

## 9. The Durresi-Kavaja wetlands

### Summary

The Lalzi complex with a total surface of 18 km<sup>2</sup> is the main wetland in the Durresi region. The coastline from the Ishmi mouth to the Palla Cape is about 26 km, of which about 18 km belong to the Lalzi bay. It was one of the most conserved beaches with dunes and wetlands, but suffers nowadays under a strong human pressure. The complex is under the administration of the municipalities of Hamallaj and Lalzi in the Durresi district. The Rrushkulli - Hamallaj (13 km<sup>2</sup>) within the Lalzi area is protected as Managed Natural Reserve (V); the Bishtaraka wetland is the most relevant transitional wetland inside of the Reserve (Figs. 9-1 to 9-3). Recently the whole area of Cape Rodoni – Lalzi bay – Ishmi forest (25 km<sup>2</sup>) has been proposed as a Protected Landscape/Seascape. In the Kavaja district (southern of Durresi) the wetlands north of the Shkumbini delta and the Karpeni zone are worth mentioning.



**Figure 9-1:** Bird view of the southern part of the Lalzi wetland with the Tarini torrent and the Bishtaraka lagoon; the Erzeni delta is at the horizon. Parallel to the Bishtaraka wetland the effect of erosion is manifested that has extremely diminished the Rrushkulli beach and the coastal dunes (Photo: A. Islami).

## 9.1. How to reach the area

The towns of Durresi and Tirana are good starting points for a visit (Fig. 9-2). The Lalzi bay - the Cape Rodoni – Ishmi forest is up to 50 km northwest Tirana, through Sukthi or Maminasi crossing at the highway Tirana-Durresi; Rushkulli-Hamallaj Reserve is about 30 km from Tirana. The Porto Romano is about 10 km north of Durresi. They are easily reached and offer a wide spectrum of facilities and accommodation.



**Figure 9-2:** Satellite map of the transitory wetlands of Lalzi bay. The main inhabited centers, habitats and roads (red) are shown (Google, 2012, modified)



**Figure 9-3:** Northern part of the Lalzi wetland zone with beach, coastal dunes and Shen Pjetri forest; the Shen Pjetri (Lalzi) village and the Rodoni Cape are at the horizon (Photo: A. Islami).



**Figure 9-4:** Habitats at the Bishtaraka lagoon (Photos: L. Kashta).



**Figure 9-5:** 1: Durrës harbour; 2: Durrës amphitheatre (2<sup>nd</sup> century AD) and its galleries (3); 4: Mosaic in the Cristian Chapel (6<sup>th</sup> century AD) in the galleries below the arena; 5: Byzantine walls and the Tower (rebuilt in the 15<sup>th</sup> century); 6: promenade with the Big Mosque in the background (Fatih's Mosque; built 1414 to 1494 and restored 1992 to 1994) (Photos: A. Miho).



The Karpeni wetland and the Kavaja river outlet at the Adriatic Sea is located about 5 km far from Kavaja (south of Durresi) from the crossing of Qerreti at the national road Durresi-Kavaja. Shkumbini outlet into the Adriatic Sea (in Kulari Zone) is about 17 km southwest of Kavaja (56 km far from Tirana), attained through Bashtova village.

## 9.2. About the most important sites

The most important wetlands and natural reserve sites in the Lalzi Bay are the Erzeni delta with its wetlands in the southern part, the Rrushkulli - Hamallaj Reserve and the Shen Pjetri (Lalzi) beach and forest (Figs. 9-1 to 9-3); besides these some historic sites are worth to be visited in Durresi (Figs. 9-5) and Rodoni (Fig. 9-13).

Durresi town with 200'000 inhabitants has first been mentioned in 627 BC as the site of the Illyrian tribe Taulants and known under the name Epidamnus. In 313 BC Dyrrahium led by the Illyrian Glauku established the alliance with Rome. One branch of the Via Egnatia started from Dyrrahium, a road connecting the Roman Empire with the East (Constantinopolis). Interesting places to visit are the archaeological museum with about 2000 objects from ancient times to the middle age, the amphitheatre from the 2<sup>nd</sup> century AD and seating more than 15'000 persons (Fig. 9-5), and the castle from the 4<sup>th</sup> and 5<sup>th</sup> century. A seaside walk offers the Venetian tower, restored in the 14<sup>th</sup> century, the monument of the Partisan Hero and the sea zone with the harbor. The Durresi hill with the palace of the former King Zogu allows an overview on the whole town and the sea.



