

# Conservation of Biological Diversity (FAA Sec 119) Analysis\*

## Annex to the USAID/West Bank and Gaza FY 2005-2008 Strategic Plan

USAID/West Bank and Gaza

May 2005



\* This report fulfils the planning requirements as set out by the Foreign Assistance Act (FAA) as amended. Section 119(d): "Country Analysis Requirements. -- Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of (1) the actions necessary in that country to conserve **biological diversity**, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified."

# TABLE OF CONTENTS

## EXECUTIVE SUMMARY

### INTRODUCTION

- Purpose
- Methods

### PHYSICAL SITUATION

- Geography
- Climate

### SOCIAL, ECONOMIC AND POLITICAL CONTEXT

- Social and economic environment
- Institutions, policies and laws affecting conservation
- Populations
- Land tenure

### STATUS OF BIODIVERSITY

- Ecosystem diversity
- Animals
- Plants
- Threatened and endangered species
- Endangered species in international trade
- Protected areas, nature reserves and landscape conservation
- Agrobiodiversity
- Rangeland
- Coastal and marine
- International agreements

### THREATS TO BIODIVERSITY

- Political issues
- Population increase
- Pollution, quarries and industrial development
- Intensive and extensive agriculture
- Pastoralism and overgrazing
- Natural context
- Infrastructure development
- Invasive species

### INSTITUTIONS INVOLVED IN CONSERVATION OF BIODIVERSITY

- Environmental Quality Authority (EQA)
- Biodiversity and Environmental Research Center (BERC)
- Palestinian Wildlife Society (PWS)
- Water and Environmental Development Organization (WEDO)
- US Agency for International Development (USAID)
  - Bilateral Assistance portfolio
    - Middle East Regional Cooperation Program (MERC)
    - US Government Wye River Program
- United Nations Development Programme (UNDP)

### ACTIONS NECESSARY TO CONSERVE BIOLOGICAL DIVERSITY

#### USAID PROPOSED STRATEGY, OBJECTIVES AND ACTIVITIES

- Establishing the enabling conditions
- Directly addressing the need
- Do no harm: Mitigating threats from proposed activities
- Integration with the portfolio: Opportunities for linkages
- Connect with global and regional initiatives

### APPENDICES

- Bibliography and references
- Acronyms and abbreviations
- Contacts

## EXECUTIVE SUMMARY

This report is compiled in response to the FAA Section 119 requirements as part of the West Bank and Gaza Strategic Plan FY 2005-2008 development providing an analysis of (1) the actions necessary in that country to conserve biological diversity, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

Located in West Asia, at the edge of the Fertile Crescent and to the East of the Mediterranean Basin, the area has been the center of origin and distribution of human civilizations. The region's long history of indigenous and invading cultures, and human movement for trade and politics made it a migratory route for exchange and dispersion of crop, seeds, flowers and animal species. Consequently this contributed to a rich diversity of flora and fauna which has long captured the interests of ecologists and scientists alike. The diversity is also nurtured by the abruptness with which climatic zones; deserts; steppe; Mediterranean woodland and even oasis-join one another in this compact geographical area.

In terms of richness of biological diversity, the area hosts over 4000 plant species, 120 species of mammals, 500 species of birds, 100 reptiles and amphibians, about 1,000 fish, and an unknown number of insects (5,000-10,000). Some of these species live under threats of degradation or extinction and examples are identified.

Twice every year, about 500 million migratory birds pass through the region following three main migratory routes: the coast and coastal plain, the mountains, and the Jordan valley. The area is of particular strategic importance for large soaring birds, such as storks and birds of prey. These birds avoid sea crossings during their migrations between Africa and Eurasia since they depend on land-based thermals and are thus concentrated in the narrow corridor between the Mediterranean and the desert.

Biodiversity in the West Bank and Gaza is currently at risk due to:

- Increasing of human population pressure on natural systems from high population growth and the long-lasting refugee crisis;
- Rapid growth of settlements and supporting roads in areas where land is already scarce;
- Restrictions on communications, movement and access, limiting implementation of environmental management measures;
- Construction of separation wall and access roads that effectively block movement of terrestrial fauna, and cut the natural ecological corridors;
- Threats from solid waste and wastewater pollution;
- Clearing of land of vegetation for security purposes, urbanization and agricultural conversion.

The USAID assistance program to date has not, with small exceptions, included biodiversity conservation activities as part of its assistance portfolio. The environmental reviews, part of the mission obligation under [22 CFR 216, or Reg 16](#), have included biodiversity considerations in the risk analysis and mitigation.

In the elaboration of activates and implementation plans for the Strategic Objectives, USAID/West Bank-Gaza will have numerous opportunities and means to contribute to conservation of biological diversity in the West Bank and Gaza.

**Establishing the enabling conditions:** SO achievements will contribute to establishing the conditions necessary to further other developmental goals, including biodiversity conservation.

**Directly addressing the need:** The proposed Strategic Objective 15: Greater Access to Better Quality Water and Other Infrastructure Services promises to most directly contribute. Under the program activity "Improve access to clean water and sanitation" the SO will expand its successful municipal parks program to include the development of preserves to conserve areas of biological or historical significance. These areas are not only important as recreational and tourist centers, they also provide critical watershed functions for storm water drainage control, environmental remediation and aquifer recharge.

Under SO15 program component “Strengthen Democratic National Governance Institutions” The SO Team will work with relevant ministries, communities, and the private sector to promote more effective wastewater reuse and ensure cleaner water supplies through watershed management, environmental pollution control and remediation, and improved solid waste management.

Under SO15 program component “Strengthen Civil Society” the SO Team will incorporate public awareness, advocacy training, and participatory decision-making processes into each of its projects.

**Do no harm: Mitigating Threats from proposed activities:** Under SO15 program component “Expand and Improve Access to Economic and Social Infrastructure” The SO team will be responsible for implementing all infrastructure projects where there is unusual complexity or high cost. The team will also provide engineering services in support of smaller infrastructure activities that might be undertaken by other teams, such as courthouses, schools, clinic rehabilitation or other small-scale projects.

**Integration within the portfolio: Opportunities for linkages:** Under the new Strategic Plan, there will also be opportunities for other SO teams to contribute to conservation of biological diversity in the West Bank and Gaza.

Under Strategic Objective 9: Program Support Objective (PSO), the Geographic Information System (GIS) maintained for the mission by the SO team provides mission management and CTOs with standardized reporting between all partners, map generation and GIS analysis. Integration of environmental data such as land use and potential, endangered species and environmental risks will improve the decision process and environmental soundness of all mission-supported activities.

Also under Strategic Objective 9: Program Support Objective (PSO), the Public Diplomacy team working with mission staff and partners will be able to incorporate attention to the environment in contact with local and international media, developing written materials about our program, and operating and maintaining the Mission’s website.

Strategic Objective 12: Improved and Sustained Performance in the Health System as presently defined does not include medicinal plants and an understanding of traditional medicines, which are often combined with “modern” medicines especially in rural areas but including that area might make sense as the SO evolves.

Strategic Objective 14: Building a New Generation of Leaders will be providing recreational and career choices available that will reduce the lure of political activism, including participation in environmental conservation activities.

**Connect with global and regional initiatives:** As demonstrated in the review of existing USAID-supported activities that contribute to biodiversity conservation in the West Bank and Gaza, the Middle East Regional Cooperation Program (MERC) Program has and could continue to play an important role. USAID/WBG will encourage applications for assistance, facilitate contacts and monitor accomplishments.

## INTRODUCTION

### Purpose

This Annex to the USAID/West Bank and Gaza FY 2005-2008 Strategic Plan fulfills the statutory planning requirement as set out by the Foreign Assistance Act (FAA) as amended Section 119(d): "Country Analysis Requirements. -- Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-- (1) the actions necessary in that country to conserve biological diversity, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified."

Similar language related to Tropical Forests is part of Section 118 but as the West Bank and Gaza are outside the tropics, that specific analysis is not required. Forests and other tree cover are, of course, important habitats and, in the West Bank and Gaza, are important for conserving biodiversity as well as for the provision of other goods and services. [Forests in Palestine](#) by Ghattas, Roubina, Nader Hrimat & Jad Isaac provides information on the natural and planted forest estate, reviews institutional aspects, describes the contribution of forests to the economy covering both direct and indirect values and finishes a review of issues.

They note "These forest environments provide a habitat for a great diversity of flora and fauna. This makes them an important key in protecting biological resources. Most of natural forest can provide a base for preserving very different ecosystems ranging from closed maquis forest to open grassland and batha (hot and dry stony or sandy hillsides). The Palestinian plant formations possess 60 species of natural trees and 90 of bush distributed all over Palestine. The natural forests are the main forest types inhabiting Palestine (79.1%), wherein *Pinus* spp., *Ceratonia* spp., *Pistacia* spp., *Quercus* spp., and *Ziziphus* spp. are the most representative tree species. Forests in the Palestinian Territories crucially contribute to the Palestinian economy through their non-timber forest products such as fruits, nuts, honey, wax, resins, dyes as well as timber/firewood as inputs for industry and heating. Perhaps the most important are the ecological functions of trees, notably by providing water retention, soil protection, biological diversity preservation, and climate stability. In addition, they represent a recreation center as a natural attraction."

Conservation of biological diversity including protection of endangered species is only one of many environmental challenges for the government and people of West Bank and Gaza but it is the focus of this study. Pressures on the country's natural resources are evidently serious problems. Some of the worse cases can be found in pollution and over-exploitation of water resources; air pollution from factories, vehicles, mining, and burning; soil erosion and misuse of pesticides; littering, land degradation and clearing and loss of natural habitat. The direct cause of these problems include random dumping of garbage, disposal of untreated sewage water, increased energy use; unsound management of water resources and unsustainable agricultural practices.

USAID/WBG has been heavily involved in addressing some of these problems through its SO2 *Greater Access to and More Effective Use of Water Resources* and to a lesser extent SO 8 *Improved Community Services*. Average annual contribution by USAID/WBG against the Agency's environment and water earmarks is about \$30 million. For the larger perspective on other environmental problems and their associated solutions, the reader is referred to the [BIBLIOGRAPHY AND REFERENCES](#) and [WEB SITES OF INTEREST](#) at the back of this report.

### Methods

This analysis was primarily conducted during a eight day period April 26 to May 5 by Tim Resch, USAID/ANE Office of Technical Support Environment Team with support for USAID/WBG and USAID/EGAT/NRM and concurrent with the final review and drafting of the Strategic Plan. Primarily a desk study supplemented by interviews and web resources, this report summarizes available information and, through contributions to the USAID/WBG library and well as the web links throughout the report, makes this information available to the mission and its partners in the design, approval and implementation of the new Strategic Plan for USAID/WBG.

The suggested purpose of the TDY also provides the organizational structure for the report: Assist USAID/West Bank/Gaza in the 119 Biodiversity Analyses associated with the formulation of an updated Strategic Plan. Steps include:

- 1) Summarize the status of biodiversity resources and conservation in West Bank/Gaza
- 2) Summarize the social, economic, institutional, legal, and policy context for their use and conservation, including actions currently being taken by government, other donors, NGOs, and the private sector.
- 3) Identify the key direct and indirect threats to biodiversity.
- 4) Identify the actions necessary to conserve and sustainably manage natural resources and biodiversity in West Bank/Gaza in the current context.
- 5) Based on analysis of country donor and NGO responses to meet these needs, prepare a report on the status of biodiversity conservation efforts in West Bank/Gaza and implications for USAID or other donor programming and environmental monitoring which shall define the actions necessary for conservation.

As West Bank and Gaza is not a sovereign entity or a "country", there has not been a previous 119 Analysis for either the *USAID/West Bank and Gaza Strategy 1996-2000* or the *2001 USAID West Bank and Gaza Transition Plan*, which is also the current operating strategy. The proposed strategy has a vision of "of a sovereign, independent, viable, democratic and territorially contiguous Palestinian state, living side by side in peace and security with Israel within four years" and, therefore, a 119 analysis was deemed appropriate at this time.

## PHYSICAL SITUATION

### Geography

West Bank and the Gaza Strip are two separate geographical areas separated by the State of Israel. The West Bank is located on the central highlands, just north of the Jordan Valley, while Gaza Strip runs along the southeastern Mediterranean bordering the northern coast of the Sinai of Egypt. Other neighboring countries include Jordan and Egypt. The larger of these two areas is called the West Bank (covering 5,700 km<sup>2</sup>), with the Gaza Strip covering only 365 km<sup>2</sup> or a total area of approximately 6,065 km<sup>2</sup> (6 million dunums).

The West Bank has a varied topography consisting of central highlands, where most of the population lives, and semi-arid rocky slopes, an arid rift valley and rich plains in the north and west. The West Bank is mostly composed of limestone hills that are between 700 to 900 meters high. The lowest point of the area is the Dead Sea at 410 meters below sea level, and the highest the Tall Asur at 1,022 meters above sea level. Brown lithosols and loessial arid brown soils cover the eastern slopes and grassland, with pockets of cultivation spreading over the steep slopes. Fertile soils are found in the plains. Soil cover is generally thin and rainfall is erratic. In all, about 12 percent of the land is desert, eroded or saline.

