Palestinian National Authority

Environment Quality Authority

Wetlands in Palestine

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WETLANDS CONSERVATION IN PALESTINE

1. Introduction.

Palestine is 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 that 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.

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

The unique location of Palestine at the terrestrial meeting point between Asia,
Europe and Africa in addition to the diversity of the country's climatic zones facilitate the interaction and spread of plants and animals of the three continents.

With regard to wetlands in Palestine, there are a few wetland zones in the West Bank most have been drained or built over. Some of these are seasonal in that they are flooded in winter and dry up in the summer. These flood zones acted as refuge, feeding and resting stations for migratory waterfowl and home for amphibians. Example of these is the two flood (balou') areas of Al Bireh and Beitunia and Marj Sanour in Jenin area. The remaining amphibian that resided in such flood areas are in a serious risk of extermination. The most important wetland is Wadi Gaza, which is the largest of the wetlands and has received special attention and a rehabilitation plan. But a lot of work still remains as there are recurrent infringements on this ecologically prized area through the dumping of wastes and human activities.

The Gaza Strip, which is located at the southern portion of the Palestine coast along the Mediterranean Sea, harbors a variety of wildlife including terrestrial and aquatic forms. Wadi Gaza provides habitats and multi-purpose niches for a variety of flora and fauna as indicated. Wadi Gaza Wetland is an important site for migratory birds along the Middle East flyway. Dense concentration of migratory birds occurs over the Gaza Strip during spring and autumn migration seasons.

Many species use the coastal and wetland habitats of Gaza as a stopover point before continuing their annual migration. The relatively large number of bird fauna in Wadi Gaza and its wetland could be attributed to ecosystem diversity where Wadi Gaza is neighboring to various ecosystems and landscapes such as the seacoast, san dunes, natural vegetation and agricultural orchards. These ecosystems provide birds with all needs; shelter, fuel, food, nesting and resting sites. The results

2. Background

2.1 Geography

West Bank and the Gaza Strip are two separate geographical areas. 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 total area of Palestine is approximately 6,065 km^2, in which West Bank area is 5,700 km^2, while Gaza Strip is only 365 km^2.

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 in Halhul city, Hebron Governorate 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.

West Bank and Gaza can be divided into five main ecological zones:

Mediterranean coastal plain, semi coastal plain, central highlands, semi-arid eastern slope and Jordan valley.

2.1.1 Phytogeographical Zones.

Palestine is divided into the following phytogeographical zones as followed:

The Mediterranean zone, which 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 *Cerationia 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 *Zygophylletum dumosi and Suadetum 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 lanicolum,Tamarix nilotica, Acacia spp. and Artemisia monosperma*.

Climate.

The climate is typical Mediterranean, characterized by being hot, dry during summer, 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, 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 30ºC at Jericho through 25ºC at Gaza to 22ºC at Hebron which is 850 meters above sea level, the mean ranges in winter from 13ºC at Jericho and Gaza to 7ºC at Hebron. Rain tends to fall in intense storms. The northern Gaza Strip receives 400 mm, the south 200 mm per year, Jericho 166mm 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 *khamasin* blows from the desert in the south.

2.3 Social and Economic Environment

The West Bank is administratively divided into eleven governorates: Hebron; Bethlehem, Jerusalem, Ramallah and 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 governorates: 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.

2.4 Populations.

The population now stands at about 3.77 million, 2.35 are living in the West Bank and about 1.42 million are living 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 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. This will undoubtedly impact the urgency with which the issues of biodiversity and plant genetic conservation must be a addressed and managed.

3. Wetlands Locations and Importance.

With regard to wetlands in Palestine, as mentioned above, there are a few wetland zones in the West Bank most of which have been drained or built over in the last few years. Some of these are seasonal in that they are flooded in winter and dry up in the summer. These flood zones acted as refuge, feeding and resting stations for migratory waterfowl and home for amphibians. Example of these is the two flood areas of Al Bireh and Beitunia in Ramallah city and Marj Sanour in Jenin area. Unfortunately these sites were not understood intensively. Investigation and assessment of these sites and determination of its potential as a wetland is highly requested.

The main and most important Palestinian wetland is Wadi Gaza. Wadi Gaza is one of the very few land areas of the Gaza Strip which used to have an important role in biodiversity. Its original function of a natural 'Wadi' has been compromised by an Israeli built dam just outside the border, and the continuous barbed wire fence around the Gaza Strip has effectively stopped the options for fauna migration into and through the Wadi. It might therefore be interesting to investigate the possibility to permanently open up the Wadi on the sea side, in an attempt to re-vitalise it. The target here would thus be to create a dynamic, micro-tidal open estuary with a special saltwater habitat,
neighbouring a stagnant and rather dry freshwater habitat.

3.1 Brief Description of Wadi Gaza

Location: Governorate of Gaza
The area: 1250 dunum (125 ha)
The height (a.s.l): +0, +06m
Coordinates 31 35`N 34 27`E

Description of the region:

A wetland region follows the coastal system of the Mediterranean Sea. The source of Wadi Gaza is located near Al Samou village south of Hebron. The course of the Wadi crosses the Naqab desert and finally opens out into the Mediterranean south of Gaza City. The last 9 km of its course are within the Gaza Strip itself, making Wadi Gaza the largest valley in Gaza.

The valley is considered an ecologically significant natural heritage area. It is one of the few remaining undeveloped natural areas in Gaza Strip, and acts as a natural habitat for migratory and endemic birds. Some bird species, ranked rare or endangered according to IUCN, still find the valley an ideal place for feeding during migration. Threats to Wadi Gaza environments is mainly the pollution from wastewater and solid waste, disposal of construction debris in Wadi bed, encroaching urban development, depletion of resources from overgrazing, tree cutting , hunting, the construction of a bridge restricting biotic exchange with the sea.

Plants of the region:

The plants are composed of a variety of fresh water and brackish water plants.

Birds of this region:

Water birds and migrant birds can be seen in Wadi Gaza, where some are considered globally threatened.

Bird species that pass the region in large numbers include: the glaucous gull, the greater flamingo observed in January 1998, the night heron, the shoveler, and the great cormorant which over winters in the region and the crane bird observed in the past but its current status is not known.

The white pelican passes over the region during its emigration being registered as a crossing bird, the common tern can be founded in large numbers reaching up to 2000 birds, some being resident while others migrate. The great black-headed gull still exists in Dier Al– Balah shore.

4. Wetlands Value, Biodiversity, Local Communities,..

4.1 The Avifauna of Wadi Gaza Nature Reserve :

Palestine is located on major migration routes in the Palearctic region. Every year, millions of migratory birds pass through the area following three main migratory routes; the coast and coastal plain, the mountains and the Jordan Valley. Its geography and climatic variations form a suitable environment for numerous species. Despite its small area, more than 500 of the 9600 bird species worldwide are found in Palestine (Ali-Shtayeh and Hamad, 1995 and 1997; The Palestinian Institute for Arid Land and Environmental Studies – PIALES, 1996; The Palestinian Central Bureau of Statistics – PCBS, 2000 and The United Nations Environment program – UNEP, 2003).
This number becomes significant when compared with far greater size countries such as Britain, France or Spain in which only 400 to 440 species can be found (Alon, 1978). What makes this avifaunistic diversity is the mix of Mediterranean, Oriental and African desert influences. However, the replacement of natural ecosystems by human-made and artificial environments has been changing the structure of animal and plant communities in Palestine, chiefly in relation to the composition and abundance of bird species. Protection of wildlife resources seem to be of low importance to Palestinians. In autumn, scores of fine nets are erected each year along the Gaza coastline to illegally catch migratory birds such as Quail *Coturnix coturnix* and many other species (Personal Observations).
Birds are among the best known parts of the Earth's biodiversity, as they are the most conspicuous groups in any fauna (Pomeroy, 1992 and Bibby *et al.*, 1998). However, birds are universal, penetrating the remote deserts, oceans and mountains on Earth (Jonsson, 1992 and Forshaw *et al.*, 1999). They are considered as good indicators of the degree of human disturbance in the various ecosystems worldwide. They have long served humans for game, food, and feathers, as well as in their predatory capacity as destroyers of insects and rodents (Collins, 1981). In Palestine, no place is deprived of birds; they occupy all habitats extending from the Mediterranean coast in the west to the mountainous, semi-tropical landscapes and the Dead Sea in the east, and from the very productive ecosystems in the north to the very dry Negev Desert and Red Sea coast in the south. Urbanization, industrialization, the draining of wetlands and the wide spread use of pesticides impose threat to birds (Donald and Gregory, 2002 and Liven-Schulman *et al.*, (2004).

