

# **Annex**

## **Annex 2 Environmental Impact Assessment**

### **Part 1 (Bekaa)**

- 1.1 EXISTING CONDITIONS
  - 1.1.1 DESCRIPTION OF FLORA & FAUNA
  - 1.1.2 AIR QUALITY
  - 1.1.3 WATER QUALITY
  - 1.1.4 WASTE
  - 1.1.5 NOISE
- 1.2 INITIAL ENVIRONMENTAL EXAMINATION

### **Part 2 (Bcharre)**

- 2.1 EXISTING CONDITIONS
  - 2.1.1 TOPOGRAPHY
  - 2.1.2 SOIL EROSION
  - 2.1.3 HYDROGEOLOGY AND GROUNDWATER
  - 2.1.4 HYDROLOGY
  - 2.1.5 FAUNA AND FLORA
  - 2.1.6 METEOROLOGY
  - 2.1.7 LANDSCAPE
  - 2.1.8 AIR POLLUTION
  - 2.1.9 WATER POLLUTION
  - 2.1.10 SOIL CONTAMINATION
- 2.2 INITIAL ENVIRONMENTAL EXAMINATION (IEE)
  - 2.2.1 SCREENING AND SCOPING

### **Part 3 ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**

- 3.1 ENVIRONMENTAL CONDITION
  - 3.1.1 ENVIRONMENTAL LEGISLATION
  - 3.1.2 INSTRUCTIONAL FRAMEWORK
- 3.2 PROJECTS REQUESTED EIA
- 3.3 ENVIRONMENTAL IMPACT ASSESSMENT
  - 3.3.1 PROJECT DESCRIPTION
  - 3.3.2 BASELINE CONDITIONS
  - 3.3.3 IMPACT ASSESSMENT
- 3.4 ENVIRONMENTAL MANAGEMENT PLAN
  - 3.4.1 ENVIRONMENTAL MITIGATION PLAN
  - 3.4.2 ENVIRONMENTAL MONITORING PLAN
- 3.5 ZONING MAP OF LAND USE

## **Part 1 (Bekaa Valley)**

### **1.1 EXISTING CONDITION**

#### **1.1.1 DESCRIPTION OF FLORA FAUNA**

##### **1.1.1.1 Background Information**

###### **(1) Endemic Species**

Endemism in Lebanon is significant, owing to its geomorphologic diversity and the isolation effect of its diverse topography. According to the biodiversity reports, approximately 400 plants are endemic to Lebanon, Syria, and Palestine, of which 92 percent are presumed endemic to Lebanon only (MoA/UNEP, 1996). Species endemic to Lebanon are typically found on the high summits of Mount Makmel and Mount Sannine. Some endemic plants are abundant, while others are rare and/or endangered. According to the 2000 IUCN “Red List of Threatened Species,” only the Cedar of Lebanon (*Cedrus libani*) is considered an endangered plant species in Lebanon, and is denoted “low risk – near threatened”.

###### **(2) Threats to Biodiversity in the Lebanese Forests**

Biodiversity and forests in Lebanon are threatened by various factors resulting from both the local and external population. The significance and degree of threats varies greatly and is affected by direct and indirect factors such as the site characteristics, population characteristics, and governmental control and protection. The following factors are examples of threats affecting forest biodiversity:

- Urban expansion in the mountain areas provides a real threat to the Lebanese forest. Unchecked expansion is not only destroying the trees but also disturbing the ecological system of the areas ( plants, animals, birds, etc);
- Illegal wood cutting by the local population;
- Illegal removal and picking of the aromatic, wild, and medicinal plants;
- Overgrazing and illegal grazing;
- Poor management and harvesting policies of the forests;
- Forest fires due to public carelessness.

###### **(3) Fauna**

There are 52 reported mammal species in Lebanon today. An additional seven are extinct including the Syrian brown bear, the Persian lynx and the Arabian gazelle. About one-third of the 52 are rare, and another 39 percent are vulnerable species or species in apparent danger. The wolf, wildcat, mongoose and squirrel are close to extinction (*Ecodit, 2001*).

##### **1.1.1.2 Description of the Biodiversity in Baalbek and Zahle Districts**

###### **(1) General Description of Vegetation Communities**

Bekaa area includes the Eastern slopes of Mount-Lebanon and Western slopes of Anti-Lebanon mountain chains, with a characteristic pre-steppic environment. The vegetation climax of this zone ceases to be a true forest landscape. The vegetation series is pre-steppic,

the landscape is generally bare, and trees are extremely scattered or completely lacking (METAP, 1995; MoA 1996).

