Segavion and Newe-Yam islets) are included in the marine reserves area.

Table 6.2b: Wetland Type Reserves In Israel

Water type	*Reserves No.*	*Reserves %*	*Area (ha)*	*Area %*
Rivers (Jordan R.)	**7**	**7.6**	**1,072**	**4.2**
Streams - running	**24**	**26.0**	**19,310***	**76.4**
Freshwater swamps	**11**	**12.0**	**1,593**	**6.3**
Salt swamps	**7**	**7.6**	**2,345**	**9.3**
Springs	**20**	**21.8**	**834**	**3.3**
Rain pools	**23**	**25.0**	**109**	**0.5**
Total	**92**	**100.00**	**25,263****	**100.00**

Source: Ortal, R. 1998. Marine and Wetland Conservation in Israel. Internal Report. NNPPA.

*** Includes their catchment basin, not only the flooding area.**
**** Entire wetland area is about 5 km^2**

Table 6.2C: Israeli Mediterranean Marine Nature Reserves

No	Nature Reserve name	area (ha)	shore line (m)	status	comments
1	Yam - Rosh HaNiqra	446.2	2,825	proposed	limestone & kurkar rocks
2	Yam - Akhziv	217.1	1,367	"	kurkar (eolinite) ridges
3	Yam - Bustan haGalil	46.8	2,649	"	kurkar (eolinite) ridges
4	Yam - Shiqmona	163.4	630	"	kurkar & limestone rocks
5	Yam - Atlit	33.8	1,479	"	kurkar ridges & sandy beaches
6	Yam - Newe Yam	85.3	3,951	"	kurkar ridges & sandy beaches
7	Yam - Dor - Habonim	532.0	1,510	"	kurkar ridges & sandy beaches
8	Yam - Ma'agan Mikha'el	455.3	9,768	"	kurkar & sandy beaches
9	Yam - Gador	65.0	2,100	"	kurkar ridges & sandy beaches
10	Yam - Mikhmoret	29.9	1,489	"	kurkar ridges & sandy beaches
11	Yam - Poleg	119.6	1,611	"	kurkar ridges & sandy beaches
12	Yam - Yavne	58.8	1,761	"	sandy beaches
13	Yam - Evtah	137.0	4,527	"	sandy beaches
14	Yam - Shiqma	102.9	4,653	"	sandy beaches
	Total	2493.1	40,320		

Source: Ortal, R. 1998. Marine and Wetland Conservation in Israel. Internal Report. NNPPA.

Table 6.2d: Israeli Mediterranean Coastal Nature Reserves

No.	Nature Reserve name	area (ha)	shore line (m)	status	comments
1	Hof Rosh HaNiqra	23.0	1,641	proposed	limestone rocks & kurkar b.
2	Hof Bustan haGalil	20.0	2,220	proposed	kurkar (eolinite) beaches
3	Shefekh ha Na'aman	34.2	583	proposed	oligohaline stream & sandy b.
4	Holot Hamifraz	12.2		declared	kurkar ridge & limestone r.
5	Hof Shiqmona	4.5	630	proposed	kurkar ridges & sandy beaches
6	Hurvat Qarta	13.7	100	declared	small stream & kurkar ridge
7	Hof Atlit	43.0	3,734	proposed	kurkar ridge & sandy beaches
8	Hof Newe Yam	30.2	3,040	proposed	kurkar ridge & sandy beaches
9	Hof Dor-Habonim	42.3	4,825	declared	kurkar ridge & sandy beaches
10	Hof Ma'agan Mikha'el	67.2	5,791	proposed	sandy beaches
11	Shefekh N. Daliyya	37.2		proposed	oligohaline stream & sandy b.
12	Nahal Tanninim	32.6	75	declared	oligohaline stream & sandy b.
13	Hof Gador	73.3	2,073	proposed	sandy beaches
14	Hof Mikhmoret	3.0	500	proposed	kurkar ridges & sandy beaches
15	Nahal Poleg	50.0	1,271	declared	small stream & sandy beaches
16	Holot Rishon leZiyyon[1]	800.0	4,300	proposed	sandy beaches
17	Holot Yavne[1]	600.0	5,500	proposed	sandy beaches
18	Holot Nizzanim	765.0	2,103	proposed	sandy beaches
19	Holot Ziqim	286.0	1,843	proposed	sandy beaches
20	Holot Nativ ha'Ashara	698.9	1,631	proposed	sandy beaches
	Total	36,363.3	41,860		

Source: Ortal, R. 1998. Marine and Wetland Conservation in Israel. Internal Report. NNPPA.

Table 6.2e: Protected Natural Asset Belts (Mediterranean and Red Sea)

No.	Name	area (ha)	shore line (m)	width at sea (m)	status	comments
1	Yam Rosh HaNiqra - Akhziv	590.0	5,964	1,120	declared	limestone rocks & kurkar ridges
2	Yam Dor - N. Me'arot	600.0	9,615	1,000	declared	kurkar (eolinite) ridges
3	Coral (Eilat-Red Sea)		3,653		declared	coral
	Total	1,190.0	*19,232			

Source: Ortal, R. 1998. Marine and Wetland Conservation in Israel. Internal Report. NNPPA.