The diversity of birds was surveyed and studied in forests of different countries for different reasons including population assessment and conservation, e.g. China (Wang *et al.,* 2000), Tanzania (Baker, 2001) and the United States of America (USA) (Francl and Schnell, 2002). In contrast to forests, wetlands are considered the best areas to survey birds due to their open nature and water domination (Pomeroy, 1992; Bibby *et al.,* 1998 and Forshaw *et al.,* 1999) as the case in the wetland ecosystem of Wadi Gaza. Wetlands support wide range of avifaunistic species of which waterfowls are the most abundant (Kirby, 1995), where wetlands grasses and fishes are the most important food for waterfowls (Middleton, 1988 and Degani *et al.,* 1998). Mamo and Bolen (1999) recorded 51 resident and migratory bird species in Carolina bays, which are non-tidal palustrine wetlands in the USA. Ashkenazi and Dimentman (1998) recorded 180 bird species including herons, dabbling ducks, kingfishers, waders, wagtails and raptors in different habitats in a newly created Agmon wetland and surrounding cultivated peat land in the Hula Valley, Palestine. Mishra and Humbert-Droz (1998) identified 34 bird species in Tsomoriri Lake and the adjoining Nuro Sumdo wetland in Ladakh, Indian trans-Himalaya. A study in Tunisian oases indicated the presence of 19 bird species using theses habitats for breeding (Selmi and Boulinier, (2003).

In Turkey, the work on avifauna seemed to be extensive including national parks and nature reserves (Kirwan, 1998; Erdogdu, 2001; Aslan and Kiziroglu, 2003; Karakas and Kilic; 2004; Sert and Erdogan, 2004 and Perktas and Ayas, 2005). In Sudan, studies on avifauna and their seasonal variation have been carried out by Hamad and Evans (1982) and Hamad (1998) in various locations including the Dinder National Park. In Jordan, Evans *et al.* (2005) recorded 142 avifaunistic species of which more than 34 species were actually breeders in the proposed Rum Wildlife Reserve.

Work on bird fauna in Palestine seemed to be very rare, fragmentary and not comprehensive. Phillips (1915) described as many as 90 bird species belonging to 30 families in Palestine and the Sinai Peninsula. The Ostrich *Struthio camelus* which is completely extinct since decades in Palestine was common at that times. Brett (1988) indicated the presence of about 40 raptors in Palestine which were threatened by pesticides and habitat destruction. Al-Safadi (1997 and 1999) carried out studies on the behavior and developmental stages of two resident bird species in the Gaza Strip; the Spur-winged Plover *Vanellus spinosus* and the Chukar *Alectoris chukar*.

Recently, Yassin *et al.* (2005) surveyed about 86 bird species in the Northern Governorate of the Gaza Strip. Moreover, Abd Rabou (2005) studied the ecology of Wadi Gaza Nature Reserve and pointed out the presence of 154 terrestrial vertebrate species, of which avifauna was the most conspicuous. In spite of that, the scarcity of scientific literature concerning avifauna in Palestine promoted the conduction of the present work which aims at (1) determining the bird species at the vicinity of Wadi Gaza Nature Reserve; particularly its wetland ecosystem, in addition to their seasonal variations and ecological habitats and thereby determining their ecological status and abundance and (2) contributing to the knowledge of the Palestinians about their avifaunistic resources. The determination of bird species will help the conservationists to evaluate and compare the changes in the bird fauna of the region in the future.

Internationally, the importance of wetlands to biodiversity issue has lead to a process known as wetland mitigation which means wetland creation and restoration to replace

wetlands lost or destroyed (Mitsch *et al.,* 1998 and Shuwen *et al.,* 2001). This could be considered as a sign to the Palestinian government and the Palestinian environmental bodies to pay more attentions to the rehabilitation and conservation of their ecosystems; particularly Wadi Gaza in order to improve the life of Palestinians through nature conservation in times all parties saying that nature is a scarce resource in Gaza Strip.
Finally, the authors recommend carrying out more research on wildlife and improving cooperation of different parties to enhance the public awareness and to implement environmental laws and legislation to conserve nature and to protect wildlife.

A total number of 118 bird species belonging to 38 families and 11 orders were recorded in sites I and II of Wadi Gaza Nature Reserve. The monthly averaged numbers of birds seen in the Reserve were illustrated in Figure 1.
The numbers of bird species slightly increased during seasonal migration especially during 2004 spring passage. Aquatic birds comprised 49 (41.5%) of the species counted, while terrestrial birds comprised 69 (58.5%) species (Figure 2). The Passeriformes was the biggest order and comprised 41 (34.7%) of the recorded species. The second biggest order was the Charadriiformes which comprised 27 species (22.9%). Non-passerines comprised 77 species (65.3%) of the whole recorded species (Figure 3). Forty eight (40.7%) bird species were seen restricted to site I only and 2 (1.7%) were seen in site II only. Sixty three (53.4%) species were seen in both sites and 5 (4.2%) were neither seen in site I nor in site II, but they were captured and brought by hunters to the surveyor. These were the Hen Harrier *Circus cyaneus*, Long-legged Buzzard *Buteo rufinus*, Golden Eagle *Aquila chrysaetos* or reared by farmers such as the Helmeted Guineafowl *Numida meleagris* or preserved at local universities, such as the Pheasant *Phasianus colchicus*, where 3 males and 1 female were seen there. It is worth mentioning that the surveyor had never seen this species before and it is probably found in the eastern parts of the Gaza Strip or imported from outside. Eighty five (72.0%) were migratory while resident species comprised 31 (26.3%). The two species; the Helmeted Guineafowl *Numida meleagris* and the Pheasant *Phasianus colchicus* were not included in this categorization because the first was domesticated and the other was not recorded in the field (Figure 5). The recorded avifaunistic species in both Wadi Gaza sites are listed in Table 1. Table 2 illustrated seasonal variations, current status and relative abundance of bird species in Wadi Gaza Nature Reserve. The species in the tables were arranged taxonomically according to the available guides and textbooks.
From Tables 1 it can be seen that the study area has quite a rich bird fauna, specially during the migration seasons; spring and autumn. Herewith is a brief description of each recorded bird species with its habitat in both sites of the study area. Some documenting photos concerning certain bird species are also provided.

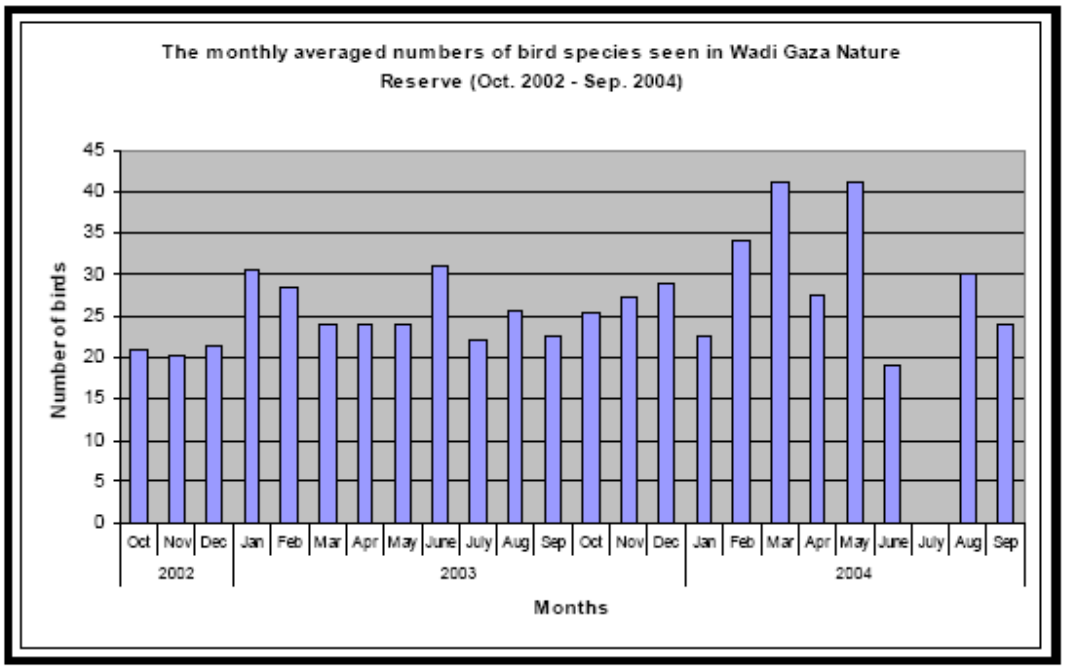

Fig. 1 Monthly Average Number of Bird Species in Wadi Gaza.