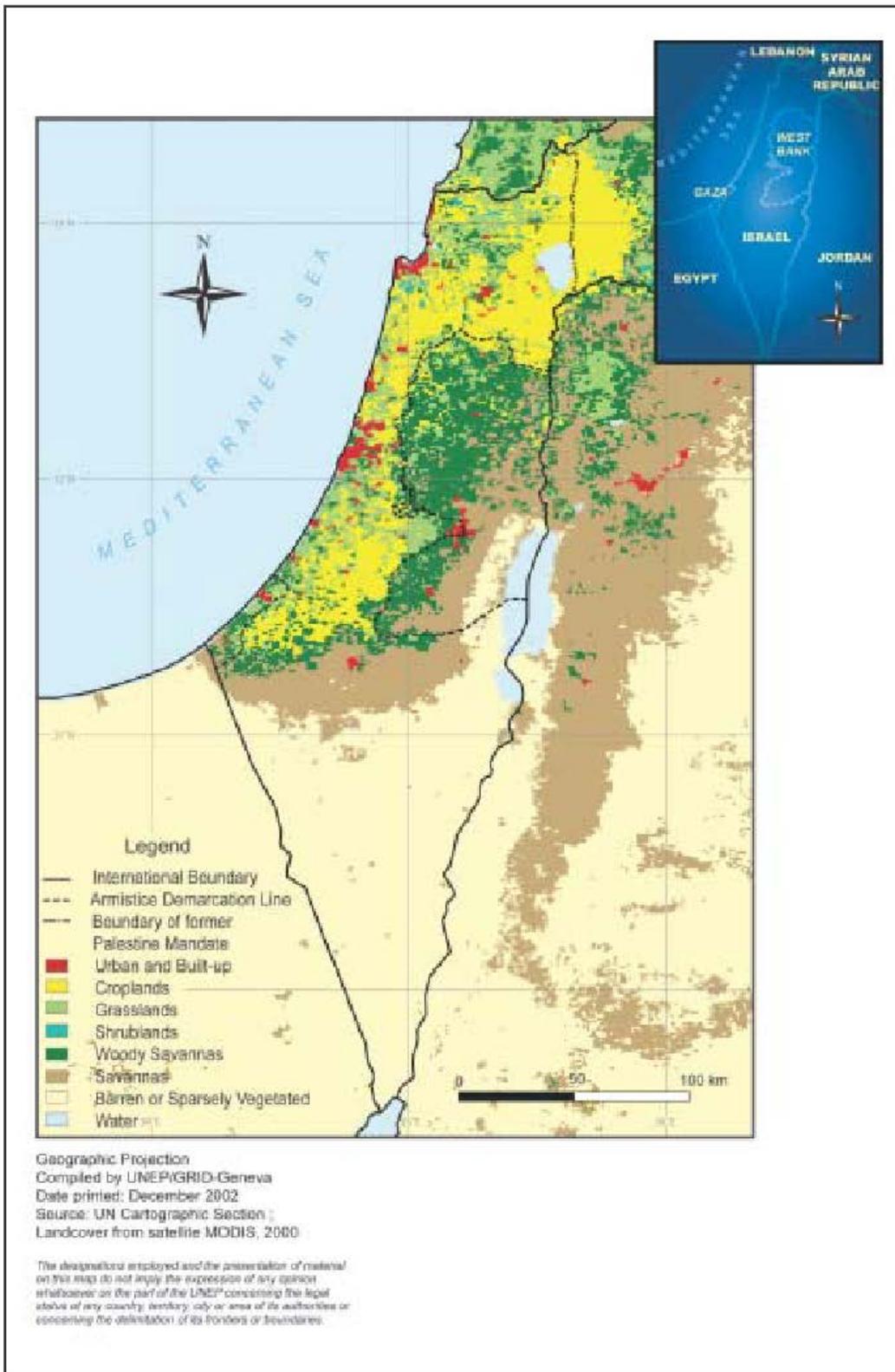
Gaza is a narrow, low-lying stretch of sand dunes along the eastern Mediterranean Sea. It forms a foreshore plain that slopes gently up to an elevation of 90 meters. The sea is warm and saline and is affected by water outflow from the Nile River.

West Bank and Gaza can be divided into five main ecological sub-regions: the Mediterranean shoreline coastal plain, the upper coastal plain, the central highlands, the semi-arid eastern slope steppes and the arid semi-tropical Jordan valley

The dry southern West Bank, eastern slopes and central Jordan valley are composed of Mediterranean savanna grading into land dominated by steppe brush and spiny dwarf shrubs. The southern Jordan valley around Jericho and the Dead Sea is also influenced via the Wadi Araba by Sudanian vegetation.

On the Gaza coastal plain the original Saharo-Sindian flora has been almost completely replaced by farmland and buildings. Gaza includes six main vegetation zones: the coastal littoral zone, the stabilized dunes and blown-out dune valleys, the Kurkar, alluvial and grumosolic soils in the northern part, the loessial plains in the eastern part, and three wadi (river) areas.

► Land cover



## **Climate**

The climate is typical Mediterranean, characterized as hot and dry during the summer and cool and wet in winter. The central highlands have occasional frost, snow and hail. The Jordan valley is warm and very dry in the south, while the climate in Gaza, by the sea, is more temperate even though it borders the desert. The temperature and the evaporation rate increases towards the south of the West Bank and towards the Jordan Valley, with rainfall ranging from 100 to 700 millimeters annually, depending on the location. The mean summer temperatures range from 30°C at Jericho through 25°C at Gaza to 22°C at Hebron which is 850 meters above sea level, the mean ranges in winter from 13°C at Jericho and Gaza to 7°C at Hebron. The average annual precipitation is 450 - 500 mm, decreasing from north to south and from high to low altitude. Rain tends to fall in intense storms. The northern Gaza Strip receives 400 mm, the south 200 mm per year, and the Dead Sea less than 100 mm. The annual average relative humidity is about 72 percent at Gaza and 52 percent at Jericho. Evaporation is high in summer when there is always a water deficit. Winds prevail from the northwest but come from the southwest in winter. Land and sea breezes occur, and in late spring the hot dry *khamsin* blows from the desert in the south.

## **SOCIAL, ECONOMIC AND POLITICAL CONTEXT**

### **Social and Economic Environment**

The West Bank is administratively divided into eleven sub-districts: Hebron; Bethlehem, Jerusalem, Ramallah/Al Bireh, Jericho, Salfit, Nablus, Tubas, Tulkarm, Jenin and Qalqilya. There are four major urban centers, Jerusalem, Nablus, Hebron and Gaza, with 440 villages and 27 refugee camps. Gaza is divided into five sub-districts: Rafah, Kahn Yunis, Deir al Balah, Gaza and North Gaza.

Agriculture makes up a large part of both the economy and land use, representing 30% of the Gross National Product (GNP), with more than 50% of the population benefiting directly from agricultural production. In terms of land use, only 31% of the land is cultivated, with another 32% classified as grazing land, while the remaining is classified as urban and barren land. Of the cultivated area 28% is considered rain-fed and 3% is irrigated mainly for vegetables.

The West Bank and Gaza are economically non-industrialized, with one third and the base of the economic GDP made up from agriculture, little industrial development because of restrictions, a large service sector and a large amount of monetary resources coming in from laborers working in Israel. The per capita GDP of between US\$610 and US\$2,400 annually means that WBG residents must worry about sustainable development, not just nature conservation (especially when living next to Israel, which has a per capita GDP of between US\$10,000 and US\$15,000 per year)

### **Populations**

The population now stands at about 3.7 million, about 1.4 million of whom live in Gaza. Estimates are that approximately 27 percent of the West Bank population lives in densely populated urban centers, 17 percent live in refugee camps and the remaining 56 percent live in rural areas. The population in Gaza is much more urban, with the large majority of the population living in either in cities or refugee camps.

West Bank and Gaza have a very high population growth rate. In recent years, the estimated natural population growth rate has been between 3 - 5%, comprising one of the highest growth rates in the region but lower than the Israeli growth rate if immigration is included. This will undoubtedly impact the urgency with which the issues of biodiversity and plant genetic conservation must be addressed.

### **Institutions, Policies and Laws Affecting Conservation**

West Bank and Gaza is not a sovereign state, but an area managed under the Oslo II Accord, formally entitled 'Interim Agreement on the West Bank and the Gaza Strip of 1995', which created three territorial zones in The West Bank: area A where the Palestinian Authority has responsibility for public order and internal security; area B where the Palestinian Authority assumes responsibility for public

order, while Israel controls internal security; and area C, where Israel maintains exclusive control. In addition, Israel also maintains exclusive control over borders, external security, Jerusalem and settlements.

The estimated area of A land is 722 km<sup>2</sup> (12%); B land is about 1318 km<sup>2</sup> (22.6%). Also, there is about 3% of the land assigned as a nature reserve extending over Hebron and Bethlehem Districts. The total land area controlled is about 38% of the area of the West Bank. The remaining 62% (C area) is under full Israeli control. This area is mainly occupied by colonies, closed military zones, military camps or declared as nature reserves (52%). The remaining 10% of the area C is occupied by villages and hamlets under Israeli full control. It is evident according to this situation how difficult is managing the natural resources taking in consideration that the West Bank and Gaza-controlled area is mainly urban with small area of agricultural use.

The continuing conflict is a serious hindrance to biodiversity and genetic conservation efforts. More than 22 percent of Gaza remains occupied by Israeli settlements and their security zones, which happen to sit on the best sweet water sources in the Strip, and the borders of Jericho were drawn in such a way as to avoid Israeli settlements. In the other 94 percent, 125 settlements, occupying 250 separate locations, exist in the West Bank and are continuing to expand. Even when the settlements themselves are not expanding, roads, infrastructure and security areas take up valuable land. Declared nature reserves have occasionally been used to establish new settlements. Forty percent of the West Bank, 85 percent of the Eastern Slopes, continues to be a closed military zone, isolating it both from bedouin shepherds and scientists who would like to study the plant and animal life within the closed off area. In all, 60 to 70 percent of the land in the West Bank is under Israeli control.

Constraints have been placed on agriculture, restricting movement through curfews, bans on entering or passing through Jerusalem, thus preventing farmers from reaching their fields or transporting produce to market. Since the Intifada, Israel has also canceled export permits during peak production periods as a form of collective punishment, thus encouraging farmers to discontinue farming. Over 250,000 trees have been uprooted in the last seven years, and forestation is prohibited. Farmers often plant olive or stone fruit trees in places more suitable for field crops because following practices associated with the latter predispose the area to confiscation. Restrictions are also in place preventing the establishment of a Palestinian body to oversee land use and development planning. In the long run, a permanent resolution to this problem will be necessary for there to be a program that truly addresses the issues of plant genetic diversity in this land.

The Palestinian Authority and NGOs have made considerable progress in identifying, analyzing and evaluating key environmental concerns over recent years, though lack of capacity for natural resource management is critical. This lack of capacity has increased since the start of the intifada in September 2000, through the slowing down and, in many cases halting, of important program and initiatives, and most direct Palestinian-Israeli cooperation. The overall result has been a worsening of the long-term degradation of biodiversity and natural resources. In some cases the international funding planned to support implementation has also been suspended.

### **Land tenure**

Land tenure system and ambiguity of land ownership, the inaccessibility of land due to the lack of rural and agricultural roads, lack of liquidity and cash, lack of economic motivations, limited education to farmers, lack of credit and marketing facilities and simple technology used in agriculture are important social and economic factors lead to less utilization of land and, hence, more land degradation.

Lack of awareness of environmental, social and economic values of land degradation is a serious factor of land degradation. For example, over-grazing of the available pastures, branches of evergreen trees are often lopped off to provide fodder for livestock. There is an intensive exploitation of the scanty vegetation to meet the ever-increasing demand for firewood, fencing and feeding animals. The change of the type of agriculture in addition to the use of vegetation for the manufacture of charcoal and the burning of lime have an adverse effects on the amount of vegetation. Another important reason for soil erosion is the significant disappearance of terrace culture.

Vast areas are being threatened by wildly over-zealous plans for expanding heavy industry, tourism initiatives, and unnecessary transportation infrastructure without land use plan of action. For example, land surrounding the Dead Sea that are mainly pristine nature reserves, are threatened by such activities.

