

### Additional information

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#### General ecological features:

The proposed Ramsar area includes a high variety of habitats: freshwater (lake and river), brackish water (estuary and lagoon), woodland, freshwater marshes, wet pastures, sandy shore and rocky habitats. The vegetation of the area is rich, with 900-1000 plant species.

#### Freshwater habitats

These habitats belong mostly to Shkodra Lake and Buna River.

#### Shkodra Lake

Within the lake surface there is a high variety of habitats and communities. Dominant vegetation types are: 1) submerse macrophytes, dominated by *Potamogeton*, *Myriophyllum*, *Najas* and *Vallisneria*; 2) floating macrophytes, with *Nuphar luteum*, *Nymphaea alba*, *Nymphoides peltata* and *Trapa natans*; 3) reed beds, dominated by *Phragmites australis* and *Typha latifolia*, in association with *Scirpus*, *Sparganium*, *Equisetum*, *Juncus*, etc. The most important plant associations are: *Najadetum marinae*, *Potametum perfoliati*, *Potametum lucentis*, *Potametum natantis*, *Potameto-Najadetum*, *Potameto-Vallisnerietum*, *Myriophyllo-Nupharetum lutei*, *Nymphoidetum peltata*, *Trapetum natantis*, *Phragmitetum australis*, *Scirpo Phragmitetum*, *Typhaetum latifolia*, *Eleochari-Hippuridetum*, *Ludwigietum palustris*, *Leucojo-Fraxinetum angustifolia*. In Shkodra Lake are known more than 685 species of phytoplankton and 350 species of both zooplankton and microfauna. From the macrobenthos are known 39 mollusc species and 35 species of insects. Fish fauna is rich, with 61 species and subspecies. It is dominated by the Family Cyprinidae, with 27 species and subspecies. 13 taxa are marine migratory species and 22 species and subspecies are aloctone (non-indigenous) species. Shkodra Lake is a very important habitat for nesting, feeding and migration of birds. In the Albanian part of the lake and its catchment area have been recorded 236 bird species. The most presented groups are Anatidae, Ardeidae, Falconiformes, Charadriiformes, Lariformes, Passeriformes, Strigiformes. 56 bird species are nesting in that area, from which 11 belong to waterfowls and 45 to non-aquatic bird species. Mammalofauna of the lake and its catchment area consists in 37 species. The most presented are Carnivora (11 species) and Chiroptera (9 species).

#### Buna River

The associations of aquatic plants of Buna River can be divided in three groups. 1) Submerse macrophytes, including mainly species of the genus *Potamogeton*, *Myriophyllum*, *Najas* and *Vallisneria*. 2) Macrophytes with floating leaves, with *Nymphaea alba*, *Nuphar luteum*, *Trapa natans* and *Nymphoides peltata*. 3) Helophytic plants, half-submerse, dominated by *Phragmites australis* and *Typha latifolia*. Plankton is very richer compared to many rivers in the region, because River Buna has an abundant water mass, quiet flow and high quantity of nutrients in the water. The main groups of phytoplankton are Chlorophyta, dominated by *Pediastrum*; Diatome, presented mostly by *Cyclotella* and *Synedra*; Cyanophyta, with predomination of *Microcystis* and *Merismopedia*. In the eutrophic parts, during hot season, is found an abundance of *Oshillatoria* and *Navicula*. From macrobenthos, the most known are molluscs with 18 species. Ichthiofauna of Buna is very interesting, with 70% dominance of cyprinids. There are known 30 freshwater fish species of Buna (excluding its delta) and 13 migratory species and subspecies from Shkodra Lake to the sea and vice-versa.

Buna River plays the role of a migrating corridor for the ornithofauna of the area, closely linked with Shkodra Lake and Velipoja area. In the river basin 170 bird species have been recorded, including waterfowls and non-aquatic birds. The half of this number belongs to Passeriformes. High species number belongs also to Falconiformes and Anseriformes.

#### Brackish water habitats

These habitats include the Coastal Lagoon of Viluni and Buna Delta.

