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PROJECT: " FINALIZATION OF PROTECTION STUDY FOR ULCINJ SALINA"

PROTECTION STUDY FOR ULCINJ SALINA – FINAL VERSION

Prepared by Mr. Andrej Sovinc, Mr. Davorin Tome, Mr. Michael Hosek

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Ulcinj salina, Jezero 1 photo: D.Tome

List of abbreviations

CZIP	Center za zastitu i proucavanje ptica Crne Gore
DEG	German Investment and Development Company
EUD	Delegation of the European Union to Montenegro
EC	European Commission
EN	Endangered (IUCN Red List Categories)
EPA	Environmental Protection Agency
EU	European Union
GIS	Geographic Information System
IBA	Important Bird Area
ICCA	Indigenous and community conserved area
IPA	Instrument for Pre-Accession Assistance
IUCN	International Union for Conservation of Nature
IWC	International Water bird Census
MA	Ministry of Agriculture
ME	Ministry of Economy
MF	Ministry of Finance
MoSDT	Ministry of Sustainable Development and Tourism
NGO	Non-governmental Organisation
NT	Near Threatened (IUCN Red List Categories)
PA	Protected area
PENP	Public Enterprise Nacionalni Parkovi
PPA	Private Protected Area
PUP	Spatial Plan for the Ulcinj Municipality
RAPPAM	Rapid Assessment and Prioritization of Protected Area Management
SPEC	Species of European Conservation Concern
TBA	To be announced
ToR	Terms of Reference
SCI	Site of Community Importance
SDF	Standard Data Form
SPA	Special Protection Area
SWOT	Strengths, Weaknesses, Opportunities, Threats analysis
UM	Ulcinj Municipality
VAT	Value added tax
VU	Vulnerable (IUCN Red List Categories)
YTD	Year to date

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Summary

Ulcinj salina is situated in the outermost southern part of Montenegro and covers slightly less than 14.5 km^2 of salty basins (total surface area is 1.477 ha). The salina is 1 km from the city of Ulcinj and from the Albanian border.

Ulcinj salina is located on the site of the former lagoon and wetland in the delta of the River Bojana. The works on amelioration of the former wetland area started in 1913. That is when the wetland was connected with the sea by the Port Milena channel and isolated itself from the Bojana River with a dike. In 1920 the decision to start with the establishment of the salina in Ulcinj was made. The salina was concluded in 1934 and the first harvesting of salt was done in 1935. The Ulcinj salina was created from the sea and represents a "cultural lagoon" and a man-made landscape. It is surrounded by channels that drain the nearby marshes and “knetas” (adjoining marshlands), not allowing their water to mix with the water from the salina. The channels take the water into the Port Milena canal and then into the sea.

The technological process of production was upgraded in the 1970s with construction of the refinery and with attempts to expand the production, both by enlarging the territory of the salina and use of industrial production between 1984 and 1994. Yearly production of salt before the above-mentioned attempts to expand the production (in the period 1935 to 1983) was highly dependent on the weather conditions and organisation of work; a maximum of 41.240 tons of salt was produced in 1952. A combination of manually collected salt and the salt produced through industrial process in the newly constructed factory in the years 1984 to 1994 led to a maximum yearly production of 59.353 tons. By contrast, the production in the last years of production (2003 to 2013) was dramatically lower, reaching on average only around 17.000 tons per year.

Ulcinj salina has very hot summers, moderately warm autumns and springs, and mild winters with temperatures only rarely below zero. On average, the most rain falls in autumn and winter, summers are two to three times more dry. Year-on-year and within years, changes in the amount of rain can be significant. Powerful pumps are essential for assuring constant water levels in basins which supports the maintenance of the ecological character of the area. The absence of salt production and consequent changes in water management have caused changes in water salinity, water regime and consequently changes in biodiversity.

We compiled data on 201 taxa of plants present in the salina, but this list is far from being comprehensive. Three habitat types based on the composition of different halophyte species are listed in annex I to the EU Habitats Directive; hence, they are important on EU level. Habitat type Coastal lagoons, characterized by the presence of *Ruppietea maritimae*, is classified as the priority habitat in Annex I to the EU Habitats Directive. It is widespread in many basins, predominantly in Jezero 1 and Jezero 2, where water is present year round. The Crystallization area was without vegetation during the period of salt production. Today, five years later, about one third is covered with vegetation. Without management (or salt

production), this succession will go on, until **all basins are overgrown**, and one of the key biodiversity values of the area will be lost.

About 250 species of birds were recorded in Ulcinj salina, which is about half of the regularly occurring birds in the EU. Among them, 60 are numerous and/or frequent, 69 are rare and/or infrequent, but still important for the area, the rest are occasional and less important visitors/breeders. The Greater flamingo is a typical flagship species, which should receive the greatest conservation attention. Regular and numerous breeders are Black-winged stilt, Stone curlew, Collared pratincole, Kentish plover, Little tern and Common tern. For some of them, the salina is the most important breeding ground in the region. The Little egret, Spoonbill, Pygmy cormorant, Redshank and Spotted redshank are important for being numerous and present year round, although they do not breed or breed only in small numbers and irregularly. Ulcinj salina is important for birds on migration, in particular for waders and ducks. Over 100.000 waterbirds are estimated to stop in spring and autumn at least for a day, to feed and rest. During the winter up to 15.000 birds are present daily. **All the aforesaid renders Ulcinj salina of significant international importance; moreover, give these parameters, the salina easily fulfils the criteria for listing as a Ramsar site.**

Over the last 15 years, there have been **some dramatic changes in the bird community**, caused mostly by abandonment of salt production in 2013 and the consequent lack of management. Breeding birds suffer from unpredictable changes of water levels during breeding season. In some years, excessive precipitation caused nests and young birds to drown, in dry years, when all water form basins evaporate, breeding areas become exposed to predators. Flamingos, Little terns and Common terns are in a danger of becoming ex-breeders of the area. During the winter, the number of birds remains more or less constant, but there has been a significant change in abundance of some birds. In recent winters, the number of ducks exceeded the number of waders, which is exactly the opposite of what it used to be. The number of Coots during the last five winters increased 30 times, which is an indication that parts of the once shallow salt or brackish water ecosystem are **changing into deep freshwater lakes.** This is most likely a consequence of the absence of management of waters and salt production, which has caused water levels during the winter to be higher and salinity lower than it used to be.

Besides birds, the importance of other vertebrates in the area is moderate. Lacking places to hide and reproduce is probably a limiting factor for mammals, relatively small area of permanently dry surface for reptiles and lack of fresh water for amphibians. Fish can be numerous. Their taxonomic composition probably depends largely on influx from sea and adjacent rivers.

Waters in Ulcinj salina are filled with two lower crab species, one from the group Amphipoda, the other from the group Isopoda. They are so numerous that they **can be considered as a key species for this ecosystem** – they are a food source directly or indirectly influencing all other animals. The population of brine shrimps, on the other hand, have disappeared or at least their abundance has declined to below the level of detection, possibly due to lack of management of the water regime. Amphipod and Isopod crabs can survive and reproduce in

waters of different salinity, but drying of the basins reduces their abundance, which has a negative impact on the presence of all other animals.

According to findings in this report, **Ulcinj salina is an internationally important biodiversity spot**. It fulfils 6 out of 9 Ramsar criteria and it has at least 11 bird species and four habitat types which can be specified as qualifying for Natura 2000 network of sites. It has to be noted, however, that securing favourable conservation status of species and habitats and the ecological character of this internationally important wetland is crucially dependent on management of the site and maintenance of the appropriate water regimes, **which has to be restored quickly or the area will lose its biodiversity value**.

Based on benefit transfer, the total economic value can be estimated at 5 842 016 EUR annually. That means that every year the broader area of Ulcinj salina of 9,969 hectares provides the regular flow of ecosystem services nearly 6 million EUR according to this quite conservative estimate. This is an average value of ecosystem benefits of 586 EUR/ha. The value estimate is based on the various estimates of ecosystem services benefits for all categories of ecosystem services, including provisioning, regulating and cultural benefits. The estimate of total value has to be considered a minimal and conservative estimate, because the applied method for assessment of the ecosystem services do not incorporate local specific benefits.

For adequate zoning purposes, we propose that the future protected area of the salina be divided into four areas, each serving a different purpose (see the map below):

In the **nature protection priority area** (red line), all will be subordinated to protection of nature. In particular, during the breeding season this means no human activities. Basins, dikes and water level will be managed in accordance with the needs of nature. But still, the area can

be used in an extensive way for salt production, too i.e. the basins can be used for concentration of water and similar activities.

In the **salt production priority area** (yellow line), all will be subordinated to salt production, but since this will still be a part of the protected area, nature-friendly ways of production will be always considered first in particular if they will not cause additional costs in production and if they will not reduce considerably the amount of salt harvested. Basins, dikes and water level will be managed to salt production needs.

In the **nature protection & salt production combined area** (green line) not very intensive procedures of salt production will take place (predominantly as evaporation areas). Maintenance of basins, dikes and water level will predominantly follow the needs of salt production. Outside of the salt production period, the water level will be managed in accordance with the needs of nature. There will be some limitations in salt production during the breeding season from April to June, but very few otherwise. We foresee salt production activities similar to those conducted in years when salt was produced here. We foresee great nature conservation potential of this area in particular during the bird migration and wintering period, when salt production activities are naturally limited or even non-existent.

In the **administrative area** (blue line) there will be (similarly to how it used to be) a place for administrative buildings, warehouses and educational room for visitors. Here it will also be possible to develop some nature-friendly touristic facilities.

For detailed delineation of external borders of the area, two options were considered and both roughly followed the channels surrounding the area of the salina. Both options do not include the Porto Milena outflow area as part of the future protected area due to its low value for biodiversity and the fact that this area was not proposed as part of the future protected area in the spatial planning documents. The difference between the two options is that the first one follows the cadastral data (borders of parcels), while the second option follows natural borders. From a conservation point of view, there is no substantial difference between the two options.

In order to evaluate and identify possible options for securing conditions for biodiversity and at the same time consider potentials of economically viable use of natural resources (for salt production), two options (one with three sub-scenarios) were considered .

Option A is concentrated on complete or partial reconstruction of the salt-making process where different key salt products are dominating: in sub-scenario 1a the main salt product is salt for roads (following the principles of production in the salina until the year 2013), in sub-scenario 1b upgrading of the production process with refinery for production of edible salt is considered; both these sub-scenarios are based on the assumption that the quantities of salt to be produced need to be high in order to cope with low prices of the final product (salt) and high production costs and thus require restoration of almost the entire territory of the salina. In the sub-scenario 1c only a limited surface of the salina would need to be restored for gaining new salt product (but the rest of the area would have to be restored in order to meet the requirements of biodiversity through controlling water regimes). The new product, salt flower,

would be the key selling item. All three sub-scenarios are also supportive to the requirements of biodiversity conservation and management of the protected area which is to be established.

Option B is based on the presumption that the area will be managed as a protected area where salt will be produced in a strictly limited area for promotional and educational purposes only.

The table below presents estimates of investments, yearly operational costs, profits (from salt production only!) and costs of production of the salt product for the options/sub-scenarios:

Option a			**Option b**
Sub-scenario 1a (road salt)	Sub-scenario 1b (edible salt)	Sub-scenario 1c (salt flower)	Park management with water regime regulation
Initial investment costs			
7.000.000	10.500.000	4.000.000	3.000.000
Operational costs (incl. basic management for biodiversity)			
1.150.000	1.350.000	500.000	600.000
Estimated annual profit (from salt products only)			
0	Up to 150.000*	Up to 70.000*	n.a.*
Production costs for a unit / expected market price			
40,23 €/t / 40 €/t	58,54 €/t/100 €/t	0,1 €/kg / 30 €/kg	

*In due time, projected profit from visitation could reach between 175.000 EUR and 350.000 EUR per year.

It is evident that Option A/sub-scenario 1a is **not profitable** as the prices of the salt of this type are extremely low on the market, demand for this salt is fluctuating (milder winters due to climate change) and high quantities of salt needed to be produced and sold. The costs of initial investments are also very high.

Option A/sub-scenario 1b shows potentially (small) profitable production, but this sub-model has to be viewed in the context of the fact that the above numbers are projected for an annual production of 25.000 tons of edible salt. This quantity goes beyond the capacity of the salina in the last 10 years of operation and above all it is unrealistic to expect that one could sell all of a large quantity of edible salt on the saturated European market. In Montenegro, overall consumption of all types of salt, not only edible salt, represents only 1/5 of the calculated annual production quantity. Mainly for this reason we would be **hesitant to promote this sub-scenario as an optimal solution**.

It seems that the **most suitable option in the long term would be a COMBINATION of the option A/sub-scenario 1c and Option B**. In this concept, initial investment in the infrastructure of approx. 4.000.000 EUR is needed. Operational costs for production of new, high quality salt products on a limited surface of the salina and costs of management of the park across the entire area of the salina would reach 1.100.000 EUR/year, while it is expected that in due time this model could generate between 245.000 EUR and 420.000 EUR from selling salt products

and incomes from visitation of the park and related programmes. Only very limited quantities of the new product (salt flower) could be potentially sold on the European market and the number of visitors to the area will only increase gradually.

In terms of the proposed category of the protected area according to the international standards, if the site's ecological character will be maintained through maintenance of the traditional salt-making production (option A), the area would fit into the IUCN PA category classification V (protected landscape). If the area will be managed exclusively for biodiversity conservation as a managed nature reserve (option B), it would best fit into the IUCN PA category IV (Habitat/species management area). If a **combination of the option A/sub-scenario 1c and option B** will be implemented, then the area would still be best assigned as the **IUCN PA category V (Protected landscape)**.

As far as the optimum management and governance model is concerned, if the Option A/sub-scenario's 1a and 1b will be applied, then the concession model should be applied where a company should be given the right to use the natural resources, produce salt and manage the protected area at the same time. The same should be applied if a **combination of the option A/sub-scenario 1c and option B is in place, but in the form of joint or collaborative management where a company responsible for salt production and a public authority for management of the protected area should share their responsibilities in decision-making processes**. If option B is applied, then any form of a public institution for management of the protected area should be promoted.

Concerning the consequences of adoption of an act of declaration of a protected area the Commercial Court of Montenegro concluded that all activities relating to the establishment of a protected area cannot be undertaken without the acceptance of the Court and the Bankruptcy Trustee. Bankruptcy proceedings are conducted over the bankruptcy debtor i.e. Saline "Bajo Sekulic" AD in Ulcinj and it should not be ignored given that decisions regarding the rights and property of debtors are now under the jurisdiction of the court.

It is evident that the questions of land-ownership rights and dispute over these rights have by far the biggest impact and consequences for adoption of a protection status over the Ulcinj salina. Other consequences, especially financial, have also been elaborated and are presented in terms of initial investments and running costs.

Key findings

- Ulcinj salina is a man and nature-made ecosystem, established in 1934, it took both to create and maintain its character.

- Biodiversity in Ulcinj salina has several biological elements which make it unique at national and international levels.
- Lack of appropriate management in recent years has caused overgrowing of the area by plants, disappearance of typical salty habitats, winter floods which transform areas into deep freshwater lakes, summer droughts that cause water from almost all basins to evaporate and, as a final consequence, cause serious deterioration of biodiversity and the landscape value of the area.
- All the above changes are causing dramatic changes in the composition and abundance of the breeding, migrating and wintering birds, which renders the area of international importance.
- To preserve the high value of the Ulcinj salina, immediate steps are necessary – a designation as a protected area (on a national level, and internationally as a Ramsar site), which has to be followed by adequate management of the area, where sustainable uses of nature resources, especially traditional salt production, are not in opposition to biodiversity conservation objectives.
- In order to secure conditions for biodiversity and at the same time consider social and economic issues, the most suitable model for long-term management would include production of a new product of salt, the salt flower, on a limited surface of the area and implementation of conservation measures over the entire area.
- The protected area would be best defined as a IUCN PA category V (protected landscape) area with different zones; one part should be managed as a strict nature reserve where all activities would be subordinated to the conservation goals, another part where salt production would be considered first, a part where salt production and nature conservation would go hand in hand and finally, a small part that would serve as an administrative area.
- Any future activity relating to the establishment of a protected area must first seek the acceptance of the Court and the Bankruptcy Trustee, given that decisions regarding the rights and property are now under the jurisdiction of the court. The solution of the dispute over land-ownership is an essential step towards the preservation of the area, its biodiversity, cultural and social values.

