SAP-BIO
"strategic Action Plan for the Conservation of Coastal and Marine Biodiversity in the Mediterranean Region"

NATIONAL REPORT
of the
SYRIAN ARAB REPUBLIC
RAC/SPA, Tunisia

- draft–

May, 2002

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i. **LIST OF ACRONYMS**

- CBD – Convention on Biological Diversity
- MSEA - the Ministry of State for Environmental Affairs.
- NAP – National Action Plan
- NCSBDS – National Country Study of Biological Diversity in Syrian Arab Republic.
- NGO None Governmental organization.
- NSAPS : National Strategy and Action Plan of Syrian Arab Republic.
- NR – National Report
- RAC/SPA – Regional Activity Center/Specially Protected Areas
- SAP – Strategic Action Plan
- UNEP – United Nations Environment Programme

ii. **METHODOLOGY:**

This draft NR was prepared according to the document provided by the national coordinator "*Guidelines for the preparation of national reports"* (as the Annex VI of the report of the 1st meeting of national correspondents for the preparation of SAP-BIO in the Mediterranean Region, UNEP (DEC)/MED WG. 191/6).

This project was organized by SAP-BIO National Correspondent, Dr Akram Issa Darwich from the Ministry of State for Environmental Affairs (MSEA). Two national consultants were engaged in preparation of this report: Amir Ibrahim, (Ph D), and Mohamad Yacine-Kassab, (Ph D) from the High Institute of Marine Research – Tishreen University - Lattakia, The team met several times with the National correspondent for consultations: and discussing the organisation of the project.

The basis for this work was the **NCSBDS and NSAPS** documents as the two National Reports related to the Convention of Biological Diversity. They give a detailed information of the situation of the Syrian biodiversity, threats and priority strategic actions for the protection of biological diversity in the coastal zone and the marine ecosystems. The consultants had examined the information available in the **NCSBDS & NSAPS** and analyzed them according to criteria of the SPA Protocol in order to meet SAP-BIO objectives. Thus, the most important issues of biodiversity conservation have been prioritized, and the needed actions are specified. This draft NR will be a subject for comments and discussions with the national steering committee.

1. INTRODUCTION

1.1- Background information :

(rewritten from MAP/UNEP report-UNEP(DEC)/MED WG.191/6)

The SAP-BIO project is being implemented within the framework of the *Mediterranean Action Plan (MAP)* which was ratified and approved in 1975, during an Inter-Governmental Meeting convened by the UNEP in Barcelona. In 1976, another conference was convened by UNEP in Barcelona, where representatives of Mediterranean countries adopted the legal support needed to implement the MAP Programme. The document signed in 1976 became known as *the Barcelona Convention*, an international agreement between Mediterranean countries for the protection of the Mediterranean Sea against pollution.

The legal framework of the MAP programme has been enlarged and modified several times since the Barcelona Convention was adopted. Among the most important legal instruments developed and approved for the protection of the marine environment there are six protocols dealing with different aspects of the environmental protection.

The new *Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean* had entered into force on 12 December 1999, replacing the *Protocol concerning Specially Protected Areas* adopted in 1982. The new Protocol is 'stronger' in several important respects:

- the extension to the protection and management of endangered and threatened species, and to the conservation and sustainable use of biodiversity;
- the extension of its geographical coverage to the international waters of the Mediterranean;
- the establishing of new international category of protected area, the *Specially Protected Areas of Mediterranean Importance (SPAMIs);*
- the drawing up of a list of endangered and threatened species and a list of a species whose exploitation should be regulated;
- provisions concerning environmental impact assessment, establishing inventories, and the introduction of non-indigenous or genetically modified species.

In 1992, 150 countries met in Rio de Janeiro for the Conference on the Environment and Development and signed the *Convention on Biological Diversity (CBD).*

In Jakarta, in 1997 the First Meeting of Experts on Marine and Coastal Biological Diversity within the CBD was held. The Meeting produced a recommendation including consideration of a draft three-year work plan on marine and coastal biological diversity. Within the Jakarta Mandate, five thematic issues were identified: Integrated Marine and Coastal Management, Marine and Coastal protected Areas,

Sustainable Use of Marine and Coastal living Resources, Mariculture, and Alien Species.

RAC/SPA and the Preparation of a Strategic Action Plan for Biodiversity in the Mediterranean (SAP BIO)

In 1981, the Second Meeting of the Barcelona Convention decided that a Center for Mediterranean Specially Protected Areas should be established as a national institution with a regional (i.e. Mediterranean) role to play, like the Regional Activity Centers already in operation as a part of MAP (the Blue Plan in Sophia Antipolis, France, and the Priority Actions Programme in Split). The meeting accepted Tunisia's offer to host the Center, RAC/SPA (Regional activity Center for Specially protected areas).

Under a GEF PDF-B grant a Strategic Action Programme to address pollution from land-based activities in the Mediterranean Region (SAP-MED) was developed within MAP, and was adopted by the Tenth Ordinary Meeting of the Contracting Parties to the Barcelona Convention, held in Tunis in 1997. As a follow-up, a project proposal on *Determination of priority actions for further elaboration and implementation of the Strategic Action Programme for the Mediterranean Sea* was submitted to GEF by the MAP Co-coordinating Unit in association with the RACs (SPA/RAC, PAP/RAC, CP/RAC), FAO, WHO, METAP, FFEM, IUCN and WWF. The project, approved by the GEF Council in April 2000, includes the *Preparation of a Strategic Action Plan for Biodiversity in the Mediterranean Region*, with RAC/SPA as the Lead Agency.

1.2- **Objectives of the National Report:**

The Syrian National Report is prepared to contribute for the preparation of the SAP-BIO general report. It aims at :

- ✓ Specifying the main problems affecting Marine biodiversity along the Syrian coast.
- ✓ Identifying the proximate and ultimate causes behind such problems.
- ✓ Assessing the relative importance of these problems in relation to Biodiversity conservation.
- ✓ Ranking of the priorities of national biodiversity conservation.
- ✓ Identifying actions to be taken, such as :
    a. preserving endangered and threatened species and population by Plan.
    b. Conservation of the threatened habitats, communities, ecosystems and landscapes by establishing marine and coastal protected areas.
    c. Limiting the activities affecting biodiversity such as fishing. By instituting fishing excusive zones for some gears and / or some period of time.

1.3 Target users:

The major target of the Syrian national report is to specify the actions to be taken at national level; such actions should be included in a National Program (NP) and ultimately arranged in National Action Plan (NAP), starting from species protection throughout to declaring new protected areas. In addition, increasing the public awareness and their environmental qualification in order to contribute directly to biodiversity conservation, is another important target.