**Figure 9-6:** *The Spanish Broom (Spartium junceum)* in flower at the Kavaja Rock (Durresi) (Photo: A. Miho).

The village Porto Romano in the southeast of the Palla Cape is an ancient port from the roman period covering Roman and Byzantine ruins, it is still in use. Visitors in the region should take time to visit the Preza castle on the hilltop near Preza village; it allows a good view on the meanders of the Erzeni and Ishmi rivers and their tributaries and on the Rodoni and Lalzi coastal wetlands. The Kavaja Rock (Fig. 9-6), a large conglomerate and sandy rock from the Miocene, is also a Natural Monument.

Near the Qerreti village in the Karpeni zone an aquaculture system can be toured. In the northern wetlands of the Shkumbini delta about 4 km from Ballaj the ruins of the quadrangular Bashtova fortress, constructed between 1467 and 1479, rises in the middle of agricultural fields. The walls were originally 9 m high. The fortress with a tower at each corner functioned as guard for the entry into the Shkumbini estuary.

### 9.3. Physico-geographical characteristics

The Lalzi bay is embedded in the Western Adriatic Lowland, between the Rodoni cape in the north and the Palla cape in the south (Fig. 9-2); its surface is estimated to be about 250 km<sup>2</sup>. The landscape is flat and some parts close to the coast are depressions reaching a depth of 1.5 m. They are kept dry by the activity of a pumping station near Hamallaj village (Fig. 9-2). A hilly chain, a mainly neogenic and molassic formation of the Miocene and the Pliocene along the Rodoni cape, separates the Erzeni watershed from the Ishmi (Figs. 9-1 and 9-3); the highest elevation is 223 m at Likmetaj (Rodoni).

**Table 9-1:** Monthly averages of selected climate data for Sukthi (Durrresi) during 2007 (Imeri, 2008).

Environmental data	months											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Air temperature, °C	6.9	7.8	9.9	13.2	17.4	21.0	23.0	22.9	20.1	16.0	11.8	8.3
Rainfall, mm	124.9	98.6	100.3	86.7	63.7	52.2	26.9	44.1	69.6	103.3	15.8	124.7
Solar radiation, kWh m <sup>2</sup>	57.0	72.3	108.6	140.8	177.6	196.7	210.9	186.9	142.5	100.3	60.5	48.6
Sunny hours	124.7	137.1	182.9	213.6	275.4	307.6	354.6	329.2	268.9	213.7	140.1	106.8

As all other wetlands along the Albanian coast the zone is influenced by the Mediterranean plain climate (Tab. 9-1). The solar radiation is somewhat higher than in Patogu or Lezha counting more than 1500 kWh m<sup>-2</sup> and more than 2650 sunny hours per year. The mean temperature ranges between 6.9°C to 23°C. Winds have a strong impact on the climate. They come in about 29% from the north. The marine breezes are characteristic and often present in all the coastal lowlands, in Durrresi at more than 70 days in summer and 18 days in winter.

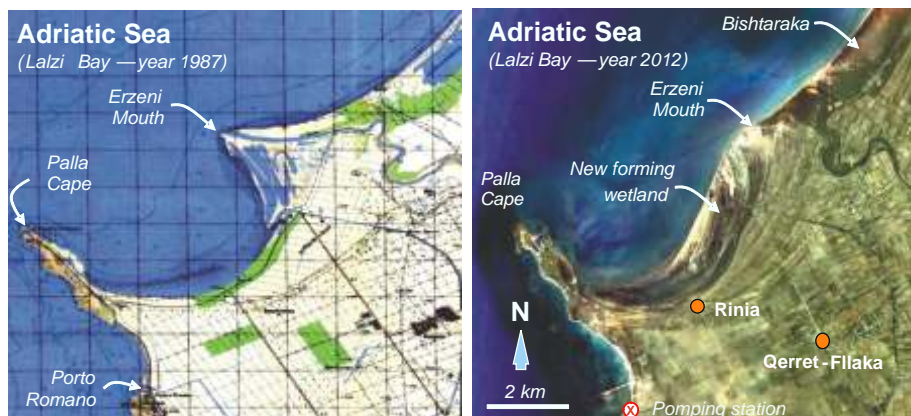
The coastline in Lalzi and its original lowlands (of the former Durrresi, Qerreti, Juba and Rrushkulli marshlands) have been strongly impacted by the Erzeni River with its delta in the most southern part of the bay (Fig. 9-8). About 35% of the coastline between the Rodoni - Palla capes are cliffs, exposed to mild erosion and stretching along both capes. The remaining part, the Lalzi bay, is partly exposed to deposition by the river (47%) and partly to erosion by the sea (18%).