The land cover/use in the West Bank would be classified as follows according to CORINE first, second, third and fourth levels:

<b>1<sup>st</sup> Level</b>	<b>2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> levels</b>	<b>Area (dunum)*</b>	<b>Total Area (dunum)</b>
<b>Artificial Surfaces</b>	Continuous urban fabric	10042	<b>429802 7%</b>
	Refugee camps	5833	
	Discontinuous urban fabric	306223	
	Colonies	70364	
	Industrial or commercial units	4440	
	Military camps	7158	
	Airports	1140	
	Mineral extraction sites	11871	
	Construction sites	7904	
	Green urban fabric	1144	
	Sports and leisure facilities	3683	
<b>Agricultural Areas</b>	Non-irrigated arable land	312158	<b>2108916 36%</b>
	Drip irrigated arable land	85125	
	Non-irrigated vineyards	94984	
	Drip irrigated vineyards	4326	
	Palm groves	4242	
	Citrus plantations	6724	
	Other fruit trees	5232	
	Olive groves	748822	
	Non-irrigated complex cultivation pattern	163741	
	Irrigated complex cultivation pattern	104286	
	Agricultural land with significant area of natural vegetation	577376	
<b>Forest and Semi Natural Bodies</b>	Broad leaf forest	2472	<b>3114962 53%</b>
	Coniferous forest	48515	
	Mixed forest	333	
	Natural grassland	1673537	
	Sclerophyllous vegetation	88766	
	Transitional woodland shrub	55313	
	Beaches, dune and sand plains	16074	
	Bare rock	25739	
	Sparsely vegetated area	1171067	
	Halophytes	33146	

<b>Water Bodies</b>	Sea (Dead Sea)	191184	<b>191184</b> <b>3%</b>
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*\*1 ha = 10 dunums*

## STATUS OF BIODIVERSITY

The most widely accepted definition of biodiversity found in the literature is that put forth by the World Conservation Union (IUCN), and which was incorporated in Article 2 of the Convention on Biological Diversity. Article 2 states: *The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.*

Located in West Asia, at the edge of the Fertile Crescent and to the East of the Mediterranean Basin, the area has been the center of origin and distribution of human civilizations. The region's long history of indigenous and invading cultures, and human movement for trade and politics made it a migratory route for exchange and dispersion of crop, seeds, flowers and animal species.

Consequently this contributed to a rich diversity of flora and fauna which has long captured the interests of ecologists and scientists alike. The diversity is also nurtured by the abruptness with which climatic zones; deserts; steppe; Mediterranean woodland and even oasis-join one another in this compact geographical area.

In terms of richness of biological diversity, the area hosts over 4000 plant species, 120 species of mammals, 500 species of birds, 100 reptiles and amphibians, about 1,000 fish, and an unknown number of insects (5,000-10,000). Although accurate figures are hard to find, some of these species live under threats of degradation or extinction.

[UNEP-WCMC's Species Database](#) includes data on 72,471 animals and 88,814 plants of conservation interest as well as 91,525 sub-species, stocks or synonyms. Data, including species fact sheets, for Israel (No information is provided for West Bank/Gaza) are shown for illustrative purpose below.

Animals Species in Israel ( <a href="#">Full details.</a> )		Plants Species in Israel ( <a href="#">Full details.</a> )	
<a href="#">No details of threatened status</a>	1043	<a href="#">No details of threatened status</a>	211
<a href="#">Extinct</a>	4		
<a href="#">Critically Endangered</a>	9		
<a href="#">Endangered</a>	17		
<a href="#">Vulnerable</a>	46		
<a href="#">Lower Risk - conservation dependent</a>	4		
<a href="#">Lower Risk - near threatened</a>	34		
<a href="#">Lower Risk - least concern</a>	67		
<a href="#">Data Deficient</a>	16		
<a href="#">Not Evaluated</a>	3		

Based on phytogeographic attributes and geomorphologic and topographical characteristics, the area, recognized rich and diverse, is composed of five climatic zones: The Coastal, the Semi-Coastal, the Central Highlands, the Eastern Slopes, and the Jordan Valley, each dominated by rather common type of chorological and phytogeographical flora and fauna characteristics.

The phytogeographical zones can be characterized as followed:

The Mediterranean zone is covered with evergreen forests and maquis in which *Quercus calliprinos* and *Pistacia palaestina* are dominant. The local forests and maquis can be grouped as the Common oak forests, the Aleppo Pine Forests with dominance of *Pinus halepensis* and the Carob-Lentisc forests with dominance of *Ceratonia siliqua* and *Pistacia lentiscus*. The largest parts of these forests are destroyed and consist now of garigue and batha with species like *Sarcopoterium spinosum*, *Cistus spp.*, *Calycotome villosa*, *Carthamus tenuis* and *Ononis leiospermum*.

The Irano-Turanian zone (Oriental steppe) covers the eastern parts of the West Bank. The main species are *Ziziphus lotus*, *Retama raetam*, *Artemisia sieberi* and *Ballota undulata*.

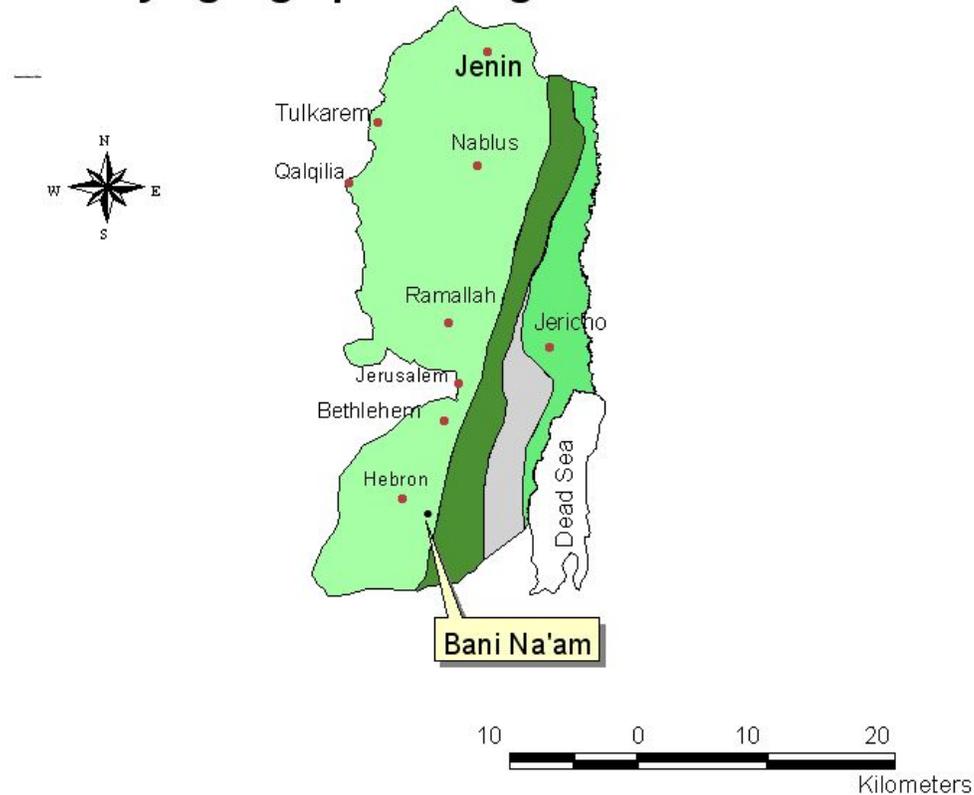
The Saharo-Arabian zone (Desert) is confined to the desert. Dominant species are *Zygophyllum dumosi* and *Suaeda asphaltica*.

The Sudanain penetration zone extends over the Dead Sea area and the Jordan Valley. The main species are *Haloxylon salicetum*, *Phoenix dactylifera*, *Ziziphus spina-christi*, *Acacia radianna*, and *Acacia tortilis*.

The main geographical element which is left is the Coastal Zone of Gaza on Sandy soils with species like *Retama raetam*, *Ziziphus spina-christi*, *Hammadetum scoparium planicolum*, *Tamarix nilotica*, *Acacia spp.* and *Artemisia monosperma*.



## Phytogeographical Regions in the West Bank



### Legend

- **Main Cities**
- Mediterranean territory**
- Irano-turanian territory**
- Saharo-arabian territory**
- Sudanian Penetration Territory**

Human infringement upon the composition of native vegetative cover has occurred primarily in four ways: gathering of wood for fuel and lumber, overgrazing by domesticated sheep and goats, conversion of woodlands to arable land, and forest fires, both planned and accidental.

During the Turkish occupation, vast areas of remaining natural forest were lost as large numbers of trees and shrubs were cut to provide fuel for Turkish railways. Many naturally occurring forests disappeared and the consequent reshuffling of the vegetal composition led to the loss or marginalization of large numbers of native flora.

Under Oslo II accords, new sets of rules affecting the environment and natural resources were imposed. Forestation was forbidden throughout most of the West Bank and Gaza and water use was limited through the closure or confiscation of irrigation wells and through strict drilling restrictions.

Intensive discharge of ground water and use of fertilizers, pesticides, other chemicals and non-degradable materials such as plastics, present a threat to biodiversity as they are hazardous not only to the soil, but to all the surrounding plant species and wildlife. Definitely, all these practices contribute to the pollution of natural resources including surface and ground water, land and air, clearly having a negative effect on overall biodiversity. Furthermore, because of the highly productive nature of this type of agriculture, there tends to be a uniformity to the type of seed stocks used, and a tenancy toward hybrid exotic gene stock rather than local.

One of the other problems with the intensive irrigation and water usage that has taken place since the middle of this century has been the deterioration of the quality of surface water and ground water sources. One of the best examples of this is the Jordan River. Once the mighty river that flowed from Lake Tiberias into the Dead Sea, the Jordan has now been reduced, through the siphoning off of water at the river's mouth, to a fraction of its original size. Furthermore, largely because of runoff from sewage and the high input farms in the Jordan valley the water of the Jordan river is now highly salinized, so much so that it is unusable for the purposes of irrigation. Clearly this has a negative effect on the traditional plant life along the banks of the river.

Biodiversity and Protected Areas – Israel	
Based on <a href="#">WRI EarthTrends</a>	
Provided as illustrative of conditions in West Bank/Gaza	
Total Land Area (000 ha)	2,106
<b>Protected Areas</b> <i>Extent of Protected Areas by IUCN Category (000 ha), 2003</i>	
Nature Reserves, Wilderness Areas, and National Parks (categories I and II)	X
Natural Monuments, Species Management Areas, and Protected Landscapes and Seascapes (categories III, IV, and V)	319
Areas Managed for Sustainable Use and Unclassified Areas (category VI & "other")	78
Total Area Protected (all categories)	397
Marine and Littoral Protected Areas	7
Protected Areas as a Percent of Total Land Area, 2003	19.1%
Number of Protected Areas, 2003	184
Number of Areas >100,000 ha, 2003	1
Number of Areas > 1 million ha, 2003	0
Wetlands of International Importance (Ramsar Sites), 2002: Number of Sites	2
Total Area (000 ha)	0
Biosphere Reserves, 2002 Number of Sites	1
Total Area (000 ha)	27
<b>Number and Status of Species</b>	
Higher Plants Total known species (number), 1992-2002	2,317
Higher Plants Number of threatened species, 2002	X
Mammals Total known species (number), 1992-2002	116
Mammals Number of threatened species, 2002	14
Breeding Birds Total known species (number), 1992-2002	162
Breeding Birds Number of threatened species, 2002	12
Reptiles Number of Total Known Species, 1992-2003	99
Reptiles Number of threatened species, 2002	4
Amphibians Number of Total Known Species, 1992-2003	8
Amphibians Number of threatened species, 2002	X
Fish Number of Total Known Species, 1992-2003	178
Fish Number of threatened species, 1992-2002	1
<b>Legal Trade in Selected Wildlife and CITES {c} Status</b>	
Year CITES Ratified	1980
Net International Legal Trade Reported by CITES, 2000 (number)	

Live Lizards	2,569
Live Snakes	482
Live Parrots	6,852

### **Ecosystem diversity**

West Bank and Gaza are located in west Asia and at the edge of the Fertile Crescent. The location, geologic and topographic diversity, climatic variation and human activities all combine to form a natural reservoir of plant and animal species and a unique place of visible biological diversity within a very small area. Terrestrial ecological systems in West Bank/Gaza are known for their genetic diversity and variability within species rather than for their species richness. They do contain, however, a significant number of species and population of species that normally exist within and between biotic communities.

The richness in biodiversity arises from the fact that this region includes three phyto-geographical regions. From west to east, the three zones are Mediterranean, Irano-Turanian, and Saharo-Arabian. The mix of Mediterranean, Oriental and African desert influences, with a wide variety of habitats and climates, together with one of the world's major routes of migratory birds, has resulted in exceptionally high faunal values: 530 bird species, 116 mammals, 96 reptiles and seven amphibians have been recorded.

There are four ecological and climatic regions.