Aquatic macrovegetation of the Viluni Lagoon is relatively poor. It is dominated mostly by *Zostera noltii* and in some small parts is present also *Ruppia cirrhosa* and *Cymodocea nodosa*. From green macroalgae, the most present are *Chaetomorpha*, *Cladophora* and *Enteromorpha*. Hydro - hygro and halophylic vegetation is characterized by a relatively high number of species. Its associations are mostly dominated from *Potamogeton*, *Ceratophyllum*, *Phragmites*, *Pycreus*, *Alisma*, *Butomus* and *Typha*. From macrobenthos, there are known 21 mollusc species. Ichthiofauna of the lagoon is rich, due to the active communication with the sea. The most common species are those which are also most known for their commercial values: *Mugil cephalus*, *Liza ramada*, *Liza saliens*, *Anguilla anguilla*, *Dicentrarchus labrax*, *Sparus aurata* and *Solea vulgaris*. Periodically common are also *Chelon labrosus*, *Diplodus sargus sargus*, *Lithognathus mormyrus*, *Atherina hepsetus*, *Gobius bucchichi*, *Mullus barbatus*.

The most evident characteristic for the communities of Buna Delta is the high diversity of fishes. This is mostly linked to the high abundance of organic matter and nutrients transported to the river mouth. In Buna mouth at least 50 fish species have been recorded. Both Viluni Lagoon and Buna Delta are important feeding and nesting habitats for some bird species of international concern, such as Pygmy cormorant (*Phalacrocorax pygmeus*), Sandwich tern (*Sterna sandvicensis*), Kentish plover (*Charadrius alexandrinus*), Common redshank (*Tringa tetanus*).

#### Woodland

Woodlands of the relevant area consist in alluvial forests in Buna banks, mostly along its downstream, mixed forest of Velipoja Reserve, coastal pine forest of Velipoja and Viluni and freshwater wood in the east coast of Shkodra Lake. Key species of the most important associations of alluvial forests of Buna and mixed forest of Velipoja belong to white poplar (*Populus alba*), tamarisks (*Tamarix parviflora*, *Tamarix hampeana*), willows (*Salix fragilis*, *Salix alba*), alder (*Alnus glutinosa*), narrow-leaved ash (*Fraxinus angustifolia*) *Vitex agnus castus*, *Ulmus campestris*, *Rosa sempervirens* etc. Coastal pine forest is composed by stone pine (*Pinus pinea*) and aleppo pine (*Pinus halepensis*). Freshwater woods in the east coast of Shkodra Lake are mostly composed by several species of willows (*Salix alba*, *S. purpurea*, *S. fragilis*, *S. pentandra*, *S. incana*), tamarisk (*Tamarix parviflora*), white poplar (*Populus alba*) and narrow-leaved ash (*Fraxinus angustifolia*). These woodland areas are the most important nesting and feeding habitats for the bird species, such as Falconiformes, Passeriformes, Ciconiformes, especially Ardeidae. These woods are almost the only remained habitats for big mammals, like jackal (*Canis aureus*), fox (*Vulpes vulpes*), badger (*Meles meles*), rabbit (*Lepus capensis*) etc.

#### Freshwater marshes

The majority of freshwater marshes are created from Buna River. The most important are those of Pentari, Çasi, Murtemza, Domni and those in the Velipoja Reserve. They have a rich vegetation, composed by floating meadows dominated by *Nymphaea alba*, *Nuphar luteum*, *Hydrocharis morsus-ranae*, *Trapa natans* etc., submerged species as *Myriophyllum spicatum*,

Ceratophyllum demersum, Potamogeton pectinatus and helophytic species, such as Phragmites communis, Typha latifolia, Schoenoplectus lacustris, Cyperus longus and green macroalgae. These marshes are important habitats for fish spawning. A considerable number of bird species use these marshes for shelter and food, especially during their migration. Herpethofauna of these habitats is very interesting, with a high diversity of species.

#### Wet pastures

Wet pastures cover a huge surface in Velipoja area, Pentari, Gjo Luli, Domni and east coast of Shkodra Lake. These pastures are continuously flooded. They are the most important grazing habitats for domestic animals of the area. They are also important feeding habitats for many bird species, some of them of international conservation concern: Ardea, Egretta, Larus, Charadrius, Platalea, Motacila Emberizia, Lullula and many falconiforms of Aquila, Circus, Circaetus, Accipiter, Falco, Pandion, Buteo, Milvus.