1. Introduction

Nature protection is a challenge for countries that want to become members of the European Union. Establishment of a Protected area on the national level and potential protection at the international level, in line with relevant national legislation and relevant international obligations, present a true challenge for all countries, including Montenegro. The importance of Ulcinj salina goes beyond the national borders in terms of its biodiversity and also landscape values. The traditional salt-making in this man-made area has contributed to its recognition as a national point of interest.

Over the past few years, the protection of Ulcinj salina has been the focus of attention for the Government of Montenegro, European Commission, European Parliament, Member States of the European Union, and Secretariats of Multilateral Environmental Conventions. The Environmental Protection Agency developed the First Protection Study by request of the Municipality of Ulcinj.

According to the legal requirements outlined in the Law on Nature Protection of Montenegro, the decision to place an area under protection should be based on a nature protection study of the particular area under the consideration. This study should provide answers to the most pertinent aspects of the conservation designation, including the description and characteristics of natural, landscape features and other values, existing state of the resources with the assessment of the condition of the site, description of the importance of the site and proposed protected area category, proposed concept for management and sustainable development of the site, implications that might follow from the adoption of a protection act, as well as the possible resources necessary to manage the site after adoption of the protection act, and other elements of importance for awarding protection status.

However, the First Protection Study (2015) was developed within a few months only and it was based on research data that was already a bit outdated (mainly until 2003), especially in the light of the rapidly changing conditions in the salina that were triggered by the abandonment of salt production. It is understandable that the First Protection Study – given the short time available, the limited resources and data - could not adequately address some of the key factors that determine the future of the area. The Ministry of Sustainable Development and Tourism found it necessary to request assistance from the European Commission to provide expertise to finalize the study and bring it fully in line with EU acquis requirements. The main issues that the First Protection Study could not adequately address are: the legal dispute about land ownership (ultimately this question can only be resolved through the courts); an indication of the financial resources that would be necessary for management of the area; and, the definition of the best model to apply to such management, keeping in mind that the salina is an artificial ecosystem, fully dependent on human activity.

The overall objective of the project Finalization of Protection Study for Ulcinj salina is the establishment of the protection status for Ulcinj salina, at the national and international level. Specific objectives are oriented towards: provision of a reliable and expert-based assessment of the biodiversity values; identification of such economic activities that are compatible to the

ecological character of the area; and, identification of the most appropriate management model to ensure the ecological and economic sustainability of the area.

The First Protection Study provided an excellent basis for some parts of the present Study which in turn means that much information written in the First Protection Study was used directly in this work. The authors would like to express gratitude to the authors of the previous study for their hard work.

We would like to thank representatives of the Ministry of Sustainable Development and Tourism (MoSDT) and the EU delegation to Montenegro (the Contracting Authority), Podgorica for their support. MoSDT is responsible for the proper technical implementation of the project.

Our thanks also go to the Municipality of Ulcinj for valuable information and support, but also for offering facilities for hosting the stakeholder workshop.

In addition, the authors would like to express their thanks to two supervisory and expert bodies: first, the Project Steering Committee – chaired by MoSDT - oversees the implementation of the project, provides strategic directions, ensures transparency and cooperation between all institutions involved in the project, ensures that the project outputs and goals are met as per the time schedule and takes care that the achieved results agree within the scope of expected results; second, the Project working team, consisting of experts from MoSDT, EPA, National Parks and others, that supports the expert team in all technical questions necessary for implementation of the contract.

Sourcing of data and information was made possible through the effective cooperation of the following institutions: Environmental Protection Agency, Public Enterprise Nacionalni Parkovi, Ministry of Economy, Ministry of Finance, Public Enterprise Morsko dobro, CZIP – Center za zaštitu i prosmatranje ptica, EUROFOND, BirdLife International / Critical Ecosystem Partnership Fund, Martin Schneider-Jacoby Association, Hunting associations (Lovačko Udruženje Ulcinj, NVO Šljuka), Local tourism representatives, Natural History Museum of Montenegro and others. This project could not have been realised without the kind and professional support of the above institutions and their dedicated representatives.

The authors are thankful to Commercial Court of Montenegro for the statement on the legal and land-ownership situation regarding the Ulcinj salina and to CZIP for the provision of a special legal analysis on the situation in the Ulcinj salina, carried out by the lawyer Srdjan Žarić (in Podgorica). Several experts were subcontracted to assist in the elaboration of particular themes. Peter Glasnović did the survey of flora and vegetation types and undertook habitat mapping in parts of the area. Vasko Radović prepared an analysis of the economics of the salt production. David Vačkar estimated the ecosystem service of the wider area of the salina.

2. Legislative and sectoral background for declaration as a protected area

2.1. Nature Protection

Pursuant to the Art 55 of the Law on Nature Protection ("Official Gazette of Montenegro", 51/08, 21/09, 40/11 and 62/13), a decision to declare an area a protected natural resource is adopted by a self-government unit after obtaining an opinion from the ministry responsible for agriculture, forestry and water management and having obtained a prior consent from the Ministry of Physical Planning and Tourism.

The Law on Nature Protection contains types of protected natural assets (Article 20) and categorization of protected areas (Article 30). The parts of nature of exceptional value characterized by biological, geological, ecosystem and areal diversity, may be declared as protected natural assets. The **types of protected natural assets** as described in the Article 20 are: 1) protected areas: **strict nature reserves, national parks, special nature reserves, nature parks, monuments of nature and regions with outstanding features** and 2) ecological network areas.

The **categories of protected areas** and/or their parts as classified in Article 30 are: protected area of **category Ia** which includes strictly protected areas set aside to protect biodiversity and also possible geological/geomorphological features; protected areas of **category Ib** which includes protected areas that are large unmodified or slightly modified protected areas; protected areas of **category II** which includes large natural areas set aside with the aim of protecting large-scale ecological processes, alongside a complement of wild species of plants, animals and fungi and ecosystems that are characteristic of the area, which also provide a foundation for ecologically and culturally compatible spiritual, scientific, educational and recreational activities and visitor opportunities; protected areas of **category III** which includes monuments of nature and parts of nature, which can be a relief landform, sea mount or a cave, a beach, geological feature such as a speleological object or a living feature such as an ancient grove; protected areas of **category IV** which includes areas in which wild species of plants, animals and fungi are protected, as well as their habitats and which are managed to provide their protection; protected areas of **category V** which includes areas where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and aesthetic value and where the conservation of the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values; and, protected areas of **category VI** which includes areas that conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems, where management and use of natural resources is conducted in a sustainable way.

The procedure for the declaration of protected areas is described in Article 34 of the Law on Nature Protection, which states, inter alia, the following:

"The nature park, the monument of nature and the region of outstanding features, which are situated in the area of a local self-government unit, shall be declared by the municipal assembly of the local self-government unit, after receiving the consent from the Ministry and the opinion from the state administration bodies competent in the fields of agriculture, forestry, waterpower management and culture. The nature park, the monument of nature and the region of outstanding features, which are not situated in the area of multiple local self-government units, shall be declared by the Government at the proposal of the local self-government units, after receiving the opinion from the Ministry and state administration bodies competent in the fields of agriculture, forestry, waterpower management and culture".

Article 28 of the Law on Nature Protection states that the procedure for declaring protected areas shall be initiated with a request for developing an expert study (Protection study). The request shall be submitted by the competent body of the local self-government unit. The protection study shall be developed by the administration body.

The assessment of the protected natural area (as described in the Article 29 of the same Law) shall be done based on the protection study or the revision study of the protected area or based on other expert documentation.

The Act on declaration of a protected area is adopted following the adoption of the mandatory Protection study conducted by the Environmental Protection Agency (Art 56).

2.2. Spatial planning

The Spatial Plan of Montenegro Until 2020 ("Official Gazette of Montenegro", no. 24/08) (hereafter "Plan") is, according to the Law on Spatial Development and Construction of Structures ("Official Gazette of Montenegro", no. 51/08, 34/11, 35/13, 33/14), a strategic document and the basis of organization and spatial development of Montenegro, which determines the state objectives and measures for spatial development, in accordance with the overall economic, social, ecological and cultural-historical development of Montenegro. The Plan was amended by the Decision of the Parliament of Montenegro, where natural monuments and landscapes of unique natural shapes are mentioned. The Decision of the Parliament amending the Spatial Plan was declared unconstitutional by the Constitutional Court, thus the original text of the Spatial Plan is applicable.

The Plan is too general to allow for realization of any right or for establishment of any legal or legitimate pretension. Even the Plan itself admits that it shall not alter sectorial policies and that it is questionable how far the spatial planning may alter or even replace sectorial policy if the latter does not exist or is considered to be inadequate vis-à-vis principles and objectives of the Plan.

The Draft of the Special Purpose Spatial Plan for the Coastal Area (Prostorni plan posebne namjene za obalno područje) envisages the protection of the area of Ulcinj Salina and construction of complementary tourism facilities (for bird-watching, interpretation centre, eco resort – Ulcinj Salina, etc.) in a small part of 6 ha of Ulcinj Salina, where existing built environment needed for salt production and storage is already located. Tourism zone is planned on the surface area of 70 ha that will encompass the area outside of the Ulcinj Salina (Figure 2.1). Detailed elaboration of the surface area and touristic zone borders are not the subject of the Spatial Plan of Special Purpose for the Coastal Area.

Figure 2.1: Grey colour on the map above, which is extracted from the Draft of the Special Purpose Spatial Plan for the Coastal Area, indicated the areas where construction will be allowed. It is indicated that construction within the area of Solana is not allowed, except in a small area of existing buildings near to the entrance (6 ha).

The Spatial Plan of Montenegro Until 2020 was used as key background documentation for the preparation of more detailed and site-specific spatial planning documentation for the area concerned. The Government of Montenegro adopted the Spatial Plan for the Ulcinj Municipality (PUP) in February 2017 which foresees the establishment of a protected area over the entire area of Ulcinj salina (Figure 2.2).

Figure 2.2: Spatial plan for the Ulcinj Municipality foresees the establishment of a protected area over the entire area of Ulcinj salina. The area proposed to become protected area is marked with light blue colour.

According to the **Spatial Plan of the Municipality of Ulcinj**, area of Saline along the lower course of the river Bojana is part of the Planning zone 3, with a total surface 3743 ha and settlements Gornji Štoj, Reč, Sutjel, Ćurke, Sveti Đorđe and complex Saline.

The largest part of the planning zone area is Saline, salt processing plant, salt pans and surrounding environment with bird habitat that meets the criteria of the Ramsar List of Wetlands of International Importance.

As per Spatial Plan, top priority for development of Saline area is rehabilitation and modernization of salt production plant, development of health facilities related to use of medicinal mud, scientific and educational tourism in the field of ornithology, organisation of hiking, sport and recreation.

Development of settlements within the planning zone will be achieved through rehabilitation and upgrade of existing structures, transport and technical infrastructure, as well as through development of agriculture, which will be achieved upon completion of the project *Regulation of Bojana River Water Regime.*

According to said document the prerequisite for protection of this unique natural environment is proclamation of Ulcinj Saline as a protected area, which will define actions and activities which threaten the characteristics and values of the area.

If there is no regulation of river Bojana, there will be a risk of further flooding and destruction of resources for agricultural production.

Guidelines from the Spatial Plan Ulcinj regarding Ulcinj Saline provide the following:

a. preservation of environmental characteristics (EMERALD area) and the character of the area as a whole;

b. establishment of Nature Park "Ulcinjska Solana"
c. spatial management in accordance with the provisions of the Law on Nature Protection;
d. purposeful use of the area with balanced and coordinated identification of relations between salt production and nature protection;
e. prohibiting the use of non-native and invasive plant species.

Spatial Plan also defines basic measures of protection of Ulcinj Saline area, as follows:

a. increase level of lab or and technological discipline in all production facilities to meet the requirements laid out in the designs by technology and equipment designers in order to reduce emissions of salt dust.
b. provide constant monitoring of water quality at the exit of each facility, respectively, as well as water from the main wastewater canal that drains industrial wastewater to canal Milena;
c. strict ban on hunting

Proclamation of the area as Nature Park and its protection in line with the Law on Nature Protection where any actions that could in any way endanger the area should not take place.

Short summary of the PUP Ulcinj (valid until 2020) in relation to the area of Ulcinj Salina

Construction of new objects is not allowed in the territory of protected areas. In particular, accommodation facilities are not allowed to be built in the area of Ulcinj Salina.

The area of Ulcinj Salina is projected to become protected area (classified as protected landscape) and RAMSAR site.

Priorities for the uses/activities in the area of salina are: production of salt, health tourism, educational tourism (in terms of bird-watching) and scientific work, appreciation of nature, sport and recreational activities.

Area of "Ulcinjsko polje" is foreseen as the sewage treatment plant for polluted waters of Port Milena

2.3. Tourism

Montenegro promotes itself as the country of wild beauty, or the country of national parks. In other words, the main pillar of tourism development is officially based on its natural resources (their beauties) in combination with cultural heritage. The Ulcinj salina, including the wider area, will become one of the tourist attractions for the segment of tourists that appreciate nature and tradition.

3.1.1. Strategic documents on tourism development in Montenegro and Ulcinj

Two main country policy documents on tourism in Montenegro and one of regional importance were analysed for the purpose of this study.

1. **Touristic Masterplan for Montenegro - Integrated Overall Regional Approach to Reorganizing and Developing the Tourist Industry in Croatia and Montenegro** (published by DEG - German Investment and Development Company in 2001)

   In this document, although outdated, Ulcinj is recognized as one of three most important resorts on the sea coast of Montenegro and described as "high quality beach/bathing resort". The Ulcinj salina is, however, also mentioned as a potential tourist attraction, mainly as a visitation point for enjoyment of nature in connection with salt production.

2. **Montenegro Tourism Development Strategy to 2020** (approved and published in 2008)
   In its vision, the strategy highlights the importance of "picturesque landscapes and protected biodiversity" as one of the principal destination values. The Strategy also introduces the brand name for the country: Montenegro – Wild Beauty.
   Strengths, as identified in the document, are natural values, complemented by climate and geographical position plus diversity in general in a small area. It constitutes further evidence that natural values are of extreme importance when it comes to the future development of the tourism sector in Montenegro.

   Weaknesses include inadequate infrastructure, lack of experience of locals and thus also a lack of initiatives in tourism (either private or state).

   The strategic goal of the Strategy is to improve services for natural values and at the same time improve living standards of Montenegrins through application of sustainable development standards in developing tourism. The objectives of the Strategy are listed in five groups.

   The strategy also sets 6 geographical tourism clusters. One of them is a cluster called "Ulcinj" which is described as: "*a place with an oriental flair and the most expansive sandy beach on the eastern Adriatic, with Ada Bojana and Valdanos. Velika Plaža affords the greatest development prospect in the Montenegrin tourism sector*". In the description of the cluster, salt works as well as some natural places are mentioned as of potential tourist interest. The main weakness, as identified by the strategy, is uncontrolled development in the area. No active measures on conservation or sustainable development of the Ulcinj area are mentioned.

   The document is the first sectoral strategy in tourism at the country level officially approved by the state authorities. Although natural values are highlighted as one of the most important pillars of Montenegro, it is obvious that the Strategy focuses in the main

on infrastructure development and does not harmonize nature conservation with business activities. The attitude of its authors is that nature is to be used as a resource to be deployed for economic ends and that nature does not require any maintenance or conservation on sustainable principles.

3. At the regional level, DEG (German Investment and Development Company) published the "**Regional Touristic Masterplan Ulcinj**" in 2003. The masterplan is focused on the wider area including Velika Plaža and the salina, too. The salina is recognized for its biodiversity value, especially for bird watching. In the final analysis and suggestions of the document, the salina is excluded and not taken into account.