According to the ecological zone, these levels of vegetation should typically be composed of *Quercus calliprinos* Webb., *Quercus infectoria* Oliv., and *Juniperus excelsa* M. Bieb., present as climax maquis with their characteristic series of vegetation, or mixed with various degrees of regeneration. The typical climax oak maquis covering the slopes of the mountains were, however, heavily destroyed by human activities leading to their disappearance in most of the areas. Very few patches of climax maquis are left. The rest were replaced by degraded garrigues, scattered trees, and low shrubs. In some places, oak trees are coming back to abandoned terraces. In others pine woods with underwood thickets and various oaks and shrubs are developing and regenerating.

Furthermore, a few remnants of the primitive maquis stands are still found in some patches with regenerating thick series of vegetation, containing a wide variety of species. This zone at the highest elevations (down to 1700 m) includes meager stands of *Junipers excelsa*, *Prunus ursino*, *Amygdalus korschinskii*, *Poterium spinosum*, and the herbs *Ononis natrix*, *Asphodelus microcarpus*, *Poa bulbosa*, *Hordeum ochroleuca*, *Dactylis glomerata*, and *Lolium perene*. These are notoriously fragile ecosystems, and they show clearly the signs of anthropic disturbances, such as overgrazing. This ensemble typically contains the following 4 levels (MoA/UNEP 1996): the pre-steppe Mediterranean zone, the pre-steppe Supramediterranean zone, the pre-steppe Mediterranean mountain zone, and the lower limit of the pre-steppe Oromediterranean zone.

## **(2) Eastern Slopes of Mount Lebanon**

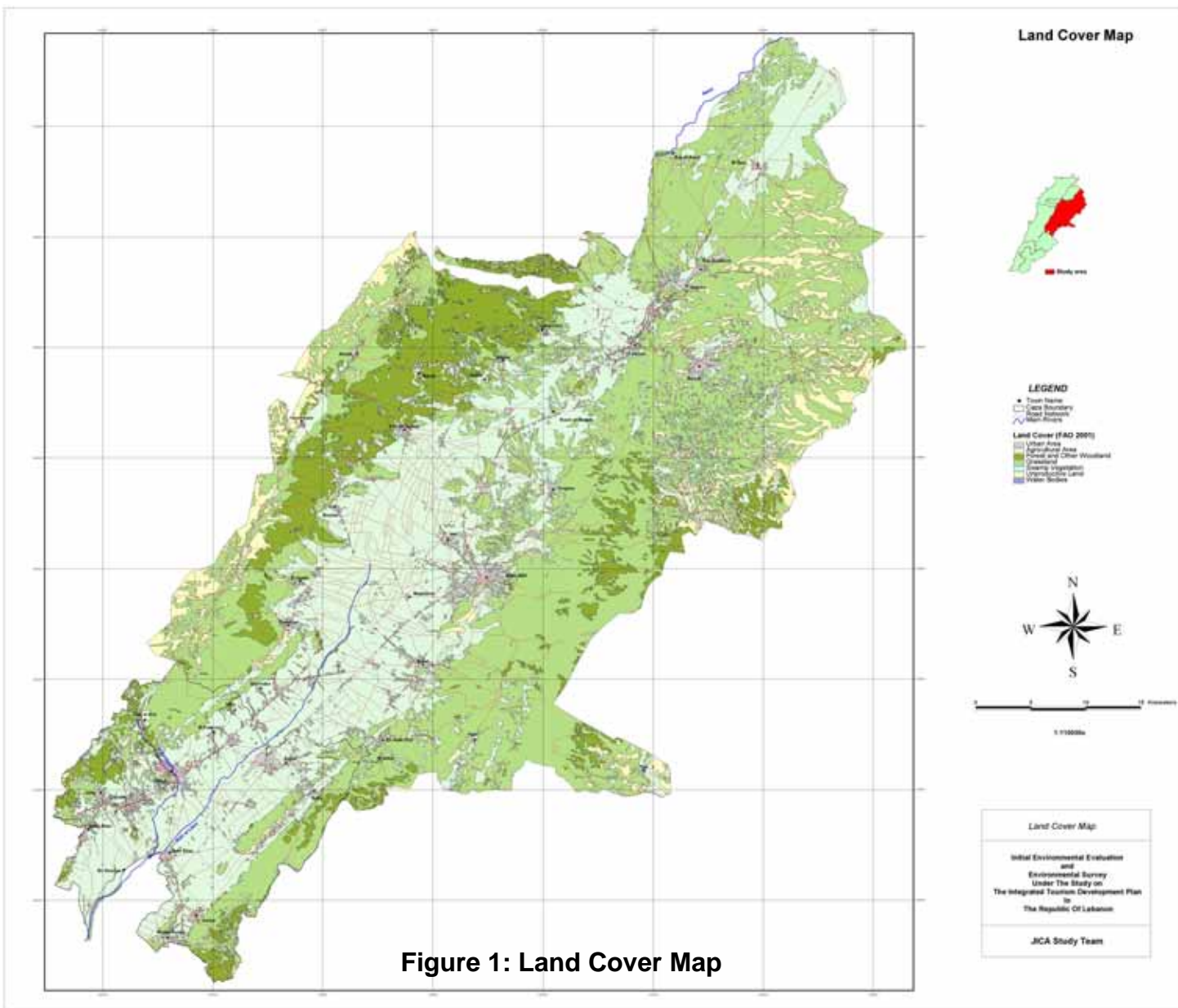
The eastern Mount Lebanon foothills are steppic and dessicated. In general, they are either occupied by a heavily degraded garrigues or barren, and the sub-desertic soils support a poor, overgrazed rangeland. The pre-steppic vegetation zone ranging between 1000 and 1500m is mainly composed of heavily grazed forestlands of *Q. calliprinos*. In the supra-Mediterranean zone (1400 – 1800 m), *Q. calliprinos* is mixed with *Q. infectoria*, followed by sparse *Juniperus excelsa* stands, which extend to higher altitudes and figures as sporadic trees mixed with dwarf thorny shrubs. However, the dominant formation on these slopes is degraded garrigues used for grazing (METAP, 1995; MoA, 2003). On the eastern slopes of the northern section of Mount Lebanon and the Anti-Lebanon, the vegetation climax ceases to be a true forest landscape. The vegetation series is pre-steppic, the landscape is generally bare, and trees are extremely scattered or completely lacking. This zone includes in the highest elevations (down to 1700 m) meager stands of *Junipers excelsa*, *Prunus ursino*, *Amygdalus korschinskii*, *Poterium spinosum*, and the herbs *Ononis natrix*, *Asphodelus microcarpus*, *Poa bulbosa*, *Hordeum ochroleuca*, *Dactylis glomerata*, and *Lolium perene* (METAP, 1995).