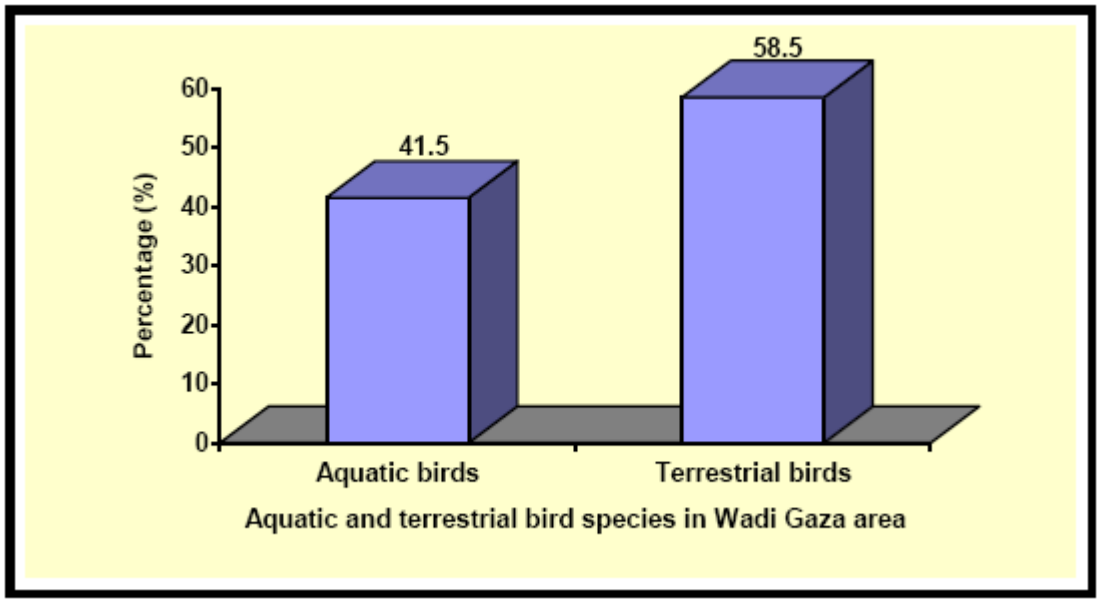

Fig.2 Aquatic and terrestrial birds of Wadi Gaza.

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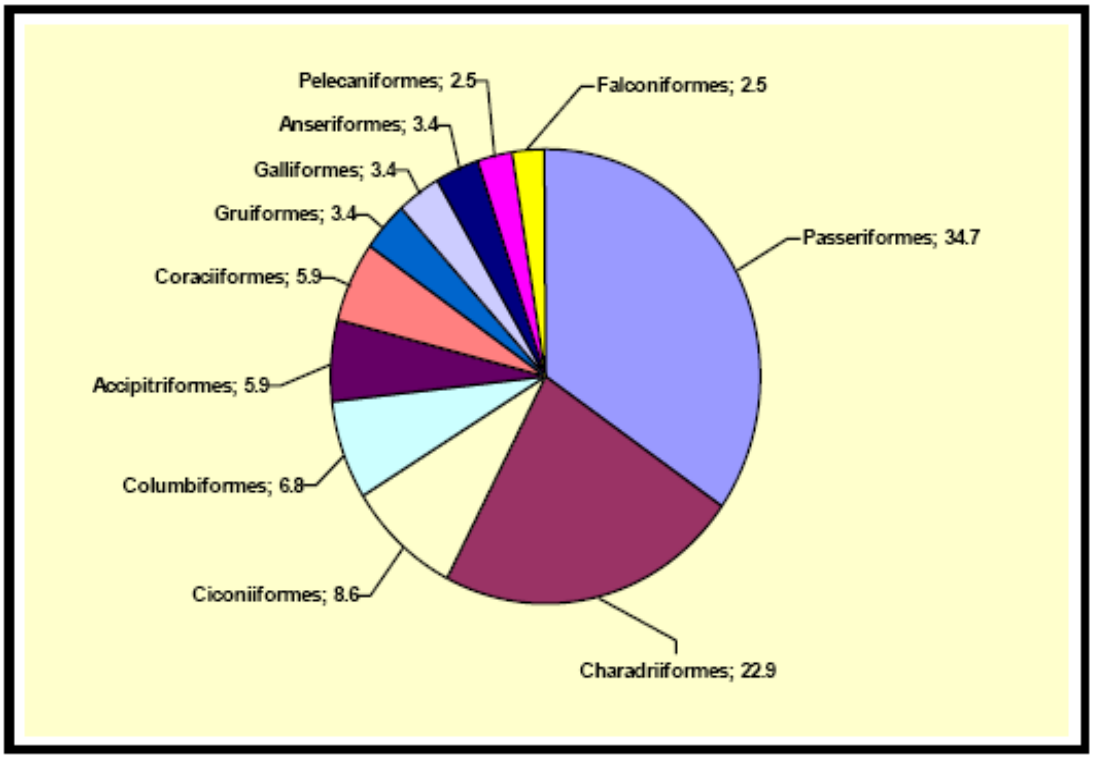


Fig.3 Different Orders of Wadi Gaza Birds.

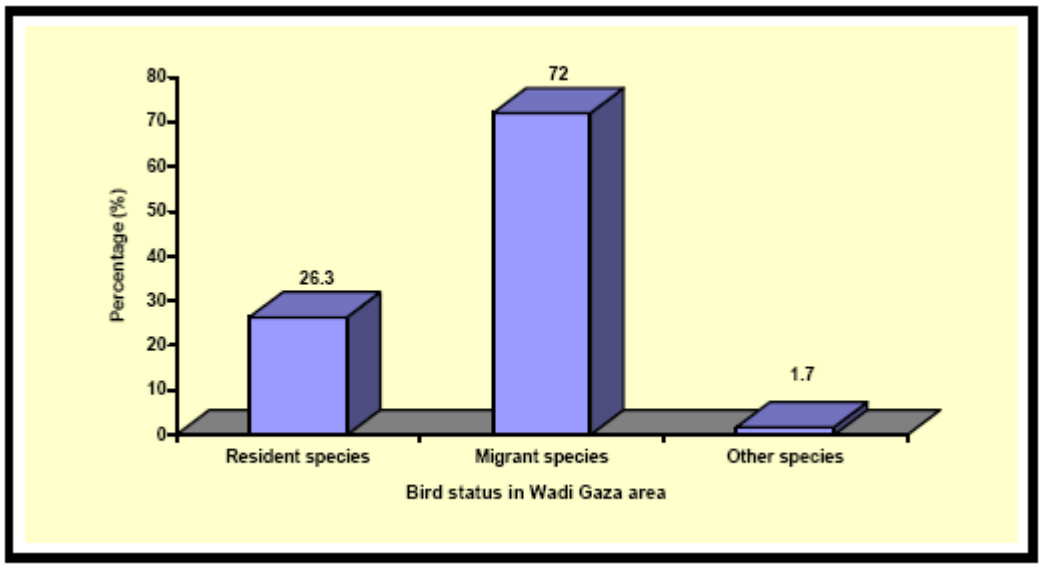


Fig.4 Bird Status I Wadi Gaza.

Table.1 Wadi Gaza Fauna.

Family	Scientific Name	Common Name	Site*	Arabic or Local Name
Order Pelecaniformes				
Phalacrocora-cidae الغرابية البحرية - العواق	*Phalacrocorax carbo*	Great Cormorant	I	غاق الماء – غراب البحر
	Phalacrocorax aristotelis	European Shag	I	غاق الماء
Pelecanidae البجعيات	*Pelecanus onocrotalus*	Great White Pelican	I	البجع الأبيض
Order Ciconiiformes				
Ardeidae البلشونية	*Ixobrychus minutus*	Little Bittern	I	الواق الصغير
	Nycticorax nycticorax	Night Heron	I	غراب الليل
	Butorides striatus	Striated Heron	I	مالك حزين مخطط
	Ardeola ralloides	Squacco Heron	I	مالك حزين
	Bubulcus ibis	Cattle Egret	I, II	أبو قردان
	Egretta garzetta	Little White Egret	I, II	بلشون أبيض (بيضوي) صغير
	Egretta alba	Great White Egret	I	بلشون أبيض كبير
	Ardea purpurea	Purple Heron	I	مالك حزين أرجواني
Ciconiidae اللقلقية	*Ciconia ciconia*	White Stork	I	لقلق أبيض
Threskiorn-ithidae الحارسيات	*Platalea leucorodia*	Spoonbill	I	أبو ملعقة
Order Anseriformes				
Anatidae البطية	*Anas strepera*	Gadwall	I	بط
	Anas platyrhynchos	Mallard	I	الخضيري
	Anas querquedula	Garganey	I	بط – حذف صيفي
	Anas clypeata	Shoveler	I	كيش – بط شرشير
Order Accipitriformes				
Accipitridae الكواسر	*Milvus migrans*	Black Kite	I,II	الحدأة السوداء
	Circus aeruginosus	Marsh Harrier	I	مرزة البطائح
	Circus cyaneus	Hen Harrier	?	مرزة الدجاج
	Buteo buteo	Common Buzzard	I, II	صقر حوام
	Buteo rufinus	Long-legged Buzzard	?	صقر (حميمق) طويل الساقين
	Aquila heliaca	Imperial Eagle	II	ملك العقبان
	Aquila chrysaetos	Golden Eagle	?	العقاب الذهبية