2. GENERAL INFORMATION ON STATUS IN THE COUNTRY:

2.1- General facts on the Syrian Arab Republic :

Total surface area: 185.179. sq. Km
Boundary: 2413 Km
Continental zone area: 900 sq.Km
Population: around 13.812 millions (on 1995)
Population/sq. km: Damascus (1274), Alepo (183), Homs (29) Lattakia (304) Tartous (308).
No. of cities: 79
Largest towns: Damascus (3.127 millions), Alepo (2.953 millions), Homs (1214, millions), Hama (1.097 millions) and Lattakia (0.741),
Coastal towns: Lattakia , Tartous, Jablah and Banias

Length of coast line: 183 km

Islands: 4; Irwad (the major Island in Syria 2 sq. km and 3 km of coast).
Rivers (km of watercourses within boundaries**):** 3,500
Long rivers (km of watercourses within boundaries): Eupfrates (600Km), Orentus (485), Quiek (126), AlKabir Alshimaly (96), Alkabir Algonobi (86Km).
Surface area of lakes: 1017 sq. km
Greatest lakes: AlAssad lake (674 sq. km), Aljabboul (239 sq. km), Qutena (61 sq. km),
Largest spring: 4420 l/sec (Alfiejeh)
Highest mountain: **2814 m (AlShiek mountain)**

Syrian coastline is about 183 km. The coastal strip includes wetlands, river estuaries, coastal cliffs and other diverse habitats. The shore of the Syrian coast is mostly rocky with only about 40 Km of sandy substrate. The coastal climate is very mild (usually 10-35º C). Sea temperatures varies between 14 and 28º C. The coastal

inhabitants concentrated chiefly in 4 major towns along the coast: Lattakia, Tartous, Baniyas, and Jableh. People in the coastal area make their living from fishing, livestock rearing, citrus and olive cultivation. Other economic activities include vegetable growing in covered green houses, maritime transport and trading. Average incomes in the region is generally low.

There are four ports: Lattakia, Tartous, Baniyas and Arwad. The sea in the region is generally deep; the contenental shelf is narrow (less than 1km in some places, the widesty point is 16Km to the south of Tartous).

The major economic activities in the coastal area is agriculture, although there is a strong future potential for tourism to become a driving force for nature conservation.

2.2- Legislation Related to Biodiversity Conservation

There are several legeslations in the Syrian Arab Republic, which aim at protecting and conserving the environment and the aquatic biodiversity:

1. The legislation No. 30 of the Year 1964, which regulates the basic issues regarding protection of aquatic organisms and ecosystems through ensuring prevention of harmful human activities. According to this legislation, a supreme council of the aquatic organisms was established from representatives of various related ministries. This council meets regularly to impose various measures to protect aquatic biodiversity, both in fresh and marine waters.
2. Act No. 10 of the Year 1972, which imposes various measures to protect marine environment from oil Pollution.
3. The ministerial Decree No. 43 of the Year 1986 related to management and safe building and operation of fish farms.
4. The ministerial Decree No. 460 of the Year 1964 related to management of fishing activities in marine waters.

Processes are underway to renew many article of the above-mentioned legislation and decrees in order to fine-tune tuff implementations.

2.3- International agreements and cooperations

In the recent years, Syria became more active in the field of international cooperation for environmental protection and biodiversity conservation. Many international conventions in the field of nature protection were signed; the Syrian Arab Republic is a party to the following international conventions:

1. *Convention on the Protection of the World Cultural and Natural Heritage* (Paris, 1972)

2. *Convention on Wetlands of International Importance especially as Waterfowl Habitat* (Ramsar, 1971)
3. *Convention on the Protection of the Mediterranean Sea against Pollution* (Barcelona, 1976) and the appertaining *Protocol Concerning Special Protected Areas and Biological Diversity in the Mediterranean Sea* (Barcelona, 1995)
4. *Convention on Biological Diversity* (1994).
5. *Convention on Sea pollution prevention (London 1972).*
6. *Convention on pollution prevention from ships (London 1973)*

Syria is now considering signing the following conventions:

1. *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn, 1979) and the appertaining agreements:
2. *Agreement on Conservation of Cetaceans of the Black Sea, the Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)* (1996);
3. *Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)* (Washington, 1973).
4. *Protocol on Biological Safety within the Convention on Biological Diversity* (Cartagena, 2000);

2.4 - Administration and management

The system of legislative power in Syria includes first of all the Parliament (committee of Environment) whose task is to manpulate individual environmental problems. The State Ministry of Environmental Affairs has the responsibility of environmental planning at the state level and can be regarded as the main body responsible for conservation. The Supreme Council of Aquatic Life (whose affiliation is to the Ministry of Agriculture and has representatives of various ministries concerned) has the power of planning for the overall policy of aquatic life conservation and suggest some individual measures to Minister of Agriculture (Legislation No. 30 of the year 1964). The Ministry of Transport (represented by the General Directorate of Ports) and the ministry of Interior are responsible for safe implementation of the legislations and decrees.

Public awareness regarding importance and conservation of natural resources and species in Syria is somehow evident due to the increased ecological associations between citizens and the environment. Several non-governmental environmental organizations (NGO) have already been established. Many more to come. The Government encourages environmental NGO's and students from Natural Sciences and Agriculturae Faculties are porvided with grants for projects that contribute to the national inventories of species and habitats biodiversities. The High Institute of

Marine Research (whose affiliation is to Tishreen University in Lattakia) carry out research project related to marine biodiversity and pollution. Ministries of Education and Ministry of Higher Education are already encouraging educational and public awareness for nature conservation through the educational program and field courses organized at various levels.

2.5 - Marine biodiversity

Waters of the eastern coast of the Mediterranean as a whole has a low primary productivity (oligotrophic coast). This is due to the low level of organic production as a result of a low freshwater discharge from the coastal rivers and consequently low content of nutritious salts in seawater (phosphorus and nitrogen in particular.

More than 2000 plant and animal species have been identified along the Syrian coast so far. A number of specific groups, such as invertebrates, are insufficiently studied and, thus, the basic data on their diversity very scarce or even not available in many cases.

2.5.1 - Invertebrates

The invertebrates fauna in general is better explored in the shallow coastal waters than in the deep sea. A total of 700 invertebrate species have been recorded so far. Foraminifera, Spongia, Cnidaria, Ctenaria, Nematoda, Annelidae, Arthropoda, Mollusca, Chaetognatha and Echinodermata are the most studied invertebrate fauna. The diversity of invertebrates fauna is mostly dependent on the diversity of habitats and water quality.

Many invertebrate species have been considered as threatened, especially in areas which are subjected to human activities. Invertebrate fishing for commercial purposes is very limited. Representatives of some groups of invertebrates living in the shallow waters (sponges, lareger crabs, cephalopods ...etc) have long been economically fished. Sponges in particular are largely overexploited, and such population are largly endangered. Other invertebrate populations can still be affected by illegal fishing methods targeting other economic marine organisms. Eventhough sponges are now not in demand and their economic significance is presently negligible; they still have a great value in such a way that they represent the Syrian traditions.

2.5.2- Marine fishes:

About 180 bony fish species (of about 500 known fish species in the Mediterranean) have been recorded from the Syrian marine waters. More than

100 other fish species are excpected to be present in the Syrian coastal waters. In addition about 50 cartilage fish species are identified from Syrian waters. This mean that high diversity of fish species are present. On contrast, the density of individuals constituting the species is considered to be low.

Fish species composition varies dramatically from time to time due to overfishing or to changes in environmental factors such as salinity, temperature …etc. Species migration and immigration from and to the Syrian waters are evident. 18 fish species (belonging to 14 families) and 15 species (belonging to 10 Families) have been recently reached the Syrian water from the red sea and the western part of the Mediterranean respectively. Moreover several fish species have disappeared from Syrian waters, or their density decreased rapidly.

Habitat destruction threatens fish species. For example, meadows of marine spermatophyta destruction is posing a threat mainly to fish species of the families *Syngnathidae,* and *Serranidae*.