***12,700 m are also included in proposed marine nature reserves, of which 4,000 are in the marine protected belt in Eilat.**

Table 6.2f: Mediterranean Islet Nature Reserves

No.	Name	area (ha)	status	comments
1	Iyyi Hof Rosh HaNiqra	31.1	declared	kurkar islets & nesting sites
2	Iyyi Hof Dor & Ma'agan Mikhael	2.1	declared	kurkar islets & nesting sites
	Total	33.2		

Source: Ortal, R. 1998. Marine and Wetland Conservation in Israel. Internal Report. NNPPA.

Table 6.2g: Israeli Mediterranean Islets

No.	Name	area (ha)	status	comments
1	Tekhelet	0.40	proposed	Yam Rosh - HaNiqra NR
2	Shahaf	0.60	declared	Iyyi Hof Rosh - Ha Niqra NR
3	Nahlieli	0.80	"	Iyyi Hof Rosh - Ha Niqra NR
4	Akhziv	0.30	"	Iyyi Hof Rosh - Ha Niqra NR
5	Segavion	2.30	"	Yam Akhziv NR
6	Atlit	0.75	-	not included
7	"Melah 1"	0.62	proposed	Yam Newe - Yam NR
8	"Melah 2"	0.50	"	Yam Newe - Yam NR
9	"Melah 3"	0.25	"	Yam Newe - Yam NR
10	haMelah	0.80	"	Hof Newe - Yam NR
11	"Newe Yam 1"	0.25	"	Yam Newe - Yam NR
12	Newe Yam	0.75	"	Hof Newe - Yam NR
13	Tamnun	0.15	"	Yam Newe - Yam NR
14	Shehafit	0.75	-	not included
15	"Me'arot 1"	0.22	-	not included
16	"Me'arot 2"	0.32	-	not included
17	"Habonim 1"	0.50	proposed	Yam Dor - Habonim NR
18	"Habonim 2"	0.12	"	Yam Dor - Habonim NR
19	"Habonim 3"	0.70	"	Yam Dor - Habonim NR
20	"Habonim 4"	0.32	"	Yam Dor - Habonim NR
21	Dor	1.30	-	not included
22	Tefet	0.60	-	not included
23	Hofmi	0.60	declared	Iyyi Hof Dor & Ma'agan - Mikha'el NR
24	"HaYonim 1"	0.16	proposed	Yam Ma'agan Mikha'el NR
25	HaYonim	0.50	declared	Iyyi Hof Dor & Ma'agan - Mikha'el NR
26	"HaYonim 2"	0.50	proposed	Yam Ma'agan – Mikha'el NR
27	"HaYonim 3"	0.16	proposed	Yam Ma'agan – Mikha'el NR
	Total	15.22		

Source: Ortal, R. 1998. Marine and Wetland Conservation in Israel. Internal Report. NNPPA.

Table 6.2h: Nature Reserves in Eilat (Red Sea)

No.	Name	area (ha)	shoreline (m)	status
1	Yam Dromi (marine)	32.8	1,336	proposed
2	Hof Dromi (coastal)	3.5	1,147	proposed
3	Yam Almog (marine)	122.4	2,317	proposed
4	Hof Almog (coastal)	12.5	1,310	declared
	Total	171.2	3,653	

Source: Ortal, R. 1998. Marine and Wetland Conservation in Israel. Internal Report. NNPPA.

6.3 If it is known, please provide an estimate of the area of wetlands in your country at present and any information on rates of loss or conversion to other activities.

If this information is available, please indicate what definition of "wetland" was used.

The following types of freshwater habitats existed in Israel at the beginning of the 20th century: swamps (including the Hula Lake and its adjacent swamp), Lake Kinneret (Sea of Galilee), rivers, springs and temporary (mainly winter rain) pools. Agricultural development led to massive reduction in the number and size of aquatic ecosystems, due to the diversion and exploitation of their sources. The main motivations for drainage were reduction of water loss by evaporation to allow for agricultural development, increasing land resources for agriculture and eradicating malaria. In addition, natural ecosystems were transformed into urban areas and industrial and transportation infrastructure. The extent of this loss of wetlands ranged from complete substitution of the wetland to agricultural land and subsequent loss of the aquatic biodiversity (i.e., Kebara wetlands in the coastal plain of Israel) to initial total draining, subsequent engineering of a wetland nature reserve in part of the drained area, and final reconstruction of another part by reflooding (Hula wetlands).

One study, published in 1992, divided 491 mammal, reptile, amphibian, fish, fern and monocotyledon plant (excluding grass) species in Israel into two categories—aquatic and riparian (122 species) v. non-aquatic (369 species) and allocated each species a risk category according to the IUCN categories of "extinct," "endangered," "vulnerable," "rare" or "insufficiently known." It was found that whereas only 14% of non-aquatic species are at risk, 35% of aquatic species are at risk. There was a statistically significant higher number of species at risk among aquatic than among non-aquatic species in each of the taxonomic groups, except in fish, where the proportion of species at risk is similar to those among non-aquatic species in other groups. Another analysis of breeding birds of Israel, published in 1996, revealed that although waterfowl and raptors consist of only a third of the regular breeding avifauna of Israel, all 14 extinct bird species in Israel except for one are waterfowl (7 species) and raptors (6 species, four of which are mostly wetland or riparian).