### **(3) Western Slopes of Anti-Lebanon**

One single series has established itself in this area: the pre-steppe series of *Quercus calliprinos* Webb. These woods are to be found from the plain of Bekaa to around 1500 m altitude as very low and poor underwood but very widespread. These areas are at present being overgrazed, which prevents any re-growth. However, in some areas, patches of the primitive climax forest are still observed and merit special attention due to their high level of endemism and their environmental importance. Degraded *Quercus* forests and natural areas with various degrees of regeneration or degradation were noticed in several locations (Jouar en Nqar, Chmiss el Emjar, and Dhour el Ghanzir) along the Eastern slopes of Anti-Lebanon mountain chain. Significant forest stands include Qoussaya, Jenta/Yahfoufa, and En Nabi Sbat/Ein El Bnaiye. Such forests typically contain pre-steppic vegetation series of *Quercus calliprinos* Webb, and are located from the Bekaa plain up to 1500 m altitude as large opened degraded areas with a tree cover of 20 to 40% *Quercus spp* grouped with *Pyracantha coccinea* roem and *Acer hermoneum*. The *Amygdalus Korschinskii* is not very frequent, and *Crataegus azarolus* appears when the level of degradation is relatively high. Furthermore, Mount Hermon presents some particularities including the presence of endemic species such as *Ferula hermonensis* (MoA, 2003). Ras Baalbeck (800 – 1000) area can be characterized as a steppe with *Haloxylon articulata* (METAP, 1995).

### **(4) The Bekaa Plain**

The Bekaa plain has been cultivated for over 2000 years, causing profound disturbances in its natural vegetation. Ancient accounts indicate that the central part was once occupied with lakes and swamps. The steppic dry to very dry area in the north (down to Housh en Nabi area) is the entrance to the Syrian Badia. Only a few xerophytic bushes and herbs can be seen, mostly *Carex stenophylla*, *Poa sinaica*, *Poa timoleontis*, and *Artemiasa herba-alpa*, indicating the closeness to the steppe. This area is intensively grazed and shows severe degradation. Towards the South, the Bekaa becomes more humid and the vegetation sequences changes progressively. The central Bekaa harbors bushes associated with *Poa bulbosa* and *Hordeum bulbosun* on devegetated lands (METAP, 1995).