#### Sandy shore

Sandy shore covers the coastal area from Buna mouth in the west to Viluni Lagoon and Baks-Rrjollli area in the east. Psamophytes plant associations are dominated by Amophila arenaria, Lagurus ovata, Medicago marina, Pancratium maritimum, Atriplex hastata, Agropyrum junceum, Eryngium maritimum. In that habitat nest several bird species, such as Himantopus himantopus, Haematopus ostralegus, Glareola pratincola, Sterna albifrons, Burhinus oedicnemus, Caprimulgus europaeus and especially Charadrius alexandrinus and Charadrius dubius.

#### Rocky habitats

Rocky habitats belong to Taraboshi Mountain in the western coast of Shkodra Lake and Rrenci Mountain in the southeastern part of the proposed Ramsar area. Their composition is calcareous – karstic with a poor vegetation of woods and shrubs where grow few species, such as: Brood-leaved mock (Phillyrea latifolia), Olive-tree (Olea europaea var. europaea), Macedonian oak (Quercus trojana), Christ's thorn (Paliurus spina-christi), Wild Pomegranate (Punica granatum), but rich with herbs vegetations of meso- and xerophytes. The most significant bio-ecological feature is the role of Rrenci Mountain as a migration corridor for the big mammals of the Montenegrin side of Buna area toward Adriatic Sea in Albania. So, it plays the role of a natural bridge for terrestrial animals who cross Buna River (brown bear Ursus arctos, jackal Canis aureus, wolf Canis lupus, wild bore Sus scroffa, fox Vulpes vulpes). These mountain areas have suitable habitats also for falconiform birds and other species who need to be far from human presence.

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#### **Physical features of the site:**

The proposed Ramsar area has a surface of 49.562 ha. It comprises a wide variety of landscape features: seacoast, lake, river, coastal lagoon, freshwater marshes, alluvial forests, pastures, karst hills etc. It concerns a Mediterranean Climate situation. The main wetland area comprises Shkodra Lake, River Buna with its delta, Velipoja forest, Viluni Lagoon and a system of freshwater marshes (Domni, Murtemza, Pentari).

Shkodra Lake is situated in the lower part of the Shkodra rift, between Taraboshi Mountain, Field of Mbishkodra (Fusha e Mbishkodres), Field of Podgorica (Fusha e Podgorices) and Shkodra town. The lake is surrounded by carstic calcareous formations and dolomites of Palaeozoic, Mesozoic and Tertiary. The area is characterized by an active tectonic process.

Origin of the lake is tectonic-karstic, during Tertiary or Quaternary. Shkodra Lake is the biggest lake in Balkan Peninsula, with a surface of 36.800 ha, from which 14.900 ha belong to Albania. Maximal surface of the lake reaches 54.200 ha. Maximal length of the lake is 45 km and maximal width 26 km. Its perimeter is 207 km, from which 57,5 km belongs to Albania. Average depth of the lake is 8 m, while maximal depth in the Albanian part is over 40 m in the karstic holes called “Syri i Sheganit” and “Syri i Virit”. The small depth and wide oscillation of water level do not enable the development of littoral, sublittoral and abyssal zones of the lake. Water surface of the lake is situated 5,6 m over sea level. River Buna is the only emissary of the lake, discharging 320 m<sup>3</sup>/sec from the lake. Fluctuation of water level is 5m. In a morphological point of view the coast of the lake consists in two main types: (i) abrasive coast, in the west side and (ii) accumulating coast in the east side.

River Buna springs from Shkodra Lake, in its southeastern part and has a length of 44 km. It pours in the Adriatic Sea, forming a typical delta. The river is shared between Albania and Montenegro from the village Samrish (Alb.) and Gorica (MN) up to its mouth. In its delta is created Ada Island which divides the river in two branches flowing to the sea. Ada and the west branch belong to Montenegro. The east branch of the delta is shared between the two countries. In the Albanian side of that branch is situated the Franz Joseph Island (4,5 ha) with a variable shape and size. In a distance of 1,3 km from its spring, Buna is connected with River Drin (which springs from Ohrid Lake and Kosovo). This connection defines the water regimen of Shkodra Lake, River Buna and its delta. Buna discharges from the lake 320 m<sup>3</sup>/sec, but after its connection with Drin the amount of water discharge reaches 680 m<sup>3</sup>/sec. Buna has a small depth, especially in the first 12 km in the upstream where are some small islands. In waving regimen mostly influence the winds at a speed of 10 – 20 m sec. The average amplitude of daily variation of the water level is 20 – 30 cm. Sea currents vary at an average speed of 0,2 – 0,3 m/sec.