At the turn of the present century, wide areas of swamps still covered the coastal plain, the inner valleys and the Jordan valley. On the coastal plain, which spans an area of about 2800 km^2, swamps covered about 60 km^2 (about 2% of the coastal area). In the entire area of the country, there were about 280 km^2 of wetlands (mostly swamps).

The largest of Israel's swamps was the Hula Swamp in the eastern Upper Galilee, south of the sources of the Jordan River. This was a 45 km^2 swamp connected with the 15 km^2 Lake Hula to its south. This swamp was artificially drained by 1957 in order to obtain good agricultural land. According to records, drainage of the Hula, a wetland which is relatively small in global terms, resulted in a local loss of 119 species (plus 10 bird species that ceased to breed there), national loss of 36 species, and global loss of 7 animal species. On the other hand, 212 aquatic animal species new to the Hula were recorded in the region following drainage. Some are probably new colonizers, indicative of the changes in habitat and diversity and in the quality of the water following the drainage and the subsequent reconstruction efforts.

Smaller swamps also existed throughout the coastal plain of Israel. The most notable were Na'aman (Kurdani), today the En Afeq Nature Reserve, Kebara swamps, today Berekhat Timsah and Tanninim River Nature Reserve and Malat swamp, today Gibbeton Nature Reserve. None exceeded 2 km^2, and all have been drained. As a result, about 97% of Israel's swamps were drained prior to enactment of the Nature Reserves Law and the establishment of Israel's nature protection bodies. Today, the only remains include the Hula Nature Reserve with some 300 hectares of swampland, the En Afeq Nature Reserve with about 20 hectares of swampland (the largest remaining area of swampland on the coastal plain) and a few tiny remnants of other swamps in other parts of the country.

Swampland drainage was accompanied by the impoundment of most springs in Israel and the diversion and exploitation of stream water for drinking and irrigation. Most of the water of the west-flowing rivers has been diverted for agricultural use and the remaining water has largely consisted of effluents and sewage. Today, natural running water systems are confined to the Lake Kinneret water catchment and to short stretches of the Lower Jordan River tributaries. The Lower Jordan River itself has nearly been cut off from its water sources by national diversion programs of its three riparian countries (Syria, Jordan and Israel).

A multitude of temporary winter rain pools existed in the temperate region of Israel. They ranged in size from several square meters to about a square kilometer. Many of the village pools were man-made and served as the only source of water for villages. They supported a rich and varied variety of invertebrate fauna and several species of amphibians. The number of winter rain pools decreased sharply between the 1950s and 1970s. Many were drained intentionally or were sprayed to control mosquitoes . As a result, the once abundant amphibians have become a threatened group.

Table 6.3a: Past and Present Swamps in Israel

Swamp name	Catchment	Area (ha) 1880th	Area (ha) 1990th
Hula valley (Isr)	**Jordan River**	**6,000**	**180**
Buthiha valley (Isr)	"	**1,000**	**200**
Yizrael valley	"	**4,000**	**few**
Bet She'an valley	"	**2,000**	**few**
Lower Jordan valley	"	**2,000**	**100**
Dead Sea valley	"	**1,000**	**few**
Na'aman valley	**Coastal**	**2,000**	**20**
Zevulun valley	"	**2,000**	**few**
Tanninim valley	"	**1,000**	**20**
Hefer (Faliq) valley	"	**3,000**	**20**
Yarqon valley	"	**2,000**	**20**
Soreq (Rubin) valley	"	**1,000**	**20**
Besor valley	"	**1,000**	**few**
Different valleys	"	**-**	**70**
Total		**28,000**	**650**

Source: Ortal, R. 1998. Marine and Wetland Conservation in Israel. Internal Report. NNPPA.

****Remarks: Today the remaining total Israeli wetland area is only about 8.5 km^2 (including the remaining 6.5 km^2 of swamps). This does not include about 100 km^2 of artificial wetlands (over 30 km^2 of fishponds, about 450 reservoirs with a net area of about 45 km^2 and sewage and other water facilities with an area of about 25 km^2) .***

6.4 Have any actions been taken in response to the COP6 Resolutions and Recommendations that Contracting Parties should give priority to listing Wetlands of International Importance which:
One) meet the criteria for fish habitat (Resolution VI.2),
Two) meet the 1% criterion for waterbird populations using data provided by the International Waterfowl Census (Resolution VI.4),
Three) are subterranean karst or cave wetland systems (Resolution VI.5),
Four) are peatland ecosystems (Recommendation 6.1)
Five) are coral reefs and associated systems (Recommendation 6.7)
Six) are under-represented wetland types (which apart from d. and e. above include mangroves and sea grass beds) (Strategic Plan Action 6.2.3)

Yes/No? If yes, please describe these actions.

