

# CONSERVATION OF ARABIAN GAZELLES

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Foreword by  
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## 15. Measures to Conserve the Wildlife of Kuwait

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**Abstract:** *Exploitation of natural resources and overgrazing of natural vegetation have caused significant destruction and depletion of the renewable natural resources of Kuwait, thereby damaging the natural habitat of wild animals.*

*Realizing the intrinsic value of protected areas for conserving flora and fauna whilst allowing public recreation, in 1983 the Kuwait Government implemented measures to conserve its natural history by designating a 250 km<sup>2</sup> protected area, Kuwait National Park (also known as "Jal Az-Zor National Park") in the north-eastern region of Kuwait. The area has extensive boundary demarcation, a diversity of plant and animal species, interesting photographic features, good accessibility and is easy to protect.*

*In this paper, the area's biological, physical and social attributes and the protection measures enforced are discussed. A zoning plan with recommendations for reintroducing wildlife and plants in the park area is provided. Other areas (consisting of both marine and desert ecosystems) are suggested as future potential nature reserves. Finally, the current status of the desert ecosystem in the post-war period is highlighted.*

**Keywords:** Kuwait, conservation, Kuwait ("Jal Az-Zor") National Park, protected areas, reintroduction programmes.

### Introduction

The fauna and flora of Kuwait are subject to pressures from both man and his livestock. Human exploitation of vegetation for animal feed, fuel and recreation has caused significant destruction and depletion of the vegetation, thereby damaging the natural habitat of wild animals. In addition, overgrazing by domestic livestock has decreased species diversity, reduced vegetation growth and vigour, and caused soil erosion. Another significant factor is off-road use by vehicles, which has disturbed the vegetation and, in many cases, has resulted in irreversible adverse effects. The lack of a governmental or institutional framework for the protection and management of wild plants and animals in Kuwait has compounded the situation (Omar and Taha, 1981).

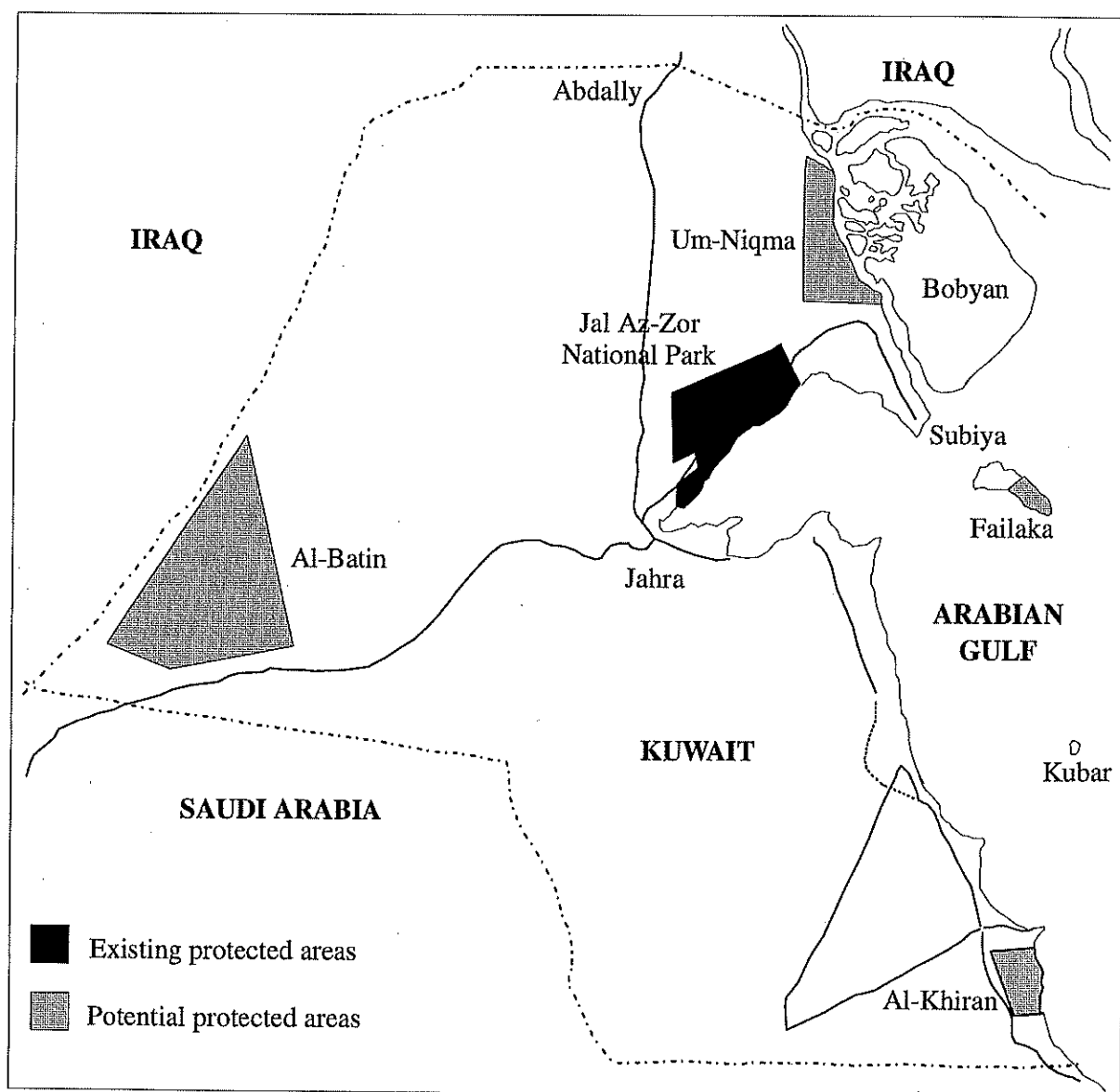
Realizing the intrinsic value of protected areas for conserving the country's flora and fauna while allowing public recreation, Kuwait Municipality designated areas in its Land-Use Master Plan for this purpose. This step was further pursued in 1981 and 1983 by requesting the Kuwait Institute for Scientific Research (KISR) to undertake two feasibility studies (phase I and II) in order to select the criteria for the establishment of protected areas in Kuwait. In accordance with the Land-Use Master Plan, KISR conducted research that resulted in the selection of a 250 km<sup>2</sup> area located in the north-east of Kuwait, and the identification of its ecological, biological, physical and social characteristics.