Velipoja area includes Delta of Buna, Velipoja beach, Velipoja forest, Viluni Lagoon, a system of freshwater marshes (Domni, Murtemza, Pentari), pastures and arable land. Development of Velipoja complex could be described as a dynamic short and long – term process based on: high sediment loads of the mountainous catchments of the Drin River, hydrographical variability of the Shkodra Lake and the Drin River, marine variability and littoral zone based on short-term events (storm waves and tides) and long-term processes (sea transgressions), tectonic changes such as uplift and abatement (several earthquakes are recorded for the area). The low tidal currents in the Adriatic Sea (about 20 cm) as well as the high sediment load of the Drin River support the delta formation whereas the delta growth with 1-1,5 km in the last 100 years is relatively low compared with other Mediterranean deltas. Velipoja forest is a natural reserve of alluvial mixed forest, with a surface 638 ha. There are 4 marshes within the forest. Their depth varies from 0,4 m in summer to 1,6 m in winter. Hydrology of that marsh system is interesting and influenced directly by the regimen of Buna River. Viluni lagoon has a surface of 380 ha, longitude 3 km and width 0.9 km. This lagoon represents the remained wetland area from the degradation of former wetland complex of Viluni, Mërtemza, Luarzi, Pentari, Reçi etc. The water of Murtemza channel pours into the lagoon. This channel collects the waters from the field of Nënshkodra. The amount of water running from this channel to the lagoon varies according to the seasons. Lagoon is connected with the sea through a 300 m long channel, which is never blocked. The average depth of the lagoon varies from 0,8 to 1 m, but in some sectors it reaches 2 – 3 m.

**Physical features of the catchment area:**

In the Albanian side, catchment area of Shkodra Lake has a surface of 1025 km<sup>2</sup>. The average altitude of the catchment area is 770 m. Geological formation consists in calcareous rocks, dolomites and pebbles of Quaternary. As a result of calcareous formations and abundant rainfall carstic processes are widely developed. Surface hydrographical net is reduced. The downstream of the torrents, such as Perroi i Thate, Perroi i Vrakes and Perroi i Rrjollit are dried for almost the half of the year. River Cemi flows from a very high mountain region (Kelmendi) and pass the border toward Morača River in Montenegro, which is the main tributary of the lake and covers 2/3 of its catchment area. Soils are mainly brown, with subtypes of pasture-brown, reddish-brown and humus carbonatic. Around the lake the yearly average rainfall is 1600 – 2000 mm, while in the mountain area 2500 – 3000 mm. 75 – 82 % of the rain falls during May – October. Average temperature of the air around the lake is 14 – 16°C, while in the mountain region of the catchment area 2 – 10°C.

Buna River, in a distance of 1,3 km from its spring in Skadar Lake, is connected with the River Drin, which has a length of 285 km. The main branches of Drin are Shala River in Albanian Alps, Valbona River in north-east of Albania, White Drin in Kosovo and Black Drin in Macedonia. The last one springs from Ohrid Lake, which provides its water from Prespa lakes. River Kiri which flows from Dukagjini highland is connected also with River Drin. Obviously, the River Buna takes water from a very complex hydrographical net, which lies almost in the 1/5 of Balkan Peninsula, in Albania, Montenegro, Kosovo, Macedonia and Greece. The average altitude of this catchment area is 909 m. A high number of streams runs from Anamali side to Buna, where the longest is the Stream of Milla (25 km) and the second is the Stream of Megjureç (21,6 km). In Buna flows also the water from Lake Shasi in Montenegro, through Vija e Shengjergjit.

The population in the Ramsar proposed area and its catchment area is 180.000 inhabitants, where over 120.000 belong to Shkodra town. The main activities are agriculture (crops, vegetables, fruits), livestock raising (cattle, sheep, goats, pigs, horses) fishery (Shkodra Lake, Buna River, Viluni Lagoon) and tourism (Velipoja Beach, Shkodra Lake, Buna River, Shkodra town, mountains).