One) Israel has implemented the recommendation of viewing fish as a key for identifying the importance of wetlands. Special care has been accorded to the coral reef ichthyofauna, sharks and rays and other unique marine fishes. These species have been declared as protected natural assets in Israel and are protected throughout the country. For all fish species, 14 marine reserves in the Mediterranean and 2 in the Red Sea were delineated and proposed for declaration. Two new regulations were promulgated in the summer of 1998 by the Israel Knesset: a new regulation under the Fisheries Ordinance which restricts the use of spear gun for hunting without any pumped aim in order to protect, for the most part, the rocky shores ichthyofauna, and

a regulation to stop the trawl in the Mediterranean Sea during 45 days in summer and 90 days in spring in the northern Sea of Galilee.

Two) Israel has taken part in the International Waterfowl Census for over 30 years (more than 600 sites visited each year). Special emphasis is accorded to migrating waterfowl which cross the country or winter in the country. Most of the important clusters of fishponds have been declared as restricted areas for waterfowl hunting (for more than 30 years) in addition to the Ramsar wetland sites of the Hula Nature Reserve and En Afeq Nature Reserve.

Three) There are a few small subterranean karst water sites in Israel, most of which are already declared as nature reserves and have monitoring schemes to provide the needed conditions for protection. They include the Dan springs in the Tel Dan Nature Reserve (headwater of the Jordan river); En Awazim in En Awazim Nature Reserve (Hula Valley); En Teo in En Teo Nature Reserve in the Hula Valley; En Nur in the En Nur Nature Reserve near the Sea of Galilee and En Tamar and En Hakikar in the proposed nature reserve of Neot Hakikar. One cave with a few small water ponds and subterranean fauna (Absalom Cave in the Judean hills, west of Jerusalem) has been declared as a nature reserve.

Four) There is almost no peatland ecosystem in Israel except for one small site which is part of the Hula Valley and is represented in the Hula Ramsar site. No special measures have been taken beyond the management scheme to protect the habitat.

Five) Israel has a very restricted coral reef in its Red Sea coast. There are two proposed marine nature reserves and two coastal reserves on the Israeli coast of the Red Sea which extend over 4 km in the marine side and 3.6 km along the Israeli coast respectively. The total length of the Israeli Red Sea coast is 14 km. The coastal reserves are the Hof Almog Nature Reserves which is fenced along its 1.2 km shoreline and the Hof Dromi Nature Reserve with 2.4 km shorelines without any fences. The "marine protected belt" lies in the sea from the international border with Egypt northward for about 4 kilometers to Nahal Shlomo. It is about 3 km wide, from the high tide line to the marine international border with Jordan. Part of the shoreline of this coastal stretch has already been declared as a nature reserve and steps have been taken to declare the whole marine parallel stretch as a nature reserve too. Israel has accorded special resources to protecting its coral reefs.

Six) There are no mangroves in Israel and sea grass beds are rare: In the Mediterranean there is no *Possidonia* and only small sites with *Cymodocea nodosa*. In the Red Sea, there are only restricted sites with *Cymodocea rotundata, Halodule uninervis* and *Thalassodendron ciliatum* (including in the protected marine belt). These unique habitats are well preserved in the nature reserves.

6.5 If your government indicated at COP6 that it would be proceeding to list further specific sites, please advise of the status of this action.

Israel did not indicate the addition of specific sites at COP 6. Nevertheless, the following additional sites are currently being considered: Rosh Haniqra, Shiqmona and Dor-Habonim marine and coastal nature reserves.

6.6 Please advise which of the sites included in the Ramsar List from your country are transfrontier wetlands (Refer also to 7.1).

None of the current sites on Israel's Ramsar List are transfrontier wetlands.

6.7 Describe any plans, or actions being taken for further transfrontier sites to be listed (Refer also to 7.1).

Preliminary steps are being taken to evaluate possibilities for declaring marine and inland water areas along Israel's borders as potential Ramsar sites. These include such sites as the Eilat coral reserve, Rosh Haniqra Nature Reserve, and some nature reserves in the Jordan River Valley.

Ramsar Strategic Plan - General Objective 7
To mobilise international cooperation and financial assistance for wetland conservation and wise use in collaboration with other conventions and agencies, both governmental and non-governmental.

7.1 Briefly describe any bilateral or multilateral activities that have been taken, are under way, or are planned for the management of transfrontier wetlands or their watersheds/catchments (Refer also to 6.6 and 6.7).

Several multilateral initiatives have been launched over the past several years as a result of the Middle East peace process. Initiatives which deal with shared water resources include:

- **Projects for the development of the Jordan Rift Valley as part of trilateral cooperation and collaboration between Israel, Jordan and the United States.**
- **Development planning for the Northern Gulf of Aqaba involving Israel, Jordan and Egypt for which the European Union is acting as facilitator.**

The Jordan Rift Valley, which stretches along the Israel-Jordan border from the Sea of Galilee to the Red Sea coastline and encompasses the Jordan River, Dead Sea, Arava Valley and Red Sea, has been a important focus of activities. Subjects envisaged for cooperation include restoration of the Jordan River, development of eco-tourism on both sides of the Jordan Valley and Dead Sea which will be based, among other elements, on migratory bird watching activity, creation of a jointly planned and managed park at the Dead Sea which will be known as "the Lowest Park on Earth," and coordinated management of shared resources including aquifers.