Family	Scientific Name	Common Name	Site*	Arabic or Local Name
Order Falconiformes				
Falconidae الصقرية	*Falco naummani*	Lesser Kestrel	I, II	عويسق
	Falco tinnunculus	Common Kestrel	I, II	عويسق – صقر الجراد
	Falco subbuteo	Eurasian Hobby	I	الكونج – الشويهين
Order Galliformes				
Phasianidae التدرجية	*Alectoris chukar*	Chukar	I, II	شنار – حجل رومي
	Coturnix coturnix	Quail	I	فر – سمان – سلوى
	Phasianus colchicus	Pheasant	?	التدرج
	Numida meleagris	Helmeted Guineafowl	?	دجاج فرعون – دجاج الوادي
Order Gruiformes				
Rallidae التفلقية	*Porzana porzana*	Spotted Crake	I	المرعة المنقطة
	Gallinula chloropus	Moorhen	I	دجاجة الماء
	Porphyrio porphyrio	Purple Gallinule	I	فرخة سلطانية
	Fulica atra	Coot	I	الغرة
Order Charadriiformes				
Recurvirostr-idae النكاتية	*Himantopus himantopus*	Black-winged Stilt	I	أبو المغازل – كرسوع
	Recurvirostra avosetta	Avocet	I	النكات – نكات الماء
Burhinidae الكروانيات	*Burhinus oedicnemus*	Stone Curlew	I, II	كروان صحراوي – كروان جبلي
Charadriidae القطقاطية	*Charadrius hiaticula*	Ringed Plover	I	أبو الرؤوس المطوق
	Charadrius alexandrius	Kentish Plover	I	أبو الرؤوس الإسكندراني
	Hoplopterus (Vanellus) spinosus	Spur-winged Plover	I, II	زقزاق شامي– قطا – أبو ظفر
	Vanellus vanellus	Lapwing	I	زقزاق شامي– أبو طيط
Scolopacidae الطياطي	*Calidris minuta*	Little Stint	I	دريجة صغيرة – القطيرة
	Gallinago gallinago	Common Snipe	I	جهلول عادي – شنقب
	Philomachus pugnax	Ruff	I	حجولة – الشقي
	Tringa erythropus	Spotted Redshank	I	طيطوي أحمر الساق مرقط
	Tringa totanus	Redshank	I	طيطوي أحمر الساق
	Tringa stagnatilis	Marsh Sandpiper	I	زمار الرمل الخواض
	Tringa ochropus	Green Sandpiper	I	زمار الرمل الأخضر
	Actitis hypoleucos	Common Sandpiper	I	زمار الرمل الشلئع

Family	Scientific Name	Common Name	Site*	Arabic or Local Name
Laridae النورسية	*Larus melanocephalus*	Mediterranean Gull	I	نورس البحر المتوسط
	Larus ridibundus	Black-headed Gull	I	نورس أسود الرأس
	Larus fuscus	Lesser black-backed Gull	I	نورس أسود الظهر الصغير
	Larus argentatus	Herring Gull	I	نورس
	Larus cachinnas	Yellow-legged Gull	I	نورس أصفر القدم – فضي
	Larus marinus	Great black-backed Gull	I	نورس أسود الظهر الكبير
Sternidae الخراشن	*Gelochelidon nilotica*	Gull-billed Tern	I	الخطاف النيلي
	Sterna hirundo	Common Tern	I	خطاف البحر الشائع
	Sterna albifrons	Little Tern	I	خطاف البحر الصغير
	Chlidonias hybridus	Whiskered Tern	I	خطاف بحر
	Chlidonias leucopterus	White-winged Tern	I	خطاف بحري أبيض الجناح
Apodidae السمامية	*Apus apus*	Common Swift	I, II	السمامة
Order Columbiformes				
Columbidae الحمامية	*Columba livia*	Rock Dove (Pigeon)	I, II	حمام بري – طوراني (صخري)
	Streptopelia decaocto	Collared Dove	I, II	يمامة مطوقة
	Streptopelia turtur	Turtle Dove	I, II	يمامة قمرية – قمري – حمام رقطي
	Streptopelia senegalensis	Laughing (Palm – Senegal) Dove	I, II	يمامة (سنغالية) ضاحكة (حمام) – دبسية – فاختة النخيل
Cuculidae الوقواقية	*Clamator glandarius*	Great Spotted Cuckoo	I, II	وقواق مرقط
Strigidae البومية	*Otus scops*	European Scops Owl	II	بومة أذناء صغيرة – الثيح
	Athene noctua	Little Owl	I, II	أم قويق – بومة صغيرة
	Tyto alba	Barn Owl	I, II	بومة الجرن – بومة بيضاء
Order Coraciiformes				
Alcedinidae القاوندية	*Halycon smyrnensis*	White-breasted Kingfisher	I, II	السماك أبيض الصدر – القاوند
	Alcedo atthis	Common Kingfisher	I	السماك الشائع – رفراف
	Ceryle rudis	Pied Kingfisher	I	السماك الأبقع / الأرقط
	Merops apiaster	European Bee-eater	I, II	الوروار الأوروبي

Family	Scientific Name	Common Name	Site*	Arabic or Local Name
Meropidae الوروارية	*Merops apiaster*	European Bee-eater	I, II	الورور الأوروبي
	Coracius garrulus	European Rollar	I, II	الشرقرق – الشقراق
Upupidae الهدهدية	*Upupa epops*	Hoopoe	I, II	هدهد
Picidae اللوائية	*Dendrocopos syriacus*	Syrian Woodpecker	I, II	نقار الخشب السوري
Passeriformes				
Alaudidae القبرية	*Galerida cristata*	Crested Lark	I, II	قبرة متوجة
	Alauda arvensis	Skylark	I, II	قنبرة الحقول
Hirundinidae السنونية	*Hirundu rustica*	Barn Swallow	I, II	سنونو – عصفور الجنة
Motacillidae الفتاحية (الذعريات)	*Motacilla flava*	Yellow Wagtail	I, II	ذعرة صفراء – سفرية
	Motacilla citreola	Citrine Wagtail	I, II	ذعرة ليمونية – سفرية
	Motacilla alba	White Wagtail	I, II	ذعرة بيضاء – كركز
Pycnonotidae البلبلية	*Pycnonotus xanthopygos*	Yellow-vented Bulbul	I, II	بلبل أصفر العجز
Turdidae المغردات	*Erithacus rubecula*	European Robin	I, II	أبو الحناء – أبو الحن – حمرية
	Luscinia svecica	Bluethroat	I, II	مسهر – دحل – هازجة زرقاء الزور
	Phoenicurus phoenicurus	Common Redstart	I, II	الحمبراء
	Saxicola torquata	Stonechat	I, II	أبلق الرعيان – قايعي احمر
	Oenanthe isabellina	Isabelline Wheatear	I, II	الأبلق
	Oenanthe oenanthe	Northern Wheatear	I, II	الأبلق الاعتيادي
	Oenanthe hispanica	Black-eared Wheatear	I, II	الأبلق أسود الأذن
	Turdus merula	Blackbird	I, II	شحرور – دج
	Turdus philomelos	Song Thrush	I,II	السمنة المغنية – سمن
Sylviidae الخناشع -	*Prinia gracilis*	Graceful Prinia (Warbler)	I, II	فسية – فسيوة
	Acrocephalus scirpaceus	European Reed Warbler	I, II	هازجة القصب

Family	Scientific Name	Common Name	Site*	Arabic or Local Name
الدخل	*Hippolais pallida*	Olivaceous Warbler	I, II	الخنشع الزيتوني الباهت
	Hippolais olivetorum	Olive-tree Warbler	I, II	خنشع شجر الزيتون
	Sylvia atricapilla	Blackcap	I, II	أبو قلنسوة
	Phylloscopus collybita	Chiffchaff	I, II	نقشرة ذهبية – نقشارة
Muscicapidae الشورية (مذبابيات)	*Muscicapa striata*	Spotted Flycatcher	I, II	خاطف الذباب المنقط
Paridae القرقفيات (الصعوية)	*Parus major*	Great Tit	I, II	قرقف كبير
Nectariniidae	*Nectarinia osea*	Palestine Sunbird	I, II	عصفور الشمس الفلسطيني
Laniidae الصرود	*Lanius senator*	Lesser grey Shrike	I, II	دقناش رمادي صغير
	Lanius nubicus	Great grey Shrike	I, II	دقناش رمادي كبير
	Lanius senator	Woodchat Shrike	I, II	دقناش شامي – صرد
	Lanius nubicus	Masked Shrike	I, II	صرد
Corvidae الغرابية	*Corvus corone*	Hooded Crow	I, II	غراب بلدي رمادي
Sturnidae الزرزورية	*Sturnus vulgaris*	Starling	I, II	الزرزور
Passeridae العصفورية	*Passer domesticus*	House Sparrow	I, II	عصفور منزلي – دوري
	Passer hispaniolensis	Spanish Sparrow	I, II	عصفور أسباني – دوري أسباني
Fringillidae الحساسين	*Fringilla coelebs*	Chaffinch	I, II	الصغنج – عصفور ظالم – زرعي
	Serinus serinus	European Serin	I, II	نعار أوروبي – بسبوس
	Serinus syriacus	Syrian Serin	I, II	نعار سوري
	Carduelis chloris	Green Finch	I, II	خضر – خضيري
	Carduelis carduelis	Goldfinch	I, II	حسون ذهبي
	Carduelis spinus	Siskin	I, II	طزليك
	Carduelis cannabina	Linnet	I, II	عصفور تفاحي
	Rhodospiza obsoleta	Desert Finch	I, II	حسون صحراوي – هرد