Therefore, the Lalzi bay with the Erzeni river mouth is an environmentally sensitive area. Not only the natural forces, but any activity altering the quantity of the materials carried by the Erzeni river will affect the littoral, generating new erosion processes. The marine hydro-dynamics or the climate changes have intensified the erosion in the Lalzi. It is enhanced also by human impact. The land reclamation and drainage of the wetlands has been excessive as elsewhere in the country. Moreover, new irrigation reservoirs in the catchment and intense gravel mining in riverbeds over the last decades have strongly disturbed the hydrological system of the coast and the river deltas of Erzeni and Ishmi. The Porto-Romano bay is also suffering from erosion.

The rapid dynamics at the Lalzi coast is more emphasized in the northern part of the Erzeni delta, from Rrushkulli to the Shen Pjetri beach. Due to the high rate of erosion since 1975, the sea has penetrated up to 300 m into the land in the Rrushkulli - Hamallaj zone (Figs. 9-7 and 9-8), with a rate of about 10 m per year.



**Figure 9-7:** The erosion effect in Rushkulli - Hamallaj beach zone are best observed by the positions of the old military bunkers; two rows of them were constructed at a distance of 50 m and 200 to 250 m from the water line. At some sites both rows are now within the water with the second row 20 to 25 m outside of the waterline (Photos: A. Miho).



**Figure 9-8:** *Left:* topographic map of 1987; *right:* recent satellite image of the Palla Cape and the southern part of the Lalzi Bay, showing the strong accumulation process of more than 1 km within 20 years (Albanian Military Maps 1:25000, 1989 and Google, 2012).



The sandy beaches became continuously smaller. From 150 and 200 m wide about 30 to 35 years ago, they are now reduced to 10 to 30 m, or at some sites even to a belt of only 2 to 5 m. The dunes of up to 100 m width and 2 to 5 m height have disappeared in many parts. The vegetation belts have also moved landwards due to the increasing erosion and salinity. As a consequence the wetlands and the alluvial forest of the Rushkulli - Hamallaj Reserve turned to a most endangered habitat.

Interestingly, land which became lost in the northern part seems to be gained back in the southern part of the Erzeni delta, where accumulation processes dominate (Fig. 9-8).



**Figure 9-9:** *Above:* dense growth of the filamentous green algae *Ulva* spp. on solid substrates in the sea littoral of the Rushkulli-Hamallaj zone. The nitrogen-loving species indicates a heavy load of nutrients from the Erzeni and other nearby sources. *Below:* Durrresi beach from Kavaja Rock; dune pine forests were urbanized during the last decade with tourist buildings; Durrresi town is seen at the horizon (Photos: A. Miho).



Nevertheless, Erzeni and Ishmi tributaries, running close to the Tirana metropolis, continue to be overexploited for gravel mining, enhancing the erosion of sandy dunes and beaches. The quality of the water remains a great problem as no wastewater treatment exists in the whole Tirana and Durrresi area with its high population density (Fig. 9-9). A chemical plant in Porto-Romano produced sodium dichromate for leather tanning and pesticides until its closure in 1990; the site of the plant as well as the nearby dumpsite and the chemical storage facilities are heavily contaminated. Marku & Nuro (2011) report that even nowadays the pollution from pesticides in the zone is extremely high (see § 5.5 in Chapter 5; Fig. 5-6). Some activities have been recently started to remediate the environment and prevent health risks in the local population.

The whole area in Lalzi and Porto-Romano is covered mostly with agricultural land. Some spots of mixed alluvial forest are still present along the coastline north of the Erzeni river outlet (at Rrushkulli - Hamallaj Reserve). The existing sandy dunes are covered with halophyte and hygrophite vegetation, and a planted pine forest is found along the coastal area. During the last decade the human interest, the human activities and the pressure continuously increased, especially focused on tourism infrastructures, transport and industry. Since the year 2000, Porto-Romano is an area for the handling and storage of fuels; recently it has been discussed to broaden the activity with the construction of an Energy Park including an oil refinery, a thermal power plant and a gas and bio-diesel terminal (<http://www.albania-estate.com/en/news/157>).

#### **9.4. Description of the most important habitats**

The transitional wetland system of Lalzi (Fig. 9-2) represents the remains of Durrresi and Juba wetlands which had been drastically scaled down around 1970. A mosaic of coastal habitats, such as the sandy dunes, salt tolerant vegetation, flood plains and planted pine forests, wetlands and marshlands offer a multitude of places for a variety of plant and animal species.

The Rrushkulli - Hamallaj coast belt (about 13 km<sup>2</sup>) is a most unique area and present a Managed Natural Reserve. It extends between the Erzeni delta and the Tarini torrent along the sea at a length of about 10 km (Fig. 9-1). After 1990, the alluvial forests in the Rrushkulli – Hamallaj coastal zone were heavily damaged for firewood and livestock, but their restoration is increasingly going on.