Detailed studies of the area showed extensive boundary demarcation, a high diversity of plants and animals, interesting photographic features, good accessibility and ease of protection.



Recommendations on park zoning, management and development were submitted to the Kuwait Municipality along with a proposed reintroduction programme for locally-extirpated plants and animal species (Omar *et al.*, 1986a,b). The recommendations were considered by the Municipality Council and Kuwait National Park was designated as Kuwait's first protected area. Responsibility for the park's development and management was given to the Public Authority for Agriculture and Fish Resources (PAAFR). A 2 m high fence was erected by PAAFR to protect the area's boundaries. The Kuwait Municipality and PAAFR in collaboration with the Environment Protection Council (EPC) issued specific legislation to protect the park area.

In addition to the establishment of Kuwait's first national park, other areas potentially important for the conservation of wildlife, such as the islands of Kuwait, were recommended for protection by various government institutions.



**Figure 15.1** Location of Kuwait ("Jal Az-Zor") National Park and potential future protected areas in Kuwait (modified from Omar *et al.* 1986a).

The purpose of this paper is to present a general description of the Kuwait ("Jal Az-Zor") National Park with emphasis on its physical, biological and social aspects and to outline the proposed plan for its management and use. The post-war status of the desert ecosystem is also highlighted, with emphasis on the impact of the war on the park, and remedies to restore renewable natural resources are proposed.

### **The physical characteristics of Kuwait ("Jal Az-Zor") National Park**

The area of the designated park in the north-east of Kuwait includes a high diversity of plant and animal species, desert basins (playas), and is easily protected due to extensive boundary demarcation by natural features such as desert, valley, escarpment and sea. Vehicle access to the designated area is provided by two routes: a two-way surfaced road running from near Jahra town to Basra, Iraq and an 11 m wide two-way road between Jahra and the police station of Subiya point (Figure 15.1).