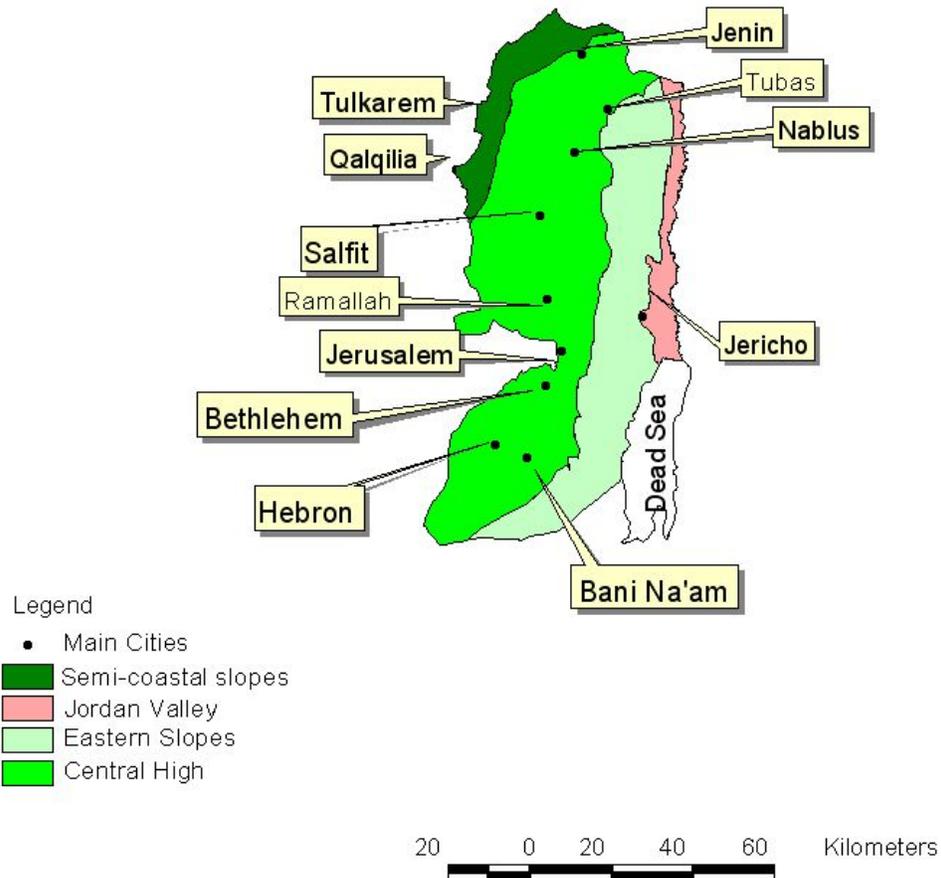
The Jordan Valley region, a low lying area (up to 250 m below sea level) of low rainfall (100-300 mm annually) which runs along the Jordan River from northern Hebron, with altitude ranging from 400-1000 m above sea level, and averaging relatively high rainfall (400-600 mm); the Eastern Slopes, the hills just above the Jordan Valley, with altitude ranging from 200 m below sea level to 600 m above, receiving moderate rainfall (250-400 mm) and stretching across all of the districts except for Tulkarem, from Jenin in the north through Hebron in the south; the Central Highlands run across the center of the area crossing from Jenin to northern Hebron, with altitude ranging from 400-1000 m above sea level, and averaging relatively high rainfall (400-600 mm); though small in size (312 km<sup>2</sup> west to east and 60 km north to south), the Semi-Coastal region is the fertile, low lying (100-300 m above sea level), part of the West Bank, located in Tulkarem and Jenin and receiving relatively high rainfall (500-600 mm)

The Gaza Strip is an area of 365 km<sup>2</sup> located next to the Mediterranean sea, on the edge of the Sinai desert and ranging in altitude from sea level to 100 m above. Rainfall in the region ranges from 400 mm annually in the north to 230 mm annually in the south. While it was chiefly rural before the creation of the State of Israel, the influx of refugees in 1948 has led to a population of almost one million making it one of the most populous places on earth.

Despite its small size, West Bank and Gaza are host to over 2,500 species of wild plants with new ones discovered each year. Approximately 800 of these plants are considered rare, and around 140 are endemic. In comparison, Great Britain, although far larger, is home to only about 1,750 plant species. At least 80 species of wild mammals are found, and its reputation as a geographical and ecological crossroads is reinforced by the fact that 380 different species of birds can be identified there. This number, within such a small area, again becomes significant when compared with countries such as Britain, France or Spain in which only 400 to 440 species can be found despite their far greater size.



## West Bank Topographical Map



### Animals

Relative to its geographical size, the area is rich in biodiversity of fauna. Thus, for example, in Europe which is 300 times larger has about 140 terrestrial mammals may be found as opposed to 106 mammals known to exist until the beginning of the present century. Several species of vertebrates, mostly mammals, disappeared from the area at the beginning of this century. The introduction of firearms to the Middle East by the end of the 19th century and the tradition of hunting were followed by the disappearance of four ungulates (roe deer, fallow deer, Arabian oryx and Syrian onager), three carnivores (Syrian bear, cheetah, and the northern subspecies of the leopard), the ostrich and the Nile crocodile.

The UNEP-WCMC Species Database for animals in Israel shows 1,273 species. Gone from the land are animals which were once plentiful the ostrich, cheetah, leopard, lion (the last ones killed 800 years ago during the Crusades), Syrian bear, crocodiles and several kinds of deer, all casualties to human encroachment.

Number of extinct, threatened and other species of animals in each Red List Category in each country

IUCN Red List Categories: EX - Extinct, EW - Extinct in the Wild, CR - Critically Endangered, EN - Endangered, VU - Vulnerable, LR/cd - Lower Risk/conservation dependent, NT - Near Threatened (includes LR/nt - Lower Risk/near threatened), DD - Data Deficient, LC - Least Concern (includes LR/lc - Lower Risk, least concern).

Country	EX	EW	Subtotal	CR	EN	VU	Subtotal	LR/cd	NT	DD	LC	Total
Israel	3	0	3	7	13	37	57	0	45	18	553	676
Jordan	0	0	0	3	5	22	30	0	31	6	420	487
West Bank and Gaza	0	0	0	1	0	3	4	0	9	0	18	31

### Mammals

Currently there are 95 mammalian species recorded. This number does not include marine mammals in Gaza Strip. Data related to the distribution, classification, and zoogeography of mammals in West Bank and Gaza needs to be updated.

The number of mammalian species shows relatively high diversity in comparison to other countries in Arabia. This fact is due to several features such as: geographical location between three continents, the high diversity in soil and climate elements. This in turn has helped species of different origins to settle and inhabit West Bank and Gaza. The distribution of most mammals in West Bank and Gaza depends on the distribution of their zoogeographic sub regions. 78% of the mammals exist mainly in the Mediterranean ecosystem.

Connecting three continents together and thus serving as a bridge between them many mammals have traveled naturally for thousand of years through this region. Mammals of West Bank and Gaza inhabit different and diverse habitats such mountains, forests, steppe, marine, wetland and even the lowest spot on Earth, the Dead Sea Basin.

Mammals of West Bank and Gaza suffer from a variety of threats. Seven species of mammals have been extinct, for example, the cheetah *Acynonyx Jupatus*, Syrian Brown Bear, *Ursus arctos syriacus*, Mesopotamian Fallow Deer *Dama mesapatomica*, and Roe Deer *Capreulus capreulus*. These species existed in the mountains less than 50 years ago. In addition, wolves and hyenas are hunted and persecuted by farmers and Bedouins concerned with their livestock.

### Invertebrates

To date there is no real scientific knowledge on the diversity of invertebrates in the West Bank. Little research has been conducted on the taxonomy, zoogeography and ecology of this group. It is estimated that the number of invertebrate species in the West Bank is in excess of several thousand. The species are being impacted upon by large-scale habitat destruction from settlements, forest cutting, overgrazing, unplanned urban development, mining and quarrying. Moreover, due to the importance of agriculture in the economy, a large quantity of agro-chemicals is being used and this is expected to increase in the future. The agro-chemicals have major impacts on terrestrial invertebrates. The usage of pesticides, for example, against the insects reduces their numbers and thus their harmful attacks. Examples of harmful invertebrates are the scorpions, *Nebo hirochunticus* and *Buthus*

*quinesetriatur* and the Black Spider *Latrodectus trecimiguttatus*. However, it is felt that these impacts will affect only a small portion of this phylum and not lead to the extinction of many species.

### Reptiles

Reptiles in West Bank and Gaza are well distributed and show high diversity in species and habitats. This diversity is due to the diverse bio-geographical, climatic, and topographical and vegetation formations found throughout the mountainous region of the West Bank.

They are represented by two orders; order *Chelonia* including turtles, and order *Squamata*, which includes lizards and snakes. Reptiles assume an important role in the ecosystem, as they are the main source of food for predators such as carnivorous raptors (kestrels, buzzard and eagles). The highest distribution of reptiles is observed in the arid and semiarid Mediterranean and Saharo Arabian zones. Statistics show that approximately 47% are located in northern part of the West Bank and 39% in the south.

Many reptilian species in West Bank and Gaza are considered threatened, which is due to: intensive agricultural practices, overgrazing, vegetation cover loss, unplanned human development and transportation corridors, snakes and vipers could play an important role in pest control of smaller rodents. Many of them are observed dead on roads and highways or killed as a result of mining or direct killing by people.

### Bird Life

Twice every year, about 500 million migratory birds pass through the region following three main migratory routes: the coast and coastal plain, the mountains, and the Jordan valley. The area is of particular strategic importance for large soaring birds, such as storks and birds of prey. These birds avoid sea crossings during their migrations between Africa and Eurasia since they depend on land-based thermals and are thus concentrated in the narrow corridor between the Mediterranean and the desert.

470 species of birds have been recorded in West Bank and Gaza, of which 80% are migratory. Many disperse to the wadis and plains of the West Bank and Gaza Strip. Passerines and warblers prefer to migrate through the forests and dense vegetation cover of the West Bank than to pass within the narrow corridor of the Jordan Valley. The West Bank and Gaza are considered as one of the favorite spots for nature tourism and bird watching due to the diversity and different species occurrence in diverse sites.

Birds and their habitats are subject to a variety of threats and impacts; namely: urban expansion and settlements, lack of land-use policies, illegal hunting, degradation of vegetation cover and forest resources, and lack of tourism management and unsustainable agricultural practices (agro-chemicals). In order to benefit from ecotourism and nature tourism it is important that the proper management of important bird areas should be initiated as soon as possible.

#### The Soaring Birds over West Bank and Gaza

English name	Latin name
Barbary Falcon	<i>Falco pelegrinoides</i>
Barn Owl	<i>Tyto alba</i>
Black Kite	<i>Milvus migrans</i>
Bonelli's Eagle	<i>Hieraaetus fasciatus</i>
Common Buzzard	<i>Buteo buteo</i>
Crested Honey Buzzard	<i>Pernis ptilorhynchus</i>
Dark Chanting Goshawk	<i>Melierax metabates</i>

Eagle Owl	<i>Bubo bubo</i>
Egyptian Vulture	<i>Neophron percnopterus</i>
European Scops Owl	<i>Otus scops</i>
Golden Eagle	<i>Aquila chrysaetos</i>
Greater Spotted Eagle	<i>Aquila clanga</i>
Griffon Vulture	<i>Gyps fulvus</i>
Hen Harrier	<i>Circus cyaneus</i>
Hobby	<i>Falco subbuteo</i>
Honey Buzzard	<i>Pernis apivorus</i>
Imperial Eagle	<i>Aquila heliaca</i>
Kestrel	<i>Falco tinnunculus</i>
Lammergeier	<i>Gypaetus barbatus</i>
Lanner Falcon	<i>Falco biarmicus</i>
Lapped-face Vulture	<i>Torgos tracheliotos</i>
Lesser Kestrel	<i>Falco naumanni</i>
Lesser Spotted Eagle	<i>Aquila promarina</i>
Levant Sparrow hawk	<i>Accipiter brevipes</i>
Little Owl	<i>Athene noctua</i>
Long-ear Owl	<i>Asio otus</i>
Long-legged Buzzard	<i>Buteo rufinus</i>
Marsh Harrier	<i>Circus aeruginosus</i>
Osprey	<i>Pandion haliaetus</i>
Palla's Fish Eagle	<i>Haliaeetus leucoryphus</i>
Red-footed Falcon	<i>Falco vespertinus</i>
Saker Falcon	<i>Falco cherrug</i>
Shikra	<i>Accipiter badius</i>
Short-ear Owl	<i>Asio flameus</i>
Short-toad Eagle	<i>Circaetus gallicus</i>
Sooty Falcon	<i>Falco concolor</i>
Sparrowhawk	<i>Accipiter nisus</i>
Steppe Eagle	<i>Aquila nipalensis</i>
Tawny Eagle	<i>Aquila rapax</i>
Tawny owl	<i>Strix aluco</i>

## Plants

[Rotem - Israel Plant Information Center](#) has already started to monitor 791 species (about a third of Israel's flora) which have been classified as rare (197 species), potentially rare (161), very rare (389), very very rare (209), and extinct. The "potentially rare species list" also includes any suggested plant species that is known to be found in ten or less geographical sites.

The [searchable database](#) of the 1997 IUCN Red List of Threatened Plants shows 32 plant species listed for Israel distributed as follows:

Country	Ex	Ex/E	E	V	R	I	Total no. threatened <sup>1</sup>	No. species	% threat-ened
Israel		2	7	7	13	3	32	2,317	1.4

The [UNEP-WCMC Trees Database](#) contains trees information on threatened trees and other trees of conservation concern and lists the following eighteen Species (sub-species) for Israel:

[Acacia albida](#) Del

[Pistacia atlantica](#) Desf.

[Taxus baccata](#) L

[Acacia gerrardii](#) Benth. ssp. *negevensis* Zoh

[Quercus ithaburensis](#) Decne. var. *calliprinos* Webb  
[Pistacia khinjuk](#) Stocks. var. *glabra* Schweinf. ex Engl  
[Acacia laeta](#) R. Br  
[Tamarix nilotica](#) (Ehrenb.) Bunge  
[Acacia pachyceras](#) O. Schwartz var. *najdensis* (Chaudhary) Boulos  
[Acacia pachyceras](#) O. Schwartz var. *pachyceras*  
[Moringa peregrina](#) (Forssk.) Fiori  
[Juniperus phoenicea](#) L.  
[Gonocytisus pterocladus](#) (Boiss.) Spach  
[Cordia sinensis](#) Lam.  
[Ficus sycomorus](#) L.  
[Malus trilobata](#) (Labill.) C.K.Schneid.  
[Rhus tripartita](#) (Ucria) Grande  
[Prunus ursina](#) Kotschy ex Boiss.