2.4. Key steps in the process of preparation for the protection of the Ulcinj salina area

There were several attempts to achieve partial or comprehensive protection of the Ulcinj salina area in the past, mainly initiated by non-governmental organisations and the local community and supported by civil society, beginning already in the last decades of the previous century. They were mainly concentrated on limitations of particular uses (ban on hunting, restrictions in visitor movements, etc.). Efforts of the governmental bodies to safeguard the area are reflected in proposals to include the area in the EMERALD network. A formal process of designation of the area as a protected natural asset was initiated in 2011 by the CZIP, and later supported by the Municipality of Ulcinj. Data for listing the area as part of the Important Bird Area (IBA) network were collected already in the year 1989.

In the National Biodiversity Strategy with the Action Plan for the period 2010 – 2015 (Ministry for Spatial Planning and Environment, Podgorica, July 2010), the Ulcinj saltpans with Knetas were envisaged to be placed under protection.

After some years of consultation, the draft Decision for declaration of Ulcinj salina as a natural monument (Nacrt Odluke o proglašenju Ulcijske solane spomenikom prirode) has been sent by the Municipality of Ulcinj, Secretariat for Utilities and Environment Protection, to the Ministry of Physical Planning and Tourism at the end of 2015. It was proposed that the whole area on the territory of the Municipality registered in KO Ulcinjsko Polje and KO Zoganje should be declared a protected area.

Before the Draft was submitted to the Ministry of Physical Planning and Tourism for obtaining the consent, the Environmental Protection Agency conducted the **Protection study of the Ulcinj salina** (in August 2015; hereafter: **First Protection Study**), based on the previous report, done by CZIP, and submitted it to the Ulcinj Municipality.

The Ministry of Agriculture and Rural Development had given its positive opinion on the First Protection Study.

At the end of February 2016, the Ministry for the Sustainable Development and Tourism sent to the Secretariat for Utilities and Environment Protection in Ulcinj a request for revision of the Draft decision and the Protection study. This decision was justified by the fact that the assessment of the biodiversity values should be done based on the situation after the abandonment of the salt production process and in relation to the criteria of the international conservation agreements and EU conservation directives, taking into account the development of an optimal management model for the area, the need to provide basic legal and economic analyses and some other issues.

The support of the European Commission was secured for the finalisation of the existing Protection study according to the identified gaps of the original Protection Study in March 2016.

In cooperation with the Commercial Court of Montenegro and in accordance with national legislation in the case of bankruptcy of a company, only a governmental body or commercial institution where the majority of shares are in the ownership of the state could become a management authority of the salina. Based on this, the Ministry of Sustainable Development and Tourism decided to propose the public institution Nacionalni Parkovi as the management authority for the area. Following the procedures of public procurement in August 2015, the public institution Nacionalni parkovi (hereafter the "Manager") was selected to manage the area. The contract was signed for one year and prolonged again for the next two years; the last contract was signed in the form of an annex to the original contract in August 2017.

The Manager is obliged to manage the area and to maintain and improve ecological conditions over the entire area of salina. Protective measures should be applied over two-thirds of the territory of the salina, together with promotion and development of tourism, based on natural assets of the area (health tourism, wellness centre, recreational activities, bird-watching, hiking, etc.) which should contribute to the generation of income. The agreement also states that the Manager is allowed to search for potential partners for revitalisation of the salt-making process or other complementary activities in accordance to the relevant spatial documents; if this is realised, the Manager has the right to offer part of the infrastructure in the territory of the salina to a potential interested party for the purposes of salt production.

This concept and model of temporary management of the area was supported by the Delegation of the European Commission in Montenegro and also by the embassies of Germany, France and Poland.

There are several legal, land-ownership and political issues that concern the process of establishing of the Ulcinj salina as a protected area. But, as concluded in the analyses done by Žarić (2016), these should not prevent the continuation of the process of establishment of a protected area in the Ulcinj salina, because:

1. there is a possibility for establishment of a protected area over the territory of Ulcinj salina based on the Law on Nature Protection;
2. owner or user, current or future, of the land and infrastructure in the salina - once the area is declared a protected area - would have to coordinate and implement all

activities and land-uses in accordance with the Law on Nature Protection and refrain from any actions which could damage or harm the protected natural resource;

3. in the case where an owner would be able to demonstrate specific limitations in use and disposal of real estate and consequently reduction of incomes, said owner would have the right to be compensated for existing and concrete damages directly resulting from such a decision. Abstract damage (reduced possibilities to purchase, reduced value of real estate, for example) shall not be granted to the owner of real estate. Compensation for eventual damage due to income loss is not conditional for the effect of the Law on Nature Protection, including declaration of a protected area;
4. neither the unresolved issue regarding real estate covered by the protection, nor the content of the Spatial Plan of Montenegro influences the protection of the salina;
5. the bankruptcy of the company that held the concession for production of salt harvested in the area does not give rise to any legal effects relating to declaring the salina a natural monument. The status of a protected natural resource in legal terms does not impact upon any activities carried out in bankruptcy proceedings, nor does it disturb the purchase of property of secured and other creditors.

Three international conferences on the Ulcinj Salina have been organised between the years 2015 and 2017 (8./9.4.2015, 7./8.4.2016, 11.3.2017) by the NGOs (CZIP, EuroNatur) and local community of Ulcinj in cooperation with others. Participants were representatives of the national and local governments, experts, ambassadors of some EU countries and the EC, NGOs, different stakeholders and other distinguished guests. Requests for immediate protection of the area at the national, European (EMERALD) and international (Ramsar site) levels, together with particular management requirements (management of waters, hunting ban, monitoring, immediate conservation measures...) were highlighted as conclusions.

3.The description of natural, artificial and areal features of Ulcinj salina

Ulcinj salina is situated in the outermost southern part of Montenegro and covers slightly less than 14.5 km^2 of salty basins (total surface area is 1.477 ha). It was built in the region with the largest number of sunny days and the largest level of insolation in the Adriatic region – 2.571 hours - and the largest number of tropical days in ex-Yugoslavia. Hence, this is an ideal place for a salina, which has based its salt production solely on evaporation. As the crow flies, the salina is 1 km from the city of Ulcinj and from the Albanian border.

The Brijeg od Mora village and Velika plaža beach separate the salina from the Adriatic Sea, while it is separated from the Bojana River by canals and dikes against flooding. The salina represents an important part of the catchment of the Lake Skadar and Bojana River, the watershed area that covers around 1000 km^2.

Ulcinj salina is located on the site of the former lagoon and wetland situated in the delta of the River Bojana. Fine river alluvium of organic origin and sand as a non-organic component can be found across the entire area. The influence of the sea and past salt production affected the soil to have a base reaction. The same applies to the semi-natural wetland, located on the site of the former natural lagoon Zoganj Lake, which retained many characteristics of its predecessor (muddy banks, reed, sedge, halophyte vegetation, and open water surface).

The area is constituted by several basins, dikes, and canals. Basins formed larger areas which have specific names (Figure 3.1, Table 3.1).

Table 3.1: Area of groups of basins

Area	ha
Kneta	417
I. evaporation	239
II evaporation	89
III evaporation	55
IV evaporation	21
Jezero 1&2	200
Zoganjski 1&2	41
Stojski 1&2	94
Crystallization	76

Figure 3.1: The Ulcinj salina is constituted by basins, dikes and canals. In this report we use the traditional names for the basins and groups of basins (from Štumberger et al. 2007)

3.2. History of the area

The natural development of the River Bojana delta complex can be described as a set of dynamic, short-term and long-term processes, which are based on the following factors:

1. High sediment loads from the mountainous catchment of the Drim River;
2. The hydrographical variability of Lake Skadar and the Drim River;
3. The sea level variability and the littoral zone, based on short-term events (storm waves and tides) and long-term processes (sea transgressions);
4. Tectonic processes caused by the uplift and abatement of tectonic plates (several earthquakes have been recorded in the area).

The formation was caused by high sediment loads that were carried by the Drim River, combined with the low tidal currents in the Adriatic Sea (about 20 cm). The growth of the Bojana delta by 1 to 1.5 km in the last 100 years is relatively slow compared with other Mediterranean deltas such as the Rhone and Po deltas (about 4 km in 100 years). Typically for Mediterranean conditions, the water level of the river is different depending on the season. During the winter, there are floods (November - April) and low water levels occur from June to August. The high water level of the Drim River blocks the discharge of the water from

the Skadar Lake, causing the level of the lake to rise. In cases where the water level of the Drim River goes down, the Skadar Lake discharges via Bojana River, and its water level decreases again. With these kinds of hydrological prerequisites, the accumulation and flooding processes are very dynamic in the delta of the River Bojana.

Before intensive drainage and amelioration of the area, almost 50% of the whole lowland region was regularly flooded (over 28,000 ha). The surveys show that nearly 9,000 ha are still regularly flooded. Flooding processes in littoral and lagoon areas depend on regional precipitation.

As the River Bojana flows through the lowland area, large sediment amounts aggregate on the way to the sea, and only sand and fine particles find their way to the sea. These sediments, which consist of fine particles, are carried to the west by the currents of the river mouth, where the border island (Velika plaža) was formed in front of the bay. The sea and wind transmitted and deposited the rest of the sediments, closing the border island and forming a shallow bay (Zoganj mud), today's salina.

All of this has created a unique environment of muddy marshes in the former bay. In the 19th century, Zoganj mud was an impassable wetland (about 25 km^2) with brackish water and was a habitat for malarial mosquitoes. The works on amelioration started in 1913. That is when the wetland connected with the sea by the Port Milena canal and isolated itself from the Bojana River with a dike, with the original intention to dry the area with the aim of combating malaria. In 1920 the decision to start with the establishment of the salina in Ulcinj was made. In 1926 the process of purchasing the land from private landowners began and construction work started the next year. The salina was concluded in 1934 and the first harvesting of salt was done in 1935 (Radović, 2008). The technological process of production was upgraded in the 1970s with construction of the refinery and with attempts to expand the production, both by enlarging the territory of the salina and use of industrial production, based on mechanic thermos-compression principles, applied between 1984 and 1994. Yearly production of salt before the above-mentioned attempts to expand the production (in the period 1935 to 1983) was highly dependent on the weather conditions and organisation of work; a maximum of 41.240 tons of salt was produced in 1952. A combination of manually collected salt and the salt produced through industrial process in the newly constructed factory in the years 1984 to 1994 led to a maximum yearly production of 59.353 tons. By contrast, the production in the last years of production (2003 to 2013) was dramatically lower, reaching on average only around 17.000 tons per year (Radović, 2008).

Today the salina covers a surface of approximately 1,477 ha. Thus, the Ulcinj salina was created from the sea and represents a "cultural lagoon". It is surrounded by canals that drain the nearby marshes and knetas (adjoining marshlands), not allowing their water to mix with the water from the salina. The canals take the water into the Port Milena canal and then into the sea.

The history of the transformation of the former Zoganjsko Jezero and adjoining marshlands to salina is summarized as follows (data from Radović 2008, Štumberger et al. 2007):

Period	Description
1920–1926	In 1920, the Monopoly Management (monopolska uprava) of former Yugoslavia invited Antun Koludrović and Guido Grisogona to select lands suitable for industrial salt production along the coast of the Adriatic Sea from Ankaran in Slovenia south to Ulcinj in Montenegro. As the most suitable site, both experts designated Zoganjsko Jezero in Ulcinjsko Polje, near Ulcinj.
1926–1934	Construction of the first salt pans and other indispensable infrastructure, like buildings, reservoirs, evaporation basins (8,6 km^2) and transportation equipment.
1935	First harvest of industrially produced salt (approximately 6.000 tons).
1952	Record harvest of 41.882 tons of salt.
1959	Reconstruction works and expansion of the salt pans (9,3 km^2).
1979	On 15 April, an earthquake heavily damaged the salt pans and the salina's other infrastructure.
1980	Reconstruction of evaporation basins which had been damaged by the earthquake and expansion of the salina by including adjoining marshlands, called kneta (14,5 km^2).
2003	The Ulcinj salina starts to cooperate with EuroNatur aiming to protect the unique ecosystem of the salina and developing the area for touristic purposes.
2005	Privatisation of the Ulcinj salina, with major stakeholders holding more than two thirds of shares. Salt production process was gradually abandoned. The salt-making company "Bano Sekulić" subsequently declared bankrupt.
2013	Salt production in the salina stopped, a unique natural / man-made ecosystem began a process of ecological succession and physical degradation.

3.3. Climate and meteorological characteristics

A weather station of the Hydro-Meteorological Institute of Montenegro is part of the international network of meteorological stations. It is situated within the Ulcinj salina. The station, whose data are updated in one-hour intervals, is placed between the factory buildings and Porto Milena (Štumberger et al., 2007).

The climate in the territory of Ulcinj is specific as a result of geographical location, altitude, relief and vicinity of the Adriatic Sea. The warm, Mediterranean climate interweaves with the cold, continental climate resulting in very hot and dry summer periods, moderate autumn and spring periods with relatively low levels of precipitation, and mild winters. Across the year annual means of sunshine average to 2.571 hours, which is the highest in Montenegro. On average, insolation in July is the highest (332 h) and in December the smallest (115 h) (Studia zaštite, 2015).

3.3.1. Precipitation

With most rainfall during winter and early spring (figure 3.2), the long-term annual mean of precipitation in Ulcinj amounts to 1.231 mm. The long-term monthly high is in November (over 150 mm) and long-term monthly low is in August (less than 50 mm) (Štumberger et al. 2007).

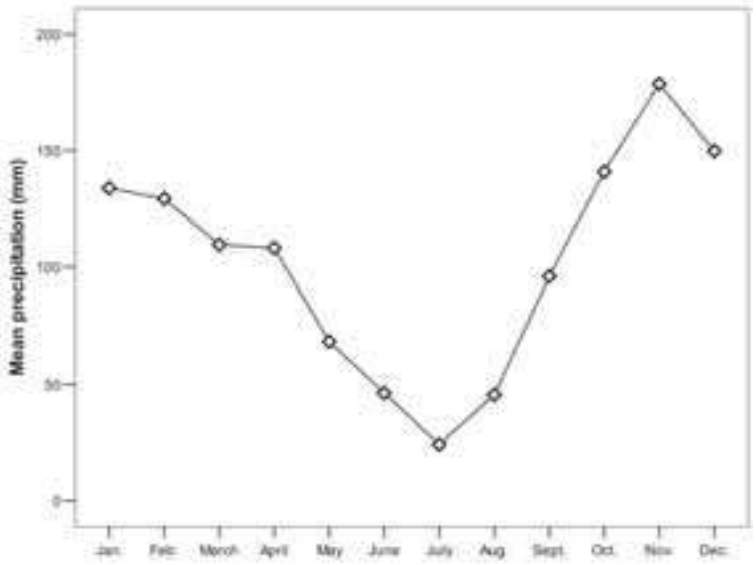


Figure 3.2: Long-term means of precipitation per month (mm) in Ulcinj (from Štumberger et al. 2007)

3.3.2. Temperature

Annual mean air temperature is 19,9 °C. In July and August, the average monthly maximum temperature is around 30 °C. In January and February, the average monthly maximum is around 10 °C (Figure 3.3). The highest temperatures during winter are around 17 °C, and the lowest around 0 °C, whereas the highest temperatures during the summer are about 34 °C, and the lowest around 16 °C. In Ulcinj there are on average 108 days with daily maximum temperatures over 25 °C, 28 days with daily maximum temperatures over 30 °C and 9 days with daily minimum temperatures below 0 °C (Studia zaštite, 2015).