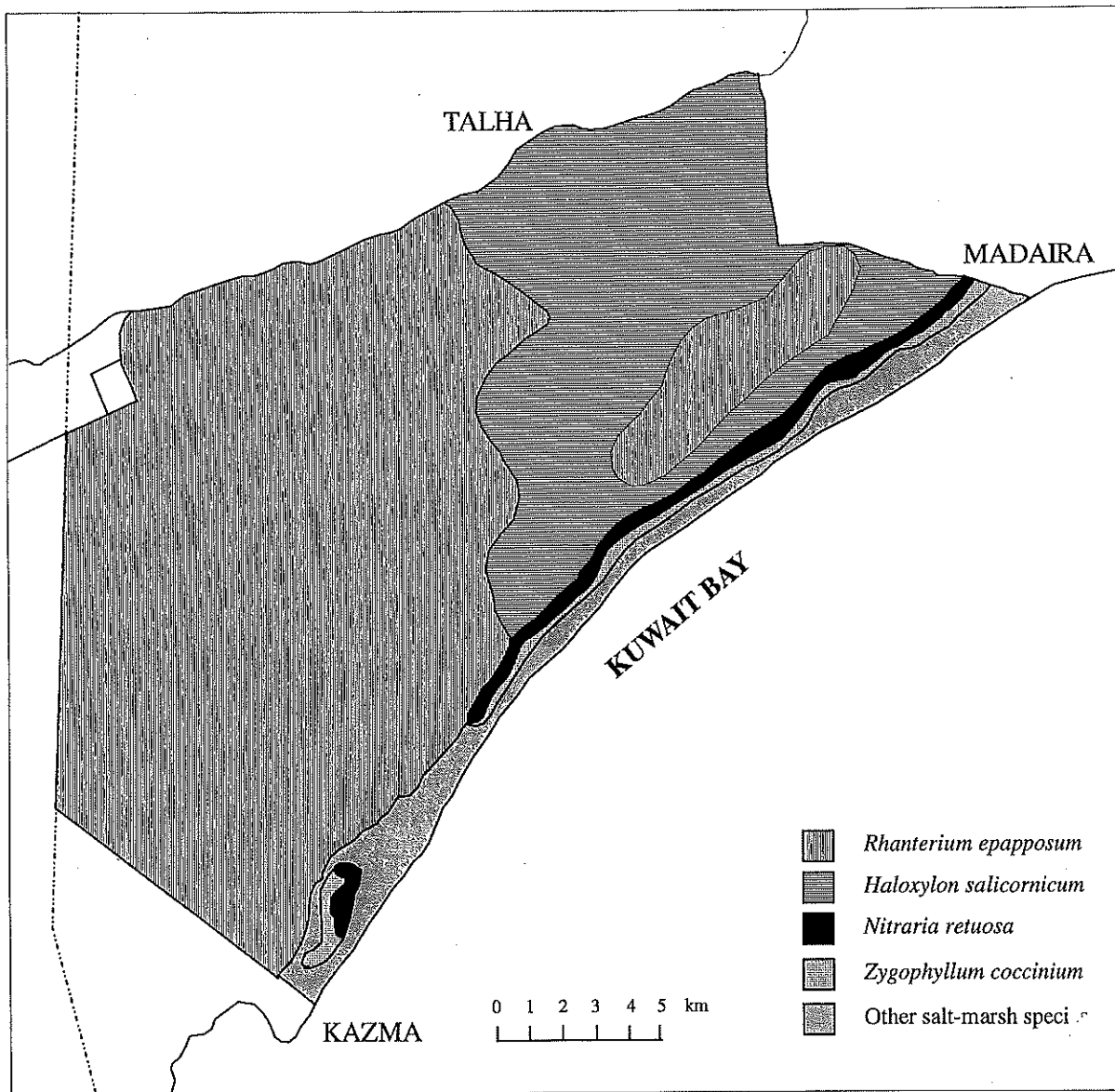
The area is generally flat with minor undulations. The most significant physical feature in the area is the Jal Az-Zor escarpment, which rises to a height of 150 m and runs parallel to the seashore. Five intersecting land forms have been identified: backslope, scarp, debris, coastal plain, and crest.

Drainage patterns generally run north-east in the form of numerous shallow wadis that dissect the debris slope. The pattern to the south is generally described as a series of wadis draining a limited catchment and falling abruptly to sea level. The most poorly drained areas are the coastal plain and some parts of the backslope. The entire surface of the Jal Az-Zor area is covered with sediments and rocks of sedimentary origin formed between the Miocene and Holocene periods.