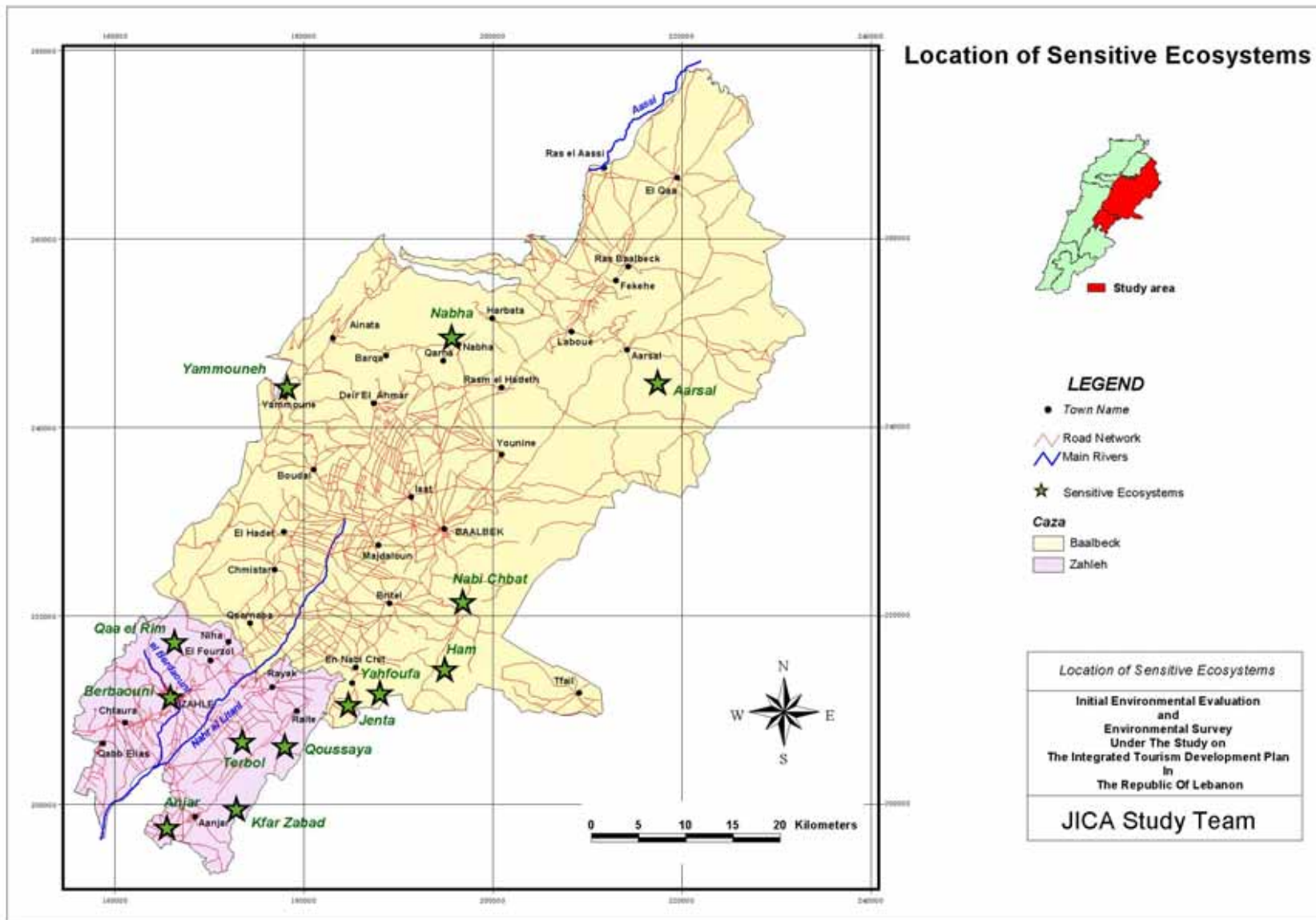


Figure 2: Location of Sensitive Ecosystems Map

### **(5) Terrestrial Fauna of Baalbeck and Zahle**

The following section describes the fauna of the study area. The mountain ranges of Mount Lebanon and Anti Lebanon harbors most of the faunal species; furthermore, the wetlands, ponds, and riversides are also considered rich in fauna. Within the scope of this study, it is difficult to perform a complete faunal survey. However, information was collected from available literature such as the MoA/UNEP biodiversity study, 1996, as well as from personal contacts, interviews with locals and researchers, and species encountered during the field visits, in addition to species listed to be found in the habitats of the study area.

Nevertheless, several species remain unknown and may not have been included in this report due to the lack of comprehensive studies and long term monitoring projects.

As for the avian diversity, the discontinuity of observations in time and space could be leading to inaccurate estimates and distribution (*Ecodit*, 2001).

#### *(i) Amphibians and Reptiles*

There are in total 5 reported species of amphibians in Lebanon: 4 species of frogs and toads, and 1 species of salamander. However, this list was identified as “undoubtedly incomplete” (*MoA/UNEP*, 1996). Reptiles in Lebanon are not commercialized; shells are not used for artifacts. Geckonids and snakes are indifferently killed because they are considered venomous; however, only two species of snakes in Lebanon are venomous and dangerous to man. The arboreal species (*Chameleon chameleon*) and insectivores are indirectly affected by human activities and the overuse of agrochemicals. Urbanization and destruction of natural biotypes is the main factor affecting the ecosystem of these animals.