Further south in the Gulf of Aqaba, Israel and Jordan are implementing a project for coordinated management and monitoring of a Binational Marine Park, facilitated by NOAA (USA) and financed by USAID. The overall goal of the project is to foster cooperation and collaboration between Jordan and Israel in studying, managing, and protecting their shared marine resources, especially coral reefs. In addition, as part of multilateral activities, an emergency response network to deal with oil spills in the Gulf of Aqaba is being implemented. The Upper Gulf of Aqaba Oil Spill Contingency Plan has led to the establishment and upgrading of three oil spill response centers in Aqaba, Eilat and Nuweiba.

Israel is a partner in the International Coral Reef Initiative for the Gulf of Aqaba as part of the Middle East region. It presented a national report on Nature Conservation and the Coral Reef Ecosystem in the Israeli part of the Gulf of Aqaba on the occasion of the Red Sea Regional Meeting held in Aqaba in September 1997. Other participants in the meeting included Egypt, Jordan, Oman, Yemen, Djibouti, and organizations such as the World Bank and EcoPeace.

7.2 Do you have Ramsar sites that are "twinned" with others, either nationally or internationally? Yes/No.

No, neither of Israel's existing Ramsar sites is "twinned" with others.

If yes, please give details.

7.3 Where your country is also a signatory of any of the following Conventions, describe what mechanism(s) exist to assist regular dialogue and cooperative actions between the personnel responsible for their implementation and the Ramsar Administrative Authority:

a. Convention on Biological Diversity
b. Framework Convention on Climate Change
c. Convention to Combat Desertification
d. Convention on Migratory Species
e. World Heritage Convention

Israel signed and ratified the first four conventions. The NNPPA under the responsibility of the Minister of the Environment, is also the focal point for the Convention on Biological Diversity, the Convention on Migratory Species and the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Israel believes that all the conventions enumerated above are intrinsically related and interconnected since the road to sustainable development entails the safeguarding of biodiversity from climate change and desertification, which in part are caused and are definitely exacerbated by damages to biodiversity. In March 1997, an Expert Meeting on Synergies among the Conventions on Biodiversity, Climate Change, Combating Desertification and the Forest Principles took place in the Blaustein Institute for Desert Research at the Sede Boqer campus of Ben Gurion University of the Negev. The meeting provided an opportunity to discuss key aspects of these international instruments and to recommend measures to promote the synergies in their implementation.

7.4 Is your country cooperating as part of any bilateral or multilateral activities directed at the conservation of migratory wetland species? Yes/No.

If yes, please provide details.

Israel ratified the Convention on Migratory Species of Wild Animals in 1983. The NNPPA, as the designated national authority, has taken an active part in implementing this convention. Israel has not yet ratified the African-Eurasian (Water Bird) Agreement (AEWA). Nevertheless, the country has taken an important part in this agreement and the Interim Secretariat attended the international seminar "Birds Know No Boundaries" which was held in Israel in September 1997 in order to promote AEWA.

The Middle East's unique location as a "bottleneck" in the migration route of about 500 million migrating birds every year provides excellent conditions for all aspects of bird migration research. The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety has funded a joint German-Israeli research project in March 1994 on white stork migration and conservation measures in the Middle East. The results of tracking migrating storks by satellite (65 storks have been tracked thus far) were presented at an international seminar held in Israel in 1997 and sponsored by the German Ministry of the Environment on the subject "Migrating Birds Know No Boundaries." The research results have formed the basis for developing hi-tech educational programs using the Internet to follow migrating birds tracked by satellite, radar and other methods, and knowledge is also being used to elaborate ecotourism programs.

An International Center for the Study of Bird Migration has been established in Israel near Latrun (between Jerusalem and Tel Aviv). This Center is helping to coordinate the creation of a network of weather and bird radar systems at key point throughout the Middle East. The International Center is also coordinating an international educational program in which school children in Europe, Israel, Jordan, the Palestinian Authority and Egypt track birds migrating between Europe and Africa. The education program not only imparts knowledge on migration but introduces students to advanced data and research methodologies and Internet communications. Dozens of Israeli and several Palestinian schools are already participating in the program. (See 3.2).

Researchers at Israeli and French universities have joined in a study of the migration of the Great White Pelican (*Pelecanus onocrotalus*) which is expected to contribute to the establishment of new management policies which will help solve the conflict between the fish industry and pelican conservation in Israel. The study of a first-year, transmitter-equipped White Pelican has provided the first records of the precise migration routes between Europe and Israel and the local movement ranges around the breeding grounds in Europe and the wintering grounds in Israel. (See 7.5).

7.5 Are there multilateral and/or bilateral donors supporting projects which contribute to implementation of the Ramsar Convention in your country? Yes/No.

If yes, please provide details.