**Noteworthy fauna:**

Shkodra Lake – Buna River – Velipoja area has a very rich fauna, including species of national and global conservation concern. According to national and international inventories and existing bibliographical data, in the relevant area have been recorded 216 fauna species with national unfavorable conservation status and 36 fauna species with global unfavorable conservation status, as following:

<b>Fauna groups</b>	<b>Species of National Conservation Concern</b>	<b>Species of Global Conservation</b>
Molluscs	34	1
Insects	13	2
Fish	44	14
Amphibians	11	1
Reptiles	10	1
Birds	88	9
Mammals	16	8
<b>Total</b>	<b>216</b>	<b>36</b>

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**Ecosystem Services****Hydrological values:**

Connection Shkodra Lake – Buna River – Drin River has a very important role in the aspect of hydrological values. Shkodra Lake serves as a retention basin for surplus waters coming from its mountainous catchment area. In its southeastern edge, River Buna plays the role of a drainage channel evacuating the surplus waters from the lake. In this way Buna prevents and reduces the risks of heavy flooding of the area around the lake. Buna plays the same role also for River Drin and its catchment area, at least in its downstream. Alluvial forests in Velipoja area with their marshes, surface and underground communication of Buna with a system of marshes and Viluni lagoon serve as discharging basins for Buna waters, keeping the water balance and reducing the flood.

Lake Shkodra, Viluni lagoon and marshes in the southern part (Velipoja) of the proposed Ramsar area serve as retention basins for sediments and nutrients that are used by wetland vegetation. Different domestic animals and fish use this vegetation as a major food resource. Buna and Drin rivers, by bringing sediments down from the neighboring mountain region, help in the advancement of the shoreline and the retreat of seawaters. This retreat reduces the influence of seawaters on inland aquifers and helps in the desalinization of the agricultural land.

This hydrologic net has important climatic values, too. Yearly average temperature of the water of Shkodra Lake is 1,4C° higher than yearly average of air temperature. That means that the lake plays a mitigation role in the thermal regime of the area. Floodplain forests, especially in the Buna downstream and Velipoja reserve transpire into the air a big amount of water, purifying it at the same time. Apart from it, they have a significant impact on agriculture. The characteristic Mediterranean summer droughts in Velipoja area are mitigated by the strong evaporation of water from floodplain forests. This helps local community and its domestic animals to overcome the dry and hot summer.

**Current land (including water) use:**

(a) within the Ramsar site:

The majority of the land is used for agriculture and livestock raising. A considerable surface is sown by cereals, different vegetables and fruits, vineyard, olive trees, etc. A large area (c. 5000 ha) has the characteristics of wet pastures and is exploited almost for domestic animals only, such as Fusha e Pentarit, Fusha e Gjo Lulit, Keneta e Domnit, Fusha e Velipojes, Livadhet e Shkodres and the east coast of Shkodra Lake. A big amount of sheep, cows, horses, goats and pigs graze on those pastures. These pastures area regularly flooded and overgrazed on at list 75% of the surface. 25% of the area is mown and then grazed for nine months. Most of the domestic animals migrate with the shepherds from the surrounding areas with cold winter.

Fishery has been mostly concentrated in some villages in the coast of the Shkodra Lake, Buna River and Viluni Lagoon. Recently, fishing is uncontrolled and exact statistics do not exist. In the early 80' fish yield in Shkodra Lake has been 50 kg/ha per year, while in Viluni Lagoon the yearly average yield was 20 t for eel, 38 t for grey mullet and 8 t for sea bass. Actually,

fishing is an activity for less than 10% of the families living near the coasts. Aquaculture is almost undeveloped in the area, except any very small private fishpond near the lake and Buna. In village Reçi (Buna downstream) there is a fishpond area of 114 ha, which has been used until 90' for freshwater fish farming, taking water from Buna River. The production has been stopped some years ago. The aqueduct and system of channels have been destroyed, but most of the basins large fishponds are still filled with shallow water of underground character.