#### *(ii) Birds*

The Bekaa plain is situated at the meeting point of the most favorable environment and the most hostile one having 72 species. More birds are to be found there than anywhere else. For this reason, one would expect to have many more species in this varied agricultural environment, but the region suffers from human activities and hunting in particular. The avifauna of the forests of the high mountains is as large as that of the Bekaa (71 species). The forests and woods of Mount Lebanon provide shelter to 87 species, which is considered as an underestimation due to the difficulty to spot migratory birds in thick woods.

#### *(iii) Mammals*

There are 52 reported mammal species in Lebanon, in addition 7 are already extinct. Bats make up the largest single group of mammals (16 species). About one third are rare, and another 39% are vulnerable species or species in apparent danger (*Ecodit*, 2001). Mammals in Lebanon can be classified according to the following groups (*MoA/UNEP*, 1996):

Species very close to extinction: The wolf, the wild cat, the mongoose, and the squirrel are considered to be very close to extinction (*MoA/UNEP*, 1996).

Rare species: Rare species include 3 shrews (Bi-color white-toothed shrew (Rayak), Large white-toothed shrew (Anjar), and Lesser white-toothed shrew (Bcharre)) and 11 bats including



the Kuhl's pipistrelle found in Baalbek, the Schreiber's bat, the common otter (found in the marshes of Ammiq at Anjar and on river banks and should be protected), as well as the weasel (*MoA/UNEP, 1996*).

Greatly diminished species: Four (4) species are considered to be greatly diminished; they include the squirrel, which was very common in the Lebanese mountains until 1954 but was almost wiped out due to the widespread use of insecticides, the hyrax, and the black rat (*MoA/UNEP, 1996*). The squirrel is still reported in Bcharre and El Chouf Reserve.

Vulnerable species: Thirteen (13) species are considered vulnerable, those include 4 bats species of which the greater mouse-eared bat found in Baalbeck, the serotine bat found in Chtaura, and the Kuhl's pipistrelle found in Baalbeck.

Endemic species: There are 2 reported endemic species in Lebanon, one of them is the greater mouse-eared bat found in Baalbeck (*MoA/UNEP, 1996*).

The fauna encountered in the Bekaa and its status is summarized in Figure 3.

#### *(iv) Araneida Family*

The species of spiders listed in Lebanon are 234, of which 22 are endemic. Spiders of shady forests of the genus *Agelena* regress with deforestation and their number decrease from the eastern slopes of Mount Lebanon towards Anti-Lebanon. Species of the section *Pterotricha* are found in warm, arid, and desert regions existing on the Anti Lebanon.

**Figure 3: Fauna of the Bekaa and its Status**

| Species                                   | Common name                 | Places found                                 | Status              |
|---|-----------------------------|--|---------------------|
| <i>Erinaceus concolor</i>                 | Hedgehog                    | Baalbek, Ras Baalbek, Zahle, Chmistar        | Vulnerable          |
| <i>Crocidura leucodon judaica</i>         | Bicolor white-toothed shrew | Rayak  | Rare                |
| <i>Crocidura lasia</i>                    | Large white-toothed shrew   | Anjar  | Rare                |
| <i>Crocidura russula</i>                  | Common white-toothed shrew  | Rayak, Anjar, Torbol                         | No apparent danger  |
| <i>Suncus etruscus</i>                    | Savi's pygmy shrew          | Chtaura                                      | No apparent danger  |
| <i>Myotis myotis macrocephalius</i>       | Greater mouse-eared bat     | Baalbak, Anjar                               | Vulnerable          |
| <i>Eptesicus serotinus serotinus</i>      | Serotine bat                | Chtaura                                      | Vulnerable          |
| <i>Pipistrellus kuhli ikhawanius</i>      | Kuhl's pipistrelle          | Baalbek, Zahle                               | Rare & vulnerable   |
| <i>Miniopterus schreibersi pallidus</i>   | Schreiber's bat             | Anjar  | Rare                |
| <i>Canis aureus syriacus</i>              | Jackal                      | Baalbek, Anjar, NabiChit                     | Growing             |
| <i>Canis lupus pallipes</i>               | Wolf                        | Beqaa, Rayak                                 | Close to extinction |
| <i>Vulpes vulpes palaestina</i>           | Red fox                     | Baalbek, Rayak, Qaa, Yammouneh, Chmistar     | No apparent danger  |
| <i>Martes foina syriaca</i>               | Stone martin                | Rayak  | Vulnerable          |
| <i>Vormela peregusna syriaca</i>          | Marbled polecat             | Rayak, Haouch Sneid                          | Vulnerable          |
| <i>Meles meles canescens</i>              | Badger                      | NabiChit , Baalbek                           | Vulnerable          |
| <i>Lutra lutra seistanica</i>             | Common otter                | Anjar  | Rare                |
| <i>Hyaena hyaena syriaca</i>              | Striped hyaena              | Baalbek, Zahle                               | Vulnerable          |
| <i>Sus scrofa lybicus</i>                 | Wild boar                   | Ammiq  | Growing             |
| <i>Lepus capensis syriacus</i>            | Cape hare                   | Rayak, Arsal, Baalbek, DeirelAhmar, Chmistar | Vulnerable          |
| <i>Hystrix indica indica</i>              | Porcupine                   | NebiChit, Beqaa, Rayak                       | Vulnerable          |
| <i>Spalax leucodon ehrenbergi</i>         | Mole rat                    | Balbek, Tall Amara, Beqaa                    | Growing             |
| <i>Apodemus mystacinus mystacinus</i>     | Field mouse                 | Beqaa  | No apparent danger  |
| <i>Rattus norvegicus norvegicus</i>       | Brown rat                   | Zahle, Beqaa                                 | Growing             |
| <i>Mus musculus praetextus</i>            | House mouse                 | Beqaa  | No apparent danger  |
| <i>Cricetulus migratorius cinerascens</i> | Grey hamster                | Haouch Sneid, Rayak, Ras Baalbek, Tall Amara | No apparent danger  |
| <i>Meriones tristrami tristrami</i>       | Jird                        | Tall Amara, Haouch Sneid                     | No apparent danger  |
| <i>Microtus guentheri guentheri</i>       | Levant vole                 | Ammiq, Haouch Sneid, Anjar                   | No apparent danger  |