The Hula Valley, including the nature reserve and the new 110-hectare reflooded lake outside of the reserve, is one of the most important migrating and wintering sites in the region for more than 200 species of birds, including five endangered species as defined by BirdLife International and the IUCN list. A financial grant from the Ramsar Small Grants Fund for Wetland Conservation and Wise Use is contributing to a research project which was initiated in 1997 to monitor vulnerable and endangered species which breed, migrate and winter in this region. The project is focusing on the Imperial Eagle (*Aquila heliaca*) and the Spotted Eagle (*Aquila clanga*). It is studying, on the one hand, the effects of pesticides and intensive agriculture on these two species, and on the other hand, their contribution to preserving the natural equilibrium of the Hula wetlands and surrounding agricultural fields. The study has confirmed the importance of the valley to the fragile populations of both species and preliminary telemetry results have shown that the eagles spend 85% of their time in the agricultural areas, especially the alfalfa fields. The results have paved the way for greater cooperation between agriculture, tourism and ecological conservation.

Euronatur in Germany, along with Lufthansa and the Society for the Protection of Nature in Israel are funding a monitoring project on the presence of Common Cranes in the Hula Valley. In the coming year the project will focus on management of cranes in the Hula Valley by providing cranes with alternative fields while allowing farmers to cultivate their crops with minimal damage. All projects incorporate local inhabitants and stakeholders in discussions and decisions on the wise use of wetlands.

The European Union, within the framework of its LIFE program, approved funds for the joint financing of two environmental projects which contribute to the implementation of the Ramsar Convention in 1997: restoration and conservation of fauna and flora in the reflooded Hula wetland habitat and restoration of rivers in Israel's coastal plain. The Hula project involves the reintroduction to the area of lost animals and plant species such as the native water buffalo, protection of species and sites from intrusive plants and harmful rodents, the creation of special habitats and monitoring of the ecosystem. The

river restoration project is intended to help the Ministry of the Environment prepare a comprehensive national masterplan for the restoration of six rivers in Israel's coastal plain. This will include a survey of all major sources of pollution, surveys of the ecology and natural and cultural resources of lands adjacent to rivers, guidelines for water quantities and qualities needed for restoration of streams, and river-specific masterplans.

Specifically, the project will involve the following:

- **Preparation of an exhaustive list of pollution sources, including characterization of both volume and pollutants and coordination of enforcement efforts by various arms of the Ministry of the Environment. A computerized list of pollution sources, their characteristics and the current and updated status of enforcement and improvements will be prepared as part of this effort.**
- **Preparation of detailed surveys of ecological sensitivities and natural values of six rivers in Israel. This will be carried out by external consultants in accordance with guidelines prepared by a multidisciplinary steering committee representing the NNPPA, the Antiquities Authority, the Ministry of the Environment and academic experts.**
- **Preparation of detailed estimations of water qualities and quantities required for rehabilitation of the six rivers included in the project. This will be carried out by teams of external consultants consisting of hydrologists, ecologists and economists. This will form the basis for requests for water allocation according to the Water Law.**
- **A masterplan for preservation and controlled development of areas adjacent to the six rivers which will be prepared by teams of landscape architects and town planners. Their work will be supervised by the National River Administration in close cooperation with the Ministry of the Interior which is in charge of the district planning and building committees. This will serve as a basis for local plans which will regulate building and development carried out in the vicinity of rivers in order to achieve their preservation and rehabilitation.**

Several foundations have donated funds for wetland conservation and education activities in Israel. They include GREEN (Global Rivers Environmental Education Network), the Hans Saidel Foundation, the Abraham Fund Israel, the Dorot and Cummings Foundations, the CRB Foundation, Shelly, the Ebert Foundation and many others.

During the general meetings of the BioCISE project in Lisbon, Portugal in January 1999, the possibility of initiating a Mediterranean biological database network, which will include Israel, Italy, Greece and possibly other countries such as Spain, Portugal and Cyprus was raised. A proposal will be submitted to the European Union 5th Framework Programme for Research, Technological Development and Demonstration activities (RTD) under the heading Specific Programme 2: "User-Friendly information society." The aim is to pool the databases of Mediterranean countries on flora and fauna for the purposes of conservation, resource use and academic research. It is expected that over the coming months, representatives of Germany, Greece, Italy, Israel and the Netherlands will draft a concerted action proposal to establish a GIS-based biological database with easy public access via the Internet. The project will initially be based in Israel and will focus also on wetlands and will later expand to other Mediterranean countries using technology developed in Israel.

7.6 Does your government make an annual budgetary allocation to support the conservation and wise use of wetlands within your country? Yes/No.

If yes, is this a specific allocation to a wetlands programme or as part of a larger environment or natural resource management budget?

Out of the NNPPA's total annual budget of about $35 million for nature conservation in Israel, less than 30% is contributed by the government and the rest is raised from income derived from nature reserves and national parks.

Approximately, $60 million are allocated to river rehabilitation in Israel each year, most of which is targeted to pollution prevention (municipal and industrial sewage treatment) and about $7.5 to the preservation of open spaces and the design and establishment of parks for leisure and recreation.

7.7 If your country has a development assistance programme, does it include funds earmarked for wetland conservation and wise use in other countries? Yes/No. If yes, please give details.

Not relevant to Israel.

7.8 Is there a formal process in place for consultation between the Ramsar Administrative Authority and the development assistance programme in your country, where one exists? Yes/No

If yes, what is that process.

Not relevant to Israel.