*Site: I= Site I, II= Site II, I, II= Both Sites

4.2 The Wild Mammals of the Gaza Strip:

The replacement of natural habitats by residential and cultivated areas has been changing the structure of animal and plant communities in Palestine, chiefly in relation to the composition and abundance of species. Mammals are considered good indicators of the degree of human disturbance in the various ecosystems. Some mammals; particularly rodents might become agricultural plagues with extreme population peaks (Galante and Cassini, 1994). In spite of the very limited area of the Gaza Strip (365 km^2) compared the total area of Palestine (27,000 km^2), it is fragmented by 21 Israeli settlements and is totally fenced by the Israeli political borders separating it from the other occupied territories of Palestine. This political situation already prevents movement of wildlife; particularly large mammals to and from the surrounding regions and as a result adversely affects wildlife ecology in the area (The United Nations Environment Program – UNEP, 2003). Similarly, the construction of the new Israeli Apartheid Separation Wall in the West Bank of Palestine is likely to have significant repercussions for wildlife movement, by adding further to the fragmentation of ecosystems and habitats and by cutting natural ecological corridors (The Palestinian Environmental NGOs Network – PENGON, 2003). Approximately 500 birds, 100 mammals and 120 herpetofaunistic species, in addition to 400 fish were known to inhabit Palestine (Yom-Tov, 1988; Ali Shtayeh and Hamad, 1995 and 1997; The Palestinian Institute for Arid Land and Environmental Studies – PIALES, 1996 and The Palestinian Central Bureau of Statistics – PCBS, 2000). Qumsiyeh (1996) described most of the mammals living in the Holy Land (Palestine and Jordan) and found that many mammals have strong affinities to that of Africa, e.g. the Ethiopian Hedgehog *Paraechinus aethiopicus*, the Egyptian Fruit-bat *Rousettus aegypticus* and the Egyptian Mongoose *Herpestes ichneumon*. Some are representative of Asiatic species, e.g. the Indian Crested Porcupine *Hystrix indica*. Others have a European origin, e.g. the Northern Hedgehog *Erinaceus europaeus*. Still, other species are endemic of Palestine such as the Palestine Mole-rat *Spalax leucodon ehrenbergi*. He also stated that most mammals of Palestine have Palearctic affinities and a few have affinities to the Ethiopian and Oriental realms.

Work on wild mammals in the West Bank of Palestine seemed to be unclear where no literature was available, while in the Gaza Strip it seemed to be limited to few unpublished reports and a preliminary work (Abd Rabou, 1999 and 2000 and Yassin *et al.*, 2005). In addition, a recent Ph.D. thesis concerning wildlife ecology and management has been carried out in Wadi Gaza (Abd Rabou, 2005). The scarcity of scientific literature concerning wildlife in the Occupied Palestinian Territories (OPTs) promoted the conduction of the present work concerning mammals which is a part of a comprehensive study aiming at surveying and giving general observations on terrestrial vertebrate fauna in the Gaza Strip.

A total number of 15 mammalian species belonging to 11 families and 5 orders was recorded in Wadi Gaza and other areas of the Gaza Strip; they were listed in Table 2. Most recorded species were of small size. Rodentia was the biggest order and comprised 6 (40.0%) of the recorded species of which one species was new to the area and happened once (N=3). It was followed by Carnivora which comprised 4 (26.7%) species of which two species were considered extinct from the area. The other three orders each comprised of one or two species. Twelve of the mammals recorded were resident and mostly found throughout the year. The other three species (one rodent and two carnivore species) were new to the area, i.e. entering the area by mistake. At least 5 out of 15 are considered pests to farmers and

people, as they may cause harmful losses to their cash crops as well as stored products. During 1980s, two whales were thrown by the Mediterranean Sea waves at the beach of the Gaza Strip after being shot by the Israeli Army. No records or data were available about whale occurrence in the area before. Dolphins were also mentioned by Gazan fishermen to occur in the sea waters of the Gaza Strip. They ensured that they saw them while fishing in the Mediterranean with no further details.

Seven mammalian species (Table 3) were mentioned by Gazans as disappeared including two of the carnivorous species listed in Table 1. The main causes contributed to the disappearance of large and medium-sized mammals in the Gaza Strip as said by local people were the limited area of the Gaza Strip, the political borders surrounding the Strip, population overcrowding which was accompanied by residential and agricultural expansions and habitat loss, modification and destruction.

Table.2 Wild Mammals Recorded in Gaza Strip, particularly Wadi Gaza.

Table 1: Wild Mammals Recorded in the Gaza Strip; Particularly Wadi Gaza

Family	Scientific Name	Common Name	Status*	Arabic or Local Name
Order Insectivora				
Erinaceidae	*Hemiechinus auritus*	Long-eared Hedgehog	R	قنفذ طويل الأذن
	Paraechinus aethiopicus	Ethiopian Hedgehog	R	القنفذ الأثيوبي

Family	Scientific Name	Common Name	Status*	Arabic or Local Name
Order Chiroptera				
Pteropoidae	*Rousettus aegyptiacus*	Egyptian Fruit-Bat	R	خفاش الثمار المصري
Vespertilionidae	*Pipistrellus kuhlii*	Kuhl's Pipistrelle Bat**	?	خفاش(وطواط) ليلي
Order Carnivora				
Canidae	*Canis lupus*	Wolf***	–	ذئب
	Canis aureus	Golden Jackal***	–	ابن آوى
Felidae	*Felis silvestris*	Wild Cat	R	قط بري
Herpestidae	*Herpestes ichneumon*	Egyptian Mongoose	R	نمس مصري
Order Rodentia				
Spalacidae	*Spalax leucodon ehrenbergi*	Palestine Mole-Rat	R	الخلد الفلسطيني
Muridae	*Mus musculus*	House Mouse	R	فأر منزلي
	Rattus rattus	House (Black) Rat	R	فأر البيوت
	Rattus norvegicus	Norway (Brown) Rat	R	فأر (بني) نرويجي
Dipodidae	*Jaculus jaculus*	Lesser Egyptian Jerboa	R	اليربوع المصري الصغير
Myocastoridae	*Myocastor coypus*	Coypu – Nutria***	?	الكويبو
Order Lagomorpha				
Leporidae	*Lepus capensis*	Cape Hare	R	أرنب بري

* Status: R = Resident; ? = Unknown

** Further studies are needed to know more about the occurrence of other existing nocturnal bat species.

*** Rare mammals: They are either reported to be seen by locals or seen by the surveyor with people hunting them.

Table.3 Disappeared Wild Mammals in Gaza Strip including Wadi Gaza.

Table 2: Disappeared Wild Mammals in the Gaza Strip

Family	Scientific Name	Common Name	Arabic or Local Name
Order Carnivora			
Hyaenidae	*Hyaena hyaena*	Striped Hyena	الضبع
Canidae	*Vulpes vulpes*	Red Fox	الثعلب
	Canis lupus	Wolf	ذئب
	Canis aureus	Golden Jackal	ابن آوى
Order Rodentia			
Hystricidae	*Hystrix indica*	Indian Crested Porcupine	النيص – الشيهم
Order Artiodactyla			
Bovidae	*Gazella dorcas*	Dorcas Gazelle	غزال الدوركاس
	Gazella gazella	Mountain Gazelle	الغزال العربي

4.3 The Herpetofauna of the Gaza Strip:

Herpetofauna (sometimes referred to as herptiles) is a common name referring to both reptiles and amphibians. Reptiles are adapted to exist in the harsh climates of deserts and arid lands. Even in areas where other wildlife has become scarce, reptiles can still be abundant. They are more abundant in the tropics and subtropics than in the temperate zones. The reptile's dry, thickened and cornified skin is suitable for these climates and habitats and protects the animals from shocks and risks of dehydration (Capula, 1989). In contrast, amphibians usually seek water, wetlands and sometimes moist soils for egg deposition and for protection against water loss from their thin skin. However, amphibians can not tolerate the high salt content of sea water and are therefore the only vertebrates not to have colonized marine habitats (Collins, 1981 and Capula, 1989). There are apparent declines and extinction of the herpetofaunal communities throughout the world (Gibbons *et al.*, 2000). The causes may include habitat loss and degradation, unsustainable use, invasive species, environmental pollution, disease and global climate change. Habitat loss appears to be the most serious threat to herpetofauna as they are the more affected than other vertebrates by serious human encroachment on their habitats (Capula, 1989 and Gibbons *et al.*, 2000). Habitat destruction, wetland draining and/or pollution represent actual threats to amphibian populations and their reproduction. For example, draining of the Hula Lake or wetland in Palestine resulted in the local extinction of many endemic species including the frog *Discoglossus nigriventer* (Skinner and Zalewski, 1995 and Gabbay, 1998).