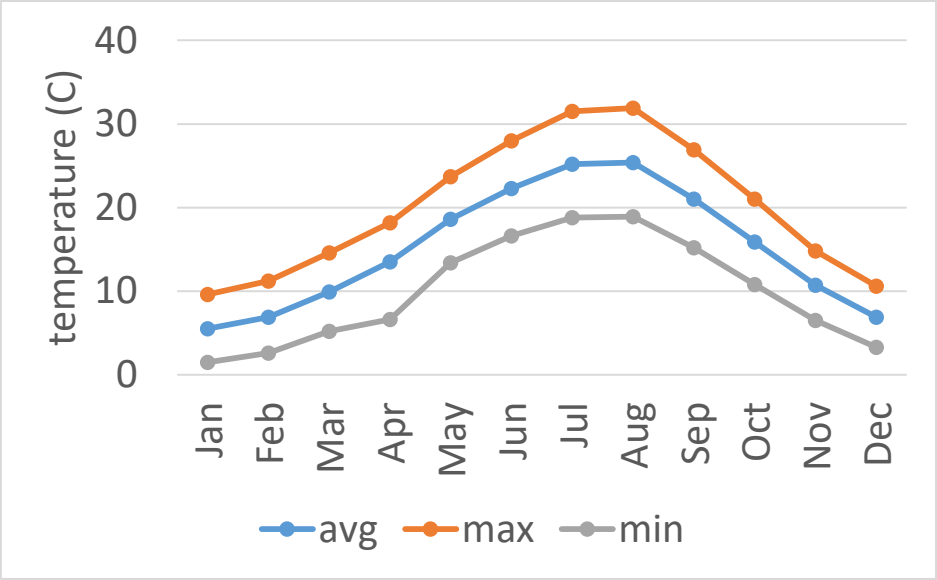


Figure 3.3: Average monthly temperature profile from 1961 to 1990 for Ulcinj (https://www.yr.no/place/Montenegro/Ulcinj/Ulcinj/statistics.html)

3.3.3. Wind

Dominant are winds from the northeast. Accordingly, the following values were recorded for the station Ulcinj: northeast (16.8%), East (16.3%), east-northeast (11.6%), West (8%), west-southwest (7.7%) and the north-northeast (7.4%). Silences account for 3.9% (Figure 3.4). The strongest are southerly winds (jugo), and inland winds (bura) which occur mainly during the winter.

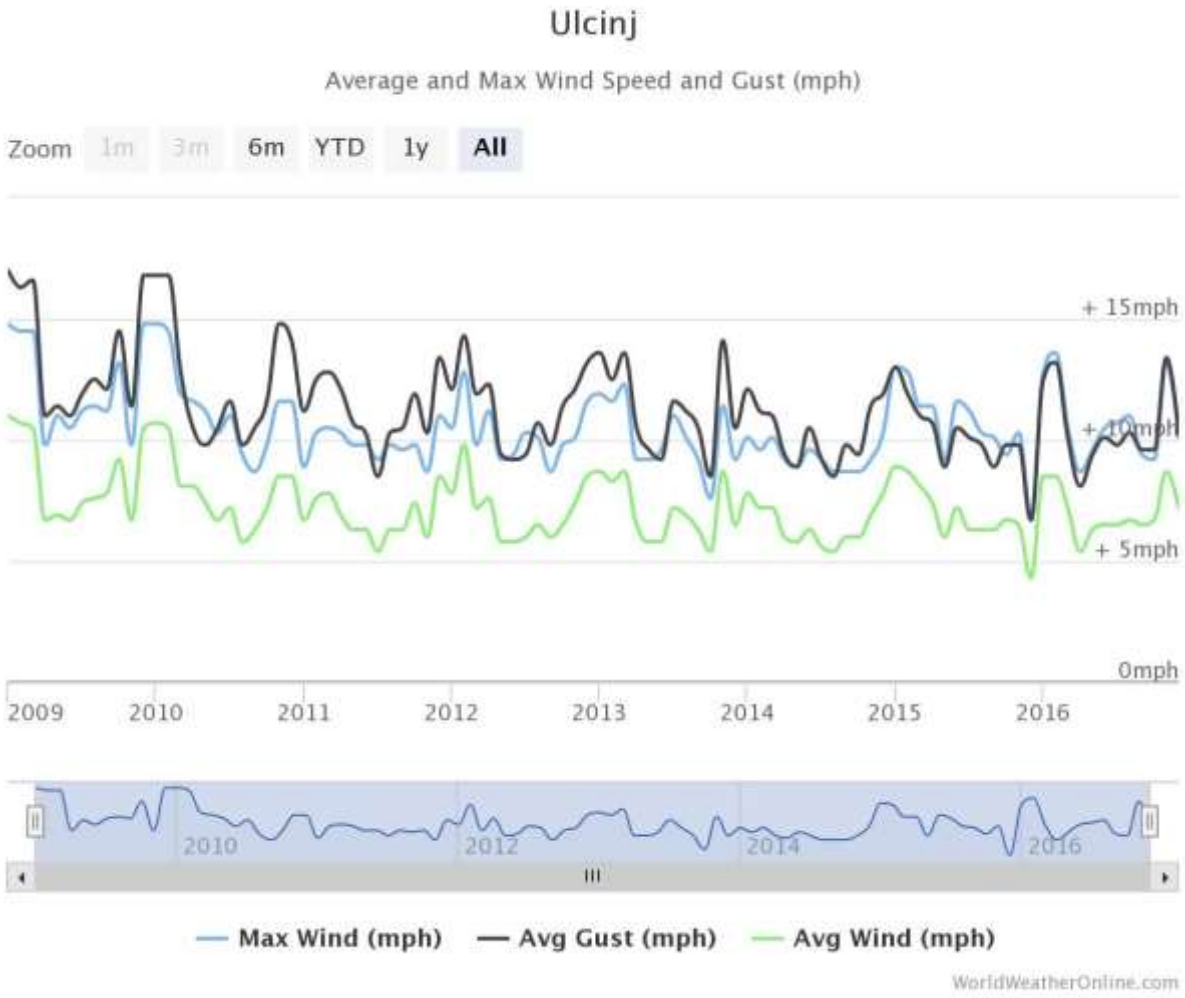


Figure 3.4: Monthly wind speed and wind gust in 2009 to 2016 in Ulcinj (https://www.worldweatheronline.com/ulcinj-weather-averages/me.aspx)

3.3.4. Humidity

The relative humidity shows a very stable course over the year. The maximum of the average monthly values is recorded during transitional months (April-May-June and September October), and the minimum is recorded mostly during the summer period, and in some cases also during January-February. The average annual value of the relative humidity counts for Ulcinj is 65,9% (min 61.5 % in July, max 69.3 in May) (Studija zaštite, 2015).

3.3.5. Cloudiness

The increased cloudiness values are typical for the winter time of year, contrary to the summer period when these values are low. Approximately 40% of the sky is covered by clouds during

the year at the littoral area. The average annual cloudiness in Ulcinj is 41% (minimum 18% during July/August, and maximum 55% during December (Studija zaštite, 2015)).

3.3.6. Meteorological conditions in 2016 and 2017

The first half of 2017 was dry. The long-term average precipitation for this period is about 590 mm, in 2017 it was only 401 mm of rain. During the main breeding period (1st April to 29th June) there was only 75 mm of rain. By contrast, 2016 was rainy: 1116 mm fell between January and July and 503 mm during the main breeding period. This indicates that in order to maintain more or less constant water levels during the breeding period of birds, there is a need for powerful equipment to pump water from the sea into the basins (in case of drought) or out of basins (in case of heavy rain).

In 2016 and 2017, temperatures were similar during the first part of the year, with the exception of a very cold spell in January 2017. Between the 7th and 12th of January, the maximum daily temperatures did not exceed 0 °C, with the lowest temperatures close to -10 °C, causing the water in the salina to freeze (Figure 3.5).

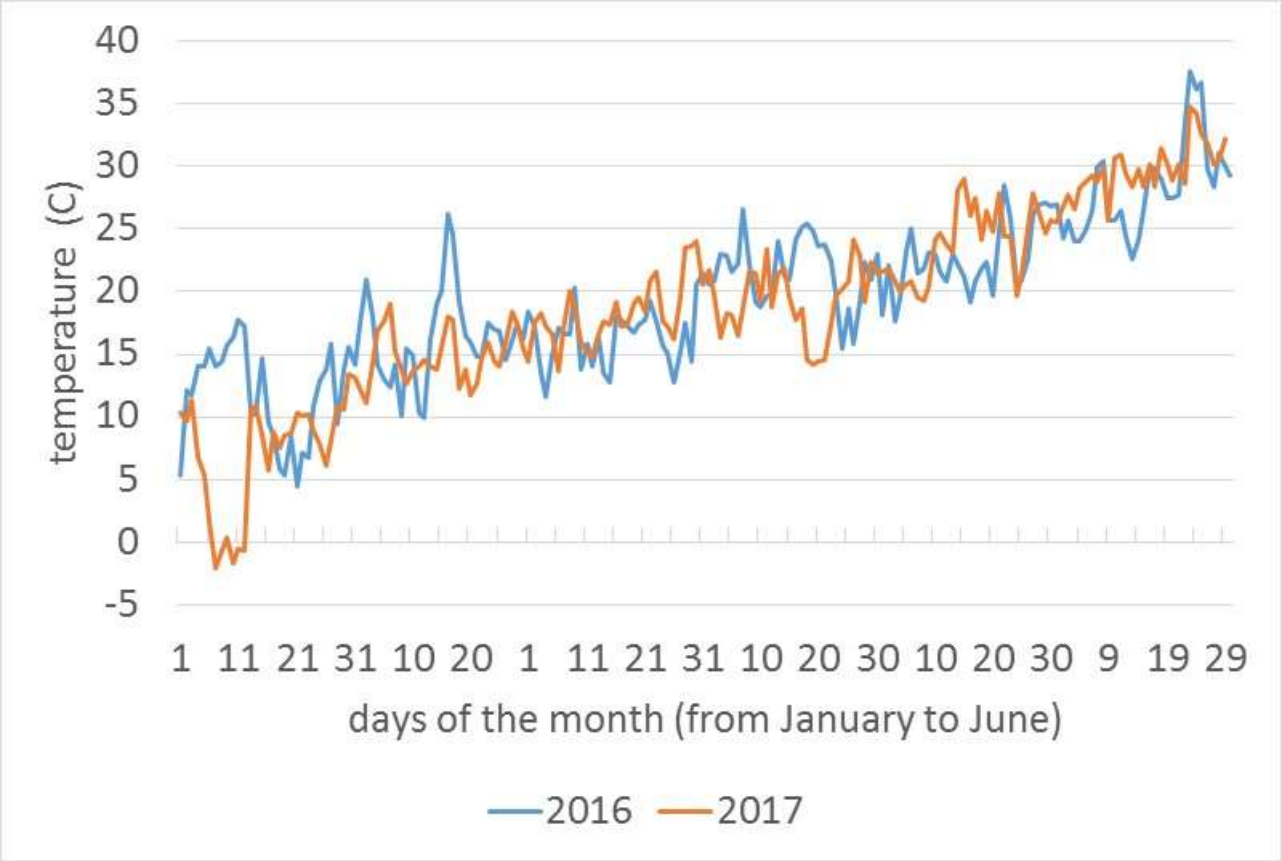


Figure 3.5: Daily maximum temperature in the first half of 2016 and 2017 in Ulcinj salina (from Zavod za hidrometeorologiju i seizmologiju Podgorica).

4. Characteristics and value of biodiversity

Ulcinj salina belongs to the biome of Mediterranean forest and shrub (makija), dominated with evergreen oak (*Quercus ilex;* Stevanović, Vasić, 1995). The biome is elongated along much of the east Adriatic coast, continuing across a large part of the Aegean coast (Matvejev 1995). The landscape impression of the salina and the surrounding lowland is totally different. Due to geomorphology, pedological and hydrological conditions, as well as the heavy influence of humans, alluvial forests, marshes, meadows and pastures predominate. Flora and fauna is typically Mediterranean, with cosmopolitan species being present too (Caković, Milošević 2013). With its tradition of wetland, the salina and its surroundings provide a home to many species which cannot be found elsewhere in Montenegro. Of all organisms, birds are the best known, followed by mammals, reptiles and amphibians. Much less information is available on fish and plants, while for invertebrates there is almost no information.

4.1. Flora and vegetation

Of about 3600 known species of plants in Montenegro, over 1500 grow in its coastal area from the bay of Kotor to the Bojana river (Caković, Milošević, 2013). We supplement the existing list of 114 plants (Vuksanović, Petrović. 2007) for Ulcinj salina with 87 new taxons; however, we must emphasize that due to time constraints for fieldwork, even our list cannot be considered a comprehensive list of flora for the area. In particular, little is presented about plants that only fully appear in late summer and autumn.

We mapped vegetation of the crystallization basins in detail; we recorded plants present and vegetation covering all of the basins. It should be noted that, when salt was produced in the area, crystallization basins were free of vegetation, so with our results it is possible to estimate the speed of succession in the last five years. The data is also crucial to future monitoring - if the area will not be managed, we can expect that succession will continue.

4.1.1. Plant composition of crystallisation basins.

In order to obtain information about the vegetation coverage of the crystallisation basins 5 years after termination of salt production, we performed a mapping of each basin integrating the standard protocol for the survey of central European vegetation. All crystallization basins were precisely surveyed and mapped. At the time of the survey (end of May 2017), the majority of plant species were in their full development phase, therefore we could ensure correct determination.

We examined altogether 100 crystallisation basins. The values of vegetation coverage varied between 0 and 100%. All together we listed 20 plant species. *Salicornia europaea* agg. and *Salsola soda* L. were the most abundant species in the vegetation coverage of the basins. The majority of surveyed species were halophytes, plant species growing and completing their life

cycles in habitats with a high salt content, usually on coastal wetlands (Figure 4.1, Figure 4.2). Some of the species, e.g. *Dittrichia viscosa* and *Tamarix* sp. enter the basins from the embankments that limit the basins. A full description of vegetation and coverage in the basins is presented in Appendix 1.

Such a survey represents a very useful depiction of the present situation and could be used as a benchmark for long-term monitoring, especially in light of future management approaches. However, all future management approaches should bear in mind that the present situation in the crystallization basins represents almost exclusively the habitat type **1310 *Salicornia* and other annuals colonising mud and sand**. This habitat type represents formations composed mostly or predominantly of annuals, in particular Chenopodiaceae, especially the genus *Salicornia* or grasses, colonising periodically inundated muds and sands of marine (also interior) salt marshes. Due to the geological composition of the eastern Adriatic coast this habitat type is represented only fragmentally, usually on small surfaces in favourable conditions. Since in Montenegro (and generally on the eastern Adriatic coast) there are only a few suitable sites (Tivat Salina is the only other larger suitable area) for the persistence of habitat types developed on salty – mud coastal substrates, conservation of **habitats on such large surfaces is of great conservational concern.**

Figure 4.1: Elements of the *Salicornia* and other annuals colonising mud and sand habitat type on former crystallization basins with some specimens of *Salicornia europea* agg. in the foreground.

Figure 4.2: *Salicornia* and other annuals colonising mud and sand habitat type almost completely covering a former crystallization basin with halophilous species *Salicornia europea* agg., *Suaeda maritima* and *Polypogon monspeliensis* prevailing.

4.1.2. Salt in the soil – influence on vegetation

We have measured salinity of the soil in basins, to present differences among overgrown and bare areas. We took several samples of soil (0 to 10 cm deep strata), incubated them for two hours in water (one part of soil, two parts of water) and in filtered solution measured salinity.

In general, areas with vegetation were on less salty soil than areas without vegetation (Figure 4.3). But the amount of salt in the soil is probably just one of factors dictating the overgrowing process. We found, for example, reed-stands growing also in very salty conditions. Among other, humidity of the soil and flooding regimes are probably equally if not even more important.

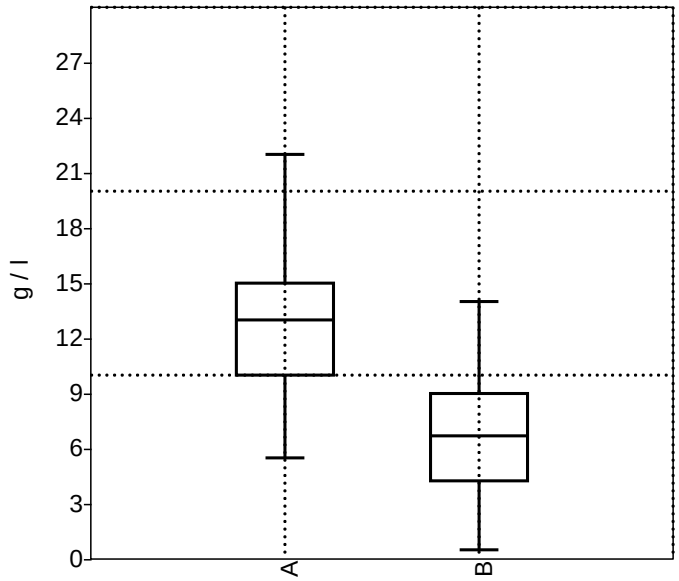


Figure 4.3: Salinity (in g per litre) of soil in basins with no vegetation (A – 12 samples) and in basins with vegetation (B – 14 samples). Median, first, third quartile and minimum, maximum presented. Samples were taken from crystallization and evaporation areas.