The Bishtaraka wetland with 1.55 km<sup>2</sup> is located about 3 km north of the Erzeni delta (Fig. 9-2). The swamp encompasses about 1.6 km in length and 750 m in width, with the Bishtaraka lagoon or Godulla Lake (Rrushkulli, 0.9 km<sup>2</sup>) and the Godulla marsh (Hamallaj, 0.65 km<sup>2</sup>).



**Figure 9-10:** The Bishtaraka lagoon: **above:** at high water level (April 2007); **below:** at low water level (September 2007) (Photos: A. Imeri).



**Figure 9-11:** Habitats at the Bishtaraka lagoon (Photo: L. Kashta).

The lagoon is shallow (Figs. 9-10 and 9-11) with a depth of hardly more than 1 m. A small littoral belt which is continuously eroded separates it from the sea. A shallow channel of 34 to 40 m length and 5 to 6 m width allows a water exchange with the sea. The littoral is shallow and covered with aquatic vegetation. The marsh extends into the northern part of the lagoon. The marshland is frequently encased by drainage channels that direct the water to the main pumping station in the north.

As the marshland is periodically flooded by tides and rainfall during the wet season the water level changes continuously. The water quality of the lagoon has been estimated to be eutrophic as it contains high concentrations of phosphate and other nutrients diffusing in from the surrounding agricultural lands, combined with polluting effects by the Erzeni River.

The Shen Pjetri beach and its forest is located in the most northern part of the Lalzi bay (Fig. 9-3). A beach zone of 100 m length and 20 m width has been formed by accumulation processes of the sea waves. The site is conserved as a natural monument (geomonument). Unfortunately, the pine belt and the coastal dunes in Shen Pjetri are continuously replaced by tourist infrastructures, as in the Durresi-Golemi belt (Fig. 9-9), Qerreti and Spille, in Velipoja (Shkodra) and in the Shengjini-Kune zone (Lezha).

The Rodoni Cape is situated in the most western part of the hilly chain of Preza-Rodoni which separates the Erzeni watershed (ending in the Lalzi bay) from the Ishmi watershed (ending in the Rodoni bay). It is formed by terrigenous material and is encompassed by high vertical banks of up to 25 m. The material is eroded and washed out continuously by the waves of the sea.



Figure 9-12: The Rodoni cape (Photo: A. Islami).



The Rodoni cape belongs also to the checklist of Natural Monuments of Albania for its special natural values (Fig. 9-12). Ruins of the Skanderbeg castle are found on the cape near the sea. The building was used until 1467, then destroyed by the Ottomans and rebuilt again in 1500 by the Venetians. Closer to the sea, there is the Saint Anthony Church (from the 14<sup>th</sup> century) (Fig. 9-13), it is also related to Skanderbeg as his sister Mamica spent the last years of her life in this monastery.



**Figure 9-13:** Sites at Rodoni Cape, **above:** the ruins of the Scanderbeg castle; **middle:** vertical banks at the coast; **below:** Church of Saint Anthony (14<sup>th</sup> century) (Photos: L. Kashta).



## 9.5 Biodiversity of the Lalzi wetlands

### Flora

The most fundamental transitional habitats in the Lalzi area are the coastal marshes and lagoons, the Mediterranean pine forests and the alluvial forests, the shrubs, dunes and beaches.

In a recent investigation of the vegetation, about 330 species of vascular plants have been recorded, among them about 15 rare or endangered species (Imeri, 2008; Imeri *et al.*, 2010) (Tab. 9-2). They develop mainly in the dunes. About 44 species have been classified as crucial for industrial and medical use, while 20 were invasive aliens.

The sandy dunes and beaches between Rrushkulli and Shen Pjetri (Fig. 9-14) represent most sensitive natural habitats. Closer to the shoreline the plant community is dominated by *Cakile maritima*, forming isolated spots 4-5 m distant from each other. On well developed dunes the plant community is dominated by *Elymus farctus*. The most frequent plants are listed in the table 9-3 (Figs. 9-17, 9-18 and 9-20). In parts with high erosion as in Rrushkulli, but also in Karpeni and Patogu, a high loss of the vegetation on developing dunes is observed, with indicator species such as the Sand couch (*Elymus farctus*). These parts are generally invaded by the Sticky fleabane (*Dittrichia viscosa*) and the annual Saltmarsh-aster (*Aster squamatus*).



**Figure 9-14:** Dunes with European beach grass (*Ammophila arenaria*) and juniper (*Juniperus oxycedrus*) in the Rrushkulli-Hamallaj zone (Photo: L. Kashta).

In the more stable dunes fragments of forests and shrubs develop, often dominated by *Juniperus oxycedrus* ssp. *macrocarpa* (Fig. 9-14) and frequently disrupted by a narrow belt of Mediterranean pines (*Pinus pinaster*, *P. halepensis* and rarely *P. pinea*) which had been cultivated about 40-50 years ago. Shrubs which commonly grow in dune forests are listed in table 9-4.