Pollution by various organic or inorganic compounds (such as phenols, petroleum, heavy metals, etc.) is particularly harmful to the early development stages of fish (larvae, post-larvae). Negative impacts of environmental pollution on fish and other marine organisms are proved, but their actual extent and mortality under natural conditions has not been be quantitatively evaluated.

2.5.3-- **Marine turtles and mammals**

Four marine turtles species were recorded along the Syrian coast; the species *Careta careta* is the most permanent inhabitant. Syrian sandy beaches are critical habitats as a breading grounds for this species in the Mediterranean. Many specimens of marine turtles are accidentaly cought yearly.

The Pinniped *Monachus monachus* (Mediterranean seal) has become a rare visitor to the Syrian coast due to habitat disturbance. Moreover, 10 species of the Cetaceans have individual specimens visiting the area frequently.

2.5.4- Submerged freshwater springs and estuaries:

Up to 56 location of the submerged freshwater springs were identified along the Syrian coast, the heaviest ones are near to Baniyas city. Studies are underway to have enough data about the status of water flow and the geomorphological and biological characteristics of such resources for future utilization.

Estuaries locations are rare in the Syrian coast; In addition to the 3 permanent river estuary (Alkabir Al Shimali, Markiah and Alkabir Aljonobi), several seasonal ones are distributed along the coast. Despite the low water inputs of such estuaries, they largely contribute to sea pollution, because they carry lots of the domestic, agricultural and industrial pollutants to the Sea. The action needed is to map such location and do enough scientific research in order to protect such important habitats.

2.5.5 - **Marine protected areas :**

Recently, Syria started to relize the importance of establishing protected areas as the core of the overall protection mechanizm of the marine components of biodiversity. Studies has aleready been done to nominate some areas along the Syrian shore and 4 stations had been already defined as suitable for this purpose. The main criteria for selection of various protected areas was the diversity of the objectives in order to include as many species and ecosystems as possible. These areas are listed below:

Area	Status	Estimated area	Purpose	Authority
Ibn Hani Protectorate	Already established	20 Km2	Protection of marine and coastal biodiversity and scientific research.	by the Ministry of Agriculture
Um Attiour Protectorate	Financed	70 Km2	Protection of marine and coastal diversity (rare species), sustainable development, tourism .	Financed through RAC/SPA
Jun Jableh-Lattakia	Proposed	80km2	Protection of biological diversity,	
South of Arwad	Proposed	50km2	Protection of biological diversity with the focus on Sponges, scientific research.	

2.6 - Coastal biodiversity

2.6.1 - General Characteristics of Syrian coast:

The Syrian coastal region is as area of about 2700 km2 which can be divided into coastal plain in the west and coastal mountain from the east. Coastal mountains is almost parallel to the sea, has a slight slop towards the west and covers an area of 210 x 10-30km (length x width). The eastern part of the Syrian coast is dominated by

a series of coastal mountains with a usual height of 1500m. These mountains are dominated by caves, forests and springs. The dominating geological base is mainly limestone. There are only few Islands facing the coast. The largest and the most important one is Arwad Island (200 Hectare, distancing 2km from Tartous city, 12 m upper sea level).

There are numerous coastal rivers; most of them became seasonal, others still running the year round and carry a great deals of pollutants from domestic, agricultural and industrial discharges. May dams has been already built on the coastal rivers in order to gather winter water for irrigation.

2.6.2 – Vegetation:

Syrian flora totals to 3150 plant species belong to 130 families and 900 genera. Out of these, 22 species are identified from *Pteridophytes*, 12 from *Gymnosperms*. The largest plant group is that of Angiosperms which has 3100 species; out of which the family Fabaceae (especially the genus Trifolium) is the largest in species number.

Forests are also important in the coastal area and include large number of species such as *Pinus halepensis* and *Cupressus sempervirens.* Some of the forest tree species became endangered *(such as Quercus calliprinos)* due to over cuttings.

2.6.3 - Invertebrate fauna:

Syria is rich in invertebrate fauna of diverse habitats, including the Parasitic and interstitial fauna, fresh-water and terrestrial species. Among the terrestrial invertebrates is 111 species of Arachnidae, 21 species of Gastropoda and 1439 species of Insecta were identified.

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2.6.4 - Fresh-water fishes:

In Syria, a total of 157 freshwater fish species (belonging tom 19 families) were identified. The Family Cyprinidae has the largest number of species (99 species) followed by the families Cichlidae (9 species) and Gobitidae (8 species). Many of these species are endemic for Mediterranean. Rivers and lakes in the coastal region of Syria are rich with fish species; some of these species are threatened fishes; they belongs to the family *Cyprinidae*. Among the most endangered fishes are those belonging to genus *Barbus* (*Barbus grypus* and *B. leteus*).

In the last few decades, some fish species were introduced into the country for the purpose of farming: In the fifties, *Cyprinus carpio* (the common carp) and *Oreochromis niloticus* (Tilapia) were introduced from Africa and in the seventies, *Oncorhynshus mykiss* (Rainbow trout) and the Chinese carps (Grass carp and Silver

carp) were introduced from Italy and china respectively. These fish species had affected the local fish populations especially in the northern parts of Syria.

Freshwater resources and consequently their biodiversity are largely affected by salination and drainage for reclamation.

2.6.5 - Amphibians and Reptiles:

There are 16 amphibian species live in Syria, 3 of them are endangered. Reptile species counted to 127 species (70 from lizards, 48 from snakes and 9 from turtles). Out of reptile species, 31 ones are regarded as endangered.

2.6.6 - Birds

Little is known about the coastal and sea bird species in Syria. Many bird species are migratory water birds, which use the coastal habitats as over wintering sites or temporary sites during their migration. Survival of these birds depends on the continued presence of suitable sites across their rotes.

Among the threatened and endangered (globally endangered) bird species are the Shearwaters (*Calonectris diomedea* and *Puffinus yelkouan*) and the gull (*Larus marinus , L. canus).* Other species such as *Bubulcus ibis* and *Falco concolor* are only frequently seen. The main threats are the predators, human disturbance, habitat destruction and over exploitation by hunting.

2.6.7- Mammals:

125 mammalian species are present in Syria; 24 of Carnivora, 7 of Insectivora, 25 of Chiroptera, 42 of Rodentia 21 of Paraoxiens, 4 of Mesaxoniens and 1 of lagomorpha.

Many of these species became rare and endangered, some is now extinct.

2.7 - Aquaculture in the coastal area:

Till now, no mariculture practice is established in Syria. The Syrian strategy for mariculture is to establish an experimental marine fish farming to identify the most suitable species for farming and to define their feeding & breading regimes. Such practise can then be generalized on commercial scale.

On contrast, freshwater aquaculture is common in the coastal area, starting from the 57 hectare earth- ponds fish farm near Baniyas city, to the cage culture fish farm in the 16th October reservoir to the north of lattakia, to many smaller- scale fish farms. Such aquaculture practice impose no obvious significant pressure to marine biodiversity.

2.8 - Available documents and information:

The available documents about the Syrian Biodiversity are:

- ✓ The National country study of Biological Diversity in the Syrian Arab Republic.
- ✓ The National Strategy and Action Plan for the Protection Biological Diversity.
- ✓ The related documents

These are the main local sources of information in the country.