4.1.3. Plant diversity

We completed our list of vascular plant species of the Ulcinj salina with data provided in a paper on the flora and vegetation of the Ulcinj salina (Vuksanović & Petrović, 2007). Altogether 201 species have been recorded for this area (Table 4.1). Species of particular conservation concern are all the halophytes, which are limited only to areas with a large salt concentration in the substrate. The coast of Montenegro is predominantly composed of limestones. Such conditions are not favourable for large surface formations of halophilous vegetation. Some species can occur especially on ruderal habitats along the coast but rarely in larger formations. Typical for salinas are muddy-clayish ground, mainly on flatland coastal areas, such as (periodically flooded) banks of coastal lagoons or river mouths or artificial habitats like. **Only few such sites are present in Montenegro, Ulcinj salina being the largest and most important one**. The majority of halophytes are considered of particular conservation concern in the regional red lists of endangered plant species, such concern should be regarded also for representatives within the Montenegro flora.

Different species of halophytes are represented in three different habitat types: (**1310) *Salicornia* and other annuals colonising mud and sand** (in order of frequency: *Salicornia europaea* agg., *Salsola soda*, *Suaeda maritima*, *Spergularia salina*, *Atriplex prostrata*, annual halophilous grasses: *Polypogon monspeliensis*, *Parapholis incurva*, *Hordeum marinum*), **(1420) Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)**; in order of frequency: *Limonium narbonense*, *Inula crithmoides*, *Halimione portulacoides*, *Sarcocornia*

fruticose – only few plants were recorded) and only fragmentally **(1410) Mediterranean salt meadows (*Juncetalia maritime*;** in order of frequency: *Juncus acutus* and *Juncus maritimus*). **All listed habitat types are in the Annex I of the Habitats Directive** as a classification habitats for Natura 2000 designation. Some species (e.g. *Aster tripolium*) are present within *Phragmites australis* formations that are largely expanding on previously used salt basins. A usual representative of Mediterranean salt meadows, *Carex extensa*, was recorded only once on an embankment just outside the crystallization zone. Embankments built between basins represent an important habitat for many plant species – the majority of non-halophilous species in the Salina can be found there. The lower embankments are largely covered by perennial grasses like *Elymus pycnanthus* and *Lolium perenne*, together with typical halophilous annual grasses like *Parapholis incurcus* and *Hordeum marinum* and other species frequently occurring on salty substrates, like *Plantago coronopus* (Figure 4.4; some examples see Figures 4.5 to 4.8). The halophilous *Beta vulgaris* L. ssp. *maritima* has its only known locality of occurrence in Montenegro in the Ulcinj salina (Vuksanović & Petrović, 2007) where it can be found in low number on some embankments. Elements of Mediterranean salt meadows, like *Juncus acutus*, are also frequent on the embankments. Recent abandonment is evident from the presence (and probably expansion) of some pioneer species like *Dittrichia viscosa* and *Tamarix* sp. The highest embankments, with lower salt load, are covered with typical Mediterranean grassland species, the most charismatic being (early) spring flowering geophytes like *Anemone hortensis*, *Asphodelus aestivus*, *Hyacinthus orientalis*, *Narcissus tazetta*, *Romulea bulbocodium* and different orchid species (*Ophrys bertolonii*, *Orchis laxiflora*, *Serapias lingua* and *Serapias vomeracea*). These habitats are characterized also by a high diversity of Mediterranean annual species - therophytes. There is a particularly high diversity of therophyte species from the Fabaceae and Poaceae families.

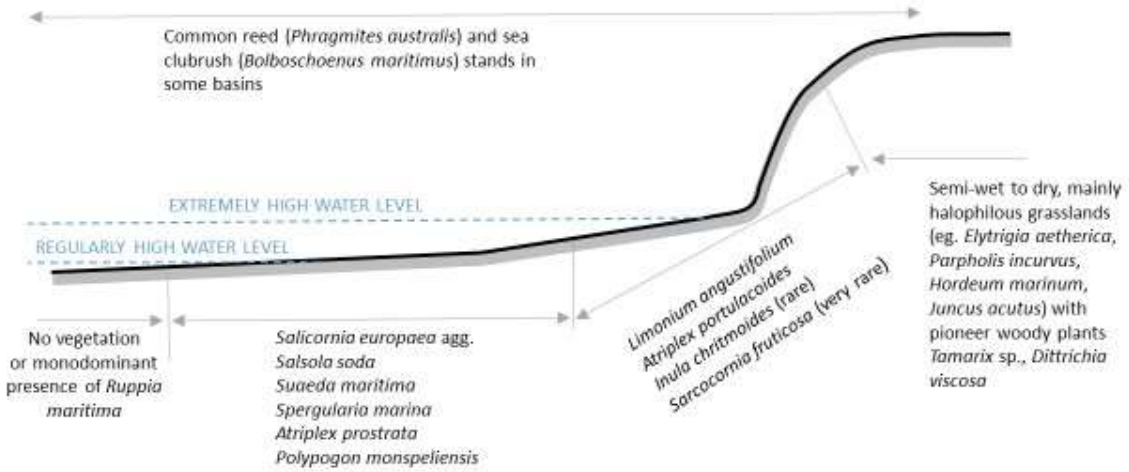


Figure 4.4: Schematic presentation of typical pattern of vegetation in basins, shaped by gradient in salt concentration in the ground and presence of water. Depth of the water vary between 0 cm in dry summers to approximately 30 cm during the autumn and winter.

The bottoms of larger water bodies and channels with constant water presence are largely covered with *Ruppia maritima*. Some bigger basins (e.g. Jezero 1 and Jezero 2) are largely covered by probably expanding surfaces of *Phragmites australis* and *Scirpus maritimus* formations. Shallow coastal salt water, of varying salinity and water volume, completely or partially separated from the sea, characterized by the vegetation from *Ruppietea maritimae* are classified as the habitat type **1150* Coastal lagoons, a priority habitat type from the Annex I** of the Habitats Directive.

According to literature data and data obtained during our survey there is no large impact of invasive alien plant species on the environment of the salina. Literature data report on the presence of *Erigeron annuus* and *Conyza canadensis*. During our visit, we were able to observe some vegetative parts belonging to species from the genus *Conyza*.

Table 4.1: List of surveyed species. Habitat types are indicated with respective codes: 1310 - *Salicornia* and other annuals colonising mud and sand; 1420 - Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticose); 1410 - Mediterranean salt meadows (Juncetalia maritime) or by a short descriptions. Halophytes and Invasive alien species are indicated in two additional columns.

Taxa	**Source**	**Habitat**	**Halophytes**	***Ivasive* alien species**
Aegilops neglecta Req. ex Bertol.	Field survey	Embankments		
Ajuga chamaepitys (L.) Schreb.	Vuksanović & Petrović 2007			
Alkanna tinctoria Tausch	Vuksanović & Petrović 2007			
Allium rotundum L.	Field survey	Embankments		
Alopecurus pratensis L.	Field survey	Embankments		
Anagallis arvensis L.	Vuksanović & Petrović 2007			
Anchusa officinalis L.	Vuksanović & Petrović 2007			
Anemone hortensis L.	Vuksanović & Petrović 2007			
Anthemis arvensis L.	Field survey	Embankments		

Arenaria serpyllifolia L.	Field survey	Embankments		
Aristolochia rotunda L.	Vuksanović & Petrović 2007			
Arum italicum Mill.	Vuksanović & Petrović 2007			
Asparagus acutifolius L.	Field survey	Embankments		
Asphodelus aestivus Brot.	Field survey	Embankments		
Aster tripolium L.	Field survey	Reed formations in the	x	
Atriplex prostrata Boucher ex DC.	Field survey	1310, Embankments	x	
Avena barbata Pott ex Link	Field survey	Embankments		
Bellis perennis L.	Vuksanović & Petrović 2007			
Beta vulgaris L. ssp. *maritima* (L.)	Field survey	Embankments	x	
Bidens tripartitus L.	Vuksanović & Petrović 2007			
Bituminaria bituminosa (L.)	Vuksanović & Petrović 2007			
Blackstonia perfoliata (L.) Huds.	Field survey	Embankments		
Briza maxima L.	Field survey	Embankments		
Bromus hordeaceus L.	Field survey	Embankments		
Calepina irregularis (Asso) Thell.	Vuksanović & Petrović 2007			
Capsella bursa-pastoris (L.)	Vuksanović & Petrović 2007			
Cardamine hirsuta L.	Vuksanović & Petrović 2007			
Carduus micropterus (Borbás)	Field survey	Embankments		
Carduus pycnocephalus L.	Field survey	Embankments		
Carex divulsa Stokes	Field survey	Embankments		
Carex extensa Gooden.	Field survey	Embankments	x	
Carthamus lanatus L.	Field survey	Embankments		
Centaurea alba L.	Vuksanović & Petrović 2039			
Centaurea calcitrapa L.	Field survey	Embankments		
Centaurea solstitialis L.	Vuksanović & Petrović 2007			
Centaurium erythraea Rafn	Vuksanović & Petrović 2007			
Cerastium brachypetalum Pers.	Field survey	Embankments		
Cichorium intybus L.	Field survey	Embankments		
Cirsium vulgare (Savi) Ten.	Field survey	Embankments		
Clematis viticella L.	Field survey	Embankments		
Clinopodium vulgare L.	Vuksanović & Petrović 2007			
Convolvulus arvensis L.	Field survey	Embankments		
Conyza canadensis (L.) Cronquist	Vuksanović & Petrović 2007			X
Coronopus squamatus (Forssk.)	Vuksanović & Petrović 2007			
Crepis foetida L.	Field survey	Embankments		
Cynanchum acutum L.	Field survey	Embankments		
Cynodon dactylon (L.) Pers.	Field survey	Embankments		
Cynoglossum creticum Mill.	Field survey	Embankments		
Daucus carota L.	Field survey	Embankments		
Delphinium peregrinum L.	Field survey	Embankments		
Desmazeria rigida (L.) Tutin	Field survey	Embankments		
Diplotaxis tenuifolia (L.) DC.	Field survey	Embankments		
Dittrichia viscosa (L.) Greuter	Field survey	Embankments		
Dorycnium hirsutum (L.) Ser.	Vuksanović & Petrović 2007			
Echium vulgare L.	Field survey	Embankments		
Elymus pycnanthus (Godr.)	Field survey	Embankments		
Epilobium hirsutum L.	Vuksanović & Petrović 2007			
Erigeron annuus (L.) Pers.	Vuksanović & Petrović 2007			X

Erodium cicutarium (L.) Ľ Hér.	Vuksanović & Petrović 2007			
Erodium malacoides (L.) Ľ Hér.	Vuksanović & Petrović 2007			
Eryngium amethystinum L.	Vuksanović & Petrović 2007			
Eupatorium cannabinum L.	Vuksanović & Petrović 2007			
Euphorbia helioscopia L.	Field survey	Embankments		
Euphorbia peplis L.	Vuksanović & Petrović 2007		x	
Euphorbia peplus L.	Vuksanović & Petrović 2007			
Euphorbia platyphyllos L.	Field survey	Embankments		
Euphorbia seguieriana Neck.	Vuksanović & Petrović 2007			
Euphorbia terracina L.	Vuksanović & Petrović 2007			
Festuca pratensis Huds.	Field survey	Embankments		
Ficus carica L.	Field survey	Embankments		
Filago vulgaris Lam.	Field survey	Embankments		
Foeniculum vulgare Mill.	Field survey	Embankments		
Galium aparine L.	Field survey	Embankments		
Gastridium ventricosum (Gouan)	Field survey	Embankments		
Geranium columbinum L.	Vuksanović & Petrović 2007			
Geranium dissectum L.	Vuksanović & Petrović 2007			
Geranium molle L. ssp. *brutium*	Vuksanović & Petrović 2007			
Geranium purpureum Vill.	Vuksanović & Petrović 2007			
Geranium rotundifolium L.	Field survey	Embankments		
Halimione portulacoides (L.)	Field survey	1420, Embankments	x	
Hedera helix L.	Field survey	Embankments		
Hedypnois cretica (L.)	Field survey	Embankments		
Helichrysum italicum (Roth)	Vuksanović & Petrović 2007			
Heliotropium europaeum L.	Vuksanović & Petrović 2007			
Holcus lanatus L.	Field survey	Embankments		
Hordeum marinum Huds.	Field survey	1310, Embankments	x	
Hordeum murinum L. ssp.	Field survey	Embankments		
Hyacinthus orientalis L.	Vuksanović & Petrović 2007			
Hypericum perforatum L.	Field survey	Embankments		
Inula britannica L.	Vuksanović & Petrović 2007			
Inula crithmoides L.	Field survey	1420, Embankments	x	
Juncus acutus L.	Field survey	1410, Embankments	x	
Juncus maritimus Lam.	Field survey	1410	x	
Kickxia commutata (Bernh. ex	Field survey	Embankments		
Lactuca viminea (L.) J. et C.Presl	Field survey	Embankments		
Lagurus ovatus L.	Field survey	Embankments		
Lamium purpureum L.	Vuksanović & Petrović 2007			
Lathyrus cicera L.	Vuksanović & Petrović 2007			
Lathyrus hirsutus L.	Field survey	Embankments		
Limonium narbonense Mill.	Field survey	1420, Embankments	x	
Linaria vulgaris Mill.	Vuksanović & Petrović 2007			
Linum nodiflorum L.	Vuksanović & Petrović 2007			
Linum usitatissimum L.	Vuksanović & Petrović 2007			
Lolium perenne L.	Field survey	Embankments		
Lotus corniculatus L.	Vuksanović & Petrović 2007			
Medicago minima (L.) Bartal.	Field survey	Embankments		
Medicago orbicularis (L.) Bartal.	Field survey	Embankments		

Melilotus italica (L.) Lam.	Field survey	Embankments		
Melilotus officinalis (L.) Lam.	Vuksanović & Petrović 2007			
Moenchia mantica (L.) Bartl.	Vuksanović & Petrović 2007			
Muscari comosum (L.) Mill.	Vuksanović & Petrović 2007			
Narcissus tazetta L.	Vuksanović & Petrović 2007			
Nigella damascena L.	Vuksanović & Petrović 2007			
Ophrys bertolonii Moretti	Vuksanović & Petrović 2007			
Orchis laxiflora Lam.	Vuksanović & Petrović 2007			
Oxalis corniculata L.	Field survey	Embankments		
Paliurus spina-christi Mill.	Field survey	Embankments		
Pallenis spinosa (L.) Cass.	Field survey	Embankments		
Parapholis incurva (L.) C.E.Hubb.	Field survey	1310, Embankments	x	
Parentucellia latifolia (L.) Caruel	Vuksanović & Petrović 2007			
Petrorhagia prolifera (L.) P. W. Ball	Field survey	Embankments		
Petrorhagia saxifraga (L.) Link	Field survey	Embankments		
Phragmites australis (Cav.) Trin. ex	Field survey	Embankments		
Picnomon acarna (L.) Cass.	Field survey	Embankments		
Picris echioides L.	Field survey	Embankments		
Plantago coronopus L.	Field survey	Embankments		
Plantago lanceolata L.	Field survey	Embankments		
Plantago major L.	Vuksanović & Petrović 2008			
Polygonum aviculare L.	Field survey	Embankments		
Polypogon monspeliensis (L.)	Field survey	1310, Embankments	x	
Portulaca oleracea L.	Vuksanović & Petrović 2009			
Potentilla reptans L.	Field survey	Embankments		
Prunella laciniata (L.) L.	Vuksanović & Petrović 2010			
Prunella vulgaris L.	Vuksanović & Petrović 2011			
Psilurus incurvus (Gouan) Schinz et	Field survey	Embankments		
Pulicaria dysenterica (L.) Bernh.	Vuksanović & Petrović 2012			
Pyrus amygdaliformis Vill.	Field survey	Embankments		
Reichardia picroides (L.) Roth	Field survey	Embankments		
Reseda phyteuma L.	Vuksanović & Petrović 2013			
Romulea bulbocodium (L.) Sebast.	Vuksanović & Petrović 2014			
Rosa canina L.	Vuksanović & Petrović 2015			
Rosa sempervirens L.	Field survey	Embankments		
Rostraria cristata (L.) Tzvelev	Field survey	Embankments		
Rubus idaeus L.	Vuksanović & Petrović 2016			
Rubus ulmifolius Schott	Field survey	Embankments		
Rumex pulcher L.	Field survey	Embankments		
Ruppia maritima L.	Field survey	Larger basins and		
Salicornia europea agg.	Field survey	1310	x	
Salsola soda L.	Field survey	1310	x	
Salvia verbenaca L.	Field survey	Embankments		
Salvia verticillata L.	Vuksanović & Petrović 2017			
Sanguisorba minor Scop.	Field survey	Embankments		
Sarcocornia fruticosa (L.) A.J.Scott	Field survey	1420	x	
Scandix pecten-veneris L.	Vuksanović & Petrović 2018			
Scirpus maritimus L.	Field survey			
Scolymus hispanicus L.	Field survey	Embankments		