### **Flora and fauna**

- **Flora:** The coastal region is primarily covered with salt-marsh vegetation such as *Zygophyllum qatarense*, whereas the desert inland is occupied primarily by *Rhanterium* and *Haloxylon* steppes (Figure 15.2). It is estimated that the *Rhanterium* steppe occupies about 85% of the study area, followed by the *Haloxylon* steppe (10%) and the salt marshes (5%). A total of 39 plant species has been recorded in the salt-marsh region (coastal habitats) and 87 species from the inland area. In general, *Halocnemum strobilaceum* dominates near the shore, followed by *Seidlitzia rosmarinus*, *Nitraria retusa*, *Z. qatarense* and *Schanginia aegyptiaca*. Major plant species in the inland ecosystem vary according to the prevailing dominant plant community. On the *Rhanterium* steppe, major associations consist of *Rhanterium epapposum*, *Stipagrostis plumosa*, *Moltkiopsis ciliata*, *Asthenatherum forsskalii*, *Plantago* sp. and *Cutandia memphitica*. Plants found in the *Haloxylon* steppe include *Haloxylon salicornicum*, *Astragalus* sp., *Medicago* sp., *Schismus barbatus*, and *Cutandia memphitica*.

Plant growth occurs mainly during January, February and March. Drought, particularly early in the growing season, usually causes poorer growth and lower plant vigour. Research on plant frequency and cover on the major plant steppes shows that both dominant and associated species are being depleted. While 57% of the species in the coastal plain are moderately to very abundant, 38% are rare and 5% are endangered. In the inland desert, however, 47% are between moderately and very abundant, 40% are considered rare and 13% are endangered.



**Figure 15.2** Vegetation map of Kuwait ("Jal Az-Zor") National Park (from Omar *et al.* 1986a).

- **Fauna:** Since the State of Kuwait is situated at the edge of the great Arabian Desert, it is clear that the local fauna has close affinities with those of neighboring countries. The main vertebrate fauna of the park includes reptiles, birds and mammals (Tables 15.1 and 15.2).

The reptiles, such as the desert monitor, or "wirral" *Varanus griseus*, are mainly carnivorous, preferring live prey. The "dhub" or spiny-tailed lizards *Uromastix* spp. however, are the only herbivorous reptiles in Kuwait. These are the most visible reptiles, but other less easily-seen species are also present. The stone gecko *Stenodactylus sleveni* and agamid lizards *Agama* spp. are common. Snakes are widely-distributed but appear to be most common between the crest of Jal Az-Zor escarpment and Umm Ar-Rimmam. Burrowing reptiles are rarely seen, since they emerge mainly at

night when the humidity is high. The sand skink *Scincus scincus* and Jayakari's sand boa *Eryx jayakari* are found in the sand hummocks adjacent to water run-off areas. The Arabian worm lizard (*Diplometopon zarudnyi*) is probably the commonest subterranean reptile and may be found buried to a depth of several centimetres in the sand throughout the park.

Mammalian fauna is relatively numerous and predominantly nocturnal. The rodents generally prefer the sandy desert region with shrub cover under which they usually burrow. The Euphrates jerboa *Allactaga euphratica* and lesser jerboa *Jaculus jaculus* are found on the more open flat areas of stony desert. Red and fennec foxes (*Vulpes vulpes* and *Fennecus zerda*) have been seen in Umm Ar-Rimmam and Jal Az-Zor, and burrows were found in the deep gully of Jal Az-Zor and Umm Ar-Rimmam. Feral dog *Canis domesticus* packs range along the coastal stretches and are increasingly common.

**Table 15.1** Selected mammals, reptiles and invertebrate species likely to be encountered within Kuwait ("Jal Az-Zor") National Park.