### Threatened and Endangered Species

Number of threatened species in each major group of organisms in each country (Critically Endangered, Endangered and Vulnerable categories only) Threatened species are those listed as Critically Endangered (CR), Endangered (EN) or Vulnerable (VU).

Country	Mammals	Birds	Reptiles	Amphibians	Fishes	Molluscs	Other Inverts	Plants	Total
Israel	13	18	4	0	12	5	5	0	57
Jordan	7	14	1	0	5	0	3	0	30
West Bank and Gaza	0	4	0	0	0	0	0	0	4

West Bank and Gaza  
 2004 IUCN Red List of Threatened Species. <[www.redlist.org](http://www.redlist.org)>.  
 Downloaded on 28 April 2005.

[Scientific Name]	Common Name(s)	Red List	Trend
<a href="#">Aythya nyroca</a>	FERRUGINOUS DUCK (E) FERRUGINOUS POCHARD (E) WHITE-EYED POCHARD (E) FULIGULE NYROCA (F) PORRÓN PARDO (S)	NT	
<a href="#">Chlamydotis undulata</a>	HOUBARA BUSTARD (E) HOUBARA ONDULÉ (F) OUTARDE HOUBARA (F) AVUTARDA HUBARA (S) HUBARA (S)	VU A2bcd+3bcd	↓
<a href="#">Circus macrourus</a>	PALE HARRIER (E) PALLID HARRIER (E) BUSARD PÂLE (F) AGUILUCHO PAPIALBO (S)	NT	↓
<a href="#">Crex crex</a>	CORN CRAKE (E) CORNCRAKE (E) RÂLE DES GENÊTS (F)	NT	↓
<a href="#">Emberiza cineracea</a>	CINEREOUS BUNTING (E)	NT	
<a href="#">Falco naumanni</a>	LESSER KESTREL (E) FAUCON CRÉCERELLETTE (F)	VU A2bce+3bce	↓

	CERNÍCALO PRIMILLA (S)		
<u>Gallinago media</u>	GREAT SNIPE (E)	NT	↓
<u>Larus audouinii</u>	AUDOUIN'S GULL (E)	NT	↑
<u>Lutra lutra</u>	COMMON OTTER (E) EURASIAN OTTER (E) EUROPEAN OTTER (E) EUROPEAN RIVER OTTER (E) OLD WORLD OTTER (E) LOUTRE COMMUNE (F) LOUTRE D'EUROPE (F) LOUTRE DE RIVIÈRE (F) NUTRIA COMÚN (S)	NT	?
<u>Numenius tenuirostris</u>	LONG-BILLED CURLEW (E) SLENDER-BILLED CURLEW (E) COURLIS À BEC GRÊLE (F) ZARAPITO FINO (S)	CR C2a(ii); D	↓
<u>Puffinus griseus</u>	SOOTY SHEARWATER (E)	NT	
<u>Tetrax tetrax</u>	LITTLE BUSTARD (E) OUTARDE CANEPETIÈRE (F) SISÓN (S)	NT	↓
<u>Torgos tracheliotus</u>	LAPPET-FACED VULTURE (E)	VU C1	↓

A similar [country search for Israel](#) from the 2004 IUCN Red List of Threatened Species shows 132 species listed.

### Endangered Species in International Trade

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between Governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The species covered by CITES are listed in [three Appendices](#), according to the degree of protection they need. Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

As the Palestinian Authority is not a sovereign state, it can not yet be a party to international treaties. Israel is, however, signatory to CITES and its results are indicative of the situation for the West Bank and Gaza. The CITES [database for listed animals](#) for Israel shows 28 species in Appendix I and 246 in Appendix II. The CITES [database for listed plants](#) for Israel shows 28 species in Appendix II.

### Protected areas, nature reserves and landscape conservation

Increasing human populations and the need for economic development mean that natural and semi-natural landscapes are under significant pressure, regardless of the additional impacts of the ongoing conflict. Such pressure increases the significance of protected areas but also increases the risk that such sites will become ecological 'islands' or 'museums', isolated from surrounding fragmented and degraded areas. Furthermore, in many cases, the protected areas established thus far are too small to maintain their ecological integrity and long-term viability.

The West Bank and Gaza are facing major challenges in conserving representative ecosystems and landscape/habitat linkages between protected areas. Most of the reserves on the West Bank lie in area

C and are controlled fully by the Israelis. Only 13 reserves (or 11.3 % of the total reserve area) are within area B and, in a non-conflict situation.

Since the events of September 2000, access to area B has also been restricted. This means that the management agency, currently the Ministry of Agriculture, cannot access most of the protected areas on the West Bank for management purposes – although enforcement activities in some reserves may be possible.

Israel commenced establishment of its protected areas system in the 1960s and now has around 200 reserves. Under Israeli legislation, nature reserves are established for the protection of ‘natural’ values (landscape, habitat, wildlife) and national parks primarily to protect cultural heritage and associated landscapes. Since 1967, Israel has designated 48 nature reserves in the West Bank covering about 5.7 % of West Bank territory. No nature reserves have been designated by Israel in Gaza, but the Palestinian Authority established the Wadi Gaza nature reserve in June 2000.

The [IUCN World Database on Protected Areas](#) of 2005 on Israel includes information on areas in the West Bank and Gaza.

<i>National Designations</i>	
<a href="#">National Park</a>	71
<a href="#">Nature Reserve</a>	232
<a href="#">Other Area</a>	1
<a href="#">Private Reserve</a>	1
<a href="#">Reserve</a>	3
<i>International Conventions and Programs</i>	
<a href="#">Wetlands of International Importance (Ramsar)</a>	2
<a href="#">World Heritage Convention</a>	3
<a href="#">UNESCO-MAB Biosphere Reserve</a>	1
<a href="#">Barcelona Convention</a>	7

UNEP claims the lack of management control is already having an impact, with localized dumping of solid waste in reserve areas and extension of agricultural activities by local people into reserve Areas.

The separation fence/wall built and planned prevents movement of wildlife to and from the surrounding regions. The wall is likely to have significant repercussions for wildlife movement, by adding further to the fragmentation of ecosystems and habitats in both Israel and the West Bank and by cutting the natural ecological corridors.

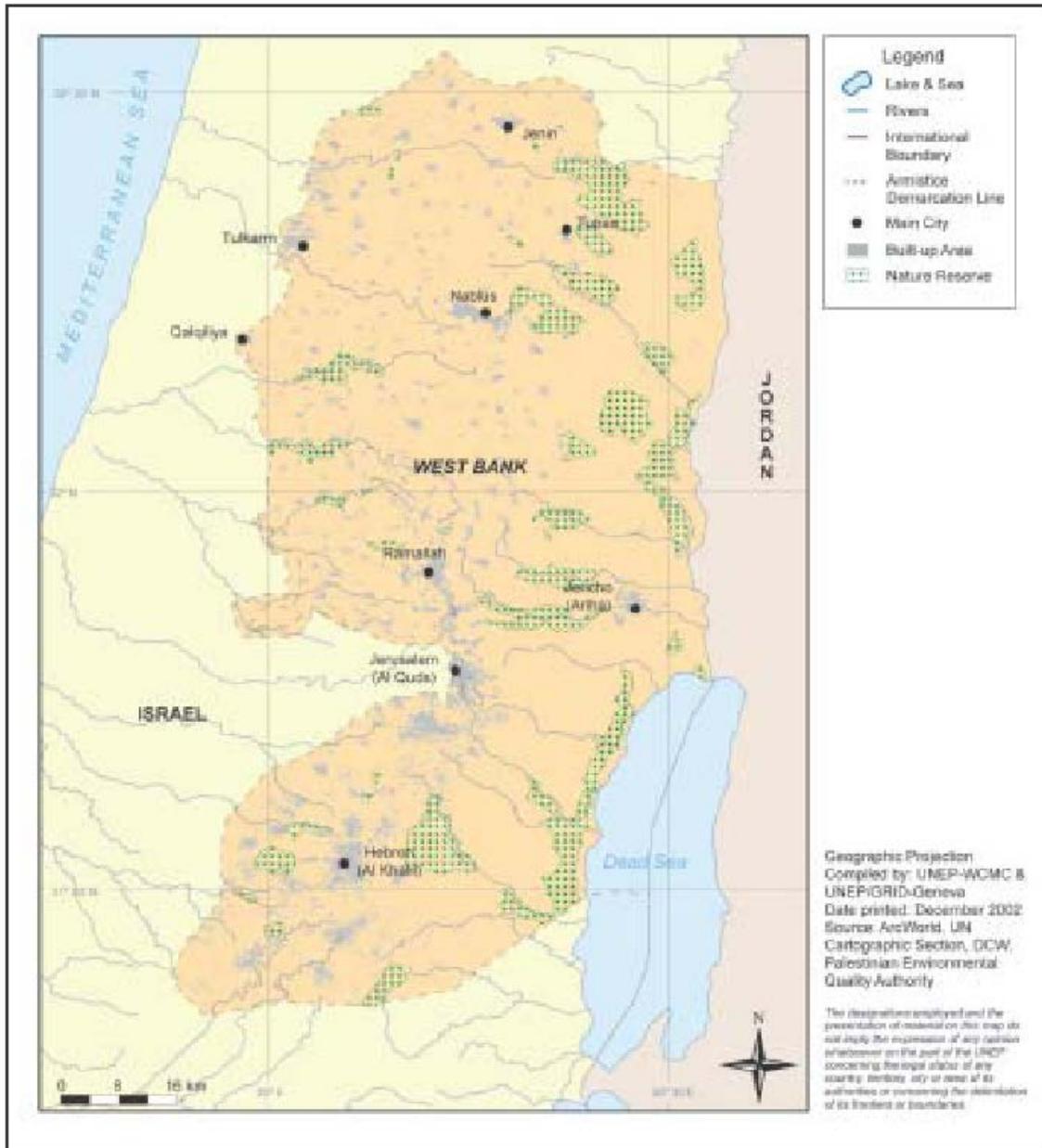
Current movement restrictions imposed on the Palestinian Authority make it difficult to enforce Article 41, on the prohibition of hunting, of the Palestinian Environment Law. However, while this may be true in the West Bank and some parts of Gaza, the law should be enforced along the Gaza coastline where scores of fine nets are erected illegally to catch migratory passerine bird species.

It is important to underline that, in addition to posing risks to human health and well being, pollutants from solid and liquid waste may have major impacts on biodiversity. Nutrient rich effluent causes eutrophication of wetlands and high biological oxygen demand (BOD) resulting in changes in ecosystem functions and loss of species, and, especially in arid ecosystems, changes in plant communities along flow channels and flooded areas.

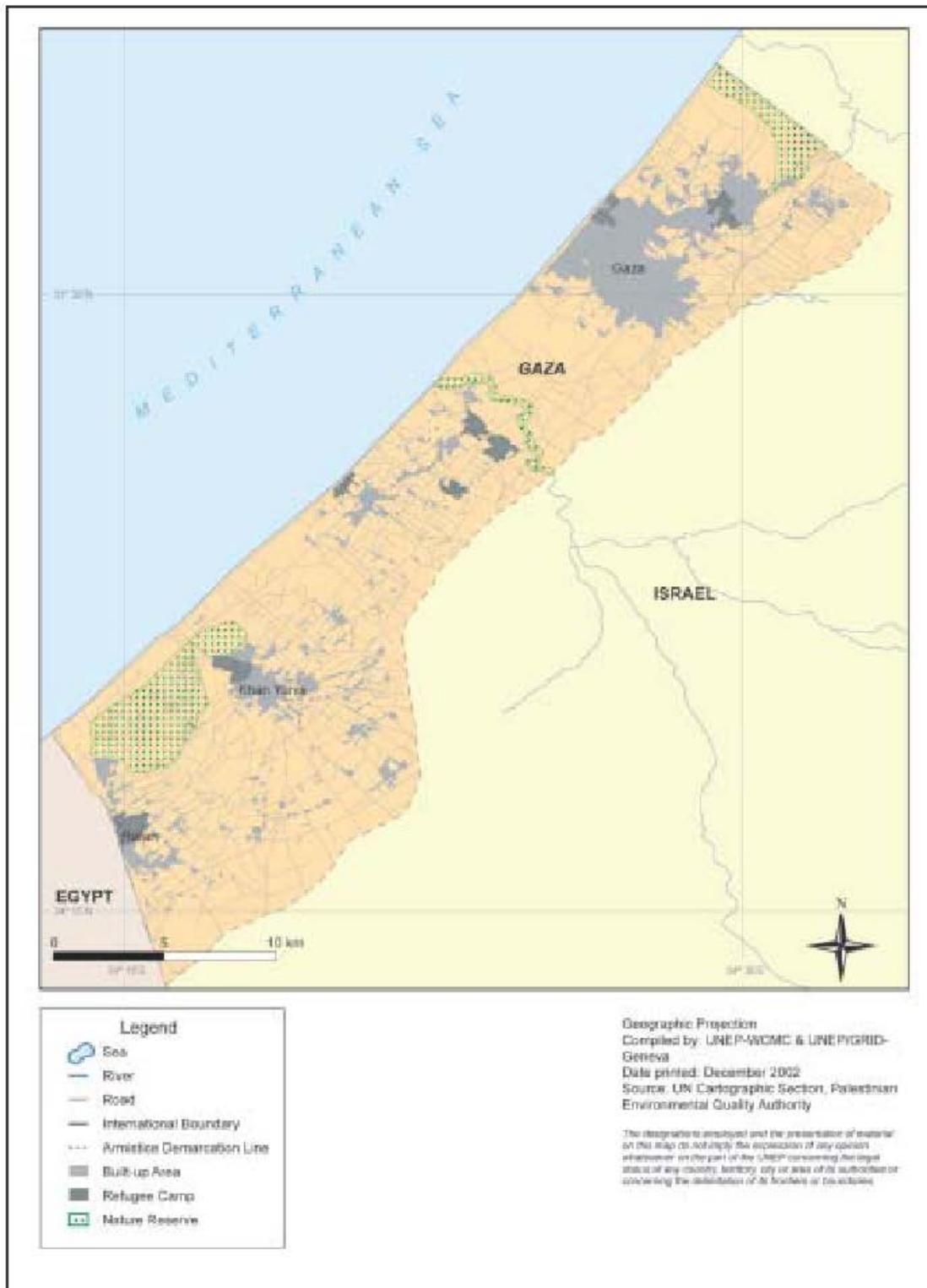
Changes in animal populations can also occur, with an increase in pest species and scavengers at exposed solid waste sites and untreated sewage outflows, and an increase in invertebrate disease

vectors. The build-up of toxins, including pesticide residues and heavy metals, in food chains is another significant potential threat to biodiversity in the region.