### (6) List of Flora and Fauna

The following biodiversity lists relevant to Baalbeck and Zahleh districts are existing.

- List of flora (*Nehmeh 1980 and MoA/UNEP, 1996*)
- List of flora, Baalbeck district (*Tohmeh and Tohmeh, 1985*)
- List of flora, Zahle District (*Tohmeh, 1985*)
- List of flora, Yammouneh area (*Greenline*)
- List of flora, Zahle Jourd (900-1000m) (*Noun, 1980*)
- List of fauna, Yammouneh (*Greenline*)
- Birds of Ammique area (*A. Rocha*)
- List of fauna (*Tohmeh, 1985*)

### 1.1.2 AIR QUALITY

Existing data on air pollution was not found in Baalbek and Zahle regions. Air pollutants are generally grouped into primary and secondary pollutants. The list of primary pollutants generally includes particulate matter (PM<sub>1</sub>, PM<sub>2.5</sub> and PM<sub>10</sub>), lead, carbon monoxide (CO), sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), and volatile organic compounds (VOCs). Secondary pollutants include by-products of primary pollutants, such as ozone, and are usually country specific. Continuous air quality monitoring at the national level does not exist in Lebanon. Partial data are becoming available either from local continuous monitoring (e.g., Tripoli, Meteorological Services at Beirut International Airport) or from sporadic monitoring campaigns (e.g., in Beirut, Chekka, along highways). Air quality monitoring results in Chekka region are shown as one example (see Figure 4). According to this, SO<sub>2</sub> and NO<sub>2</sub> exceeded the Lebanese standards of 120 mg/m<sup>3</sup> (0.21ppm) and 150 mg/m<sup>3</sup> (0.017ppm) respectively.

**Figure 4: Monitoring Results of Air Quality in the Chekka Region**

| Constituent           | Concentration range | Lebanese Standards in µg/m <sup>3</sup> (ppm) |
|-----------------------|---------------------|---|
| SO <sub>2</sub> (ppm) | 0.45 - 0.7          | 120 (0.21) in 24 hrs                          |
| NO <sub>2</sub> (ppm) | 6.4 - 10.11         | 150 (0.079) in 24 hrs                         |
| CO (ppm)              | 0.33                | 10,000 (9) in 8 hrs                           |

Source: State of Environment Report, MOE, 2001, Indicator Data Sheet, MOE, March 2001

### 1.1.3 WATER QUALITY

Water quality is adversely affected by industrial, agricultural and domestic wastewaters. Leaching of pesticides and fertilizers from agriculture causes ground and surface water pollution. Surface water quality data are available from sporadic sampling activities conducted by various institutions. In November 1999, a study conducted by the AUB Water Resources Center assessed the impact of waste disposal on water quality in nine major rivers in Lebanon (including Litani River which receives the untreated sewage from Baalbeck). The results of water and sediment samples from 65 separate sampling sites showed generally high concentrations of BOD (up to 154 mg/l at certain sites) as well as fecal and total coliforms. (MoE-CDR/MVM, 2000)

The Litani River is considered to be one of the most polluted rivers in Lebanon. The Qaraaoun Lake which is located 70km down stream from Baalbek, fed by the Litani River, was put off limits for fishermen, due to the high concentrations of heavy metal and pesticide residues found in fish. In fact, all rivers in Lebanon suffer at varying degrees from the effects of solid waste and effluents. Existing data of biological oxygen demand (BOD) in the Litani River is shown in Figure 5.