| Mammals                       | Reptiles                           | Invertebrates / Insects              |
|-------------------------------|------------------------------------|--------------------------------------|
| <i>Gerbillus cheesmani</i>    | <i>Uromastix microlepis</i>        | <i>Androctonus crassicauda</i>       |
| <i>Gerbillus dasyurus</i>     | <i>Uromastix loricatus</i>         | <i>Apistobuthus pterygocerus</i>     |
| <i>Gerbillus nanus</i>        | <i>Agama blanfordi</i>             | <i>Compsobuthus arabicus</i>         |
| <i>Meriones libycus</i>       | <i>Agama pallida</i>               | <i>Buthacus leptochelys</i>          |
| <i>Meriones crassus</i>       | <i>Phrynocephalus maculatus</i>    | <i>Scolopendra</i> sp.               |
| <i>Jaculus jaculus</i>        | <i>Eremias brevirostris</i>        | <i>Lycosa</i> sp. <i>narbonensis</i> |
| <i>Allactaga euphratica</i>   | <i>Acanthodactylus schmidti</i>    | <i>Thanatus fabricii</i>             |
| <i>Mus musculus</i>           | <i>Acanthodactylus boskianus</i>   | <i>Philodronus</i> sp.               |
| <i>Hemiechinus auritus</i>    | <i>Acanthodactylus scutellatus</i> | <i>Hyalomma</i> sp.                  |
| <i>Parechinus aethiopicus</i> | <i>Acanthodactylus opheodurus</i>  | <i>Porrellio evansi</i>              |
| <i>Vulpes vulpes</i>          | <i>Bunopus tuberculatus</i>        | <i>Calosoma imbricatum</i>           |
| <i>Canis domesticus</i>       | <i>Stenodactylus sleveni</i>       | <i>Calosoma olivieri</i>             |
| <i>Fennecus zerda</i>         | <i>Scincus scincus</i>             | <i>Gauropterus flugidus</i>          |
| <i>Taphozous nudiventris</i>  | <i>Diplometopon zarudnyi</i>       | <i>Cardiophorus</i> sp.              |
| <i>Asellia tridens</i>        | <i>Varanus griseus</i>             | <i>Cocinella septempunctata</i>      |
| <i>Mellivora capensis</i>     | <i>Eryx jayakari</i>               | <i>Prionothea coronata</i>           |
|                               | <i>Lytorhyncus gaddi</i>           | <i>Pimelia arabica</i>               |
|                               | <i>Malpolon moilensis</i>          | <i>Ocnera hispida</i>                |
|                               | <i>Psammophis schokari</i>         | <i>Akis elevata</i>                  |
|                               | <i>Coluber ventromaculatus</i>     | <i>Scarabaeus rotundipennis</i>      |
|                               | <i>Cerastes cerastes</i>           | <i>Ammocleonus aschabadensis</i>     |
|                               |                                    | <i>Larinus</i> sp. <i>elegans</i>    |

Of the 280 bird species recorded in Kuwait, among the most common terrestrial species seen in the park are crested larks *Galerida cristata*, shrikes *Lanius* spp., bee-eaters *Merops* spp., wagtails *Motacilla* spp., little owls *Athene noctua*, kestrels *Falco tinnunculus* and steppe eagles *Aquila rapax* (Table 15.2). The mud-flats play host to two sorts of migratory birds: autumn and spring passage migrants and winter visitors. Among the commonly seen coastal and mud-flat birds are: greater

flamingos *Phoenicopterus ruber*; herons (family Ardeidae); egrets *Egretta* spp.; cormorants (family Phalacrocoracidae); gulls and terns (family Laridae); ducks (family Anatidae); and crab plovers *Dromas ardeola* and numerous other waders (order Charadriiformes).

**Table 15.2** Selected birds of Kuwait ("Jal Az-Zor") National Park.

| Species                      | English Name           |
|------------------------------|------------------------|
| <i>Gallinula chloropus</i>   | Moorhen                |
| <i>Dromas ardeola</i>        | Crab Plover            |
| <i>Cursorius cursor</i>      | Cream-coloured Courser |
| <i>Sterna caspia</i>         | Caspian Tern           |
| <i>Sterna hirundo</i>        | Common Tern            |
| <i>Streptopelia decaocto</i> | Collared Dove          |
| <i>Athene noctua</i>         | Little Owl             |
| <i>Ammomanes deserti</i>     | Desert Lark            |
| <i>Alaeman alaudipes</i>     | Hoopoe Lark            |
| <i>Eremophila bilopha</i>    | Temminck's Horned Lark |
| <i>Corvus ruficollis</i>     | Brown-necked Raven     |
| <i>Passer domesticus</i>     | House Sparrow          |
| <i>Merops superciliosus</i>  | Blue-cheeked Bee-eater |
| <i>Merops apiaster</i>       | European Bee-eater     |
| <i>Motacilla cinerea</i>     | Grey Wagtail           |
| <i>Motacilla alba</i>        | White Wagtail          |
| <i>Lanius minor</i>          | Lesser Grey Shrike     |
| <i>Lanius excubitor</i>      | Great Grey Shrike      |
| <i>Phoenicopterus ruber</i>  | Greater Flamingo       |
| <i>Egretta alba</i>          | Great White Egret      |
| <i>Egretta garzetta</i>      | Little Egret           |
| <i>Egretta gularis</i>       | Western Reef Heron     |
| <i>Falco tinnunculus</i>     | Kestrel                |
| <i>Galerida cristata</i>     | Crested Lark           |