Scorzonera laciniata L.	Field survey	Embankments		
Securigera securidaca (L.) Degen et	Field survey	Embankments		
Senecio rupestris Waldst. & Kit.	Vuksanović & Petrović 2019			
Serapias lingua L.	Vuksanović & Petrović 2020			
Serapias vomeracea (Burm.) Briq.	Vuksanović & Petrović 2021			
Sherardia arvensis L.	Field survey	Embankments		
Sideritis romana L. ssp. *purpurea*	Field survey	Embankments		
Silene conica L.	Vuksanović & Petrović 2022			
Silene gallica L.	Vuksanović & Petrović 2023			
Silene latifolia Poir.	Field survey	Embankments		
Silene nocturna L.	Vuksanović & Petrović 2024			
Sisymbrium officinale (L.) Scop.	Field survey	Embankments		
Solanum nigrum L.	Vuksanović & Petrović 2025			
Sonchus arvensis L.	Vuksanović & Petrović 2026			
Sonchus asper (L.) Hill	Field survey	Embankments		
Sonchus oleraceus L.	Field survey	Embankments		
Spergularia salina J. Presl et C.	Field survey	1310, Embankments	x	
Stellaria media (L.) Vill.	Vuksanović & Petrović 2027			
Suaeda maritima (L.) Dumort.	Field survey	1310	x	
Tamarix sp.	Field survey	Embankments		
Taraxacum officinale Weber	Vuksanović & Petrović 2028			
Teucrium chamaedrys L.	Vuksanović & Petrović 2029			
Teucrium polium L.	Field survey	Embankments		
Torilis nodosa (L.) Gaertn.	Field survey	Embankments		
Trifolium angustifolium L.	Field survey	Embankments		
Trifolium campestre Schreber	Field survey	Embankments		
Trifolium fragiferum L.	Field survey	Embankments		
Trifolium incarnatum L.	Vuksanović & Petrović 2030			
Trifolium lappaceum L.	Field survey	Embankments		
Trifolium nigrescens Viv.	Field survey	Embankments		
Trifolium repens L.	Field survey	Embankments		
Trifolium resupinatum L.	Vuksanović & Petrović 2031			
Trifolium subterraneum L.	Vuksanović & Petrović 2032			
Trigonella esculenta Willd.	Vuksanović & Petrović 2033			
Urospermum picroides (L.) Scop. ex	Field survey	Embankments		
Valantia muralis L.	Field survey	Embankments		
Verbascum sinuatum L.	Field survey	Embankments		
Verbena officinalis L.	Field survey	Embankments		
Veronica arvensis L.	Vuksanović & Petrović 2035			
Veronica chamaedrys L.	Vuksanović & Petrović 2034			
Vicia dasycarpa Ten.	Field survey	Embankments		
Vicia grandiflora Scop.	Vuksanović & Petrović 2036			
Vicia hybrida L.	Field survey	Embankments		
Vicia sativa L.	Vuksanović & Petrović 2037			
Vincetoxicum hirundinaria	Vuksanović & Petrović 2038			

Figure 4.5: *Salicornia* and other annuals colonising mud and sand habitat type on basin margins with prevalence of annual halophyte *Salicornia europea* agg and annual halophilous grass *Polypogon monspeliensis*.

Figure 4.6: *Salicornia* and other annuals colonising mud and sand habitat type on basin margins with prevalence of annual halophytes *Salicornia europea* agg. and *Suaeda maritima*.

Figure 4.7: Profile with *Salicornia* and other annuals colonising mud and sand habitat type on basin margins with prevalence of annual halophytes *Salicornia europea* agg. and *Suaeda maritima,* followed by a narrow strip of Mediterranean and thermo-Atlantic halophilous scrubs with domination of *Limonium narbonense* and elements of Mediterranean salt meadows on top of the embankment with *Juncus acutus*.

Figure 4.8: Profile with *Salicornia* and other annuals colonising mud and sand habitat type on basin margins with prevalence of annual halophyte *Salicornia europea* agg. and *Suaeda maritima,* followed by a narrow strip of Mediterranean and thermo-Atlantic halophilous scrubs with domination of *Limonium narbonense*.

4.2. Birds

Of almost 350 birds known for Montenegro (Saveljić, Jovićevič 2015) about 250 were registered in the area of Ulcinj salina. For the presentation of the birds from Ulcinj salina in this report, all available data were used. Data obtained by CZIP (original data file), from Studia zaštite (2015), and from EuroNatur publications (Štumberger et al. 2007, Schwarz & Sackl 2017), data collected during IWC (prepared by IWC national coordinator A. Vizi) as well as our own data obtained in 2017 surveys. Only surveys where at least 90% of all the area was searched were taken into consideration. Some surveys were done by more observers in one day, some were taken by one observer in several consecutive days. For some non-water birds, there are no quantitative data; in these cases, populations were roughly estimated according to our observations.

During migration, birds are not stationary as during the winter. They stay in the area for a few days and then move on following their route to breeding (in spring) or wintering (in autumn) grounds. But outgoing birds are constantly replaced by newcomers. So the total number of birds hosted by a wetland during migration is much higher than those estimated from data of daily counts. In ecology, we call this a "turn-over" rate or effect. Unfortunately, without marked birds, the turn-over rate is very difficult to estimate and it unevitably underestimate abundance of migratory birds. Nevertheless, it should be noted, that considering the "turn-over rate, the population of migrants counted in one day could therefore be much higher than while considering just the actually counted birds. For salina currently there are no data available to take into account the turn-over effect systematically (but see some estimates in Sackl et al. 2017). Only in some specific parts in this report, when this effect was crucial for understanding of the population dynamics of bird communities, we did some very rough estimations of our own.

Bird ringing was not part of the surveys. The potential value of the area for Passerines during spring and autumn migration therefore is not considered.

4.2.1. Characteristics

On the territory of EU, there are over 470 native, regularly occurring bird species and over 300 vagrants (do not occur regularly or predictably):
http://ec.europa.eu/environment/nature/conservation/wildbirds/eu_species/index_en.htm

According to Studia zaštite (2015), about 250 bird species were recorded for the area so far. That is more than half of the regularly occurring and about 1/3 of all naturally present birds in the EU and about 70% of all birds found in Montenegro. In our report, we deal with data on 173 bird species, 57 of them breeding in the area. Of all the birds, 63 are listed on ANNEX I of the Bird directive and 10 of them are priority species. Sixty-eight species are of special conservation concern in Europe. Among them, 17 are SPEC 1, 12 are SPEC 2 and 39 are SPEC 3 (for explanation, see end of the chapter). We must stress that the number of species is just one among many indicators of importance for the area and, in our opinion, it is not the most important one.

In analyses we considered 50 surveys from Ulcinj salina, dated from 25.4.2003 to 2.6.2017. In all fifty surveys, almost half a million birds were counted (433.589). On average, during winter and spring or autumn migration, between 5.000 and 30.000 birds are present in the salina daily, during the breeding period and in summer up to 5000 (Figure 4.9).

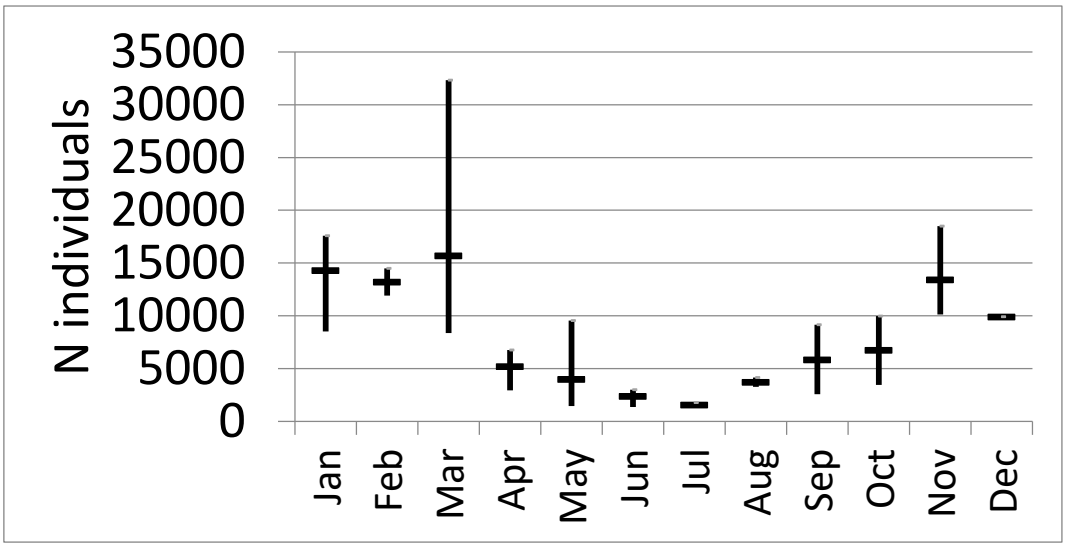


Figure 4.9: Average, minimum and maximum number of birds recorded per day according to month of observation (N of surveys =50).

We present birds in three groups. The first are birds that are common or numerous at least in some season within the perimeter of Ulcinj salina. Those are the most important species for the area, that is, **for the area they represent the greatest ecological value**. The second group are birds present in the salina only occasionally, in small numbers or for short periods. Some of them can also breed here, and do so usually, but not regularly. **Although less important for the salina as an ecosystem, the area can still be very important for their well-being and their conservation status** - for some of them, Ulcinj salina is the only habitat in the broader area. The third group are birds from surroundings which can from time to time appear in the salina. In general, their value for the area is low.

Each species was assigned the status of Natura 2000 species and Species of European Conservation Concern (SPEC; BirdLife International 2017). Natura 2000 are all species listed on ANNEX I of the bird directive. If their population in a particular site within the EU meets certain predefined criteria, the area must be designated as Natura 2000. Although the bird directive does not list which of the species are priority, we add this information according to the decision of the Ornis Committee (http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/docs/list_annex1.pdf) . We mark priority species with an asterix - "*" - beside ANNEX I index.

SPEC (Species of European Conservation Concern) categories sort species according to their conservation status in Europe. In this report, we consider the first three levels, SPEC 1 – 3.

SPEC 1 - European species of global conservation concern. They are classified as Critically Endangered, Endangered, Vulnerable or Near threatened at global level.

SPEC 2 – Global population is concentrated in Europe and is classified as Regionally Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened, Declining, Depleted or Rare at European level.

SPEC 3 – Population is not concentrated in Europe, but it is classified as Regionally Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened, Declining, Depleted or Rare at European level.

4.2.2. Frequent / numerous birds (60 species)

For each species we show three variables: presence, breeding and daily maximum (Table 4.2).

A presence is a measure of regularity of occurrence in the area. It is calculated as a rounded percentage of surveys in which species were recorded. If a species has a presence of 100 that means that it was recorded in all surveys. As an interpretation aid, we consider birds with a presence of more than 90 to be regularly present in the area (with little effort the bird can be seen in the area on any day), birds with a presence of more than 50% are considered as irregularly present (in some seasons birds can be easily spotted in some they are not present), birds with a presence less than 50% are considered as sporadically present and birds with a presence less than 10% are considered as accidentally present.

Variable breeding denotes a number of breeding pairs. The number is a compilation of findings from all years of investigation. The span between minimum and maximum is due to different estimates in different years.

Variable daily maximum presents the maximum number of individuals of a particular species recorded in the salina on a single day. The highest number is the absolute maximum of counted birds. In some cases this information exaggerates possible expectations, since it represents population size as it was determined only once in 15 years. The second number is the fifth highest number of individuals recorded per day (statistically it is calculated as a 90^{th} percentile). This is a more conservative estimate of the maximum birds present in the area on any given day. It should be kept in mind that both numbers correspond only to a season, when particular species is the most numerous in the area.

Table 4.2: Frequent / numerous birds in Ulcinj salina (at least in part of the season). Presence = percentage of surveys in which the species was present; breeding = estimate of number of breeding pairs; daily maximum = the first and the fifth greatest number of recorded individuals .

English name	Scientific name	presence	breeding	daily maximum	ANNEX I	SPEC
Shelduck	Tadorna tadorna	88	0-7	620/70		
Mallard	*Anas platyrhinchos*	*56*	*0-3*	*870/374*		
Gadwall	*Anas strepera*	*40*	*0*	*433/200*		
Pintail	*Anas acuta*	*82*	*0*	*136/563*		*3*
Shoveler	*Anas clypeata*	*72*	*0-3*	*1158/238*		
Wigeon	*Anas penelope*	*68*	*0*	*2549/1180*		
Teal	*Anas crecca*	*50*	*0-3*	*3460/945*		
Garganey	*Anas querquedula*	*38*	*0-3*	*8279/151*		*3*
Pochard	*Aythya ferina*	*16*	*0*	*508/383*		*1*
Little grebe	*Tachybaptus ruficollis*	*52*	*0-18*	108/48		
Black-necked grebe	*Podiceps nigricollis*	*46*	*0*	*68/41*		
Dalmatian pelican	*Pelecanus crispus*	*56*	*0*	*108/94*	*x**	*1*
Cormorant	*Phalacrocorax carbo*	*72*	*0*	*342/160*		
Pygmy cormorant	*Phalacrocorax pygmaeus*	*88*	*0*	*598/336*	*x*	
Little egret	*Egretta garzetta*	*96*	*0*	*680/237*	*x*	
Great egret	*Casmerodius albus*	*80*	*0*	*501/136*	*x*	
Grey heron	*Ardea cinerea*	*92*	*0*	*269/145*		
Spoonbill	*Platalea leucorodia*	*80*	*0*	*147/89*	*x*	
Flamingo	*Phoenicopterus roseus*	*28*	*0-350*	*1164/998*	*x*	
Marsh harrier	*Circus aeruginosus*	*78*	*0-1*	*10/7*	*x*	
Coot	*Fulica atra*	*32*	*0-25*	*7640/5414*		*3*
Crane	*Grus grus*	*4*	*0*	*299/280*	*x*	
Avocet	*Recurvirostra avosetta*	*28*	*0-2*	*101/7*	*x*	
Black-winged stilt	*Himantopus himantopus*	*58*	*45-130*	*304/264*	*x*	
Stone curlew	*Burhinus oedicnemus*	*48*	*6-18*	*90/48*	*x*	*3*
Collared pratincole	*Glareola pratincola*	*38*	*28-100*	*225/206*	*x*	*3*
Little ringed plover	*Charadrius dubius*	*58*	*3-11*	*201/56*		
Ringed plover	*Charadrius hiaticula*	*44*	*0*	*143/57*		
Kentish plover	*Charadrius alexandrinus*	*90*	*30-78*	*472/285*	*x*	*3*
Grey plover	*Pluvialis squatarola*	*92*	*0*	*481/379*		
Golden plover	*Pluvialis apricaria*	*40*	*0*	*630/595*	*x*	
Lapwing	*Vanellus vanellus*	*72*	*0-2*	*4143/2042*		*1*
Sanderling	*Calidris alba*	*26*	*0*	*140/93*		
Dunlin	*Calidris alpina*	*84*	*0*	*10.503/7535*		*3*
Curlew sandpiper	*Calidris ferruginea*	*22*	*0*	*2328/363*		*1*
Little stint	*Calidris minuta*	*72*	*0*	*1868/471*		
Common sandpiper	*Actitis hypoleucos*	*50*	*0-7*	*65/18*		*3*
Redshank	*Tringa totanus*	*100*	*4-60*	*1993/1614*		*2*
Spotted redshank	*Tringa erythropus*	*94*	*0*	*2249/849*		*3*
Greenshank	*Tringa nebularia*	*96*	*0*	*620/94*		
Marsh sandpiper	*Tringa stagnatilis*	*66*	*0*	*500/57*		
Wood sandpiper	*Tringa glareola*	*32*	*0*	*486/179*	*x*	*3*
Green sandpiper	*Tringa ochrops*	*72*	*0*	*750/21*		