2.9 - On-going and planned activities:

Bilateral projects:

1. A joint national project : Med-Pol. Phase III, National Marine Program (with cooperation with MAP/UNEP) to study marine pollution
2. A joint project with Lebanon (between the High Institute of Marine Research Tishreen University- Lattakia and The National Center for Marine Science-Albatroun). The aims of that project include the effects of the environmental factor on marine biodiversity with special reference to migratory species. The project is planned to start in May. 2002.
3. A joint project with Germany (between the High Institute of Marine Research Tishreen University- Lattakia, and the Institute of environmental chemistry, Germany) to study Biomarkers in fish.
4. A joint project with Egypt (between the High Institute of Marine Research, Tishreen University- Lattakia and Tanta University) to study fouling, fish parasites and microbiology in Syrian marine waters.

2.10 - **H**uman Effects on Marine and Coastal Biodiversity

2.10.1 - Threats on Marine biodiversity:

The most affected marine community is that living in shallow coastline areas due to human activities and to the direct impact of the Anthropogenic pollution where unpurified waste waters of municipal and industrial origin are discharged. Fish schools (such as those of mullet fingerlings) die frequently from discharging urban effluents. Solid waste disposal sites (near Al Bassa plant) badly affects sea water quality where high level of heavy metals were found. Pollutants carried out by coastal rivers are also of great concern.

The process of filling up the littoral zones with various building and earthworks wastes negatively affects the settlements of various fauna and flora species. In addition, the process of excessive benthic fishing by trawling nets on sandy and muddy substrates erradicates many marine plant species: Out of the spermatophyta species, *Halophila stipulacea* is the only common species in the coast of Syria; *Posidonia oceanica* has probably disappeared and the two species *Zostera marina* and *Cymodocea nodosa* are now close to extinction from Syrian waters. In general terms, 35% of marine algal species and 75% of spermatophytes ones and 100% of sponge species are now regarded as threatened species.

Due to the loss of vegetation cover, the nesting grounds of fish has largely been affected, resulting in low fish productivity.

2.10.1.1 - Threatened areas:

Trawling has been performed mostly over sandy-muddy bottoms in area of 25-150m water depth where small scale and sport fisheries dominate. . **A**s a consequence of high fishing pressure, a negative fishing impacts on demersal fish biodiversity might occur. The Syrian fishing fleet is old and has no sufficiernt power to carry out fishing outside the national waters. Thus, heavy impact of fishing is imposed on Syrian fish stocks in Sandy areas. River Estuaries are also threatened due to pollution and oligotrophication. .

2.10.2- Threats to Coastal Biodiversity:

The suitable climate and the fertile land of the Syrian coastal area led to an extensive vegetable farming (both in open fields and in plastic green housed) and citrus & olive orchards farmings. Such agricultural activities are accompanied by a heavy use of chemical pesticides, fungicides, herbicides and chemical fertilizers. In addition, the area is heavily populated which contributes to large inputs of domestic waste and the large number of the industrial plants in the area produces various levels of gaseous, liquid and solid pollutants. Tar balls and garbage are distributed almost everywhere on sand and rocky beaches. Such pollutants ultimately affect biological diversity and cause negative changes in natural communities.

Tourism and urban development, including infrastructure and recreational activities has an adverse impacts on biodiversity. Syrian climate is typically Mediterranean and the coastland is very popular destination for tourism and recreation, where the tourist number is continually increasing. In most cases, tourism and industry have priority to conservation of nature and the Syrian coastal line is used for tourist complexes, industrial plants and related infrastructure. This increases environmental damage from resulted pollution which have a sever impact on beach nesting or dwelling species. The sand and gravel beaches are mostly threatened by organic pollution that damages interstitial fauna and coastal vegetation.

Inefficient control of hunting and fishing represents a very serious problem in Syria Illegal hunting is widespread along the coast line regardless of protection status imposed by the legislations or the close hunting season.

Pollution and heavy tourism resulted in destruction of surface, underground and interstitial fauna. For example, shrimps die in large numbers on polluted beaches facing Baniyas refinery and the distribution of sand crab *Ocypode cursor* is limited to some isolated areas with less human activities (Oum Al Tiour Area).

Animal and plant species previously distributed in the Syrian coastal region become nowadays regionally extinct, rare or had limited breeding range.

The most threatened habitats and ecosystems in the coastal area are:

1. *Sand and gravel beaches*– threatened by sand & gravel removal for building activities and Garbage pollution resulted from tourism. The associated flora and the interstitial fauna are endangered.
2. *River basin*s: are threatened by various human activities such as sand & gravel removal and tree-cutting.
3. *Wetlands* **,**– threatened by drainage and land reclamation.
4. *Underground water* – threatened by domestic , Industrial and agricultural pollutions. Inadequate use as waste disposal sites is common in the coastal area of Syria; this has consequent adverse effect on interstitial fauna.

3. ANALYSIS OF THE PRESENT SITUATION:

3.1 - Marine biodiversity:

Table 1. Issues that have adverse affects on marine biodiversity in Syria:

ISSUES	*PROBLEMS*	*STATUS*	*TREND*
1. Overexploitation of marine organisms (esp. Fish).	i. Illegal fishing (eg. with dynamite, poisons, fine nets …etc). ii. Lack of information about the secondary productivity of marine biological resources and the sustainable exploitation. iii. trawling on sandy beds and destroying vegetation cover. iv. Heavy fishing in areas close to the shore.	- High pressure on the marine ecosystem. - Stress to the organisms	Slight decrease
2. Legislations related to marine managements	i. Insufficient legislations. ii. Insufficient implementation of the available acts.	High pressure on the coast- stress to the organisms	Increase
3. Human activity along the shore and nautical tourism .	i. Heavy use of the coastal area and beaches. ii. Discharge of untreated domestic waste into the sea. iii. Dumping garbage into the sea and beaches.	- High pressure near populated coastal areas	Increase
4. Inadequate buildings and constructions close to sea	1.1Limiting the areas available for public.	- High pressure on the coast. - Stress to the	Strong increase

water.	ii. Uncontrolled waste water disposal and dumping solid waste into the sea	organisms	
5. Marine transport	i. Old, unequipped harbours and marinas. i. Old and unequipped vessels. ii. Possible accidents (oil and other chemical spills. iii. Ballast water disposals.	High pressure on the coast- stress to the organisms because of bad water quality	Increase
6. Pollution	i. Disposal of urban, agricultural and industrial wastes. ii. Driving nutritive elements (N and P) by river flow.	Stress or death to the organisms.	Slight increase
7. Continuous change in local conditions and the increase in salinity level.	i. Species active immigration via Swiss canal or from the western Mediterranean. ii. Species migration	Affecting the marine biodiversity	Increase
8. Invasive species	i. Species passive introduction through tanker ballast waters	Biodiversity degradation	Increase
9. Threatened species	i. No legal list of threatened species. ii. Threat by pollution, continual salinity and Temperature increases. iii. Threat to nesting ground. iv. Being caught in fishing nets	Marine turtles, Monk seal Dolphins and Whales	Increase
10. Insufficient public awareness for marine biodiversity conservation.	i. Public ignorance and missuse of marine species and habitats.	Marine pollution, species overexploitation …etc.	Stable to decreasing

MAJOR THREATS RESULTING FROM THE PROBLEMS LISTED IN Table (1)

Table (1 - 1): Overexploitation of marine organisms.