The invertebrates, especially the insects, are an ephemeral component of the community, the majority only appearing for a restricted period of each year. Grasshoppers (family Acrididae, order Orthoptera) are extremely common in March and April. Spiders are also well represented but few have been identified. Together with the grasshoppers, the bristle tails (Thysanura) and desert cockroaches (Orthoptera) probably form the basic food items for many of the desert predators. Scorpions (Scorpionidae) are also present.

### Social aspects

Three groups of people are encountered in the park: nomads, who camp in the area for a long period of time; campers, who remain on-site for the spring season; and visitors, who spend from one to seven days during the spring holidays. Representatives of all three groups were interviewed, and

their views on camping and desert recreation as well as their interest in environmental protection and desert parks were evaluated. The nomadic population comprised only about 3% of the total sample number. Most users preferred mobile homes to nomadic tents or prefabs. A majority of the people who camped for recreation also engaged in physical activities such as walking, running, and ball sports. For evening entertainment, they watched television and listened to the radio. Electric generators were used to light camps and to supply electricity for appliances. Water tankers were the major means for getting water to camps, and food was usually cooked by gas stove. The preferred food to eat was fresh meat followed by canned food.

Most of the area users were married male Kuwaitis. The fact that a large number of Kuwaitis enjoy desert recreation demonstrates an avid local interest in the desert and its plants and animals.

### **Zoning plan**

Different park functions and uses are identified in the Zoning Plan:

- Nature reserves (strict nature zone, managed nature zone and protected landscape);
- Recreation (park headquarters and visitor center, camping area, and hiking trails);
- Education and research.

Criteria for site selection were chosen taking into consideration the major zones: tidal mud-flat, Jal Az-Zor escarpment, backslope, Umm Ar-Rimmam depression, and shallow depressions. Each site was ranked using a Site Index. A map was prepared showing alternative functions of zones (Figure 15.3). At least three alternative areas were indicated for each function to give decision makers the opportunity to select the most appropriate site for each function.

### **Wildlife and vegetation reintroduction plan**

- **Introduction of suitable plants:** Two locations within the park, with a total area of 3,100 ha, have been proposed for the reintroduction of plants. The larger site (2,300 ha) is situated in the south-west of the park, and the smaller site (800 ha) is near Talha in the north-west. The major problems for both areas under irrigation are root zone and tillage limitations and erosion hazards. Another problem is that only 1,400 m<sup>3</sup> / day (about 310,000 gal/d) of underground water can safely be extracted under the "safe yield" strategy suggested for water utilization in the area (Omar *et al.*, 1986b). If the only source of irrigation water is the underground aquifer and its limited replenishment from natural recharges, the potential for afforestation and "soft" landscaping is limited to 10 ha. The quality of the water is fair, varying between 1,000 and 10,000 ppm TDS and does not contain harmful levels of toxic minerals.