Tourism has been developed mostly on the west side of Shkodra Lake and Velipoja beach. Shiroka and Zogaj are known as old tourist sites, with a small capacity (actually 400 – 500 beds), while Velipoja started to be used as an important summer tourist site since 1970, with the actual capacity of 2000 beds. Number of daily tourists is very high during the summer, even in Buna and Drini sides. During the maximal capacity period (July-August) in Velipoja coast the number of tourist can reach 20.000 per day. Generally in the area, tourist settlements are of small and medium size. Last years in Velipoja coast tourist settlements are hugely expanding in its northern part and toward Viluni Lagoon in the west.

(b) in the surroundings/catchment:

In the surrounding Ramsar proposed area (in its east) the majority of the land is similarly used for agriculture and livestock raising. Crop products, cereals, vegetables, vineyard and other fruits cover the most part of agricultural land. Large areas are used as pastures for domestic animals: sheep, cows, horses, goats, pigs and donkeys. Milk products, wine, honey, leather, silk, wool and meat products from domestic cattle and birds are important economic resources for the community. In the hill and mountain areas, especially in the western and northern part of Shkodra Lake, woodlands and shrubs cover a considerable part, which are used from the local community for fire or as building and industrial material.

### **Social and cultural values:**

The proposed Ramsar site covers a well-known area for its natural richness, old civilization and historical significance. Hydrographic map of the area corresponds to the population distribution map, what means that the hydrographic developments of the area are reflected in the demographic developments. The population within the Ramsar proposed area is 160.000 inhabitants, where over 120.000 belong to Shkodra town. The main activity of the local community in the villages is agriculture and livestock raising. Traditional economy is appreciated for crops, cereals, potatoes, bean, different vegetables and fruits, olive oil, wine, milk and meat products, honey, leather, silk, wool etc., for its own necessities of the population, but also for trade within the country. Raising of cattle, sheep, goats, pigs, horses and donkeys it's an old tradition of the community. There are several old breeds of domestic animals in the area, what increases its biodiversity and touristic value.

Although not much developed, fishery is an important activity for several villages in the coast of Shkodra Lake (Shiroka, Zogaj, Sterbeqi, Kamica, Flaka), Buna River (Oboti, Samrishti, Reçi, Pulaj), Velipoja coast and Viluni Lagoon. Tourism has been developed mostly on the west side of Shkodra Lake (Shiroka and Zogaj) and Velipoja beach. Recently, tourism is expanding along the whole hydrographic net. The high diversity of habitats, as well as natural and cultural potentials of the area offer a high variety of tourism types: balneary, safari, rural, mountainous, cultural etc.

Shkodra (Skadar, Scutari) with an over 2000 years history, is a well-known town in regional level. It has been known in Southern Europe for the navigation and commerce through Buna to Adriatic Sea and for his high level of culture and civilization. Rozafa Castle, with its famous legend and architecture, built at the entrance of Shkodra, represents a precious historical and cultural monument. Its Illyrian walls and archeological sites around are testimony of the old civilization of Shkodra. Ruins of antic dwellings have been found also in Koplík area (east coast of Shkodra Lake), Shiroka (south-west coast of Shkodra Lake) and Pulaj (Buna downstream). In the village Shirq (Buna middlestream) exists a remained wall and cemetery of a 600 years old catholic church, which is still a peregrination site for the people of surrounding villages. Three main religions of the relevant area are muslim, catholic and orthodox, with the dominance of the first one. Influence and coexistence of these three religions have let important traces in the development, history, art and culture of Shkodra, what makes that town attractive in many aspects.

Surrounding area of the proposed Ramsar area, especially in the eastern and northern side of Shkodra Lake, offers possibilities also for mountain tourism and winter sports, as it includes high mountains. This type of tourism is not often practised in that area.

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**Factors (actual or likely) adversely affecting the Site's ecological character**

The proposed Ramsar area, especially Velipoja area, experienced big changes during 1950 - 1960 through the drainage of a huge marshland area for creating new agricultural land. The same phenomenon happened with the forests in the coasts of Buna and Shkodra Lake. These actions resulted in loss, degradation and fragmentation of habitats and impoverishment of flora and fauna. After the changes of the communist regime in 1991, a new negative phenomenon appeared: degradation of administrative structures leading to uncontrolled development and illegal practices.