**Figure 5: BOD in Litani River**

| Measurement Point | Value (BOD; mg/l) | Remarks  |
|-------------------|-------------------|--|
| Tamnine et Tahta  | 300~800           | Litani River at about 3km east from Rayak  |
| Qaa er Rim        | 16~100<br>100~800 | Berdaouni River (about 5km upstream from Zahle urban area)                                 |
| Taalabaya         | 100~300           | Berdaouni River (about 3km upstream from the Junction of Berdaouni River and Litani River) |
| Barr Elias        | 100~300           | Litani River in Barr Elias   |
| El Mansoura       | 16~100            | Litani River in El Mansoura  |
| Jobb Jannine      | 16~100            | Litani River in Jobb Jannine   |
| El Qaraaoun Dam   | 16~100            | South end of Quaraaoun Lake  |

Source: MoE

Lebanon has a water quality standard for drinking and household water. The standard for household water is indicated to be less than 2 mg/l of BOD. MoE assumed the BOD load of raw sewage was 400 mg/l for an estimation of the yearly outflow of BOD load in 2001. Considering these figures of BOD, the fact of 300~800 mg/l of BOD in the Litani River indicates that the water pollution is quite serious.

#### 1.1.4 WASTE

##### 1.1.4.1 Wastewater

As part of the National Emergency Reconstruction Program (NERP), the design and construction of a water supply and distribution network for Baalbek was implemented under the ERRP, funded through a World Bank loan. Similarly to the water supply and distribution network, considerable efforts have been made to improve the wastewater system in Baalbek and the surrounding villages. Under the ERRP, around 20 km of wastewater pipelines were laid in the city of Baalbek, mainly in replacement of damaged or old existing pipelines. Later on CDR initiated a new contract that included: (1) the construction of a wastewater treatment plant with a capacity of 12,500 m<sup>3</sup>/day to serve Baalbek and the surrounding villages up to year 2008. (2) the provision of approximately 7.4 km of trunk lines; and (3) the operation and maintenance of the wastewater treatment plant for one year.

Source: *Project Appraisal Document on a Proposed Loan to the Lebanese Republic for a Baalbek Water and Wastewater Project, May 6, 2002*

##### 1.1.4.2 Solid Waste

Sizeable, uncontrolled inland landfills include Zahle, Sour (Tyre), Nabatiye and Baalbek. Figure 6 shows background information on the status of the Zahle and Baalbek dumps.

**Figure 6: Status of Dumpsites in Zahle and Baalbek**

| Area    | Current status  | Remarks  |
|---------|---|--|
| Zahle   | To be used until nearby landfill becomes fully operational. New facility also includes a sorting plant and a leachate evaporation pond. | Existing dump to be used until existing nearby landfill facility becomes available. Social cost incurred includes the presence of small communities living on top of the existing dump |
| Baalbek | Still used. Emits fumes and smoke most of the year.   | No immediate plans to close it.  |

Source: State of Environment Report, MOE, 2001

### 1.1.5 NOISE

Existing data of noise level is not in Baalbek areas. Construction noise can be a significant source of community noise. The noise levels generated from the different construction activities are checked against the Lebanese daytime noise standard set for urban residential areas and business districts (Figure 7).

**Figure 7 Lebanese Noise Guidelines in Different Zones (Ministry of Environment, 1996)**

| Area classification   | Maximum accepted noise level dBA |                      |                    |
|---|----------------------------------|----------------------|--------------------|
|   | Day <sup>1</sup>                 | Evening <sup>2</sup> | Night <sup>3</sup> |
| Business district   | 55 – 65                          | 50 – 60              | 45 – 55            |
| Residential area with few construction sites, commercial activities or on highway | 50 – 60                          | 45 – 55              | 40 – 50            |
| Urban residential area  | 45 – 55                          | 40 – 50              | 35 – 45            |
| Residential suburb  | 40 – 50                          | 35 – 45              | 30 – 40            |
| Rural residential, hospital, public garden  | 35 – 45                          | 30 – 40              | 25 – 35            |
| Industrial zone   | 60 – 70                          | 55 – 65              | 50 – 60            |

Note: <sup>1</sup> 7 a.m. to 6 p.m. <sup>2</sup> 6 p.m. to 10 p.m. <sup>3</sup> 10 p.m. to 7 a.m.

### 2.1.2 INITIAL ENVIRONMENTAL EXAMINATION

The screening table from the main report is presented below with some additional comments.