Ramsar Strategic Plan - General Objective 8
To provide the Convention with the required institutional mechanisms and resources.

8.1 Has your government made voluntary financial contributions, other than the invoiced contributions or to the Small Grants Fund, to further the work of the Convention globally? Yes/No.

If yes, please provide details.

No

8.2 If your country is in arrears with the payment of its annual contributions to the Ramsar Convention, please indicate the reasons for this situation and the prospects for paying these arrears in the near future.

Not in arrears.

Optional section - Participation of non-government organizations in the implementation of the Convention

9.1 Approximately how many NGOs have wetlands as part of their regular "business" in your country?

Please break this down between international, regional and national/provincial organizations.

` **Numerous NGOs operate in Israel today and several have wetlands as part of their regular "business."**

- **Society for the Protection of Nature in Israel (SPNI): The largest and most prominent environmental NGO is the SPNI, with more than 45,000 individual and family members. The SPNI began with a group of conservationists in 1953 around a specific wetland issue: draining of Lake Hula and the surrounding swamps. As a result of their efforts, 300 hectares of untouched swampland were preserved as a protected refuge for the flora and fauna of the Hula Valley. The campaign also succeeded in putting nature conservation on Israel's national agenda. The SPNI is a public representative on the National Planning and Building Board. Its activities have been backed up by public protests and legal action, including petitions to the High Court of Justice.**
- **Jewish National Fund (JNF): The JNF has been instrumental in reclaiming, developing and afforesting the land of Israel since its establishment in the beginning of the century. The JNF has developed innovative methods of water harvesting and has initiated large-scale water conservation projects. It has built reservoirs and dams to capture floodwater for irrigation, halt soil erosion and replenish underground aquifers. It has cleared clogged riverbeds, reinforced river banks and restored rivers as part of a national river rehabilitation program. It has been actively involved in rehabilitating the Hula Valley.**
- **Israel Marine Mammal Research and Assistance Center (IMMRAC): Established in 1995 under the Center for Maritime Studies of Haifa University, this center is dedicated to gaining biological and ecological knowledge on populations of marine mammals in the southeastern Mediterranean and northern Red Sea, to studying the factors causing mortality in marine mammals in these areas and developing means of reducing mortality, and to developing systems to rescue marine mammals in distress.**
- **Israel Union for Environmental Defense (IUED): The establishment of the IUED in 1990 marked a milestone in the use of legal means to tackle environmental problems in Israel. The organization has received legal standing under a number of Israeli laws to represent the public in court on environmental issues. In addition, its staff serve as consultants in Knesset committee hearings, government meetings and public commissions dealing with nature protection. The IUED has been especially active in river rehabilitation and coastal and open space conservation.**
- **GreenAction was set up in 1994 to raise consciousness in the Israeli community and provide a forum for the public to express grievances over environmental issues.**
- **Public Council for the Preservation of Open Landscapes and Land Resources was set up in 1994 and has taken an active part in classifying open space landscapes into units according to criteria which relate to the characteristics and functions of landscape units.**
- **Green Course was launched in 1997 on a dozen university and college campuses throughout the country. It has concentrated on environmental campaigns for the preservation of the coasts as open spaces.**
- **Middle East Nature Conservation Association (MENCA): This organization, established in 1995, is a member of IUCN. Its aim is to promote nature conservation and**

environmental protection in the Middle East. Current projects include field surveys of natural assets in the Middle East, reintroduction of species into their original habitats, aid in law enforcement and rehabilitation of Middle East wetlands.

- **GreenPeace inaugurated its Israeli office in 1995. Initial campaigns have focused on prevention of Mediterranean pollution.**
- **EcoPeace, founded in 1994 by Egyptian, Jordanian, Palestinian and Israeli environmentalists, is actively involved in assessing and monitoring environmental implications of projects or activities that are likely to have transboundary impacts and to addressing common regional environmental issues. The organization is implementing projects in such areas as sustainable tourism for the Gulf of Aqaba and regional development for the Dead Sea basin. In 1998, EcoPeace became the Middle East chapter of Friends of the Earth.**

Women's organizations also take an active part in environmental and nature protection campaigns.

9. Is there a regular forum or mechanism through which these NGOs express their views on wetland conservation and Ramsar implementation:
   a. to each other? Yes/No
   b. to the government? Yes/No

If yes in either case, please give details.

Israel's environmental NGOs are part of an umbrella organization which was set up in 1975 (Life and Environment). Today, this organization includes over 30 NGOs. Representatives of the various groups meet regularly to exchange information on specific environmental activities, plan campaigns and select priority areas for action. Life and Environment represents Israel's environmental bodies, as a united lobby group, at the level of the Knesset, government ministries and local authorities and represents Israel's environmental NGOs on the international front. Within the country, the SPNI is represented on the National Planning and Building Board, and several other NGOs provide environmental input to planning and legislative authorities in Israel. According to Israeli law, several NGOs may bring civil claims and secure injunctions against potential and actual polluters. All of Israel's NGOs serve a "watchdog" function over government agencies and have proved most effective in halting large-scale development projects which threaten irreversible harm to the environment including marinas on Israel's coastlines or sewage discharge into rivers and water sources.