Black-tailed godwit	*Limosa limosa*	*50*	*0*	*3423/628*		*1*
Curlew	*Numenius arquata*	*84*	*0*	*75/34*		*1*
Snipe	*Gallinago gallinago*	*66*	*0*	*2445/900*		*3*
Ruff	*Philomachus pugnax*	*54*	*0*	*2618/1985*	*x*	*2*
Black-headed gull	*Chroicophalus ridibundus*	*88*	*0*	*3023/1440*		
Yellow-legged gull	*Larus michahellis*	*100*	*2-50*	*753/352*		
Little tern	*Sternula albifrons*	*34*	*65-150*	*391/282*	*x*	*3*
Common tern	*Sterna hirundo*	*36*	*5-80*	*144/80*	*x*	
Kingfisher	*Alcedo athis*	*60*	*0-5*	*71/34*	*x*	*3*
Crested lark	*Galerida cristata*	*-*	*30-50*	*-*		*3*
Barn swallow	*Hirundo rustica*	*-*	*?*	*-*		*3*
Yellow wagtail	*Motacila flava*	*-*	*30-50*	*-*		*3*
Wheater	*Oenanthe oenanthe*	*-*	*0*	*-*		*3*
Whinchat	*Saxicola rubetra*	*-*	*0*	*-*		*2*
Great reed warbler	*Acrocephalus arundinaceus*	*-*	*30-70*	*-*		
House sparrow	*Passer domesticus*	*-*	*<50*	*-*		*3*
Spanish sparrow	*Passer hispaniolensis*	*-*	*>50*	*-*		

4.2.3. Rare and scarce birds (69 species)

In this group, we listed species for which we estimated that they have a rather small habitat and for that reason in Ulcinj salina they cannot realize the full potential of the population (Table 4.3). We realize, that some species ended up in this group because their number was underestimated, since they were not surveyed using adequate methods, in particular the case of bird species that are active during the night. In this group are also birds that nest predominantly in canals on the perimeter of the salina and not on the "mainland" of salina. Some species in this group are naturally rare and scarce in this type of ecosystem, some nest in the area only in nest boxes. Being listed in this group does not mean that Ulcinj salina is not important for them. It is just an indication that the ecological influence of those birds on the ecosystem is less intense as an influence of birds from group one.

Table 4.3: Rare and scarce birds in Ulcinj salina. Indiv. = number of recorded individuals for particular species (if information exists). $^{+}$ - there are no recent observations within the whole of Europe, the species is classified by IUCN as Critically endangered (Possibly extinct).

English name	Scientific name	Indiv.	ANNEX I	SPEC
Mute swan	*Cygnus olor*	28		
White-fronted goose	*Anser albifrons*	21		
Lesser white-fronted goose	*Anser erythropus*	3	x*	1
Greylag goose	*Anser anser*	5		
Red-crested pochard	*Neta rufina*	6		
Ferruginous duck	*Aythya nyroca*	47	x*	1
Tufted duck	*Aythya fuligula*	22		3
Slavonian grebe	*Podiceps auritus*	1	X	1
Great crested grebe	*Podiceps cristatus*	32		
White pelican	*Pelecanus onocrotalus*	5	X	3

Bittern	*Botaurus stellaris*	11	x*	3
Little bittern	*Ixobrychus minutus*	2	X	3
Night heron	*Nycticorax nycticorax*	111	X	3
Cattle egret	*Bubulcus ibis*			
Squacco heron	*Ardeola ralloides*	22	X	3
Purple heron	*Ardea purpurea*	8	X	3
White stork	*Ciconia ciconia*	1	X	
Black stork	*Ciconia nigra*	4	X	
Glossy ibis	*Plegadis falcinellus*	84	X	
Osprey	*Pandion haliaetus*		X	
Hen harrier	*Circus cyaneus*	44	X	3
Montagus harrier	*Circus pygargus*	10	X	
Pallid harrier	*Circus macrouros*	2	X	1
Red-footed falcon	*Falco vespertinus*	11	x*	1
Water rail	*Rallus aquaticus*	188		
Spotted crake	*Porzana porzana*	1	X	
Moorhen	*Gallinula chloropus*	110		
Oystercatcher	*Haematopus ostralegus*	24		1
Dotterel	*Charadrius morinellus*	1	X	
Knot	*Calidris canutus*	149		1
Temminck's stint	*Calidris temminckii*	73		
Turnstone	*Arenaria interpres*	7		
Bar-tailed godwit	*Limosa lapponica*	7	X	1
Whimbrel	*Numenius phaeopus*	213		
Slender-billed curlew[+]	*Numenius tenuirostris*	1	X	1
Woodcock	*Scolopax rusticola*			
Jack snipe	*Lymnocryptes minimus*			
Red-necked phalarope	*Phalaropus lobatus*	1	X	
Slender-billed gull	*Chroicocephalus genei*	10	X	
Common gull	*Larus canus*	140		
Mediteranean gull	*Larus melanocephalus*	13	X	
Lesser black-backed gull	*Larus fuscus*	8		
Little gull	*Hydrocoloeus minutus*	84	X	3
Sandwich tern	*Sterna sandvicensis*	2	X	
Gull-billed turn	*Gelochelidon nilotica*	18	X	3
Caspian tern	*Hydroprogne caspia*	66	X	
Black tern	*Chlidonias niger*	35	X	3
White-winged tern	*Chlidonias leucopterus*	72		
Whickered tern	*Chlidonias hybrid*	11	X	
Gret spotted cuckoo	*Clamator glandarius*			
Little owl	*Anthene noctua*			3
Nightjar	*Caprimulgus europaeus*		X	3
Bee-eater	*Merops apiaster*			
Roller	*Coracias garrulous*		x*	2
Short-toed lark	*Calandrella brachydactyla*		X	3
Red-rumped swallow	*Cecropis daurica*			
House martin	*Delichon urbicum*			2
Red-throated pipit	*Anthus cervinus*			
Black-eared wheatear	*Oenanthe hispanica*			

Whitethroat	*Sylvia communis*			
Subalpine warbler	*Sylvia cantillans*			
Sedge warbler	*Acr. Schoenobaenus*			
Reed warbler	*Acrocephalus scirpaceus*			
Savis warbler	*Locustela luscinoides*			
Penduline tit	*Remiz pendulinus*			
Magpie	*Pica pica*			
Jay	*Garrulus glandarius*			
Reed bunting	*Emberiza schoeniclus*			
Corn bunting	*Milaria calandra*			2

4.2.4. Birds occasionally visiting the area (46 species)

Inclusion of birds in this group does not mean that some of them in some years do not nest in the salina (Table 4.4). But this is more or less exceptional and as a rule in very small numbers, at least when compared with the surrounding areas. Usually birds from this list live and breed outside the area, visiting the salina only from time to time. This means that the salina is not very important for them and also that they do not have a big influence on this ecosystem. During our field work, we did not go to great extremes to confirm the presence of birds from this group, so this list is, of all lists in this report, the least comprehensive.

Table 4.4: Birds occasionally occurring in Ulcinj salina.

English name	Scientific name	ANNEX I	SPEC
Pheasant	*Phasianus colchicus*		
Spotted eagle	*Aquila clanga*	x*	1
Short-toed eagle	*Circaetus gallicus*	x	
Long-legged buzzard	*Buteo rufinus*	x	
Common buzzard	*Buteo buteo*		
Honey buzzard	*Pernis apivorus*	x	
Sparrowhawk	*Accipiter nisus*		
Goshawk	*Accipiter gentilis*		
Levant sparrow hawk	*Accipiter brevipes*	x	2
Kestrel	*Falco tinnunculus*		3
Hobby	*Falco Subbuteo*		
Eleonoras falcon	*Falco eleonore*	x*	
Peregrine falcon	*Falco peregrinus*	x	
Merlin	*Falco columbarius*	x	
Lanner falcon	*Falco biarmicus*	x*	3
Collared dove	*Streptopelia turtur*		1
Turtle dove	*Streptopelia decaocto*		
Cuckoo	*Cuculus canorus*		
Swift	*Apus apus*		3
Alpine swift	*Apus melba*		
Hoopoe	*Upupa epops*		
Great spotted woodpecker	*Dendrocopos major*		
Skylark	*Alauda arvensis*		3
Sand martin	*Riparia riparia*		3

White wagtail	*Motacilla alba*		
Nightingale	*Luscinia megarhynchos*		
Black redstart	*Phoenicurus ochruros*		
Blackbird	*Turdus merula*		
Blackcap	*Sylvia atricapilla*		
Sardinian warbler	*Sylvia melanocephala*		
Zitting cisticola	*Cisticola juncidis*		
Olivaceous warbler	*Hippolais pallida*		
Spotted flycatcher	*Muscicapa striata*		2
Great tit	*Parus major*		
Lesser grey shrike	*Lanius minor*	x	2
Red-backed shrike	*Lanius collurio*	x	2
Woodchat shrike	*Lanius senator*		2
Hooded crow	*Corvus corone cornix*		
Jackdaw	*Corvus monedula*		
Starling	*Sturnus vulgaris*		3
Golden oriole	*Oriolus oriolus*		
Tree sparrow	*Passer montanus*		3
Linnet	*Carduelis canabina*		2
Goldfinch	*Carduelis carduelis*		
Greenfinch	*Caruelis chloris*		
Black-headed bunting	*Emberiza melanocephala*		

4.2.5. Value

GREATER FLAMINGO Phoenicopterus roseus – A FLAGSHIP SPECIES

Breeding population is increasing, present year-round.

The flagship species concept holds that by raising the profile of a particular species, the importance of a particular area can be increased disproportionally, which in turn can result in a more successful conservation process. The flagship concept somehow connects the ecological, conservational and sociological importance of a species.

The Greater flamingo was successfully selected as a flagship species already in many other places round the world (Johnson & Cezilly, 2007). When in high number, it has a large ecological impact on the area, people like to observe them and they are also easily spotted. The flamingo is one of the most unique and distinctive birds in this part of the Mediterranean. **We believe that the Greater flamingo would be an appropriate flagship species for Ulcinj salina**.

There is another unique and distinctive bird regularly present in the salina, the Dalmatian pelican. It can be present in flocks of up to 100 in particular in autumn. It is a very big bird, very conspicuous and people recognize them without much previous knowledge. So the Dalmatian pelican could also, in a way, be a flagship species. Nevertheless, we decided against it. We do not see a salina ecosystem as typical for pelicans. On the other hand, only some ten kilometres away there is another important bird area in Montenegro, Skadarsko jezero, which is ideal for birds like pelicans. In our opinion, pelicans should be flagship species on Skadarsko jezero.

In the EU, flamingos nest only in about ten localities, all of which are in the Mediterranean region. Closest to Ulcinj is the breeding ground near Bari (Italy). During the years of salt production in Ulcinj, the flamingo was only an exceptional guest. In 2010, a flock of over 100 birds spent winter in the salina, for the first time in so large a number (Studia zaštite 2015). In autumn 2011, there were 450 birds; in 2012, already 735 birds; and in 2014, a stunning 2500 birds. The first nesting was recorded in 2013 (approximately 350 breeding pairs, Studija zaštite, 2015), and then in the next years, too, but to our knowledge it was not successful due to the changing water level and/or disturbance. In 2016 over 1000 individuals were recorded and a nesting colony was flooded (Schwarz & Sackl, 2017). In April 2017 we observed one of the breeding displays, “head fagging” (Johnson & Cezilly, 2007), but birds did not commence with nesting. There was also a very pronounced dynamic in the number of birds in 2017. In the beginning of March, there were less than 100 birds. As locals explained, this was a remaining part of the population left after an exceptionally cold winter, which killed several birds. From the middle until the end of April, when breeding usually starts, the number increased from 400 to 750. Until the end of May, the number decreased to 81 and at the end of June increased again to 750. During our field study, we never saw flamingos fly to or away from the salina. Migration probably occurred at night, something that it is not unusual for them (Johnson & Cezilly, 2007). **It seems that from 2012, there has been a regularly present population of flamingos counting 700 and more individuals**. With this number, the flamingo population in the salina exceeds the 1% threshold for designation as an internationally important area. The conection of population with other populations throughout the Mediterranean region is confirmed with findings of 78 ringed birds from Algeria, Grance, Italy, Spain and Turkey (Saveljić, Zeković 2017).

IMPORTANT BREEDING BIRDS

Among all breeding birds from Ulcinj salina, we selected 6 species as the most important, as being traditional and numerous breeders of the area. Some of them are attracted to the salina due to its shallow waters with muddy banks which they use as a feeding ground and as a protection against predators. Stone curlew and Collared pratincole on the other hand are attracted by vast, sparsely vegetated, dry land, which still, somehow, depends on a water. Otherwise both species probably would not be listed on the pages of Wetland International.

As a potential for further development of a protected area, we present also a size of the breeding population that could be reached in the current area of the salina with proper management. We estimate this potential number by comparing populations with populations

from Sečoveljske soline (Slovenia), which is about twice smaller and where part of the area is carefully managed for the benefit of birds. While each of the two salinas are unique in their own way, they are still sufficiently similar to allow meaningful comparisons.

Black-winged stilt *Himantopus himantopus*

Stable breeding population, 45-130 breeding pairs, present only during breeding season.

The Black-winged stilt has a wide distribution on the coasts as well as inland across most of the southern part of the EU. In 2017 in Ulcinj salina up to 100 breeding pairs started with nesting activities at the end of April. By the end of May, young already hatch and leave the nests to feed. Breeding success depends on conditions. In 2016, due to rainfall and consecutive flooding of basins, many young birds drowned (Schwarz & Sackl, 2017). In 2017, due to dry basins, nests were easily accessed by predators and several young birds could be preyed upon. In spite of fluctuations in the number of nests and in breeding success from year to year, over the long term, the breeding population seems to be stable. **It could be that Ulcinj salina is the only breeding place for this species in Montenegro** (Studia zaštite, 2015).

We estimate that, with appropriate management, a breeding population of up to 200 pairs could easily be achieved, which is about twice as much as today.

Stone curlew *Burhinus oedicnemus*

Increased breeding population, 6 to 18 breeding pairs, present only during breeding season.

The Stone curlew is not a very typical bird for the salina. It should be pointed out that many pairs breed elsewhere in Montenegro, too. Nevertheless, the bird with its big, yellow eyes is quite striking also among salina basins and a good eye-catcher for birdwatchers. The population in the salina in the last years has possibly increased from less than 10 to more than 10 breeding pairs. It is also

possible that more research time in the last years effected better results, so a stable population in this case would be a better estimation. One possible explanation is also that the Stone curlews have benefited from conditions since salt production stopped. The basins in the crystallization area, where we found most of the breeding pairs, are now mostly dry during breeding time.

Collared pratincole *Glareola pratincola*

Stable breeding population, 28 to 100 breeding pairs, present only during breeding season.

The Collared pratincola is a unique bird in Ulcinj salina. As far as we know, this is its only breeding place in Montenegro (Studia zaštite 2015). **Besides Albania, there are also no other known breeding populations of this species along the eastern side of the Adriatic coast**. The species is extremely sparsely distributed in the entire EU.

In Ulcinj, the Collared pratincola is a very abundant breeder with a population of around 100 pairs. From year to year its population fluctuates, probably due to weather conditions. In dry years, breeding success is high; in years with more rain in spring, floods in the basins destroy nests and reduce breeding success. In 2017, all birds were nesting in dry basins in particular in areas of evaporation I, II and III. There was a colony also in Stojski area. Birds were nesting in several loose colonies. Nests were found also on heavily cracked dry mud in the middle of the basins, free of any vegetation. Young hatched at the end of June. They are capable of moving around a day after. Possibly at least some of them are able to avoid high waters after a heavy rain at that time.