**Figure 8 JICA Format for Screening (Tourism) in Baalbek and Zahle**

| Environmental Item   | Description                       | Evaluation   | Remarks (Reason)   |
|--|-----------------------------------|--|--|
| <b>Social Environment</b>                                      |                                   |  |  |
| 1  | Resettlement                      | Resettlement due to land occupancy (transfer of rights of residence/land ownership)                                    | (N) No resettlement is expected  |
| 2  | Economic Activities               | Loss of bases of economic activities, such as land, and change of economic structure                                   | (N) No negative impacts. Positive impact is assumed.   |
| 3  | Traffic and Public Facilities     | Impacts on schools, hospitals and present traffic conditions, such as the increase of traffic congestion and accidents | (N) No big traffic flow is expected comparing with existing traffic flow. Traffic to be mitigated in Zahle by municipal improvements |
| 4  | Split of Communities              | Community split due to interruption of area traffic  | (N) There is no factor regarding this item.  |
| 5  | Cultural Property                 | Damage to or loss of the value of churches, temples, shrines, archaeological remains or other cultural assets          | (N) Positive impact. Cultural property will be well maintained with management plan.   |
| 6  | Water Rights and Rights in Common | Obstruction of fishing rights, water rights, rights of common  | (N) No change of right to drinking or irrigation water.  |
| 7  | Public Health Condition           | Deterioration of public health and sanitary condition due to generation of garbage and the increase of vermin          | (N) No change is expected with Public Health Condition.  |
| 8  | Waste                             | Generation of construction and demolition waste, debris and logs   | (N) No significant construction works are expected.  |
| 9  | Hazards (Risk)                    | Increase in risk of landslides, cave-ins and accidents   | (N) No significant construction works are expected.  |
| <b>Natural Environment</b>                                     |                                   |  |  |
| 10   | Topography and Geology            | Changes of valuable topography and geology due to excavation or filling work   | (N) No change of topography is expected.   |
| 11   | Soil Erosion                      | Topsoil erosion by rainfall after reclamation and vegetation removal   | (N) There is no factor regarding this item.  |
| 12   | Groundwater                       | Change of distribution of groundwater by large-scale excavation  | (N) No significant construction works are expected.  |
| 13   | Hydrological Situation            | Changes of river discharge and riverbed condition due to changes of habitat conditions                                 | (N) There is no factor regarding this item.  |
| 14   | Coastal Zone                      | Coastal erosion and sedimentation due to landfill or change in marine condition  | (N) There is no coastal zone.  |
| 15   | Fauna and Flora                   | Obstruction of breeding and extinction of species due to changes of habitat conditions                                 | (N) Tourism facilities will be established to avoid impacting the important fauna and flora.   |
| 16   | Meteorology                       | Changes of temperature, precipitation, wind, etc. due to large-scale land reclamation and building construction        | (N) There is no factor regarding this item   |
| 17   | Landscape                         | Changes of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures              | (N) There is no factor regarding this item. Recommending policies to protect landscapes  |
| <b>Pollution</b>   |                                   |  |  |
| 18   | Air Pollution                     | Pollution caused by exhausted gas or toxic gas from vehicles and factories   | (N) The increase of tourist vehicles is not much compared with present amounts.  |
| 19   | Water Pollution                   | Pollution by inflow of slit, sand and effluent into rivers and groundwater   | (N) Tourist excreta will be treated by new system.   |
| 20   | Soil Contamination                | Contamination of soil by dust and chemicals, such as herbicides  | (N) There is no factor regarding this item.  |
| 21   | Noise and Vibration               | Noise and vibration generated by vehicles  | (N) The increase of tourist vehicles is not much compared with present amounts.  |
| 22   | Land Subsidence                   | Deformation of land and land subsidence due to the lowering of groundwater table                                       | (N) There is no factor regarding this item.  |
| 23   | Offensive Odor                    | Generation of exhaust gas and offensive odor by facility construction and operation                                    | (N) There is no factor regarding this item.  |
| Overall Evaluation:  |                                   |  |  |
| Either IEE or EIA is necessary for the project implementation? |                                   | (N)  | EIA is not necessary for the project implementation because all items are N.   |

Y: Yes N: No U: Unknown

(1) Fauna and Flora

During the construction phase, fauna and flora will be not negatively impacted because of the tourism facilities will be constructed avoiding the inhabiting areas of important fauna and flora.

(2) Air Pollution, Noise

During the construction and operating phases air quality and noise will not be negatively impacted because that the construction will be not so large scale and the increase of tourist vehicles is not so much comparing present amount.

(3) Water Quality, Solid Waste

During the construction and operating phases water quality and solid waste will not be negatively impacted because that the construction will be not so large scale and the increase of tourist excreta is not so much comparing present amount.

(4) Other Items

During the construction and operating phases all of other items will not be negatively impacted.

## **Part 2 (Bcharre)**

### **2.1 EXISTING CONDITIONS**

Exhibits 9 and 10 present sensitive eco-system and land cover for Bcharre Qaza.