► Nature reserves in the West Bank



► Nature reserves in Gaza



## **Agrobiodiversity**

For many crops, West Bank is considered the main centre of diversity as well as the probable area of domestication. More crops and crop progenitors originated from the Near East accompanied barley and wheat on their way. Some of them, for example, lentil, pea and chickpea were domesticated in the Near East. The present geographical distribution of a wild progenitor of emmer, durum, bread wheat *Triticum dicoccoides*, and barley coincides perfectly with the geographical limits of the Fertile Crescent. These crops together with domesticated sheep and goats were a basis of a farming system that evolved in 7000 BC.

Additional crops, which are not included in the forgoing paragraph, have regional importance in human food production, for example, chickpea and fava bean or other valuable components of human diet, e.g., olive, almond, pistachio, apple, pear, apricot, peach, hazelnut, grape, quince, fig, date palm, cucumber and melon. The Near East is an important centre of genetic diversity for a wide range of crops. This is partly due to its very dissected ecosystems, with consequently an extremely wide range of agro-ecological conditions.

Drylands in general are most known for their within-species genetic diversity. The indigenous crops and food plants of the Near East are known for their resistance to disease and biotic stresses, making them a valuable source of genetic material for germplasm enhancement upon which global food security depends. The conservation and sustainable use of agro-biodiversity and plant genetic resources require a totally different approach from protected areas for biodiversity at species level.

Farmers have developed crop varieties through centuries of selection and management, which has resulted in a rich local agricultural biodiversity, with varieties benefiting earliness, disease and pest resistance, nutritional quality, and resistance to drought and other stresses

The ongoing crisis presents threats to preserving agrobiodiversity. The inability of many farmers to reach their fields for cultivation because of movement restrictions means that large areas are falling into disrepair through neglect, and crops are being lost. The practice of clearing agricultural fields for security purposes is in all probability having an impact on agrobiodiversity, especially in the intensively cultivated areas of Gaza.

## **Rangeland**

It is the eastern slopes region that is considered valuable rangeland, with an arid to semi-arid climate and an average annual rainfall of 150-350 mm and elevation of 450-750 m above sea level. Of the total area, only 225 km<sup>2</sup> are reportedly accessible to livestock owners as a result of the current restrictions. The National Biodiversity Strategy and Action Plan (PA, 1999) reports that the accessible area of the West Bank has a carrying capacity of 35,000 head of stock (goats and sheep), while the actual figure is in the order of 200,000 head. As a result of overgrazing, the accessible area has been impacted by loss of vegetation, spread of inedible plant species and erosion.

## **Coastal and marine**

The Gaza Strip's 40 km long western border with the Mediterranean Sea is the only area with access to marine and coastal environments. The beaches of Gaza also provide the only source of natural recreation for the population of this area.

The Gaza Strip is one of the most densely populated areas in the world, with an estimated 1.3 million people living in an area of 365 km<sup>2</sup>, or around 3,600 people per km<sup>2</sup>. The 42 kilometers of shoreline and 74 km<sup>2</sup> coastal zone is already under intense pressure, with substantial environmental degradation of terrestrial and marine resources.

Pollution from wastewater has contaminated the beaches and surf zone waters of the Gaza coast. Limited studies on the quality of the marine water indicated high levels of total ammonia nitrogen (TAN) levels 200 m off-shore (Hosh, 1995). This is an indication of contamination from sewage and

fertilizer runoff. Wastewater from several pollution sources, including Gaza City and Deir El Balah, is dumped untreated into the sea. Pollution from Israeli sources also reaches the area through dumping into Wadi Gaza, the largest natural drainage outlet in the area, before it enters the Gaza Strip. This pollution increases the spread of contagious diseases, and has rendered the water unsafe for swimming near the more heavily populated regions. The odor generated by this pollution also makes the beaches unattractive to potential tourists, as well as the local population.

Uncontrolled pollution is not the only detrimental attribute. Unregulated construction of housing and industry on the banks of the Mediterranean act as eyesores to the landscape. Also, the surrounding dunes, the only natural physical characteristic remaining, are rapidly disappearing due to the heavy quarrying of their sand. This industry is among the largest in the region, and is completely unregulated.

In December 2001, the Palestinian Ministry of Environmental Affairs published the comprehensive Third Countries programme. The plan identifies key coastal and marine issues for Gaza, such as:

- Depletion of sand resources through commercial and informal extraction for building
- Erosion caused by coastal infrastructure construction that disrupts longshore sand movements,
- Disturbance of marine and coastal ecology through intense fishing pressure, including
- Impacts of liquid and solid waste;
- Lack of cooperation among different authorities and coastal zone stakeholders.
- Lack of information. "Currently, data and information on coastal and marine environmental matters are scattered throughout different authorities' project offices and donor organizations. An information system on the coastal and marine environment is needed to support actions and coordination among the different agencies".

### **International Agreements**

As the West Bank and Gaza is not at sovereign state, it cannot apply for membership of the IMF or the World Bank Group, and is therefore not eligible for the sources of financing normally available to Member states. To overcome these legal and practical problems, the *Trust Fund for Gaza and West Bank* (TFGWB) was established in 1993. The TFGWB has periodically been replenished through allocations from the World Bank's surplus/net income. To date, a total of six allocations for a total of US\$460 million have been made to date, the most recent in December 2003.

The Palestinian Authority is party to the following international agreements:

- [Agreement for the Establishment for Arab Centre for the Studies of Dry and Barren Land \(Strasbourg, 1968 \)](#)
- [Protocol concerning Regional Co-operation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency \(Jeddah, 1982 \)](#)
- [Regional Convention for the Conservation of the Red Sea and of the Gulf of Aden Environment \(Jeddah, 1982 \)](#)

### **THREATS TO BIODIVERSITY**

The area of West Bank and Gaza have very limited natural resources. The geographic, political and socioeconomic uniqueness of this area imposes additional pressure on these resources. As a result of absence of management natural resources for the last 36 years, in addition to the high population growth rate (3.5-5.0%), centralization of peoples in smaller spots of land, colonizing activities like colonies construction, bypass roads and military bases, all the above mentioned increased the pressure on natural resources.

Biodiversity in the West Bank and Gaza is currently at risk due to:

- Increasing of human population pressure on natural systems from high population growth and the long-lasting refugee crisis;
- Rapid growth of settlements and supporting roads in areas where land is already scarce;
- Restrictions on communications, movement and access, limiting implementation of environmental management measures;

- Construction of separation wall and access roads that effectively block movement of terrestrial fauna, and cut the natural ecological corridors;
- Threats from solid waste and wastewater pollution;
- Clearing of land of vegetation for security purposes, urbanization and agricultural conversion.

Imad Iddin Al-Baba Biodiversity Specialist & Marine Biologist, Palestinian Environmental Authority in 1998 provided the basis of the review of threats to biodiversity which is updated below.

### **Political Issues**

The degradation of biodiversity is attributed to the destruction in natural habitats and ecosystems, partly through socio-economic and political activities. Over the past and recent history, the Territories have been subjected to series of successive civilizations (from the Canaanites to the present situation) that have added to the destruction of the already sensitive equilibrium of nature. In this context, it is becoming difficult to address issues of biodiversity threats beyond the scope of politically induced effects on land, water and other resources. Over the last millennia, thousand of hectares of forestlands and shrubs were cut for food, fuel and shelter. The flowering lands of milk and honey, described by early visitors, is nowadays topped with barren hills and decertified lands, devoid of biological life.

Authorities have been unable to fully control their biodiversity wealth and other valuable natural resources such as water. In the West Bank and Gaza territories, thousands of dunums of lands have been confiscated (or left closed) for settlements, roads, infrastructure, military bases and even for protected areas. No accurate figures are available for the state and rate of biodiversity degradation, and what is available is just rough estimations based on personal experience or preliminary investigations. The destruction of habitats and vegetative covers is of critical concern that must be dealt with immediately and can not be delayed any further. Practices of genetic erosion of species and desertification are common phenomena of no objection in areas such as the West Bank and Gaza.

### **Population Increase**

Increase in population growth enlarges competition for water resources, land and food and is a threat to biodiversity. Over the last 50 years there has been astounding growth rate that the combined population of both Israel and West Bank/Gaza reached 9.9 million today. This high rate of population growth has affected the amount of land holdings available and has brought much competition on agricultural lands and water resources, especially in the arid and semi arid areas. This ultimately brought about extensive pressures on biological resources and further consumption of their components.

### **Pollution, Quarries and Industrial Development**

Pollution is one of the factors contributing partly to the present degradation in biodiversity resources. Quarries and related industrial development activities have an ominous potential for creating air, water, and soil pollution during their operation and damaging runoff courses and landscapes during their construction. Polluted environment, insufficient health properties and scenic values have great influence on the production, survival, and diversity of biological species. Many plant and wild life species have been suffering from such severe polluting emissions over the last expansion of solid, industrial and agricultural wastes. Given the fragility of the ecosystem and the need for sustainable tourism development in the area, careful attention must be given to this potential conflict and to means of averting it.

### **Intensive and extensive agriculture**

Rapid intensification of agricultural involves an accelerated and extensive increase in cultivated areas. This will be accompanied by insufficient attention to water quality, pumping rates and appropriate management of ground water storage. Such risky action can generate disastrous results given the fragility of the ecosystem to be cultivated, which is very sensitive to the severe climatic conditions of the area and its water scarcity. In addition the cultivation of all types of soil sites in the area will bring about extinction of biological genotypes land races, and will reduce biodiversity significantly through the elimination of this unique but scarce habitat.

### **Pastoralism and Overgrazing**

Increased pressure from pastorals and other political effects in the mountainous regions of the area, in particular towards the Eastern Slopes, have brought over the years a significant damage to the biogenic soil crust and had resulted in overgrazing. These pressures can intensify losses of precipitation water to evaporation and or soil erosion and may have a consequential effect on the water budget of the area, which will ultimately restrict the biomass capacity of the grazing area and the diversity of its range species. In the Eastern Slopes, overgrazing is a serious pressure on Rangelands available for grazing, as only 15% of this grazing area is left open to herders after 1967. This makes the Eastern Slopes as one of the most decertified zones in the Arid lands of the Middle East.

### **Natural Context**

Periodic drought is one of the prominent features of low rainfall precipitation areas. The amount of rainfall is a limiting factor for dry land agricultural production and ecosystem rehabilitation. Therefore, the biological diversity may become less spectacular as precipitation rate is decreased to an adequate level, which ultimately affects the survival, continuo utilization and regeneration of plant and animal biota leading to desertification.

Given our regional ecological surrounding and cultural heritage, the States of the region have a leading role to play in supporting; ratifying and acceding the CCD; CBD as some countries have already done. Measures to promote rural development by protecting the Environmental; maintaining the countryside and restoring the landscape; soil; water conservation programs; land reclamation schemes and specific measures for the efficient use of energy resources needed to be foreseen.

Desertification is widely distributed in arid and semi arid and dry sub-humid land of the Jordan River valley. Ecology in this part is fragile and environment is flexible. The situation of land degradation/desertification is accelerating and becoming worse from bad. This negative fact brings serious threats and damages to the local; social-economic environment; biodiversity and development of peoples life and existence.

It is great importance that short and medium term priority Environmental action plan address issue like desertification combat, and conservation of biodiversity in the time where the Environmental Quality Authority (EQA) focuses its attention on dealing with those matters as top Environmental priority.