A variety of herpetological surveys and studies has been conducted in different countries and environments worldwide. In an attempt to monitor herpetofauna in a managed forest landscape to study the effects of habitat types and census techniques, Ryan *et al.* (2002) recorded 72 herpetofaunistic species in five (2 wetlands and 3 terrestrial) habitats in the U.S.A.. These included 19 species of anurans, 8 salamanders, 8 lizards, 28 snakes in addition

to many turtle species. They found that herpetofaunal communities in the two wetland habitats were clearly dissimilar from those in the three terrestrial habitats.

In Turkey, the survey of herpetofauna seems to be extensive as many studies have been conducted in different localities of the country. Kumlutas *et al.* (1998 and 2004a and b) recorded 17 and 22 reptile and amphibian species respectively in different ecosystems. The species included urodelans, anurans, lizards, snakes and tortoises. Similarly, Ugurtas *et al.* (2000), Baran *et al.* (2001) and Ozdemir and Baran (2002) recorded 27, 11, 15 species of reptiles and amphibians respectively. The previous studies showed that lizards were the most common group of reptiles in terms of species identified or the species caught. Three Anuran species (*Bufo viridis, Rana ridibunda* and *Hyla arborea*)that were investigated in the different areas of Turkey have a wide distribution throughout the Middle East countries (Baha El din, 1992; Disi *et al.*, 2001; Disi, 2002 and Al-Sorkhy and Amr, 2003).

In Israel, reptiles were surveyed in the Golan Plateau and Mount Hermon where 36 (2 turtles, 15 lizards and 19 snakes) species were recognized (Sivan and Werner, 1992). The two species of turtles (the Caspian Terrapin *Mauremys caspica rivulata* and the terrestrial Spur-thighed Tortoise *Testudo graeca terrestris*) occurring in the Golan Plateau were found to occur in most areas of the Mediterranean basin and the countries of the Middle East as well (Gasith and Sidis, 1983; Blasco *et al.*, 1986/87; Tok, 1999; Disi *et al.*, 2001; Disi, 2002 and Turkozan *et al.*, 2003). In spite of the threats facing freshwater turtles worldwide, they have received relatively little attention in terms of stream and riparian wetland management (Bodie, 2001). With regard to poisonous snakes, Kochva (1998) recorded 10 species occurring in Israel and Jordan belonging to 3 families. The most dangerous and the most common snake is the Palestine Viper *Vipera palaestinae*. All these venomous snakes seem to pose a serious threat to humans, where several hundred bites are reported every year in Israel and Jordan (Kochva, 1998).

Herpetological surveys in the Occupied Palestinian Territories (OPTs) seemed unclear where no specific scientific literatures were available. Rough data on wildlife species indicated that approximately 500 birds, 100–120 mammals and 120 herpetofaunistic species, in addition to about 400 fish were known to inhabit Palestine (Ali-Shtayeh and Hamad, 1997; The Palestinian Institute for Arid Land and Environmental Studies – PIALES, 1996 and The Palestinian Central Bureau of Statistics – PCBS, 2000). In the Gaza Strip, work on herpetofauna was restricted only to two recent studies (Abd Rabou, 2005 and Yassin *et al.*, 2005). The scarcity of scientific literature concerning wildlife in general and herpetofauna in particular in specific regions of the OPTs promoted the conduction of the present work aiming at surveying and giving general observations on reptiles and amphibians in Wadi Gaza and its adjacent habitats, Gaza Strip. A total number of 21 herpetofaunistic species (2 turtles, 8 lizards, 8 snakes and 3 frogs) belonging to 15 different families and three orders was recorded in Wadi Gaza and other localities of the Gaza Strip; they are listed in Tables 4 and 5. Squamata was the bigger of the two orders of reptiles comprising 16 species.

The three amphibians belonging to one order and three families were recorded to inhabit wetlands, seasonal rainwater pools, rainwater harvesting schemes, irrigated canals and wastewater ponds of the study area. Reptiles and amphibians of the area were all resident and mostly found throughout the year. Some reptiles may cause harm to local people.

Table.4 Reptiles recorded in Wadi Gaza and other localities in the Gaza Strip.

Table 1: Reptiles recorded in Wadi Gaza and other localities in the Gaza Strip

Family	Scientific Name	Common Name	Status*	Arabic or Local Name
Order Chelonia				
Emydidae	*Mauremys caspica rivulata*	Caspian Terrapin	R	سلحفاة الماء العذب
Testudinidae	*Testudo graeca*	Spur-thighed Tortoise	R	السلحفاة الأرضية
Order Squamata				
Varanidae	*Varanus griseus*	Desert Monitor	R	الورل الصحراوي
Chamaeleoni-dae	*Chameleo chameleon*	Mediterranean Chameleon	R	الحرباء
Geckonidae	*Hemidactylus turcicus*	Turkish Gecko	R	أم بريص
	Ptyodactylus hasselquistii	Light Fan-footed Gecko	R	أم بريص مروحية القدم
Lacertidae	*Acanthodactylus boskianus*	Bosc's Lizard	R	سحلية
Agamidae	*Laudakia (=Agama) stellio*	Agama	R	الحردون
Scincidae	*Chalcides ocellatus*	Ocellated Skink	R	الدفان
	Scincus scincus	Sand Skink (Sandfish)	R	سقنقور الرمل

Family	Scientific Name	Common Name	Status*	Arabic or Local Name
Boidae	*Eryx jaculus*	Sand Boa	R	البوا الرملية
Elapidae	*Walterinnesia aegyptica*	Desert Black Snake	R	الثعبان الأسود الصحراوي
Colubridae	*Coluber jugularis asianus*	Syrian Black Snake - Arbeed	R	عربيد
	Coluber nummifer	Coined Snake	R	الثعبان النقدي
	Coluber rhodorhachis	Jan's Desert (Cliff) Racer	R	ثعبان
	Coluber rubriceps	Red Whip Snake – Red-headed Snake	R	ثعبان أحمر الرأس
Viperidae	*Echis coloratus*	Carpet Viper	R	حية السجادة
	Vipera palaestinae	Palestine Viper	R	الحية الفلسطينية

Status: R = Resident

Table.5 Amphibians recorded in Wadi Gaza and other localities in the Gaza Strip.

Table 2: Amphibians recorded in Wadi Gaza and other localities in the Gaza Strip

Family	Scientific Name	Common Name	Status*	Arabic or Local Name
Order Anura				
Bufonidae	*Bufo viridis*	Common (Green) Toad	R	علجوم شائع
Ranidae	*Rana bedriagae*	Levantine Frog	R	ضفدع
Hylidae	*Hyla savignyi*	Tree Frog	R	ضفدع شجري

***Status: R = Resident**

5. Legislations and Regulations: 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 publicorder, 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 km2 (12%); B land is about 1318 km2 (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 difficulties 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 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.

For the past thirty years of political and socio-economic difficulties have influenced substantially the potential of the area for development and has led to severe degradation of its natural resources (land, water and air). Under the Middle East Peace Agreements between the PA and Israel, various areas of the West bank and the Gaza Strip have become under Palestinian self rule authority, which pave the way for expanding the Palestinian Administration to be responsible for protecting Palestine environment and natural heritage within the light of economic development.

Unfortunately, over the recent history, there has been a total neglect to the environment in the Palestine, in particular the conservation of land, water, air, habitats and biological resources. Nevertheless, the PA is increasingly becoming aware of the need to conserve, protect and monitor its biodiversity and to put forward plans and strategies in the course of economic development. Clearly, a legal framework is not yet elaborated in the PT for that purpose, neither is there any national legislation policies or plans pertaining to the environment and biodiversity of the area.

“In October 1994, following the Oslo I Accord, an Environmental Planning Directorate (EPD) was established in the Ministry of Planning and International Cooperation (MOPIC) to deal with environmental protection matters in terms of planning, management and implementation.