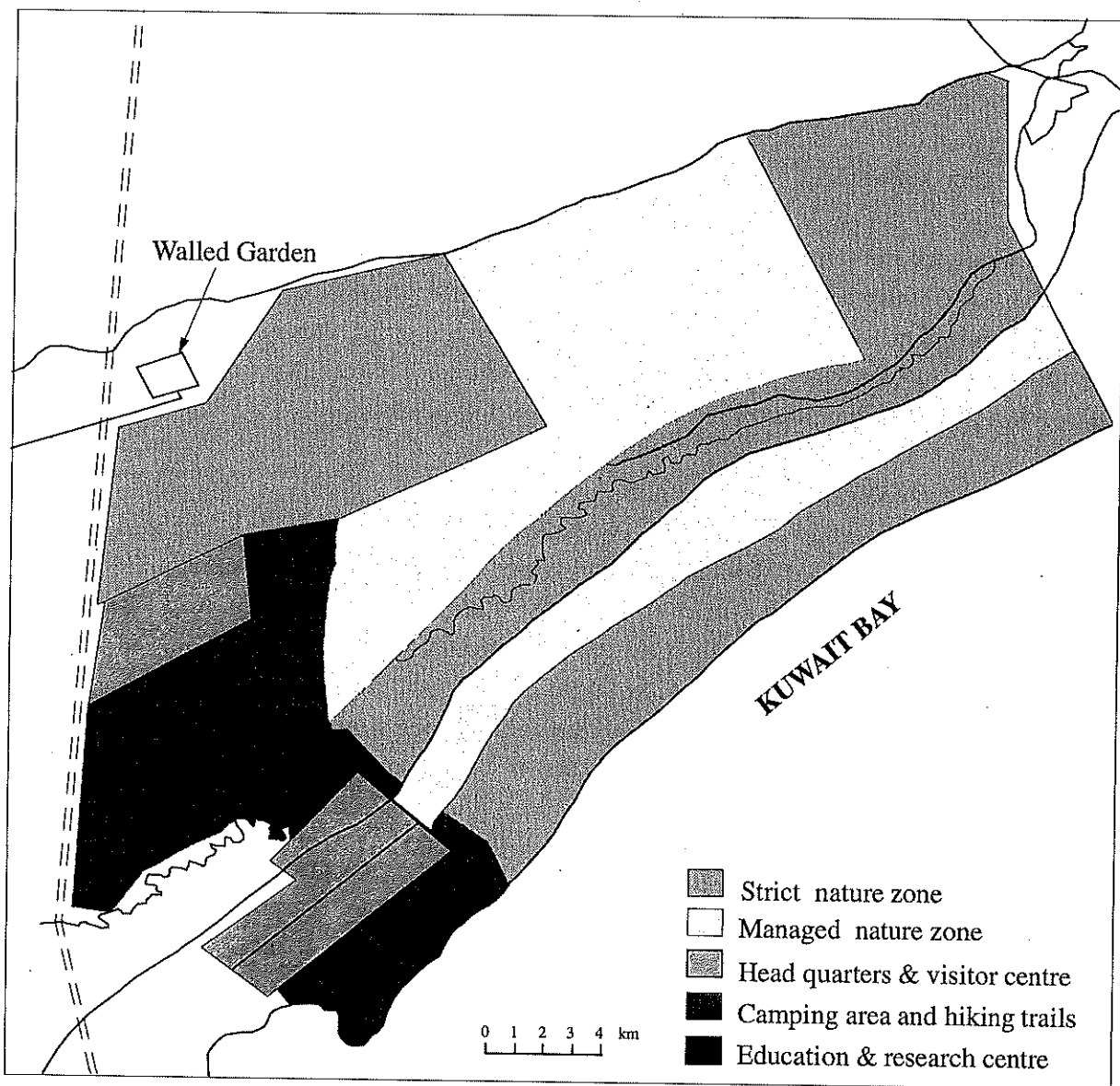
As the area for planting is rather limited and generally exhibits unfavorable growing conditions, it is suggested that planting (afforestation and soft landscaping) be limited to the hardy species that thrive best under these condition. Twenty-eight tree species, 23 shrubs, and 5 ground cover plant species have been suggested as suitable for planting (Omar *et al.*, 1986b).

- **Reintroduction programme for wildlife:** Six important habitats, vital for the successful reintroduction of wildlife have been recommended for immediate protection: coastal mud-flats, the



salt marshes and associated sand dunes, artificial oases (e.g. Kazma gardens), Jal Az-Zor escarpment and wadis, and the gravel sandy area.

Introduction and reintroduction of wildlife in the area can include either re-stocking the disappearing species of local fauna or reintroducing animal species that used to live in the region. Creation of artificial oasis inside the park boundaries with an abundance of water and trees will serve the purpose of conservation. An aviary should be established in this oasis to house the species of birds proposed for introduction or reintroduction. It is suggested that the following birds be released into the park: houbara bustard *Chlamydotis undulata macqueeni*, ostrich *Struthio camelus camelus*, chukar *Alectoris chukar*, and sandgrouse *Pterocles* spp.