### **Infrastructure Development**

Increased colonization, settlement construction and urban development as well as transport and tourism through out the region will require development of railway lines, runways, modern airports and bypasses in the area. Since all of these lines will cut through all the outlets of watersheds leading to the area damaging the already fragile but valuable ecosystems, the agricultural and floristic biodiversity will be drastically affected.

### **Invasive Species**

According to recent scientific data, there are over 120 adventive wild plant species in Israel. About 30 have already become widespread and have penetrated into natural habitats, causing changes in the composition of plant communities and habitats. Another 20 are known as invasive species from other countries and are therefore expected to cause similar problems in the future.

## **INSTITUTIONS INVOLVED IN CONSERVATION OF BIODIVERSITY**

### **The Environmental Quality Authority (EQA)**

The Environmental Quality Authority (EQA) is implementing the following programs and activities to combat desertification and to conserve biodiversity.

- Combating desertification in the Jordan valley as an approach towards sustainable development. It is a sub-regional collaborative program that's comprised of H.K.Jordan; West Bank and Gaza; and Israel to examine the potential for sustainable development through combating desertification in the Jordan River valley. This project included collection of all sources of information that are related to arid land degradation in the region and put forward plans and

strategies to control them. The inter-governmental negotiation committee (INCD) of the convention to combat desertification (CCD) funds this program.

- A Biodiversity strategy and Action Plan Project (BSAP) funded by GEF through the UNDP and executed in collaboration with the IUCN. This project will prepare a mechanism and framework for biodiversity conservation and management along with an assessment survey on the state of biodiversity protected areas and nature conservation in West Bank and Gaza.
- Rangeland management project. This project discussing the threats of degradation in conjunction with means to alleviate these threats. This project funded by the Swiss government through the initiative to combat desertification and executed in various places in West Bank and Gaza.
- Germplasm conservation in the arid lands of West Bank and Gaza funded by the Government of the Republic of Korea and executed by EQA at about three sites.
- Economic forestry for arid lands, funded by ICARDA, and will be executed by EQA at about five sites will be used for forestation efforts. 80 ha to be planted until the end of this year.
- Since 1997, till now more than 50,000 forestry plants have been planted in many occasions and through several campaigns.

### **Biodiversity and Environmental Research Center (BERC)**

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### **Wildlife Palestine Society**

[Wildlife Palestine Society](#) evolved from Children for the Protection of Nature in Palestine (CPNP), which was a project from the Lutheran Schools and other private schools, upon their requests. WLPS was founded unofficially in autumn 1998. Since then, WLPS has had clear and strategic objectives regarding environmental concepts, protection of nature, and preservation of diverse species while the CPNP main objectives and activities concentrate on public and children awareness. Wildlife Palestine believes that education of conservation is the main pillar in the conservation movement of any country. One of the successes of WLPS is the inclusion of environment in the national education curriculum of the Ministry of Education.

Palestine Wildlife Society was established since 1999 and the first of its kind in the area but was created in the year of 1998. Since then the society has a clear and strategic objectives regarding *Environmental Educational Concepts, Conservation of the Nature and Biodiversity*, which made it through the years a society that proved dedication and effectiveness in raising environmental awareness throughout different sections in West Bank and Gaza and the region. It aims to serve the population of West Bank & Gaza, generally the economic level of the population is low, some live in poverty, they are being reached in their own native language (Arabic), as for the gender, the percentage of females is higher than males.

Wildlife Palestine Nature Conservation programs and projects include:

1. Migrating Birds with no boundaries: This project was a joint project that aimed to utilize bird migration as a perfect vehicle for cooperation between nations in the region, and to emphasize joint educational endeavors for students in West Bank and Gaza, Jordan and Israel. The project is led by three organizations: The International Center for the Study of Bird Migration in Latrun, established by the Society for the Protection of Nature in Israel (SPNI) together with Tel-Aviv University; Wildlife Palestine Society in the Palestinian Authority; and the Royal Society for the Conservation of Nature (RSCN) in Jordan.
2. Establishment of monitoring stations of the Wildlife (Flora and Fauna) in three stations - Beit Jala, Jericho, and Gaza by 2001.
3. Training of local and regional ecologists on nature conservation and management.
4. Education and promotion program: This program emphasizes education and promotion of birds and habitats through its activities with school and children, trips to nature reserves, and similar activities, production of printing materials including posters, magazines and video tapes, and inclusion of birds and wildlife conservation in national curriculum for schools.

5. Introducing Eco-Tourism concepts.

PWLS Projects:

1. Migratory Birds Know No Boundaries Project:  
Supported By: USAID/MERC –USA Government /Washington DC  
Activities :  
Education: using the Internet, Field Trips, and Bird Watching.  
Research: Recording Voices, Bird Ringing, and Bird Survey.
2. Together for Birds and people In the Jordan valley  
Supported By: European Commission through Birdlife International-UK  
Activities:  
Education: using the Internet, Field Trips, and Bird Watching  
Research: Recording Voices, Bird Ringing, and Bird Survey.  
Agriculture: from Pesticide to Biological Control.
3. Conservation of Wetland Area –Wadi Gaza  
Supported By: United Nation Developing Program/UNDP –Jerusalem  
Activities:  
Education: Field Trips, Environmental Campaign /Eco School.  
Research: Wildlife Survey/Bird Survey.  
Capacity Building: Human Capacity Building.
4. Conservation of Wetland Area-AIOja Spring-Jordan Valley.  
Supported by: IUCN-Netherlands  
Activities:  
Education: Field Trips, Environmental Campaign /Eco School.  
Research: Wildlife Survey/Bird Survey.  
Capacity Building: Human Capacity Building (Teachers, Students).
5. “Environmental Awareness through Local Media”  
Supported by: UNDP/PAPP - Jerusalem  
Activities:  
Dealing with the Local Media: Newspaper, TV, and Radio, by discussing important environmental issues.
6. “Conservation of the Eastern Slopes Bani Na’am area”  
Supported by: USAID through ANERA- Jerusalem  
Activities:  
Conducting a Flora and Fauna Survey for the area.
7. Promoting Eco tourism  
Supported by: GEF/UNDP  
Activities:  
Introducing the Eco Tourism NGO's and GO's.

**Water and Environmental Development Organization (WEDO)**

**Water and Environmental Development Organization (WEDO)** was established in 1997 as a non-profit, non-governmental Palestinian organization. WEDO was established due to recommendations made for creating an environmental organization to fill the growing gap between scientific research and policy recommendations concerning wastewater, solid waste management and environmental protection, on the one hand, and the absence of application of this knowledge on the other hand. WEDO has an application to the MERC for Fisheries research in the tributaries to the Dead Sea involving researchers in Jordan, Israel, West Bank and Gaza.

**US Agency for International Development (USAID)**

## **Bilateral Program**

The USAID/WBG Program management/GIS system lists 620 environment activities (214 for SO 2 and 405 for SO 8) with a USAID contribution of \$150 million (\$135 for SO 2 and \$15 for SO 8) mainly related to water, wastewater, and cleaning campaigns. These activities include construction, rehabilitation, extension of water and wastewater (also rainwater collection systems) systems and also includes training/educational activities related to water and wastewater. In addition, the GIS activities include the cleaning activities and campaigns (including public awareness and educational activities) that were done by some PVOs.

The mission is now reviewing responses to a Request for Application (RFA) for Palestinian Urban Parks Initiative (PUPPI). The program will rehabilitate, expand or improve existing public parks, or create new parks in neighborhoods throughout the West Bank and Gaza. The anticipated level of funding for this program is up to \$1,990,000.

The USAID assistance program has not, with small exceptions, included biodiversity conservation activities as part of its assistance portfolio. The environmental reviews, part of the mission obligation under [22 CFR 216, or Reg 16](#), have included biodiversity considerations in the risk analysis and mitigation.

## **Middle East Regional Cooperation Program (MERC)**

The Middle East Regional Cooperation Program (MERC) Program is administered by USAID under which collaborative research grants are awarded on a competitive, peer reviewed basis. These programs forge links between Arab and Israeli scientific and technical institutions, and between scientists in developing countries and counterparts in the U.S. and Israel. In addition, MERC grants have strengthened the capacity of institutions in developing countries to conduct their own research. MERC in particular has also promoted the Middle East Peace Process by its support of Arab-Israeli technical cooperation.

Relevant grants active 12/04 include:

[Migrating Birds Know No Boundaries](#) (M22-018 later added to include Jordan)

*Grantee Institution:* Tel Aviv University, ISRAEL

*Countries:* JORDAN, WEST BANK/GAZA, ISRAEL

*Award Date:* 7/14/1998 M17-098 PCE-G-00-98-00010-00

*End Date:* 12/31/2004 (Extended with additional resources)

*Abstract:* Development of the program (M17-098) on Migrating Birds Know no Boundaries by 1) significantly promoting scientific and educational activities among Israelis, Palestinians and Jordanians, 2) promoting peaceful dialog and cooperation among teachers, school children, and the public from Israel, Jordan and West Bank and Gaza and 3) bringing together in people-to-people activities Israeli, Palestinian, and Jordanian school children, teachers, researchers, and decision makers to cooperate on shared objective educational and scientific issues involving bird migration and factors that affect it.

Monitoring and Evaluation of Watersheds in the Middle East Region

*Grantee Institution:* USDA Forest Service, USA

*Countries:* ISRAEL, JORDAN, WEST BANK/GAZA, TURKEY (non-funded), USA

*Award Date:* 3/1/2001 M20-022 PCE-P-00-01-00011-00

*End Date:* 3/1/2006

*Abstract:* Support ongoing and new efforts to protect and improve natural resources and improve the socio-economic situation of the inhabitants by 1) monitoring and evaluating the effectiveness of watershed management practices in preventing erosion and increasing the efficiency of water use in

arid and semi-arid watershed pilot programs and 2) evaluating the biophysical measurements appropriate for evaluation of operational watershed management practices implemented for erosion control and biomass production in arid and semi-arid regions.

#### Assessment of Species Diversity in the Southern Arava Rift Valley

*Grantee Institution:* The Arava Institute for Environmental Studies, ISRAEL

*Countries:* ISRAEL, JORDAN

*Award Date:* 6/1/2002 M21-041 TA-MOU-01-M21-041

*End Date:* 5/31/2005

*Abstract:* Assess the distribution and frequency of species along the southern Arava Rift valley by 1) producing a series of biotic maps based on currently available data, 2) defining the primary landscape units, 3) determining the distribution of different organisms and their relationship to the landscape units, 4) identifying and mapping anthropogenic disturbances, 5) producing a map of ecological sensitivities that characterize biological landscape units and 6) designing alternative preservation plans based on the sensitivity maps and anthropogenic disturbance data.

#### Watershed Modeling, Biomonitoring, and Economic Analysis to Determine Optimal Restoration Strategies for Transboundary Streams

*Grantee Institution:* The Arava Institute for Environmental Studies

*Countries:* ISRAEL, WEST BANK/GAZA

*Award Date:* 7/1/2004 M23-019 TA-MOU-03-M23-019

*End Date:* 6/30/2007

*Abstract:* Identify an effective stream restoration strategy for Israel and Palestine, based on the development of watershed models that provide clear indications of contaminant loadings into streams, tailored to the unique ecological and geographical conditions of the local streams. 1) Develop a watershed model which can quantify the different sources of contaminants and their interactions for several area transboundary streams. 2) Identify and quantify the key parameters for stream restoration including water flow, nutrient and other contaminant loadings from nonpoint and point sources, and discharge limits (especially from municipal waste treatment facilities). 3) Extrapolate the maximum loading limits for the transboundary streams evaluated. 4) Establish a biomonitoring program that will offer a more thorough characterization of ecological health in local transboundary streams and offer baseline values to assess future reduction strategies. 5) Assess the effectiveness of different municipal waste treatment technologies in use in Israel and Palestine in order to identify a cost-effective waste treatment strategy given the goal of river restoration in low-flow, effluent dominated stream conditions. 6) Contrast the impacts of different nonpoint and point waste treatment strategies and technologies on stream water quality and ecological systems in low-flow, multi-seasonal conditions. The ultimate aim of this research is to lay the foundations for an effective river restoration strategy for Israel and Palestine. The project will approach restoration from a new angle, comprehensively and realistically, addressing the deficiencies in present restoration efforts.

#### An Environmental and Socioeconomic Cost Benefit Analysis and Predesign Evaluation of the Proposed Red Sea/Dead Sea Canal

*Grantee Institution:* American Near East Refugee Aid, Israel (PI: Friends of the Earth Middle East, Jordan)

*Countries:* JORDAN, ISRAEL, WEST BANK/GAZA

*Award Date:* 2/1/2004 M23-024 TA-MOU-03-M23-024

*End Date:* 3/31/2006

*Abstract:* Map out key potential environmental and socioeconomic impacts that would occur on the Gulf of Aqaba, Wadi Araba and Dead Sea as a result of the proposed RedSea-Dead Sea Conduit (RDC) by: for the Dead Sea 1) studying the impact of the RDC 2) modeling the mixing of seawater and the development of stratification of the water column, 3) quantifying the expected precipitation of gypsum, 4) understanding the impact of prolonged dilution of the upper water column; for the Araba

valley 1) studying the vulnerability of the region to continuous leaks from the RDC, 2) studying the environmental impact of the civil works involved in construction and maintenance of the RDC: for the Gulf of Aqaba 1) researching the impact of water flow disruption on the marine environment, 2) researching the impact of sediment movement on marine life, and 3) researching the effect of the open canal on humidity and its comfort impact on residents and fauna and flora.