In the fragmented areas behind the dunes Mediterranean halo-psamophyte meadows prosper, the vegetation is dominated by *Saccharum ravennae* (= *Erianthus ravennae*) and *Schoenus nigricans* in isolated spots (Fig. 9-15). Other fragmented Mediterranean meadows with *Scirpus holoschoenus* and *Teucrium polium*, *Daucus guttatus* and *Lagurus ovatus* spread the ground between the Bishtaraka lagoon and the pumping station channel.



**Figure 9-15:** Vegetation in the Rushkulli habitats, Mediterranean meadows with *Schoenus nigricans* or *Scirpus holoschoenus* (Photo: A. Miho).

Rooted submerged vegetation develops densely in the Bishtaraka lagoon, it is rich in Fennel pondweed (*Potamogeton pectinatus*) and Eurasian watermilfoil (*Myriophyllum spicatum*). In standing freshwater associations Common duckweed (*Lemna minor*) disperse everywhere in the drainage channels with slowly running water; isolated areas are also full of Pond water starwort (*Callitriche stagnalis*), Common water-crowfoot (*Ranunculus aquatilis*) and Common water-plantain (*Alisma plantago-aquatica*).

**Table 9-2:** Checklist of nationally or internationally endangered plant species recorded for the Lalzi habitats (Imeri, 2008).

Scientific name	Common name	Albanian name	Habitats
<i>Ammophila arenaria</i>	European marram grass	Amofila ranore	Dunes
<i>Cladium mariscus</i>	Saw-sedge	Kladi fik i eger	Freshwater marshes
<i>Colchicum autumnale</i>	Autumn crocus, Meadow saffron	Xherrokulli vjeshtor	Quite rare in alluvial and pine forests
<i>Desmazeria marina</i>	Stiff sand -grass	Desmazeria detare	Dunes
<i>Gladiolus palustris</i>	Marsh gladiolus	Gladiola kenetore	Freshwater marshes
<i>Hypericum perforatum</i>	Saint John's wort	Lulebasani	Everywhere
<i>Juniperus oxycedrus</i> ssp. <i>macrocarpa</i>	Prickly juniper, Large-fruited juniper	Dellinja kokermadhe	Dunes
<i>Lotus cytisoides</i>	Grey birdsfoot trefoil	Thuapule	Dunes
<i>Matthiola tricuspidata</i>	Three-horned stock	Pllatka	Dunes
<i>Origanum vulgare</i>	Wild marjoram	Rigoni	Everywhere
<i>Pancratium maritimum</i>	Sea daffodil	Zambaku i detit	Dunes
<i>Posidonia oceanica</i>	Neptune grass	Posidonia	Marine waters
<i>Quercus ilex</i>	Holm oak, Holly oak	Ilqja	Alluvial forests
<i>Quercus robur</i>	Pedunculate oak	Rrenja	Alluvial forests
<i>Stachys maritima</i>	Woundwort	Sarusha bregdetare	Dunes

**Table 9-3:** Plants in sandy dunes and beaches of the Lalz region (Durresi).

Latin name	English name	Albanian name
<i>Ammophila arenaria</i>	European marram grass	Amofila ranore
<i>Cakile maritima</i>	European searocket	Brokra bregdetare
<i>Echinophora spinosa</i>	Prickly parsnip	Ekinofora gjembake
<i>Elymus farctus</i>	Sand couch	Elimi
<i>Eryngium maritimum</i>	Sea holly	Gjembardhi bregdetar
<i>Euphorbia paralias</i>	Sea spurge	Qumeshtoria e bregdetit
<i>Euphorbia peplis</i>	Purple spurge	Qumeshtoria peplus
<i>Inula crithmoides</i>	Golden samphire	Omani kritmoid
<i>Medicago marina</i>	Sea medick	Jonxha detare
<i>Pancratium maritimum</i>	Sea daffodil	Zambaku i detit
<i>Salsola kali</i>	Prickly saltwort	Kembekuqja
<i>Sporobolus pungens</i>	Coast dropseed	Skadhine e bute
<i>Xanthium strumarium</i>	Rough cocklebur	Rodhja, ksanti italian