During the negotiation of the Oslo II Accord, it was agreed to establish a number of ministries and authorities. As a result, in December 1996, a Palestinian Environmental Authority (PEA) was established and the EPD mandate and responsibilities were transferred

to it. Although an organizational structure was developed for the PEA, it was neither approved nor made operational. However, all activities started within the EPD continued, alongside additional tasks.

In December 1998, a Minister of State for Environmental Affairs was appointed by His Excellency Yasser Arafat, President of the Palestinian Authority, through Presidential Decree No. 2. An entire new Cabinet was appointed at that time to head various ministries, authorities and other institutions. However, the cabinet appointments were not followed by specific written mandates and tasks and the development of each ministry's functions and responsibilities was left to individual ministers. This led to a high degree of overlap within and between institutions, especially with regard to inter-sectoral environmental issues, and the subsequent development of memoranda of cooperation and agreement to reduce such overlap.

Following Presidential Decree No. 2 designating a new Cabinet, a Palestinian Ministry of Environmental Affairs was established. As a result of administrative reforms, Presidential Decree No. 6 in June 2002 established the Environmental Quality Authority as the successor body to the Ministry of Environmental Affairs. The Environmental Quality Authority has its own budget and is responsible to the Cabinet of Ministers. All the functions, responsibilities and authorities of the former ministry were transferred to the Environmental Quality Authority including all property and employees."
. MEnA Mission Statement is: **To safeguard and protect the environment, human health, control and limit the degradation of natural resources, combat desertification, prevent further pollution, enhance environmental awareness and ensure environmentally sustainable development.**

Environment Law No.7 were published and activated since 1999. It is considered as the main umbrella for all environmental responsibilities and mandates of latest EQA. Three Palestinian country reports on Biodiversity were produced so far. The first was: "Palestinian Biodiversity Strategy and Action Plan". This important documents needs to be updated after 10 years of its development. The second and third reports were description of Palestinian Biodiversity and capacity building needs assessment in that regard.
Currently Environment Quality Authority and Ministry of Agriculture are working together on elaborating four bylaws on biodiversity and its conservation.

6. Threats and Challenges,

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, Israeli actions and aggressions on Palestine including natural resources and natural ecosystems are many and continuous. These includes but not

limited to the following: colonizing activities like construction of colonies, bypass roads and military bases, all the above mentioned increased the pressure on natural resources.
The impact of latest Israeli war on Gaza including Wadi Gaza Nature Reserve and surrounding were detrimental and could be irreversible. UNEP deployed a group of environmental experts to Gaza aiming at assessing the impact of the latest aggression on Palestinian environment. The report to be produced will be submitted to UN Secretary General by mid July.

In general, 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 bypass roads in areas where land is already scarce and natural ecosystems are fragile;
- 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;
- Stagnant Ecosystem , the Wadi Gaza mouth is almost permanently closed,
- Uncontrolled discharge collection of raw sewage from adjacent areas, since Wadi Gaza catchments area covers about 3500 km2 of the Negev desert and surroundings,
- Uncontrolled dumping of solid waste as a result of absence of central sanitary landfills,
- Clearing of land of vegetation for security purposes, urbanization and agricultural activities,
- Uprooting and demolishing vast vegetated areas.
- Uncontrolled and massive damage and deterioration of natural ecosystems resulted from the latest Israeli aggression on Gaza that resulted in an unprecedented damage to fragile ecosystems.

In response to the latest, the international community showed a highly appreciated commitment represented in the 25th Global Ministerial Environment Forum, in which UNEP Governing Council adopted decision 25\12 that stated in its 2nd point:

> 2. *Requests* the Executive Director of the United Nations Environment Programme to deploy immediately thereafter a mission of environmental experts to Gaza in coordination with other relevant international organizations to assess the natural and environmental impacts on the Gaza Strip caused by the escalation of violence and hostilities; to carry out an economic evaluation of the rehabilitation and restoration of the environmental damage; and to report to the Secretary-General thereon;

UNEP Mission report will be submitted to the UN secretary general by mid July 2009 and is expected to be scientifically strong, politically balanced and comprehensive.
Recommendations of the report are expected to be a program of work and action plan for

thee international community in supporting Palestine aiming at restoration and rehabilitation of deteriorated ecosstems.

7. Protection Action Plans and Required Assistance,

The Desk Study on the Environment in the Occupied Palestinian Territories published by the United Nations Environment Programme in 2003 was the product of extensive scientific and technical investigations. Desk Study team of 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.

Taking into consideration above mentioned challenges, constraints and problems, and recalling the UNEP Desk Study carried out in 2002 especially those related to biodiversity conservation, below are summary of some recommendations, interventions and measures:

1. **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.

2. **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.

3. **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 geo-morphological feature. The international community should assist the parties to carefully assess the possibilities of including the Dead Sea in a World Heritage Site.

4. **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.

5. **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.**

6. **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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. Stop uncontrolled clearance of farmland.

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

13. 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.

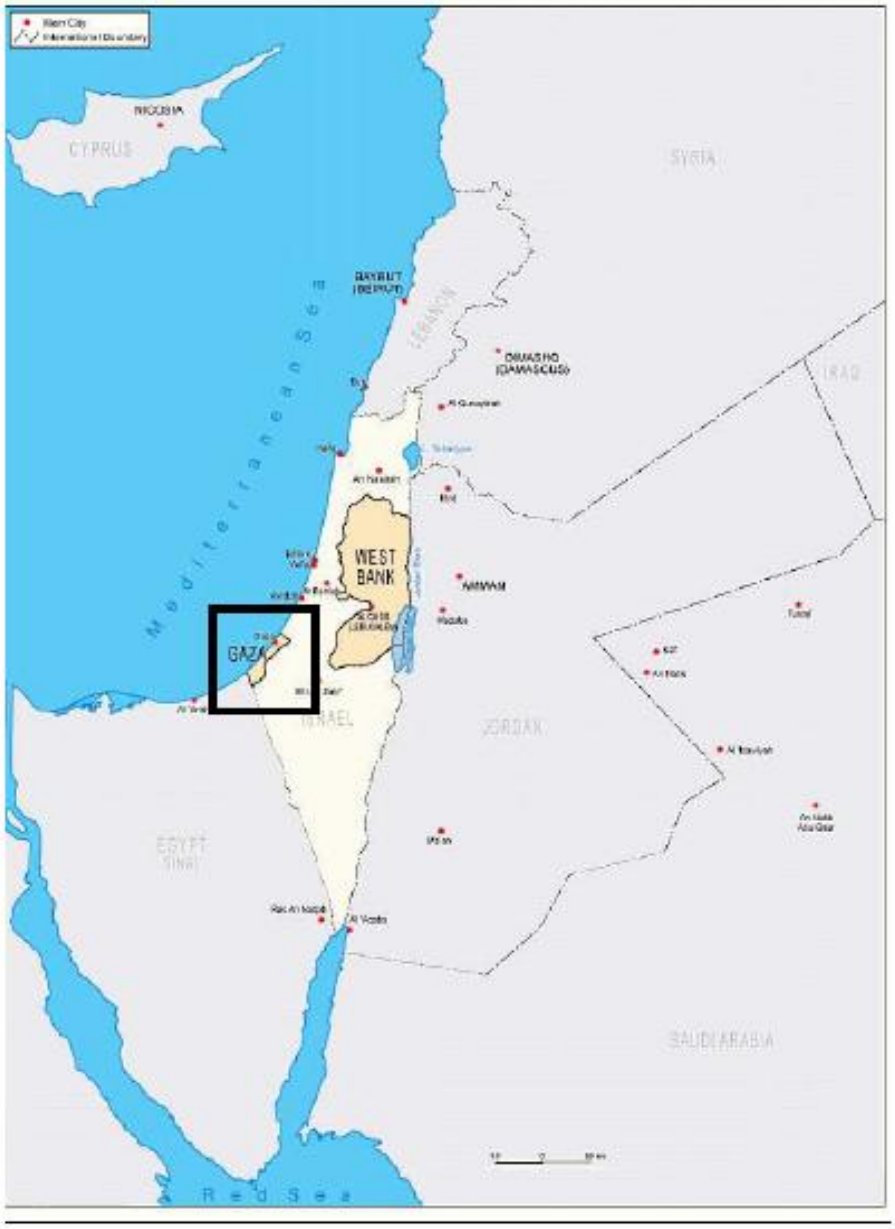
14. Possible interventions with regard to habitats

The Palestinian Environmental Strategy has already defined a number of required initiatives with regard to nature and biodiversity. These include (MEnA, 1999):

1. Assessment of the current biodiversity through a comprehensive inventory to set up priorities of actions.
2. Declaration of natural reserves.
3. Protection of the wild animals through enforcement of hunting or fishing law, especially to protect rare and threatened species and migratory birds.
4. Facilitation of some studies to evaluate the contribution of flora and fauna to the national economics.