Preserving the Endangered Marine Ecosystems in the Northern Gulf of Aqaba: Development of Resources Management Oriented Research and Novel Monitoring Techniques

*Grantee Institution:* ASEZA (Gov't of Jordan), PI: Marine Science Station in Aqaba

*Countries:* ISRAEL, JORDAN

*Award Date:* 5/1/2004 M23-025 TA-MOU-03-M23-025

*End Date:* 12/31/2006

*Abstract:* Develop and/or introduce new monitoring techniques and new methodologies for stress assessment in coral reefs. The main purpose is to upgrade and improve the capability of the national monitoring programs and regional management tasks, allowing for transition to joint management by the Jordanian and Israeli government authorities.

### **US Government Wye River Program**

Recently published with among others support from the US Government Wye River Program is *Crossing the Jordan: Concept Document to Rehabilitate, Promote Prosperity, and Help Bring Peace to the Lower Jordan River Valley* by EcoPeace/Friends of the Earth-Middle East. This concept document is the start of a regional effort to raise awareness, educate and influence decision makers, the Media and the public as to the current demise of the Lower Jordan River. Though still unique in its cultural and natural wealth the river valley is presently threatened by excessive water diversion, pollution and inappropriate development. Residents and tourists have little access to the river, due to present military restrictions. Despite the Valley's potential to attract significant tourism and have residents benefit from resulting revenue, the residents in the valley are among the poorest in their respective countries.

### **United Nations Development Programme**

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### **ACTIONS NECESSARY TO CONSERVE BIOLOGICAL DIVERSITY**

The [Desk Study on the Environment in the Occupied Palestinian Territories](#) published by the United Nations Environment Programme in 2003 was the product of an extensive late 2002 effort led by Mr. Pekka Haavisto, former Finnish Minister of Environment and Development Cooperation, to act as Chairman of the Desk Study team that was to carry out this assessment. The Post-Conflict Assessment Unit in the Division of Environmental Policy Implementation was the unit within UNEP in charge of this assignment.

The Desk Study team comprising of eight highly qualified and impartial environmental experts was formed during the early autumn and it visited the region between 1 and 11 October. The experts covered the following areas identified as the most vital for the environment in the region: water quality and quantity; solid waste; waste water; hazardous waste; biodiversity; land use and land use change; and environmental administration. The report reviewed over 500 publications and includes 136 recommendations. Those related to conservation and biodiversity are cited below:

#### **Continue cooperation on management of protected areas**

The lack or non-existence of cooperation is hampering the protection of valuable biodiversity as well as sustainable management of natural resources. Official cooperation on these issues has been halted since September 2000 and even technical cooperation has been very limited.

#### **Strengthen the regional cooperation to combat desertification.**

Regional efforts to combat desertification would benefit from the participation of Israel in the UNCCD Sub-Regional Action Program for West Asia. Jordan, Lebanon and the Syrian Arab Republic have recently endorsed the updated program. The Palestinian Authority is also engaged in its development.

**Enhance the protection of migratory species.**

Efforts should be made to engage the Palestinians and Israelis in relevant regional agreements such as the African-Eurasian Migratory Water Bird Agreement.

**Strengthen the cooperation to protect the Dead Sea.**

Collaborative approaches between Israel, Jordan and the Palestinian Authority are needed to halt the degradation of the world's unique geomorphological feature. The international community should assist the parties to carefully assess the possibilities of including the Dead Sea in a World Heritage Site.

**Increase nature protection.**

The pressures of population growth and economic development are endangering the environmental health of the region. Existing protected areas are in many cases too small to maintain their ecological integrity and long-term viability.

**Ensure proper management of the existing protected areas.**

Authorities on both sides should respect the goals and management rules set for the areas protected. In particular, efforts to rehabilitate the Wadi Gaza should be intensified.

**Restart capacity-building activities on conservation management.**

The system planning project for the protected areas has been suspended since 2000 and many of the much-needed in situ training activities have been stopped.

**Prepare an educational book of Palestinian flora and fauna.**

With support from the international community, the Palestinian Authority and/or NGOs should prepare a comprehensive easy-to-read catalogue of the Palestinian flora and fauna, in Arabic and English. This tool should be used for capacity-building of the local authorities and as educational material in schools and universities.

**Reconsider the ecological impacts of the separation wall.**

If the proposed separation wall is completed, this will further fragment the ecosystems and will disconnect natural ecological corridors. This is likely to have a negative impact on biodiversity. The demolition of buildings to enable construction of the wall could also have negative environmental impacts. An environmental impact assessment could show additional negative impacts. Further, the proposed wall may have other negative impacts on local communities, for instance separating people from their wells and agricultural lands. From the environmental point of view, the construction of the separation wall should be reconsidered.

**Enforce the prohibition on hunting.**

While the conflict has hampered the enforcement of the ban in the West Bank and in some parts of Gaza, the illegal hunting of migratory birds along the Gaza coastline should be stopped at once.

**Stop deforestation.**

Rapid loss of planted and natural forests in the region is increasing the risks of soil degradation and loss of biodiversity. More than 25 % of the officially designated forest areas are thought to have been lost between 1971 and 1999. Natural forests should be protected and afforestation promoted.

**Diminish pollution of wetlands.**

Untreated wastewater discharged to vulnerable wetlands may result in changes in ecosystem functions and loss of species. Eutrophication caused by nutrient-rich effluents creates high biological oxygen demand.

**Stop uncontrolled clearance of farmland.**

The practice of clearing farmland for security purposes needs to be weighed against the agrobiodiversity loss, other environmental costs, and losses of cultural importance, such as olive groves, not to mention the detrimental environmental impacts of increased poverty.

**Improve the protection of rangelands.**

Overgrazing and improper management of rangeland has contributed to the loss of vegetation and erosion. There is a need for improved protection and rangeland management.

**Improve coastal zone management.**

While regional and Mediterranean cooperation should help, the Palestinians must resolve the fundamental environmental threats on the coastal zone in Gaza. The results and recommendations of the “Gaza Coastal and Marine Environmental Action Plan” should be taken into account.

**Stop overfishing.**

Ways and means must be sought to provide Palestinian with greater access to fishing grounds, both to prevent damage to local fish populations, and also to ensure that Palestinians traditionally reliant on fish do not, driven by necessity, resort to overexploiting other natural resources as well.

**USAID PROPOSED STRATEGY, OBJECTIVES AND ACTIVITIES**

The mission will propose six new Strategic objectives. They are:

Strategic Objective 9: Program Support Objective (PSO)

Strategic Objective 10: Promote Economic Stability

Strategic Objective 11: Promote Democratic Reform

Strategic Objective 12: Improved and Sustained Performance in the Health System

Strategic Objective 14: Building a New Generation of Leaders

Strategic Objective 15: Greater Access to Better Quality Water and Other Infrastructure Services

The mission will propose all previous Strategic Objectives be continued under the new Strategy until the contracts and grants that have been awarded under the earlier strategy have been closed out. Incremental funding of awards made under the earlier strategy will continue to be made under the original SOs.

In the elaboration of activates and implementation plans for the Strategic Objectives, USAID/West Bank and Gaza will have numerous opportunities and means to contribute to conservation of biological diversity in the West Bank and Gaza.

**Establishing the enabling conditions.** SO achievements will contribute to establishing the conditions necessary to further other developmental goals, including biodiversity conservation. The key program focus, as proposed, moves beyond humanitarian relief or “conflict maintenance” to create conditions of stability, reform, and capacity and infrastructure development essential for “conflict resolution” and the establishment of a viable, sustainable state. WB/G will seek opportunities to reduce corruption. The Palestinian Authority has already started steps towards reducing corruption, and will assist in the multi-donor efforts that are now getting underway. Directly or indirectly, all mission activities are intended to address the root causes of conflict and terrorism. Local procurement, to the extent possible, will help support the recovering economy. Equal access to the benefits of assistance, regardless of gender, origin or religion remains a cornerstone of this strategy.

**Directly addressing the need**

The proposed Strategic Objective 15: Greater Access to Better Quality Water and Other Infrastructure Services promises to most directly contribute. Under the program activity “Improve access to clean water and sanitation” the SO Team will expand its successful municipal parks program to include the development of preserves to conserve areas of biological or historical significance. These areas are not only important as recreational and tourist centers, they also provide critical watershed functions for storm water drainage control, environmental remediation and aquifer recharge.

Under SO15 program component “Strengthen Democratic National Governance Institutions” USAID/WBG will work with relevant ministries, communities, and the private sector to promote more effective wastewater reuse and ensure cleaner water supplies through watershed management, environmental pollution control and remediation, and improved solid waste management.

Under SO15 program component “Strengthen Civil Society” the Mission will incorporate public awareness, advocacy training, and participatory decision-making processes into each of its projects. Broad-based public support is critical to reducing unaccounted for water losses, adopting water conservation practices, achieving cost-recovery, ensuring transparent and equitable distribution of services, and financing future infrastructure programs. Behavior change, training, and technology transfer activities may be needed in order to alter perceptions and attitudes about water use, use of treated wastewater for agriculture, and solid waste disposal practices. The Mission will explore opportunities for private sector involvement in service delivery through water utility management contracts in the West Bank, especially the central and southern regions. The first trial of a private sector management contract is about to be launched in Gaza with support from the World Bank through the creation of a regional water utility company.

### **Do no harm: Mitigating Threats from proposed activities**

Under SO15 program component “Expand and improve access to economic and social infrastructure” The team will be responsible for implementing all infrastructure projects where there is unusual complexity or high cost. The team will also provide engineering services in support of smaller infrastructure activities that might be undertaken by other teams, such as courthouses, schools, clinic rehabilitation or other small-scale projects.

### **Integration within the portfolio: Opportunities for linkages**

Under the new Strategic Plan, there will also be opportunities for other SO teams to contribute to conservation of biological diversity in the West Bank and Gaza.

Under Strategic Objective 9: Program Support Objective (PSO), the Geographic Information System (GIS) maintained for the mission by the SO team provides mission management and CTOs with standardized reporting between all partners, map generation and GIS analysis. This database is extremely useful in the environment when there are frequent short-fuse needs for program information to meet USAID mission, Country Mission and Washington needs. Integration of environmental data such as land use and potential, endangered species and environmental risks will improve the decision process and environmental soundness of all mission-supported activities.

Also under Strategic Objective 9: Program Support Objective (PSO), the Public Diplomacy team working with mission staff and partners will be able to incorporate attention to the environment in contact with local and international media, developing written materials about our program, and operating and maintaining the Mission’s website. It is charged with telling the very important story of how USAID assistance impacts the lives of Palestinians, the linkages it has in promoting a peaceful resolution to the current conflict, the promotion of stability. This activity is important to engender support from a variety of constituencies in the U.S., Israel, and Arab world on USAID’s program in the West Bank and Gaza.

Strategic Objective 12: Improved and Sustained Performance in the Health System as presently defined does not include medicinal plants and an understanding of traditional medicines, which are often combined with “modern” medicines especially in rural areas but including that area might make sense as the SO evolves. The Biodiversity and Environmental Research Center (BERC) in Til-Nablus is presently researching medicinal plants.

Strategic Objective 14: Building a New Generation of Leaders will be providing recreational and career choices available that will reduce the lure of political activism, including participation in environmental conservation activities.

### **Connect with global and regional initiatives**

As demonstrated in the review of existing USAID-supported activities that contribute to biodiversity conservation in the West Bank and Gaza, the Middle East Regional Cooperation Program (MERC) Program has and could continue to play an important role. USAID/WBG will encourage applications for assistance, facilitate contacts and monitor accomplishments.

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[Palestinian National Authority](#)

[Palestinian National Authority Ministry of Environmental Affairs \(MEnA\)](#)

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[Palestinian Ecological and Agricultural Organizations](#) by [Peace Research Institute in the Middle East \(PRIME\)](#)

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- [Arab Studies Society: Land Research Center \(LRC\)](#)
- [Applied Research Institute of Jerusalem](#)
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- [Center for Agricultural Services](#)
- [Development and Environment Association](#)
- [Environmental Protection and Research Institute](#)
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- [Union of Agricultural Work Center \(UAWC\)](#)
- [Water & Environmental Development Organization \(WEDO\)](#)
- [Water and Environmental Studies Center \(WESC\)](#)
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[Lonely Planet World Guide: Israel and the Palestinian Territories](#) Travel information and advice, attractions and activities, and local culture and history for dozens of Israeli and Palestinian locations.

[Palestinian Tourism Guide](#) Listing of tourist attractions - hotels, museums and art galleries, restaurants and cafes, and other tourist facilities.

[All that you need in Palestine](#) Businesses, Culture, Education, History, Media, Organization, Travel and more...

### **Acronyms and Abbreviations**

ANERA	American Near East Refugee Aid
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CCD	Convention To Combat Desertification
EQA	Environmental Quality Authority
PEnA	Palestinian Environmental Authority (now the Environmental Quality Authority (EQA))
USAID	US Agency for International Development

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