**Figure 15.3** Proposed management zoning scheme for Kuwait ("Jal Az-Zor") National Park (from Omar *et al.* 1986a).

Reintroduction of the following mammals was also recommended: rheem gazelle *Gazella subgutturosa marica*, Arabian oryx *Oryx leucoryx*, wild ass *Equus hemionus onager*, Cape hare *Lepus capensis*, and Arabian sand cat *Felis margarita harrisoni*.

It is recommended that wildlife is first reintroduced into isolated areas such as Failaka Island. When the animals and birds are fully adapted to the environmental conditions in the area and their population size increases, they can then be transferred to the open land in the National Park.

### **Operational plan for the management and development of Kuwait ("Jal Az-Zor") National Park**

Under the auspices of the Range and Afforestation Department at PAAFR, funds were allocated for the erection of a 2m high wire fence along the park boundaries. Protection measures were also implemented by utilizing the manpower at four police stations in the park area. Continuous patrolling of the area and relocation of park users to areas outside the park boundaries were the main measures taken to protect the area. The erection of the fence was completed in early 1990, but the implementation plan for the establishment of the park ceased in August 1990 when the Gulf crisis started.

### **Potential future protected areas in Kuwait**

A field reconnaissance survey was conducted to identify other sites in Kuwait that might be suitable as national parks. The survey was limited to areas delineated by the Kuwait Municipality in its Master Plan Second Review. Three desert regions were investigated and proposed as potential future protected areas: Al Batin in the south-west, Um-Niqa in the north-east, and Al-Khiran in the south-east of Kuwait (Figure 15.1). The islands of Kuwait (Kubbar, Qaru, Bobyan, Umm Al-Muradem and part of Failaka) were recommended as marine parks.

Exclosures for the protection of habitats and native plants were established at different localities in Kuwait. Since 1980, KISR has conducted research to monitor changes in the structure and species composition of range plants inside and outside the exclosures. Other areas for the conservation of native wildlife were also proposed by EPC and Kuwait University.

### **Post-war status of the wildlife and vegetation**

In early March 1991, more than 700 Kuwaiti oil fields were set on fire by the Iraqi forces (Al-Besharah, 1992) causing catastrophic environmental pollution. Many articles cautioned that the well-head fires and oil spills could cause serious environmental damage (Al-Satti, 1992; Blackwelder, 1991; Kuhn, 1991). Rice and Sheppard (1991) raised concerns about oil spill pollution on the marine environment because of the vulnerability of the Gulf ecosystem. Under these recently altered environmental conditions it could be expected that some changes in the desert ecosystem will have taken place.

A field reconnaissance survey in desert areas heavily contaminated with oil was conducted in August 1991 and October 1992. The dominant vegetation community in the area is *Cyperus conglomeratus* in association with *Cornulaca*. Field observation showed that crude oil flows and aerosol deposits (mist, soot and partially combusted oil) contaminated the plants and most of the soil in the area (Omar and Bartolome, 1992).

Many projects were initiated at KISR and EPC to study the impact of the crude oil on the flora and fauna of the contaminated areas. Preliminary results indicated low productivity of the vegetation and a high level of soil contamination. Birds, turtles, fishes and other animals were also casualties of the oil spills on land and at sea. Field studies are continuing and data on the long term impact of crude oil on the marine and desert ecosystems will soon be available.

In addition to environmental contamination, the park suffered a large amount of physical destruction such as the removal of the top soil by movement of tanks, artillery and other vehicles, and the breakage of existing fences (including the boundary fence). A further hazard is the presence of many mines, left behind by the departing Iraqis. Intensive efforts are presently being made by the military authorities to clean the desert and marine ecosystems.

### Summary and conclusions

Realizing the intrinsic value of protected areas for conserving flora and fauna while allowing public recreation, the Kuwait Government took measures to conserve its natural heritage by designating and fencing large areas. The Kuwait ("Jal Az-Zor") National Park, established in 1983, is one example of this commitment. Other potential areas have been proposed and some are in the process of assessment and evaluation.

The Gulf War caused severe destruction and deterioration of terrestrial and marine habitats. The fences of the national park and other exclosures were broken or destroyed by the Iraqi forces. Measures to reclaim soil and to rehabilitate and/or restore the natural habitats are being considered and undertaken by the authorities concerned.

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