9.3 Does your government include one or more NGO representatives on its official delegation to Ramsar COPs? Yes/No

No

9.4 Do any of the NGOs run programmes aimed at Education and Public Awareness about wetlands in your country? Yes/No. If yes, please give details (Refer also to question 3.1).

The SPNI maintains 24 field schools and 10 urban nature centers dedicated to education and public awareness. The field schools play an important role in increasing public awareness about wetlands, especially in rivers and nature reserves throughout the country. In fact, most of the SPNI field schools are situated in the vicinity of wetlands.

SPNI's education department brings the organization's message to more than 700,000 Israelis and tourists each year through direct encounters with nature. SPNI's nature education starts at a very young age, teaching students through hand-on activities in the

field about Israel's natural landscapes, including wetlands. Nature Groups, for young elementary school students, lead into Trailblazers, for upper elementary school through early high school. These youth groups take students on hikes, teach them about Israel's flora and fauna, and encourage a sense of respect for Israel's environment. More than 2,500 high school students each year, as part of their biology studies with their high school, take the option of working with the SPNI on the "biotope" project, where they go out into the field and conduct hands-on research about biology and the environment. In 1997, the Eilat Field Study Center initiated a program combining the "biotope" research with computer analysis. This combination of nature and technology has been so successful that SPNI is currently preparing to extend the project to other school systems around the country.

SPNI trains about 400 nature guides each year who commit to continue to guide for the SPNI, NNPPA and other NGOs. Continuing education programs are required for guides to retain their certification.

Through its network of field study centers and urban nature centers across the country, the SPNI works within local communities to teach them about the natural world at their doorstep. Some field schools include hostels for Israeli and foreign groups while others have areas dedicated as museums to teach about the local environment. SPNI educational activities extend to the Israeli Arab and Druze populations, reaching thousands of educators, students and concerned individuals through teacher training, regional hikes and biotope and ecotope courses for high school students.

The Ministry of Education, Society for the Protection of Nature in Israel, Tel Aviv University and the Globe Program have initiated an interdisciplinary curriculum using the Internet to follow satellite transmitters attached to migrating birds. The program was initiated by the International Center for the Study of Bird Migration at Latrun, Israel. The curriculum combines biology, geography, climate and computer communication, as well as English and research skills, through a program following migrating birds. It emphasizes the linkage between nations along the birds' migration route, serving to raise awareness of nature and wetland conservation among all people. (See 3.2 and 7.4).

9.5 Where they exist, do Ramsar site management advisory committees include NGO representatives? If yes, please give details.

NGOs play an important part in the conservation and use of Israel's Ramsar sites.

9.6 Describe the themes of the Convention (refer to General Objectives 1-8 of the Strategic Plan) where you perceive the national/provincial NGOs to be most active.

Israel's NGOs are most active in promoting the objectives of raising awareness of wetland values and functions (Objective 3). However, they are also active in reinforcing the capacity of institutions to achieve conservation and wise use of wetlands (Objective 4) and in achieving the wise use of wetlands by implementing and further developing the Ramsar Wise Use Guidelines (Objective 2).

Final comments:

10.1 General comments on implementation of the Ramsar Strategic Plan.

Israel seeks to broaden its active participation in the implementation of the Ramsar Strategic Plan under the constraints of significant water shortage in which natural water resources do not suffice to meet drinking water requirements. Therefore, Israel would be interested in assisting to develop strategic lines for wetland conservation measures in arid and semi-arid land where the stochastic rainfall water regime requires water authorities to construct multi-annual water reservoirs, on the one hand, and to limit water allocations for aquatic ecosystems, on the other hand. Furthermore, Israel is interested in cooperating on research related to the reuse of treated wastewater for nature conservation purposes.

10.2 Observations concerning the functioning of, relations with, and services provided by:

a. The Ramsar Standing Committee
b. The Ramsar Scientific and Technical Review Panel
c. The Ramsar Bureau
d. The Ramsar NGO partners

Israel is interested in broadening its activities within the framework of the Ramsar Convention. The first three years of membership (since 1996) were largely devoted to study the different institutions and opportunities with the collaboration of the Ramsar Bureau. Israel is still looking forward to the first visit of the Ramsar Bureau representative in this country. Israel will participate as a full member, for the first time, in the regional Asian meeting and the International Conference of Ramsar planned for 1999 with the hope of promoting its wetland conservation activities.

10.3 Any other general observations and/or recommendations for the future.

Israel values its participation in the Ramsar Convention and the Ramsar Strategic Plan. Although the country has accumulated extensive experience in the conservation and rehabilitation of wetlands, ratification of the convention has facilitated conservation and management efforts in such areas as river rehabilitation, protection of the Sea of Galilee, rehabilitation of the Hula wetlands and conservation of coastal wetlands. The financial funds provided by the Ramsar Small Grants Fund have helped Israel to advance its plans for conservation of two raptor species and their habitats.

The Ramsar Convention Bureau
Rue Mauverney 28
CH-1196 Gland, Switzerland
tel +41 22 999 0170
fax +41 22 999 0169
e-mail ramsar@hq.iucn.org