**Table 9-4:** Shrubs in dunes and dune forests from Lalzi region (Durrresi).

Scientific name	Common name	Albanian name
<i>Alkanna tinctoria</i>	Dyers' bugloss	Alkana ngjyruese
<i>Asparagus acutifolius</i>	Wild asparagus	Ferremiu
<i>Asphodelus aestivus</i>	Summer asphodel	Badhra
<i>Cistus incanus</i>	Hoary rockrose	Menishtja
<i>Cistus salviifolius</i>	Rockrose	Menishtja gjethesherebele
<i>Crataegus monogyna</i>	Hawthorn	Murrizi njeberthamor
<i>Dorycnium hirsutum</i>	Hairy canary clover	Dorikni qimeashper
<i>Erica manipuliflora</i>	Mediterranean heath	Hamuriqui
<i>Hedera helix</i>	Ivy	Urthi
<i>Juniperus phoenicea</i>	Phoenician juniper	Dellinja Fenikase
<i>Lagurus ovatus</i>	Hare's tail grass	Bishtlepuri vezak
<i>Ligustrum vulgare</i>	Wild privet	Voshtra e rendomte, Gjipsi
<i>Myrtus communis</i>	Myrtle	Mersina
<i>Phillyrea angustifolia</i>	False olive	Mretja gjethengushte, Krifsha
<i>Phillyrea latifolia</i>	Broad-leaved phillyrea	Mretja gjethegjere
<i>Pistacia lentiscus</i>	Lentisk	Xina, Bafra, Sqindi
<i>Rhamnus alaternus</i>	Mediterranean buckthorn	Beloti
<i>Ruscus aculeatus</i>	Butcher's broom	Rrushkulli shpues
<i>Scirpus holoschoenus</i>	Round-headed clubrush	Zuba e rendomte
<i>Smilax aspera</i>	Mediterranean smilax	Morenxa
<i>Teucrium polium</i>	Germander	Barmajaselli
<i>Vulpia fasciculata</i>	Dune fescue	Vulpia e tufezuar

**Figure 9-16:** Students of first year Biology, Tirana University, during the field practice in Botany, in May 2004 - walking through associations with *Juncus* spp. (Photo: A. Miho)







**Figure 9-17:** Typical plant species from the Rushkulli-Hamallaj zone: **1:** Autumn crocus (*Colchicum autumnale*); **2:** Hedge nettle (*Stachys maritima*); **3:** Three-horned stock (*Matthiola tricuspidata*); **4:** Cottonweed (*Otanthus maritimus*); **5:** European searocket (*Cakile maritima*); **6:** Felty germander (*Teucrium polium*) (Photos: A. Imeri and J. Marka).



**Figure 9-18:** Typical plant species from the Rushkulli-Hamallaj zone: **1:** Rock-rose (*Cistus incanus*); **2:** Silk vine (*Periploca graeca*); **3:** Dyers' bugloss (*Alkanna tinctoria*); **4:** Bunch of European beachgrass (*Ammophila arenaria*), growing in sandy dunes (Photos: L. Kashta and A. Miho)

**Figure 9-19:** Vegetation in the Rushkulli habitats, associations with rushes (*Juncus* spp.) (Photo: A. Miho).



Reed beds with *Phragmites australis* expand broadly in large areas surrounding the Bishtaraka lagoon (Figs. 9-4, 9-10, 9-11), along the Erzeni river banks and the drainage channels, forming often wide belts. Reed is often followed by reed mace beds dominated by *Typha angustifolia*. These two associations also often contain *Scirpus lacustris*, *S. maritimus*, *Typha latifolia*, *Tamarix parviflora*, *Lithrum salicaria*, *Alisma plantago-aquatica*, *Equisetum palustris* and *Mentha aquatica*. Coastal salt marsh beds, mainly dominated by *Scirpus maritimus*, cover large areas in the northern part of the Bishtaraka channel. The aw sedge (*Cladium mariscus*) belongs to the hydro-hygrophilous vegetation, found in a few spots of 500-600 m<sup>2</sup> of freshwater habitats in the northern littoral of the Bishtaraka lagoon.

Large areas with low habitats that are often flooded and with a high salinity are dominated by succulent plants like *Arthrocnemum fruticosum*, *Puccinellia festuciformis*, and to a lesser extent by *Halimione portulacoides*. Marshes or Mediterranean salty meadows extend widely, especially around the Bishtaraka lagoon, but even in open zones in alluvial forests. *Juncus maritimus* and *J. acutus* are the most dominant species, accompanied often by *Phragmites australis*, *Limonium vulgare*, *Tamarix hampeana*, *Schoenus nigricans* and *Carex extensa*. Small surfaces scattered between Rrushkulli and Bishtaraka comprise associations with Sea lavender (*Limonium vulgare*) and Sagebrush (*Artemisia coerulescens*).

The Mediterraneo-Turanian alluvial forests extend widely in the Erzeni delta and along the Rrushkulli - Hamallaj Reserve. There the Mediterranean riparian forests with White poplar (*Populus alba*) accompanied by *Salix alba*, *Populus nigra* and *Ulmus minor* are most abundant. Mixed alluvial forests with *Quercus robur*, *Ulmus laevis*, *U. minor*, *Alnus glutinosa* and *Fraxinus angustifolia* are at present very dense in the Reserve, fenced and strictly protected since the year 2000.