ISSUE/ PROBLEM	THREAT	CAUSES	IMPACT	SIGNIFICANCE
1. Illegal fishing (eg. with dynamite, poisons, fine nets …etc).	- Destruction of fish and other species - Habitat Destruction	- Ineffective measures taken to control illegal fishing	Medium to High	-Degradation of grounds necessary for reproduction and growing of certain species -Diminishing or loss of species
2.Lack of information about the secondary productivity of marine biological resources and the sustainable exploitation.	Over fishing	Bad management of marine bilogical resources.	High	Overexpolitation and decrease of biological stocks.
3.trawling on sandy beds and destroying vegetation cover.	- destruction beds of *Posidonia* & other species of spermatophytes	Physical destruction of sea beds	High	-Loss of species - Destruction of habitats necessary for reproduction and growth of certain species
4. Heavy fishing close to the shore	- catching of juvenile and immature fish.	- illegal fishing with too small net mesh	high	- Destruction of habitats necessary for reproduction, growth and feeding of many vertebrate and invertebrate species

Table (1 - 2): Legislations related to coastal and marine managements.

ISSUE/ PROBLEM	THREAT	CAUSES	IMPACT	SIGNIFICANCE
1. Insufficient legislations. .	-Unsustainable management of marine biodiversity	-weak legislative framework	- Impact on marine fisheries and habitats	- Marine biodiversity degradation
2. Insufficient implementation of the available acts	- Encouraging illegal behaviour.	-weak institutional framework	- Impact on marine fisheries and habitats	- Marine biodiversity degradation

Table (1 –3): Human activity along the shore and nautical tourism .

ISSUE/ PROBLEM	THREAT	CAUSES	IMPACT	SIGNIFICANCE
1. Heavy use of the coastal area and beaches.	- Biodiversity degradation in sea areas close to the constructions and farms.	- Physical disturbance to species.	High	-Biocoenoses destruction -Habitats destruction
2. Untreated domestic waste .	-Water deoxygenation -Killing certain marine species. - Diminishing of biodiversity	High input of the nutritive elements (N & P) due to untreated waste water	Locally high	-Biocoenoses destruction -Habitats destruction
3. Dumping garbage into the sea and beaches	- Affecting sea appearance for tourists and for local population. - Killing, Suffocation or starvation of marine animals (such as turtles and fish)	- Human negligence - Lack of disposing pins and insufficient management of waste disposal.	Critical during summer times	- Most garbage materials are hardly degradable and stay in marine ecosystem for long time.

Table (1 - 4): Inadequate buildings and constructions close to sea water:

ISSUE/ PROBLEM	THREAT	CAUSES	IMPACT	SIGNIFICANCE
1. Limiting the areas available for public.	- Destroying the natural view of the coast.	- Inadequate implementation of existing legislations	High, especially in tourist beaches.	- Destruction of natural areas and uncontrolled use of the coast.
2. Uncontrolled waste-water disposal and dumping solid waste into the sea	-Spatial eutrophication - Negative effect on marine biocoenoses - Killing, Suffocation or starvation of marine animals (such as turtles and fish)	- lack of facilities for waste water treatment - Insufficient facilities for solid waste removal - Human negligence	Medium to high (permanent, Till waste water treatment plants are established	- Negative effect on Biodiversity. - Most garbage materials are hardly degradable and stay in marine ecosystem for long time.

Table (1 - 5): Marine transport.

ISSUE/ PROBLEM	THREAT	CAUSES	IMPACT	SIGNIFICANCE
1. Old and unequipped harbours and marinas	- Chemical pollution - Effect on tourism - Preventing people from reaching the coast.	- old equipment - lack of treatment facility	Medium (permanent)	- Marine biodiversity degradation
2. Old and unequipped vessels.	- Chemical pollution - Effect on tourism	- old and insufficient oil spill prevention equipment - lack of treatment facility	Medium (permanent)	- Marine biodiversity degradation
3. Possible accidents (oil and other chemical spills)	- Oil spills from accidents affect water quality and biodiversity	- biological, chemical and physical damage to affected area	critical affect in areas of accidents	- Marine biodiversity degradation
4. Ballast water disposal	- introduction of invasive species (possibly)	- ballast water from other areas contains adults of immature organisms .	Possibly high	- Change in local communities

Table (2 –6): Pollution:

ISSUE/ PROBLEM	THREAT	CAUSES	IMPACT	SIGNIFICANCE
1. Disposal of urban, agricultural and industrial wastes	1. Occasional mortality of marine organisms in surface water layer close to the shore. 2. Bottom anoxia. 3. blooms of specific species of phytoplankton 4. Biodiversity loss	- Excessive amounts of organic pollutants and dissolved N and P in untreated urban wastewater - Toxic effects of industrial wastewater and agricultural drainage	Medium	-Degradation of marine life - Biodiversity loss
2. Driving nutritive elements (N and P) by river flow.	1. Occasional mortality of marine organisms in surface water layer close to the shore. 2. Bottom anoxia. 3. Blooms of specific species of phytoplankton 4. Biodiversity loss	- The subsequent increase in primary production. - Input of pesticides and herbicides	High on some locations	-Degradation of marine life - Biodiversity loss

Table (2 –7): Continuous change in local conditions and the increase in salinity level.

ISSUE/ PROBLEM	THREAT	CAUSES	IMPACT	SIGNIFICANCE
1. Species immigration	- Competition with local species for food and space . - Overgrows the original biocoenoses. - Degradation of some valuable local marine species.	1. Neglectful cleaning of fishing nets and anchor storage's 2.Species active migration via Swiss canal or from the western Mediterranean.	Medium to high	- Reduction of biodiversity
2. Species migration	- Loss of traditional biodiversity.	1. Species disappearance from Syrian coastal waters.	Low	- Reduction of biodiversity

Table (2 –8): Invasive species.

ISSUE/ PROBLEM	THREAT	CAUSE	IMPACT	SIGNIFICANCE
1. . Species passive introduction through tanker ballast water disposals	- Competition with local species . - Overgrows the original biocoenoses. - Degradation of some valuable local marine species. - Danger to biological equilibrium	- Ballast water in tankers taken from other areas contains pelagic organisms or larvae of other organisms.	Low-medium.	- Reduction of biodiversity

Table (2 - 9): Threatened species.

ISSUE/ PROBLEM	THREAT	CAUSE	IMPACT	SIGNIFICANCE
1. No legal list of threatened species.	- Insufficient management strategy regarding threatened species protection.	-Insufficient knowledge of biodiversity status and distribution.	- Medium.	- Reduction of biodiversity
2. Threat by pollution, continual salinity and Temperature increases.	- Change in biodiversity species composition.	- Species migration or immigration.	- High	- Reduction of biodiversity
3. Threat to nesting grounds.	- Improper nesting and rearing grounds	- Habitat disturbance	-High	- Reduction of biodiversity
4. Being caught in fishing nets	- Additional pressure on rare species.	- Insufficient avoiding methods.	Medium	- Reduction of biodiversity

Table (2 -10): Insufficient public awareness for biodiversity conservation:

ISSUE/ PROBLEM	THREAT	CAUSE	IMPACT	SIGNIFICANCE
1. Insufficient knowledge of the value of the environmental, scientific and economic values of marine biodiversity	- Degradation of some valuable marine species and/or ecosystems. - Degradation of biodiversity .	- Lack of educated professionals. - Lack of knowledge in local population to recognise natural and scientific values of the of species and ecosystems - Lack of funds allocated to overcome such situation. - Ignorance of policy makers. - Insufficient knowledge of finding a proper way to protect and manage species and ecosystems	Medium in general- critical in affected areas.	- Degradation/destruction of habitats - Reduction of habitat/ species biodiversity

Table (3): **PRIORITY ACTION PLANS FOR MARINE BIODIVERSITY CONSERVATION IN SYRIA.**

Legends: **P1 =***Immediate action to be taken and completed within* 1 *year time;* **P3**= *Action to be completed within a 3 years;* **P5**= *Action to be completed within 5 years;* **P10**=*Action to be completed within 10 years.*

ISSUES/ OF PRIORITY	**PRIORITY ACTION PLAN**	**PRIORITY**
1. Overexploitation of marine organisms (esp. Fish).	1. **Stock assessment and management**: ✓ Estimation of secondary productivity (available biological stocks). ✓ Putting the optimal plans for sustainable management and exploitation. ✓ Issuing the optimal legislative fishing acts accordingly.	P3 P5 P5
2. Insufficient legislations and managements related to marine and coastal ecosystems	**2. Issuing efficient regulations:** ✓ Integrated action plan for coastal zone and marine managements . ✓ Action plan for improving legislation in the area regarding nature protection.	P3 P1
3. Human activity along the coast and nautical tourism .	3. **Managing human activities along the coast**: ✓ Enhancing the surveillance stations along the Syrian coast	P3

	✓ Building municipal waste water treatment plants in the major coastal cities and on the major industrial outlets. ✓ Forcing boats owners of possessing facilities and recipient units for all kinds of waste waters on their boats. ✓ Reducing pollutants from industrial and agricultural sources.	P3 P3 P5
4. Inadequate buildings and constructions close to sea water.	4. **Rearranging the constructions along the coastline**.	P10
5. Marine transport	5. **Managing marine transport, through**: ✓ Issuing a National Contingency Plan for oil (and other toxic agents) combating in case of emergency. ✓ Forcing ships owners of possessing facilities for pollutant discharges of all kinds. ✓ Equipping the ports and marinas for oil treatment facilities.	 P1 P3 P5
6. Pollution from Land-Based sources	6. **Pollution control**: ✓ Controlling pollutions from land- based and from diffused sources. ✓ Increasing public awareness about the danger of use of mineral fertilisers (N and P), pesticides, herbicides and fungicides and substitute such chemical with organic fertilizers and biological controls respectively.	 P5 P1

7. Continuous change in local conditions and the increase in salinity level.	7. **Enhancing the flow of freshwater into the sea accompanied by more ecological & economical studies on the effects of dam building**.	P3
8. Invasive species	**Managing species invasion**: ✓ Reducing the chance of species invasion and imposing measures to treat ballast water against invasive biological species. ✓ Identifying the foreign species and developing ways to reduce their danger	P3 P3
9. Threatened species	8. **Threatened species conservation**: ✓ Putting a comprehensive national plan to identify the threatened species and ways of conservations. ✓ Artificial reproduction of the threatened species ✓ Enhancing the existed protected areas. ✓ Establishing new protected areas. ✓ Mapping the distribution and protection of marine flowering plants	P3 P3 P5 P3
10. Insufficient public awareness for marine biodiversity conservation.	9. **Increasing public awareness**: ✓ Arranging a national comprehensive awareness programme. ✓ Compilation of existing data and forming of the common, interactive and easily accessible data base about species and habitats.	P1 P3

DISCRIPTION OF THE ITEMS PROPOSED FOR PRIORITY ACTION PLANS (LISTED IN TABLE 3) FOR MARINE BIODIVERSITY CONSERVATION IN SYRIA:

Priority Action 1	*Stock assessment and management*
Justification	-These estimations have not been done in Syria since 1976. -Biological stocks are overexploited and the need for management measure to exploit them sustainablly, based on the determination of the available stocks, is a must.
Description	-Statistical determination of the fish, crustaceans and molluscs stocks in the Syrian national waters. See also table 3.
Targets	-Improving the knowledge about biological stocks. -Providing sufficient justifications for the measures to be taken.
Responsibility	-Ministry of Higher Education Marine Research Centres, Ministry of Agriculture, Ministry of Transport.
Prerequisites needed for implementation.	-None.
Support needed	-Technical and financial

Priority Action 2	*Issuing efficient regulations*
Justification	- No sufficient regulations available in Syria till now. - High stress on marine biodiversity.
Description	-The action plan should take into account various components of coastal and marine biodiversities and deals with various issued affecting biodiversity components. . See also table 3.
Targets	-Reaching better management of marine biodiversity.
Responsibility	Ministry of Environment (Biodiversity Unit) Ministry of Agriculture (Supreme council for aquatic organisms) , Ministry of Transport (General Directorate of Ports).
Prerequisites needed for implementation.	- Implementing the priority action 1 listed above.
Support needed	Technical.

Priority Action 3	***Managing human activities along the coast***: .
Justification	- Human activities along the coast and accordingly the resulting pollutants are annually increasing. - There is an increasing pressure on marine biodiversity
Description	- Measures to be taken to minimize various effects resulted from various human activities practiced in the sea. See also table 3.
Targets	- Minimizing pollutants resulted from human activities - Improving sea water quality -Decreasing the stress on marine biodiversity.
Responsibility	- Ministry of Environment, - Ministry of Local Administration (Coastal Municipalities). - Ministry of Industry, - Ministry of Transport.
Prerequisites needed for implementation.	-None
Support needed	-Technical and financial

Priority Action 4	***Rearranging the constructions along the coastline***.
Justification	- Too many buildings for various usages were built along the coast close to the sea, which interferes with the proper management of marine biodiversity.
Description	-The local authority should impose a serious regulation to combat this phenomena.
Targets	- Stop new construction. -Reducing the existed construction
Responsibility	Ministry of Local Administration (Coastal Municipalities). Ministry of Transport (General Directorate of Ports).
Prerequisites needed for implementation.	-None.
Support needed	Possibly none.

Priority Action 5	*Managing marine transport*: .
Justification	- The existed mmarine transportation imposes a large pressure and have an adverse effect on Syrian marine ecosystems.
Description	- Measures to be taken to minimize various effects resulted from various human activities practiced in the sea. . See also table 3.
Targets	- Minimizing pollutants resulted from human activities - Improving sea water quality - Decreasing the stress on marine biodiversity.
Responsibility	- Ministry of Transport.
Prerequisites needed for implementation.	- None
Support needed	- Technical and financial

Priority Action 6	*Pollution control*
Justification	- Many area in Syrian marine waters are identified to have high levels of pollution, some hot-spots area are also recognized, This necessitates taking proper measures.
Description	-Measures to be taken to minimize pollution from various sources. See also table 3.
Targets	- Reduce pollution discharges into the sea. - Improving sea water quality, - improving the status of marine biodiversity.
Responsibility	Ministry of Local Administration (Coastal Municipalities). Ministry of Transport (General Directorate of Ports). Ministry of Agriculture (Coastal Directorates).
Prerequisites needed for implementation.	- None.
Support needed	Possiblyy none.