The main impacts on the ecological character of the area are:

**Land reclamation**

This process covered a huge area, especially in Velipoja and Buna fields. Marshes which were taking water from Buna, such as the system of Pentari, Çasi, Murtemza, Domni and Viluni have been dried up in a considerable part of their surface. These processes continued until near 1970. Many alluvial and freshwater forest areas in the coasts of Shkodra Lake and River Buna have been also transformed in agricultural land. The loss of wetland areas was accompanied with the extinction or high reduction of certain species.

**Development of agriculture**

The new agricultural lands were intensively used for crop production and grazing. The pressure from overgrazing is very high. The impact of the agriculture development on the biodiversity of the area is increasing, especially from the use of fertilizers and introduce of non-indigenous agricultural plants and domestic animals. It has damaged the natural habitats and indigenous flora and fauna.

**Changes in water regime**

Since River Drin started to pour in Buna River (more than 100 years ago), Shkodra Lake has a very sensitive regime. In big water discharge periods, Drin blocks Buna while taking water from the Lake and for this reason the surface of the lake highly increases, up to almost its

double. Meanwhile Buna was filled with sediments from Drin. This has reduced marine migratory species in Buna and Shkodra Lake. Last 30 – 40 years several Hydro Plants have been built on the River Drin (Fierza, Vau i Dejes, Komani) and a new one was recently approved (Bushati). Their dams have reduced the sediment flow to Buna, what has a strong impact to Buna delta. Sea erosion is highly increasing and a considerable coastal area is loosing. A good example for this might be the Franz Joseph Island (4,5 ha) in Buna delta, which is expected to disappear in a near future.

#### Deforestation

A considerable area of alluvial forests in Buna, mixed forest in Velipoja, oak and willow forest in Shkodra Lake coasts was destroyed, mainly through drainage and creation of agricultural lands. Deforestation is still continuing for taking wood for fire or industry, as well as for opening new grazing areas. Macrophyte vegetation is also damaged in the coasts. They are the most important producers of the aquatic ecosystems, shelter for many fauna groups and reproducing habitats for many species. Damage of forests and macrovegetation has destroyed not only the flora and fauna but also soil nutrients and has increase erosion.

#### Tourism development

The actual development of tourism is problematic, as the natural values have not been preserved in time. Most critical is the situation in Velipoja, where building of houses and tourist settlements impact directly the seascape. The impacts include off-road car running along the beaches, new roads and trails built to reach remote parts of the dune landscape, water pollution, solid waste and sewage. (Local government of Shkodra is preparing a construction plan for tourist settlements in Velipoja beach and Shkodra Lake Coast and management of territory in those areas).

#### Fishing

Fishing is uncontrolled in the majority of the area. Closing of the mouth of Buna in Shkodra Lake and estuary of the Viluni Lagoon by nets and hindering migration of fish is an unsustainable use, which threatens the fish populations and reproduction of several species. There are no protection measures for fish migration form the sea to Shkodra Lake and vice-versa. Using of explosives for fishing is still a serious problem for the area. There are no protected areas for spawning. Nets are seen all along the coasts and inside the wetlands. Information on fish stocks and use is very scarce. The number of local people who practices fishing is increasing. Number of restaurants and tourists, which have to be supplied by fresh fish from the area is also growing. (Inspectorate of Fishing in Shkodra has the responsibility for controlling and managing fishing activities, but its role has been weak and unsupported from other state institutions).

#### Hunting

Illegal hunting is often practiced in the area. Hunting season is not respected and hunting occurs during the whole year. Usage of automatic guns and hunting of protected species is a problem of great conservation concern. The capacity of the area for breeding and migrating birds is already strongly limited by the hunting impact and degradation of habitat. Populations of birds and mammals are hugely decreased. The value of the area for tourism is also decreasing, as the attractive species are not visible there.

#### Pollution

Solid waste is a problem at all waters in the relevant area, as it is shifted with the currency. Solid waste is transferred through the tributaries to Lake Shkodra and through the Buna River

to the Adriatic Sea. Riverbanks, coast of the lake and the large coastal dune and beach areas are covered by solid waste. More critical is the situation during July-August, when the area is frequented by a very high number of tourists. The wastewater is another urgent problem for the area. Sewage and industrial waters of Shkodra, as well as the chemically polluted waters from agriculture of the adjacent areas are directly poured in the lake, Drin and Buna without any preliminary elaboration. These pollutions are endangering the tourist destinations at the coast. The lack of adequate facilities and improper management leads to an increasing water pollution. This impact is increasing also by the fast rising of inhabitants and tourists number.