Evergreen shrubs and pines form the most dominant vegetation in the Rodoni hills, with the Strawberry tree (*Arbutus unedo*), the Common myrtle (*Myrtus communis*), and others (Fig. 9-21). The Spanish Broom (*Spartium junceum*) is also dominant in the Kavaja and Durreši hills (Fig. 9-6).







**Figure 9-21:** Evergreen shrubs in flower and with fruits from the Durresi coastal zone: **above:** strawberry tree *Arbutus unedo* (Rodoni); **below:** common myrtle *Myrtus communis* (Spille) (Photos: L. Kashta).

« « **Figure 9-20:** Typical plant species from the Rushkulli-Hamallaj zone: **1:** Common oak (*Quercus robur*); **2:** Holm oak (*Quercus ilex*); **3:** Prickly juniper (*Juniperus oxycedrus* ssp. *macrocarpa*); **4:** Bird's-foot trefoil (*Lotus cytisoides*); **5:** Sea daffodil (*Pancratium maritimum*); **6:** Great fen sedge (*Cladium mariscus*); **7:** Sea fern-grass (*Desmazeria marina*) (Photos: A. Imeri).



A unique habitat, the Kolndrekaj beach forest spot, is situated close to the Bize village (at the Ishmi-Zhuri pass, about 160 m a.s.l.). About 60 individual beech trees (*Fagus sylvatica*) grow there in a rather unusual habitat since beech grows in Albania normally at altitudes between 1000 and 1200 m above sea level.

## Fauna

Data about the fauna of the Lalzi wetlands are quite limited. With regard to the marine invertebrates in the Lalzi Bay and the Rodoni Cape, so far 4 bryozoans, 69 mollusks (33 gastropods, 31 bivalves and 5 cephalopods), 30 crustaceans (mostly decapods) and 5 polychaetes have been reported.

About 18 gastropods, 16 bivalves and 12 decapod crustaceans have a national protection status, while 8 mollusks belong into the highly endangered category (VU = Vulnerable). Recently, the presence of the invasive Blue crab *Callinectes sapidus* has been recorded at the Erzeni mouth.

The Lalzi area is also well known for fishing (Figs. 9-22 and 9-23) which is a major activity in the zone; main fishing concerns *Mugil* spp., *Liza* spp., *Dicentrachus labrax*, *Umbrina cirrosa*, *Lichia amia*, *Sparus* sp., *Alosa fallax*, *Anguilla anguilla*, but also crustaceans (*Penaeus kerathurus*; = *Melicertus kerathurus*) and bivalves (*Chamalea gallina* and *Donax trunculus*). For the combined Patogu and Lalzi wetlands 58 fish species have been counted, the two sites seem to be quite similar.

About 9 amphibians have been described for the Rushkulli and Shen Pjetri forests, five belong to frogs, two to toads and two to newts. Among the 25 species of reptiles are two species of terrapin species (*Caretta caretta* and *Chelonia mydas*), both visitors of shallow marine water and two freshwater turtles (*Emys orbicularis* and *Mauremys caspica*).



Figure 9-22: Left: *Lacerta viridis*; right: fisherman from Lalzi (Photos: I. Haxhiu and A. Miho).

The other reptiles are scattered among 9 species of lacertids (i.e. *Algyroides nigropunctatus*, *Anguis fragilis*, *Lacerta* spp., *Podarcis* spp.) (Fig. 9-22) and 10 snakes (*Coluber* spp., *Elaphe* spp., *Malpolon monspessulanus*, *Natrix* spp., *Telescopus fallax* and *Vipera ammodytes*).

The Lalzi zone is also noted for habitats that are significant for birds. The area has been identified as Important Bird Area (IBAs) for over 10'000 waterbirds. According to the census in December 2004 about 20 waterfowl species overwinter at the Palla and the Rodoni Cape (Tab. 9-5). Most abundant were ducks, followed by waders. However, the number of bird species and the bird abundance did not reach the capacity of the habitat, and was lower than in the other coastal habitats discussed.

**Figure 9-23:** The Erzeni river in Rrushkulli, the nets are used for traditional fishing (Photo: L. Kashta).



The Golden jackal (*Canis aureus*) and the European otter (*Lutra lutra*) are the most often seen mammals within the zone.