Priority Action 7	***Enhancing the flow of freshwater into the sea.***
Justification	- Many dams have been built on the coastal rivers, which reduced the nutrients and increased sea water salinity.
Description	- Enhancing the flow of freshwater into the sea accompanied by more ecological & economical studies on the effects of dam building.
Targets	- Increasing fresh water volume reaching the sea. - Increasing sea water nutrients. - Minimizing the increase in salinity level.
Responsibility	- Ministry of Irrigation (Coastal basin Directorate) - Ministry of Environment..
Prerequisites needed for implementation.	- None
Support needed	-Possibly Technical

Priority Action 8	***Managing invasion.***
Justification	- Many foreign species have been already invaded Syrian water and largely affect species composition and biodiversity. This necessitates taking proper measures.
Description	Reducing the chance of species invasion and imposing measures to treat ballast water against invasive biological species and managing the foreign species (eg Jellyfish)
Targets	- Reducing species invasion. - Conserving the conventional biodiversity. - Protecting local species from the danger arised from invasive species
Responsibility	Ministry of Transport (General Directorate of Ports). Ministry of Agriculture (Coastal Directorates). Ministry of Higher Education (for research) Ministry of Agriculture.
Prerequisites needed for implementation.	- None.
Support needed	Technical and financial.

Priority Action 9	***Threatened species conservation***
Justification	-Many marine species are threatened, some of them are regionally or internationally protected (eg. Sea turtle , Seals, Dolphins)
Description	-See Table 3.
Targets	- Identifying the protected species available ion Syrian waters. - Imposing regulation for protection.
Responsibility	- Ministry of Higher Education (for research) - Ministry of Environment. - Ministry of Agriculture - Ministry of transport
Prerequisites needed for implementation.	-None.
Support needed	- Technical and financial.

Priority Action 10	***Increasing public awareness.***
Justification	- Public awareness, which is necessary for any conservation measure, still below the required level. - The data base itself is of utmost importance of cultural and scientific purposes..
Description	- See Table 3.
Targets	- Increasing public awareness towards the status of marine biodiversity and the importance of conservation. - Establishing marine Aquaria, museums …etc - Building up a national data base center.
Responsibility	- Ministry of environment - Ministry of Medias, - Ministry of education
Prerequisites needed for implementation.	- None.
Support needed	-Technical and financial.

3.2 - Coastal biodiversity:

Table (4): Issues that have adverse affects on Coastal biodiversity in Syria:

ISSUE	PROBLEMS	STATUS	TRENDS
1. Tourism and recreational infrastructure	i. Uncontrolled waste disposals ii. Recreational activities	- Stress to the organisms	Increasing
2. Urban developments (Inadequate buildings and constructions along the coast)	i. Coastal overcrowding by recreational and other human activities. ii. Limiting the areas available for public.	- High pressure on the coast -	Increasing
3. Sand removal from beaches for concrete constructions.	i. Diminishing nesting grounds available to marine turtles. ii. Degradation of habitats and endangering the associated organisms. iii. Limiting the areas of beaches suitable for swimming.	Pressure coastal biodiversity	Stable
4. Insufficient measures for management of biological diversity	i. Public ignorance of existing lows. ii. Lack of qualified expert staff to implement the protection measures. iii. Insufficient management.	Biodiversity degradation	Stable

5. Illegal coastal hunting practices	i. Hunting of coastal-bird species for recreation and for food.	Effect on coastal birds	Stable
6. Dam building on coastal rivers.	i. Reclamation of coastal wetlands. ii. Increase in concentration of domestic and agricultural waste discharged into coastal rivers. iii. Preventing fish species (eg. Eels and Mullets) from reaching upper rivers. iv. Change in the balance and location of underground . v. Salinity increase at estuaries.	- Effects on coastal wetlands and coastal rivers. - Effect on ecosystems and biodiversity in coastal rivers	- Great part of such habitats are already destroyed. - Increasing.
7. Change in river basin landscape.	i. Tree-cutting from the rivers. ii. Sand & gravel removal from river bottoms.	- Effect on river habitats and species	- Increasing.
8. Threats to habitats and rare species.	i. Insufficient protection	All habitats/species are threatened	- Stable

Major threats resulting from the problems listed in Table (4):

Table (4-1): Tourism and recreational infrastructure.

ISSUE/ PROBLEM	THREATS	CAUSES	IMPACTS	SIGNIFIANCE
1. Uncontrolled waste disposals	i. Coastal habitat destruction. ii. Species degradation iii. Pollution	-Constructions. - Waste disposal. - Disturbance to breeding & feeding sites.	Medium	- Diminishing of wildlife habitats - Destroying of coastal organisms.
2. Recreational activities	i. Effect on the quality of the coastal areas. ii. Threats on habitat/species.	- Organic / chemical pollutions	Medium to high (tourism is increasing).	- Effect on coastal biodiversity.

Table (4-2): Urban developments.

ISSUE/ PROBLEM	THREATS	CAUSES	IMPACTS	SIGNIFIANCE
1. Coastal overcrowding by recreational and other human activities.	i. Coastal habitat destruction. ii. Species degradation iii. Pollution	-Constructions. - Waste disposal and organic / chemical pollutions. - Destroying vegetation cover on the coast. - Desertification of breeding & feeding sites.	Medium to high	- Diminishing of wildlife habitats - Destroying of coastal fauna. - Restriction of endangered plant species.
2. Uncontrolled waste disposals	i. Effect on the quality of the coastal areas. ii. Threats on habitat/species.	- Waste disposals.	Medium	- Effect on coastal biodiversity.
3 Limiting the areas available for public activity.	i. Public ignorance to the value of the coastal areas.	-	Medium	- Limited public Awareness

Table (4-3): Sand removal from beaches :

ISSUE/ PROBLEM	THREATS	CAUSES	IMPACTS	SIGNIFICANCE
1. Diminishing nesting grounds available to marine turtles.	- Degradation of marine turtle population	Disturbance of nesting grounds	Medium	
2. Degradation of habitats and endangering the associated organisms.	- Degradation of interstitial fauna	Degradation of sandy habitats.	Medium	

Table (4-4): Insufficient measures for protection of biological diversity:

ISSUE/ PROBLEM	THREATS	CAUSES	IMPACTS	SIGNIFICANCE
1. Public ignorance of existing lows.	- Insufficient implementation - Illegal hunting	- Inadequate control of human behavior towards coastal biodiversity.	Medium to high	Biodiversity degradation
2. Lack of qualified expert staff to implement the protection measures.	-Improper implementation	Lack of nature protection inspectors in counties	high	Inadequate use of resources
3. Insufficient management.	Inadequate use and protection of coastal land	- Improper plans to protect. - areas/species Weak nature protection - institutional framework	high	

Table (4-5): Illegal coastal hunting practices

ISSUE/ PROBLEM	THREATS	CAUSES	IMPACTS	SIGNIFICANCE
1. Hunting of coastal-bird species for recreation and for food	- Danger on protected coastal birds	- Killing of birds, disturbance during breeding, feeding and roosting. - Shooting birds of all sizes.	Medium to low	- Heavy impact on rare and protected species - Reduction of many species

Table (4-6): Dam building on coastal rivers:

ISSUE/ PROBLEM	THREATS	CAUSES	IMPACTS	SIGNIFICANCE
1. Reclamation of coastal wetlands	i. Devastation of coastal wetlands. ii. degradation of rivers ecosystems.	- Changes in land use. - Transformation of wetlands to agricultural land	High (on the coastal rivers and adjacent areas).	- Effects on biodiversity in coastal wetlands (including flooding areas) and coastal rivers basins - Many of such habitats are already destroyed
2. Increase in concentration of domestic and agricultural waste discharged into coastal rivers	i. Destroying habitat and species.	- Decrease of water volume in the rivers and simultaneous increase in pollutant loads. - Construction of various plants and numerous small works.	Medium to high	- Species eradication from the rivers. - Habitat destruction.
. Preventing fish species from reaching upper rivers.	i. Disappearance of certain fish species (eg Eels and Mullets) from rivers.	- Fish unable to pass dams.	High	-Negative effect on fish biodiversity .
4. Salinity increase at estuaries	1. Threatening biodiversity.	- Decrease in freshwater discharge into estuaries	Medium	- Changes in species composition.