8. Expected: Meeting Outputs and International Support,

Taking into consideration the fore mentioned UNEP Desk study recommendations and the expected recommendations of UNEP Gaza Mission report of July 2009, Palestinian National Authority is highly evaluating the international community support in translating recommendations into programs of work and action plans. Technical assistance, funding and different kinds of support will be invaluable, keeping in minds that ownership of natural ecosystems is a global and universal ones. Loss of any genetic resource is a global threat and we call all global environmentalists to keep in their minds that: "Environment Knows NO Boundaries".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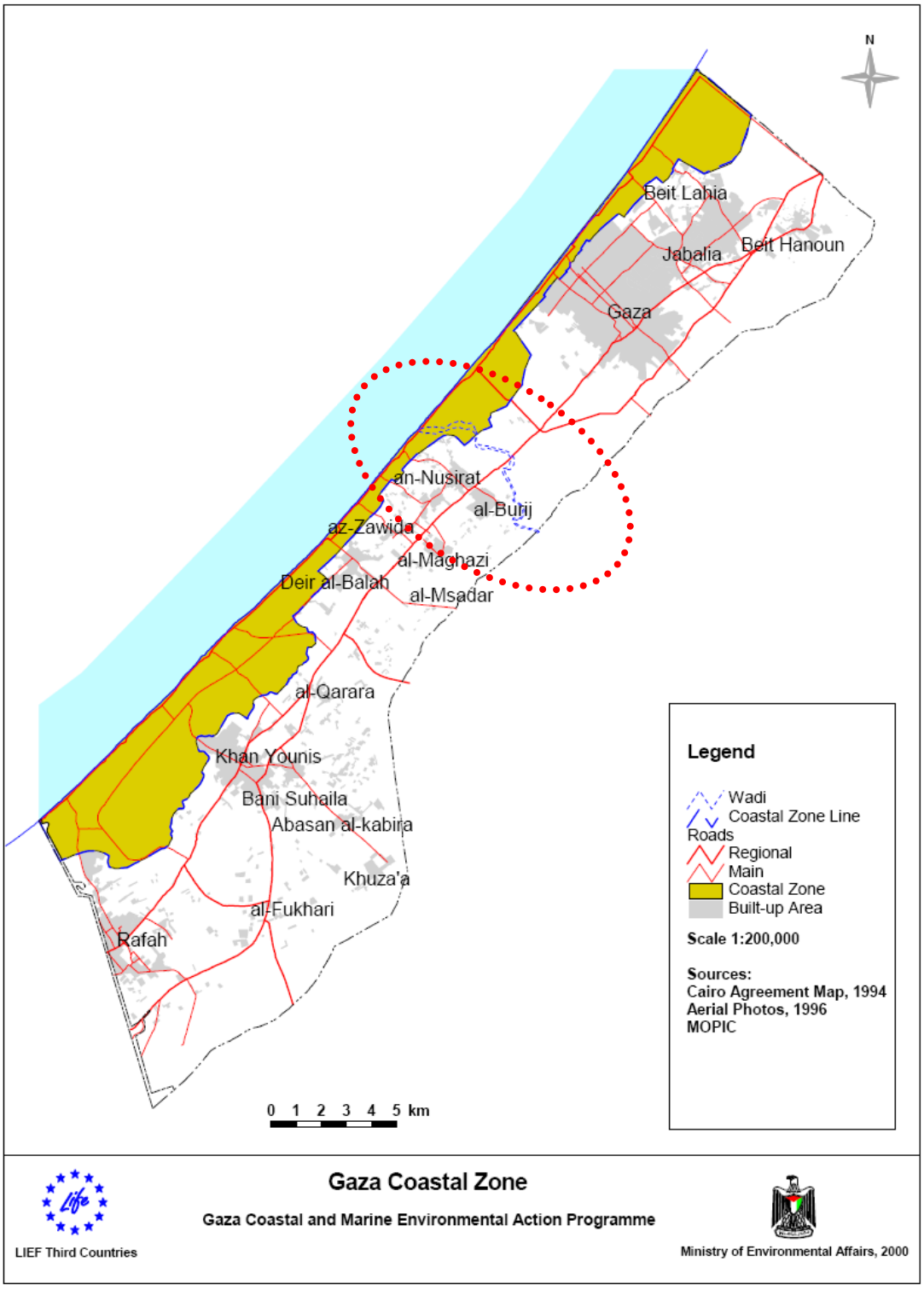
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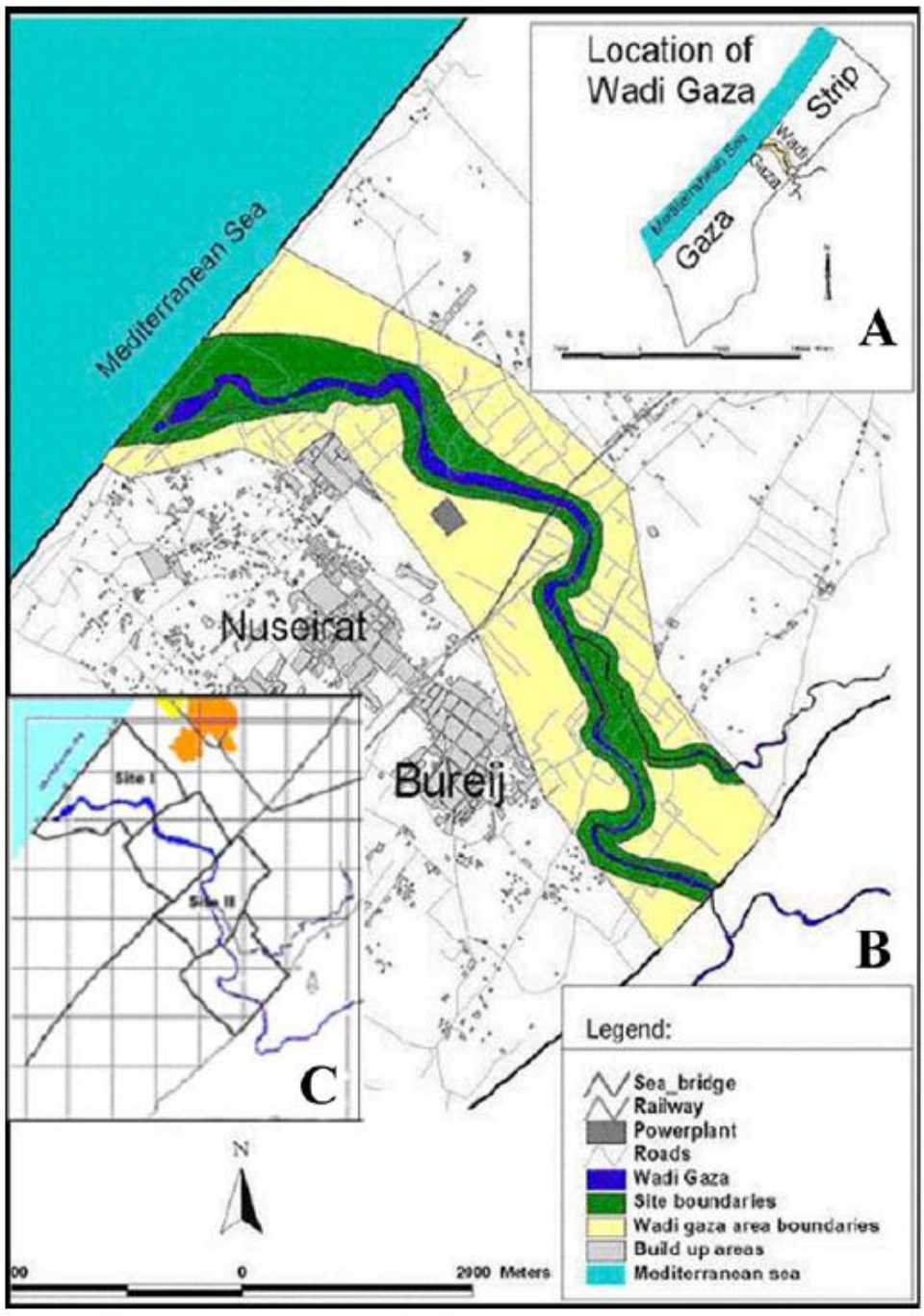
Aerial Photos, 1996
MOPIC
Gaza Coastal Zone
Gaza Coastal and Marine Environmental Action Programme
LIEF Third Countries
Ministry of Environmental Affairs, 2000


Location of
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Railway
Powerplant
Roads
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Build up areas
Mediterranean sea

This report was submitted to:

Regional Meeting on the Implementation of the Ramsar Convention in the Arab Region

Egypt - Cairo

22-25 June 2009

Collected and prepared by: Nedal Katbeh-Bader

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