In addition, like in the Patogu lagoon the marine water of the Lalzi site is often visited by dolphins (*Delphinus delphis* and *Tursiopus truncatus*). Fishermen reported that also the Beak whale (*Ziphius cavirostris*) has been spotted in the marine water in Lalzi (see also the Chapter 4). A Sperm whale (*Physeter catodon*) entered 1966 the Lalzi bay and Monk seals (*Monachus monachus*) were regularly observed there (Rakaj, in Tekke, 1996).

## 9.6. The Karpeni aquaculture ponds

Karpeni wetland with a surface of 4.6 km<sup>2</sup> is situated along the coastline (Fig. 9-24) near Karpeni village, in the northwest side of Kavaja lowland, south of Durrësi. Its surface became reduced to 1/10 of the original size after the drainage of the wetlands in 1965. It may be possible that even this remnant wetland will be drained. Despite of the limited area it has its natural merits; a sand belt in the western part separates it from the Adriatic Sea and the Kryevidhi hills surround it in the south. Hydrophyte vegetation offers proper habitats for waterfowl. Drainage channel in the south discharge the waters into the sea and sea water enters the wetland through a narrow land belt, forming also a small lagoon. In its northern part it is shallower, the salinity is higher, plant halophytes flourish.

**Table 9-5:** Number of individuals of wintering waterfowl species in December 2004 at the Palla and the Rodoni capes (Haxhiu and Halimi, 2006).

Scientific name	Common name	Albanian name	Palla Cape	Rodoni Cape
<i>Anas penelope</i>	Eurasian wigeon	Rosa kryekuqe	1030	no
<i>Anatidae</i> (spp. <i>diverse</i> )	Ducks, geese swans	Rosa	950	no
<i>Ardea cinerea</i>	Grey heron	Çafka e perhime	4	no
<i>Calidris alpina</i>	Dunlin	Gjelaci barkzi	40	no
<i>Calidris minuta</i>	Little stint	Gjelaci i vogel	120	no
<i>Calonectris diomedea</i>	Cory's shearwater	Lajmetari i madh i fortunes	no	3
<i>Larus cachinnans</i>	Caspian gull	Pulebardha kembeverdhe	65	no
<i>Larus ridibundus</i>	Black-headed gull	Pulebardha e rendomte	155	no
<i>Mergus serrator</i>	Red-breasted Merganser	Zhytesi i mesem me çallme	no	3
<i>Numenius arquata</i>	Eurasian curlew	Kojliku i madh	180	no
<i>Phalacrocorax carbo</i>	Great cormorant	Karabullaku i deti	2	3
<i>Pluvialis squatarola</i>	Grey plover	Gjeleza pikaloshe	26	no
<i>Podiceps cristatus</i>	Great crested grebe	Kredharaku i madh	3	no
<i>Puffinus yelkouan</i>	Mediterranean shearwater	Lajmetari i vogel i fortunes	no	11
<i>Rallus aquaticus</i>	Water rail	Gjeli i ujit	2	no
<i>Recurvirostra avosetta</i>	Pied avocet	Sqepshpata kembekalter	12	no
<i>Sterna sandvicensis</i>	Sandwich tern	Dallendyshja e detit kembeshkurter	45	no
<i>Tringa totanus</i>	Common redshank	Qurylyku sqepkuq	8	1
<i>Vanellus vanellus</i>	Northern lapwing	Gicvilja, Cinja, Cingla	140	no
no = not observed				

The hydrological regime of the wetland is strongly influenced by rainfall and evaporation. Close to the Karpeni wetland, the Darci drains all the water from the northern part of the Kavaja lowland to the sea, running in a dammed channel in the southern part of the Karpeni wetland. The quality of the river water is determined by the sea tides. About 2.2 km<sup>2</sup> of the Karpeni wetland were originally used as carp farm (Cyprinidae) and became transformed after 1993 to an extensive Shrimp Farm. It is the first semi-intensive exploitation of shrimps (*Marsupeneus japonicus*) in the Albanian coastal wetlands.





Figure 9-24: Air view of Karpeni wetland in Kavaja district (Arapi & Sadikaj, 2006).

The coastal zone from Durresi to Kavaja (southern part of the Durresi bay), with Golemi, Qerreti, Karpeni and Spille became extremely invaded by buildings aimed for bathing tourism (Fig. 9-9). In the last decade, a series of tourist buildings has been constructed from the Currila coast (in Durresi) to Qerreti (in Kavaja), covering the sandy dunes and replacing the planted pine forest. No sustainable planning has been applied and no proper sewage collection was foreseen. As a strong erosion is observed in some parts of the Karpeni-Qerreti coastline, sea barriers have been constructed in 2011. The sandy dunes and the pine belt became drastically reduced. Besides that, other risks of this extreme urbanization are the over- exploitation of resources like fish and mussels, the degradation of water quality, an increase of the pollution level and the demolition of the sea grass meadows.