Table (4-7): Change in river basin landscape:

ISSUE/ PROBLEM	THREATS	CAUSES	IMPACTS	SIGNIFICANCE
1. Tree-cutting from the rivers	i. Pressure on species.	- Unstable substrate and dislodging of river bottoms	Medium (on river habitats and species).	- Loss of specific species.
2. Sand & gravel removal from river bottoms.	1. destroying the interstitial fauna from the river bottom.	- River bottom instability and destroying the top layer of soils	Medium (on river habitats and species).	- Biodiversity loss

Table (4-8): Threats to habitats and rare species:

ISSUE/ PROBLEM	THREATS	CAUSES	IMPACTS	SIGNIFICANCE
1. Insufficient protection	i. Lack of proper protection measures imposed at national levels.	Lack of the proper species and habitats systematic inventories.	-High	- All habitats and species are threatened in a way or another.
2. Introduction of foreign freshwater fish species for farming.	i. Competition and predation	- Deliberate introduction of species. - Release of farm-raised game animals	Medium in the case of farming fish.	Possible disappearance of specific local population

Table (5): PRIORITY ACTION PLANS FOR COASTAL BIODIVERSITY CONSERVATION IN SYRIA.

Legends:

P1 *=Immediate action to be taken and completed within 1 year time;*

P3*= Action to be completed within a 3 years;*

P5*= Action to be completed within 5 years;*

P10*=Action to be completed within 10 years.*

ISSUE OF PRIORITY	PRIORITY ACTION PLAN	PRIORITY
1. Recreational & tourism infrastructure and Urban developments	**1. Comprehensive and integrated management plan of the Syrian coastal area.**	P1
2. Insufficient measures for management of coastal biological diversity	2. **Proper management of the coastal biological diversity**, through: ✓ Identifying and naming protected areas along the Syrian coast. ✓ Prevention of sand removal from beach and rivers. ✓ Regional management plans of Syrian coastal boundaries with Lebanon and Turkey. ✓ Program for conserving traditional agriculture in the coastal areas. ✓ Protection and management of coastal rivers basins. ✓ Management plan of Arwad and the other few Syrian islands. ✓ Protection of wetlands in coastal areas. ✓ Establishing a list of the ecologically threathened	 P1 P1 P3 P5 P5 P5 P3 P1

	and rare habitats and species. ✓ Identifying the factors adversely affecting each species. ✓ Rehabilitation of destructed habitats and species. ✓ Identifying and managing the migratory bird species and conserving their habitats. ✓ Strict enforcement of the regulations regarding the introduction of foreign species. ✓	P1 P10 P3 P1
3. Illegal coastal hunting practices.	**3. Controlling hunting practices**, through: ✓ Renewing the existing lows. ✓ Issuing new legislations in regards of species protections. ✓ Preparing a program to suppress illegal hunting ✓ Public awareness program to rapidly reduce traditional bird-hunting.	P1 P1 P3 P1
4. Dams building on coastal rivers.	**4- Issuing and enforceing the regulations regarding assessment of the ecological impact prior to building dams and other economic projects, based on the compromization between the economic income and the ecological losses.**	P1

DISCRIPTION OF THE ITEMS PROPOSED FOR **PRIORITY ACTION PLANS (LISTED IN TABLE 5) FOR COASTAL BIODIVERSITY CONSERVATION IN SYRIA**

Priority Action 1	***Comprehensive and integrated management plan of the Syrian coastal area.***
Justification	- The integrated planning of the Syrian coastal area is already started and need it to be put in a form of Management action plan to conserve biodiversity.
Description	- Various components of coastal biodiversity should be taken into account.
Targets	- Management of recreational and tourism infrastructure e in the coastal area. - Management of the urban development component.
Responsibility	- Ministry of Environment. - Ministry of tourism. - Ministry of transport
Prerequisites needed for implementation.	-None.
Support needed	- Technical and financial.

Priority Action 2	***Proper management of the coastal biological diversity.***
Justification	- Degradation in the coastal habitats and species is obvious and proper management is needed
Description	- See Table 5.
Targets	- Improving the state of various coastal habitats. - Biodiversity conservation.
Responsibility	- Ministry of Environment, Ministry of Local Administration (coastal Municipalities). - Ministry of Higher Education, - Ministry Transport (General Directorate of Ports) - Ministry of Agriculture (coastal Directorates).
Prerequisites needed for implementation.	- None.
Support needed	-Technical and financial.

Priority Action 3	***Controlling hunting practices.***
Justification	- Many endemic and migratory species are subjected to illegal hunting and measure to reduce such practice is necessary.
Description	- See Table 5.
Targets	- Better species protection. - Increase public awareness.
Responsibility	- Ministry of Environment, - Ministry of Interior, - Ministry of Agriculture (Coastal Directorates).
Prerequisites needed for implementation.	- None.
Support needed	-Technical and financial.

Priority Action 4	***Assessment of the ecological impact prior to building dams and other economic projects.***
Justification	- Economic projects are mostly built on the basis of pure direct economic income which in most cases has a n adverse effect on the local environment and biodiversity. Therefore The ecological impact should be assessed and taken into account.
Description	- Issuing and enforceing the regulations regarding the economic projects, based on the compromization between the economic income and the ecological losses.
Targets	- Reducing the effects on the coastal habitat and species. - Biodiversity conservation.
Responsibility	- Ministry of Environment, - Ministry of Irrigation, - Ministry of Agriculture (Coastal Directorates). - Other ministries (According the project)
Prerequisites needed for implementation.	- None.
Support needed	-Technical.

4. INVESTMENT PORTFOLIO: *(TO BE ASSESSED AFTER CONSULTATION WITH THE STEERING COMMITTEE*).

Table (6): Priority Activities to be financed for promoting the conservation of marine and coastal biodiversity in Syria

	PRIORITY ACTIONS	Type	RESPONSIBILITY	TARGETS	ESTIMATED COST IN US $
1.	Stock assessment and management	Marine			
2.	Issuing efficient regulations	Marine			
3.	Managing human activities along the coast	Marine			
4.	Rearranging the constructions along the coastline	Marine			
5.	Managing marine transport	Marine			
6.	Pollution control	Marine			
7.	the flow of freshwater into the sea	Marine			
8.	species invasion	Marine			
9.	Threatened species	Marine			
10.	Increasing public awareness	Marine			
11.	Comprehensive and integrated management plan	Coastal			
12.	Proper management of the coastal biological diversity	Coastal			
13.	Controlling hunting practices	Coastal			
14.	The ecological impact of dams	Coastal			