#### Human disturbance

Human disturbance is closely linked to the uncontrolled development in the area. Human disturbance is very high and a serious contributing factor to the reduction of biodiversity values. It is expressed through the overall presence of humans in every natural and semi-natural, aquatic and terrestrial habitat. As a result, the density of many animal populations has been strongly reduced. A good example for the impact of human disturbance is the fact that many bird species, which feed in the Albanian part, nest only in the Montenegrin part of Shkodra Lake and Buna delta. Illegal methods of fishing and hunting are also a major source of disturbance.

#### Introduced species

In Shkodra Lake, 22 fish species and subspecies (more than 1/3 of all fish species and subspecies of the lake) are alloctone. Half of them have been introduced by humans last 30 – 40 years. Many of them are exotic species, which reproduce artificially, but the populations of some others like *Carassius auratus gibelio*, *Perca fluviatilis* and *Pseudorasbora parva* are highly increased and are dominating the indigenous (autoctone) fish populations of the lake. These introductions have negatively impacted the population structures of the most important fish species of economic and genetic diversity interest, such as cyprinids, especially the native (autoctone) *Cyprinus carpio*.

#### Low level of environmental education

Like generally in the wetlands and protected areas of Albania, the protection of biodiversity is difficult because of the low level of public awareness on environmental issues. Many habitats and species are endangered due to a lack of knowledge and appreciation of their importance to the overall environmental well-being of the area and their importance to the future tourism development.

(b) in the surrounding area:

In the surrounding area the main impacts on the ecological character are generally similar to them of the proposed Ramsar area. As in the surrounding area tourism development is lower, human disturbance is also in a lower level. However, in the surrounding area of the proposed Ramsar area many critical factors have a negative impact, such as: land reclamation, development of the agriculture, deforestation, changes in water regime (especially linked with Drin and Buna rivers), hunting, pollutions and low level of environmental education.

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### **Key Conservation measures**

#### **Conservation measures taken:**

As regards to the management of the area, several proposals have been designed from the local and central government, NGO-s, in collaboration with scientific institutions. Many of them derived from small projects during 1992 – 2001 (see 32. Bibliographical references).

These projects served as a good database on biodiversity values, environmental situation, legal framework and management practices for Shkora Lake, River Buna, Velipoja Reserve and Viluni Lagoon. In most cases, those proposals were treated separately, not for the whole area. Some of them have been integrated in the Regulation and Urbanization Plan of Shkodra (including Shkodra Lake coasts), designed in 1998.

The most complex project dealing with protection and management practices, which is under implementation since 2000 is the REReP project "Promotion of networks and exchanges in the countries of the South Eastern Europe" (SDC, REC). This project promotes transboundary collaboration between Albania and Montenegro in environmental issues, focused on Shkodra Lake area. Up to now there are prepared a Bibliography on Shkodra Lake, Report on risks and potentials, Biodiversity database, Study on roles and responsibilities of Shkodra Lake stakeholders, many capacity building activities are organized in the level of trainings, workshops and seminars, aiming cross-border cooperation.

Cooperation in government level between the two countries is becoming more active and two memorandums for cooperation in the field of environment protection and sustainable development principle implementation between the Ministry of Environment of the Republic of Albania and the Ministry of Environment and Physical Planning of the Republic of Montenegro have been signed (see material attached).

#### **Current conservation education:**

The proposed Ramsar area offers excellent natural possibilities and capacities for an organized infrastructure with several centres of education for tourists and scholars. For this purpose, a system of trails and hides, suitable boards and guides has to be developed in order to give access to the visitors and minimize the disturbance to the wildlife in the same time. The visitors could be acquainted with many items, such as: site's history, land reclamation, formation processes of the main wetlands (e.g. Shkodra Lake, Delta of Buna, Viluni Lagoon), ecological demands of the most known animal groups, migration of fish and birds, old characteristic breeds of domestic animals of the area, grazing impact on the area's vegetation, benefits of the local community from the sustainable use and wise management of the natural resources etc. The relevant area is also very suitable for an international naturalist centre. Its permanent tasks would be local management and formation of nest-sites for fauna, guidance, control, monitoring, etc.

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