Kentish plover *Charadrius alexandrinus*

Stable breeding population, 30 to 78 breeding pairs, present year-round.

To the north of the EU, the breeding distribution of the Kentish plover extends to Denmark, but it is rather sparsely limited to a very narrow belt on the coasts. It is very sparsely distributed also along Adriatic coast. The Kentish plover is very secretive bird, although it lives in open, un-vegetated space. Its coloration blends it in with the environment very well and this makes it difficult to observe and count. Assuming that all data were contributed by similarly skilled bird-watchers spending similar effort on this species, its population in Ulcinj salina seems to be stable at around 70 breeding pairs per year.

Ulcinj is probably the only breeding ground for this species in Montenegro (Studija zaštite 2015).

In 2017, Kentish plovers nested mostly on dry basin floors, where they were susceptible to flooding. Luckily, there were no heavy rains in April and May of this year, so their breeding success was probably high. Among all important breeding birds, the Kentish plover was the most evenly distributed, missing mostly only from Jezero 1 and 2, which were 100% full of water all of the time.

We estimate that with appropriate management, a breeding population of up to 150 pairs could be easily achieved, what is about twice as much as today.

Little tern *Sternula albifrons*

Decreasing breeding population, 65 to 150 breeding pairs, present only during breeding season.

In the EU, the Little tern has very sparse distribution on coasts and also inland. **Also on the Adriatic coast there are only a few known breeding colonies**. In Ulcinj salina, it is the only one of the important breeders to decrease.

In 2017, there were 5 loose colonies in Kneta, Evaporation I and III, Stojski 2 and Crystallization, of which 3 were abandoned already at the beginning of June before hatching time. At least some of the pairs turn to replacement nests. Coincidentally, in the middle of June, a pump in the sea broke down and water ceased to be delivered to the salina and, as a consequence, the water level in Jezero 1 decreased. This exposed new dikes in the middle of the water, where a new colony of at least 20 breeding pairs had started. This was a more natural breeding habitat for Little terns. But a flock of flamingos occupied the dikes a few days later and all nests of the Little tern were abandoned. We assume that breeding success of Little terns was very low this year, possibly with less than 50 successful nests, most likely due to unstable water regime. The majority of successful pairs nested in the middle of dry basins.

We estimate that, with appropriate management, a breeding population of up to 170 pairs could easily be achieved, which is actually not much more than in its best years in Ulcinj.

Common tern *Sterna hirundo*

Stable breeding population, 5 to 80 breeding pairs, present only during breeding season.

In the EU, the Common tern has a patchy distribution from the Mediterranean to Scandinavia. Some populations breed on coasts and islands on the sea, others in mainland by the rivers. The population in Ulcinj salina breed very close to the sea, but its breeding habitat is like on mainland. Unlike the Little tern, they will not breed on dry basin floors, they always select breeding spots on a dike or an

island in the middle of the water. In 2017, nests were found on dikes in basin 31 (later they were deserted since the basin dried out) and on Jezero 1 (later they were deserted too). It could be, that the Common terns did not fledge a single chick in year 2017. Apart from the Stone curlew, the Common tern has the smallest breeding population of all important breeders in the salina, counting about 20 breeding pairs. But at least it seems that the population is stable.

We estimate that, **with appropriate management, a breeding population of up to 170 pairs could easily be achieved**, which is about eight times as much as today.

IMPORTANT YEAR-ROUND PRESENT BIRDS

Among birds present in the salina in all seasons, we give importance to five species that are present most of the time in good numbers. They are Little egret, Spoonbill, Pygmy cormorant, Redshank and Spotted Redshank. Those are the birds a visitor will have a good chance of seeing at any time, regardless of the date of the visit.

For all five species we present phenogram, where bars are calculated as average number of birds recorded during all surveys in a particular month. We consider this number to be a good proxy for the number of monthly occurring birds in the area.

Little egret *Egreta garzetta*

The Little egret is most numerous during the autumn, but also in other months there is usually at least 100 birds present (Figure 4.10). Due to its glossy white plumage, large posture and habit of being in open areas, it is easy to spot. Egrets do not breed in the area, mostly they use salina as a feeding ground. Groups of up to ten birds often congregate in basins with shallow water, where they hunt mostly invertebrates.

In some years, the number of counted Little egrets reaches the 1% threshold for designation of the salina as an internationally important area. Considering turn over effect, we conclude that species is **probably regularly present in internationally important numbers**.

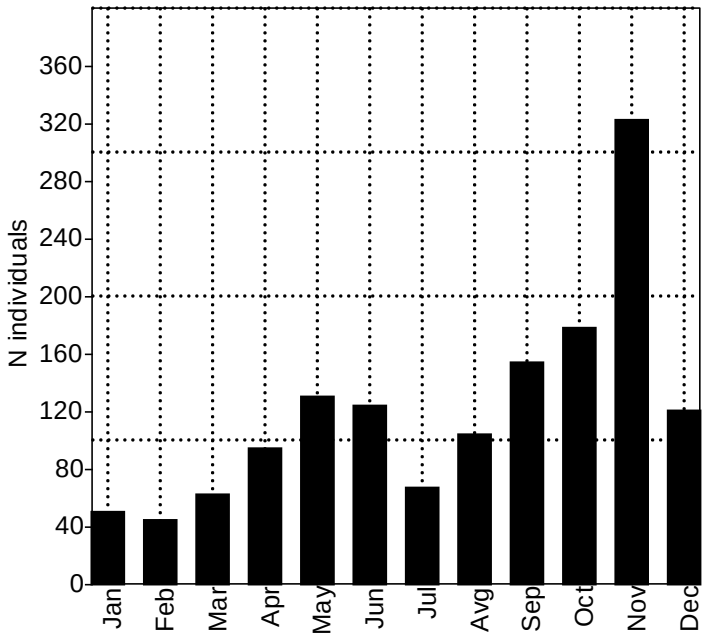


Figure 4.10. Number of individuals (averaged across all surveys in a particular month) of Little egrets *Egreta garzetta* in Ulcinj salina.

Spoonbill *Platalea leucorodia*

Although not very numerous, the spoonbill was recorded in almost all surveys. The biggest number of birds recorded in a single day was 147, the most numerous are in February, March and in August and September (Figure 4.11). Spoonbills do not breed in the salina, they use it for feeding.

In some years, the number of counted Spoonbill reaches the 1% threshold for designation of the salina as an internationally important area. Considering turn over effect, we conclude that species is **probably regularly present in internationally important number**.

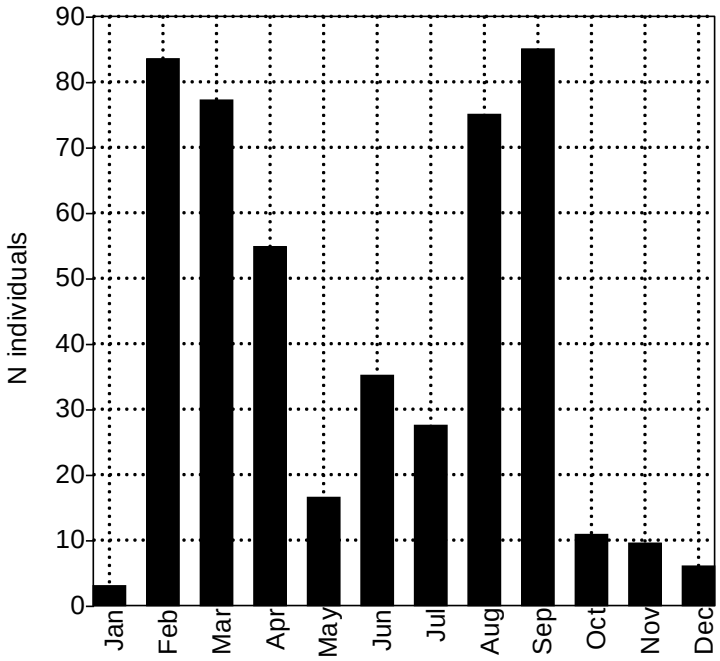


Figure 4.11: Number of individuals (averaged across all surveys in a particular month) of Spoonbill *Platalea leucorodia* in Ulcinj salina.

Pygmy cormorant *Phalacrocorax pygmeus*

The Pygmy cormorant is most numerous in Ulcinj salina in autumn (Figure 4.12). In spring, only a few tens of birds are present, but due to their habits, a visitor will never miss spotting them. After a prolonged period of hunting in deep water, they go to exposed places (old branches, large stones, etc.), spreading wings widely to dry them, which is easily recognizable also from a distance. The Pygmy cormorant does not breed in the area, they use the salina for feeding. With on average 290 birds regularly present in the salina during August, the Pygmy cormorant **reaches the 1% threshold for designation of the salina as an internationally important area**.

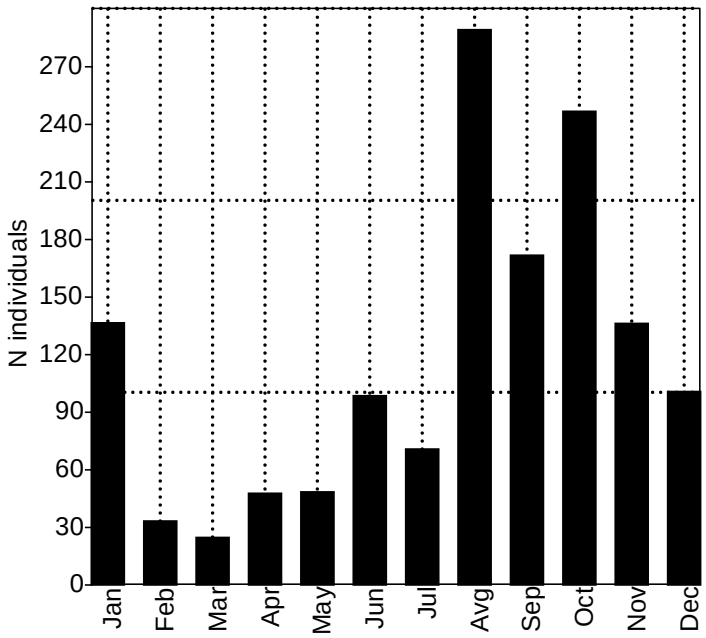


Figure 4.12: Number of individuals (averaged across all surveys in a particular month) of Pygmy cormorants (*Phalacrocorax pygmeus*) in Ulcinj salina.

Redshank *Tringa totanus*

The Redshank is very numerous in Ulcinj salina in all months except during the breeding period in April and May (Figure 4.13). Often over 1000 birds can be present in the basins with low water or fresh mud, hunting invertebrates. Up to 20 pairs also breed in the salina. The Redshank is otherwise more typically a breeding bird of northern parts of Europe, where they are present in large numbers. Sporadic breeding in southern parts is not unusual, but **the greatest importance of the salina for the species is during migration and in winter**.

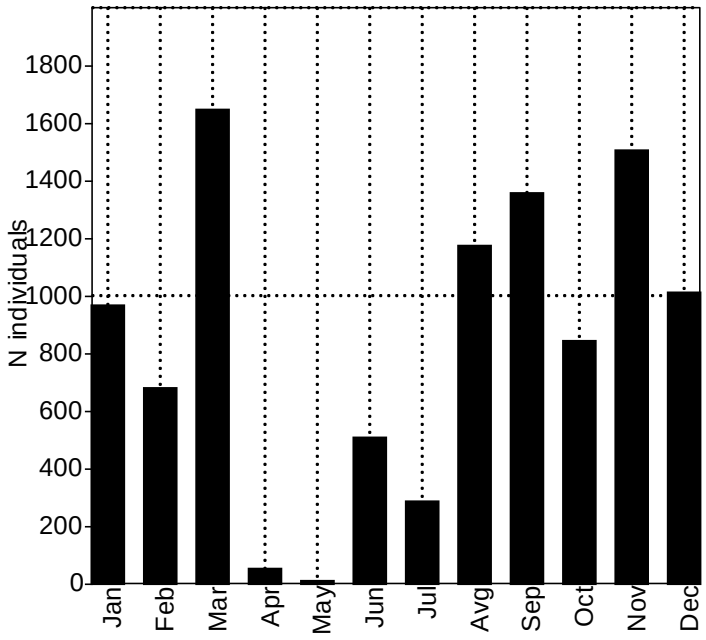


Figure 4.13: Number of individuals (averaged across all surveys in a particular month) of Redshanks *Tringa totanus* in Ulcinj salina.

Spotted redshank *Tringa erythropus*

The Spotted redshank is less numerous than Redshank, but still regularly present throughout the year (Figure 4.14). The most abundant population is in September and October, when over 1000 birds can be present. During autumn, migration of Spotted redshank **regularly exceed the 1% threshold number for designation of the salina as an internationally important area**. During spring migration in March and April, when birds are already in their black breeding plumage, several hundreds are present, only exceptionally over 1000. They are less abundant during the breeding period in May and June.

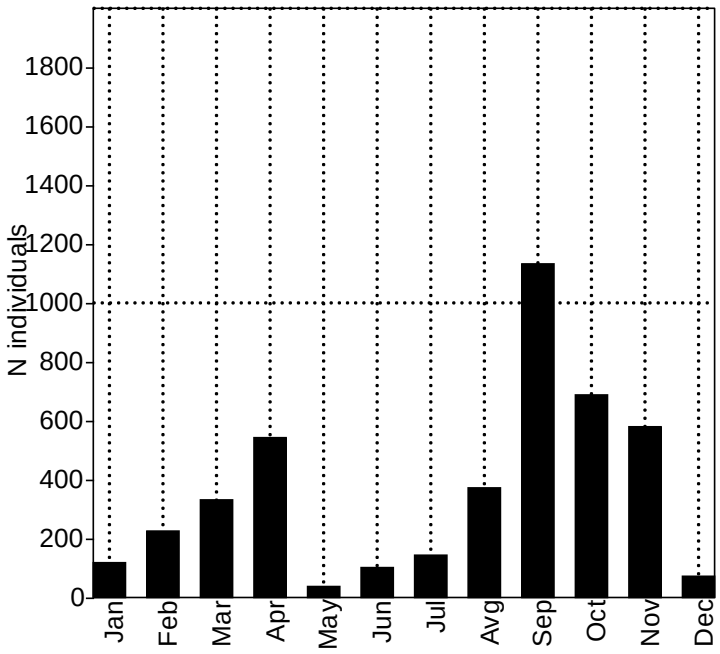


Figure 4.14: Number of individuals (averaged across all surveys in a particular month) of Spotted redshank *Tringa erythropus* in Ulcinj salina.

BIRDS WITH GOOD POTENTIAL FOR SIGNIFICANT INCREASE IN NUMBER OF BREEDING PAIRS

Two birds are currently listed as irregular, rare, sparse breeders of the area, Pied avocet *Recurvirostra avosetta* and Common Shelduck *Tadorna tadorna*. Pied avocet is actually a rather rare bird in the salina, with more than 10 individuals present only exceptionally. In some years, the breeding behaviour of the birds was recorded. About 50 to 100 Shelducks usually overwinter, the number increases to over 100 during spring migration. Over the year, 10 or 20 birds remain in the salina. Up to 5 pairs in some years breed, but no breeding pairs were found in other years.

According to experience from similar areas in the Mediterranean, with some conservational effort both species could become regular and numerous breeders and as such **they would increase the conservational importance of the area**. In the salina in Camargue (France), the population of Shelduck increased from 50 in 1956 to 500 in 1986 (Isenmann 1993). In Sečoveljske soline (Slovenia), Avocet first bred in 2009. After managing part of the area into breeding ground suitable for Avocet in 2016, 40 nests with eggs were found (Škornik, 2017). With some appropriate management, the number of Avocets can increase also during the winter. In some close Albanian Adriatic wetlands (Patoku, Karavasta lagoon; BirdLife International, 2017) up to 1000 birds winter regularly. Common Shelduck could be attracted by setting up nest boxes; this activity has already been undertaken in Ulcinj salina by EuroNatur and CZIP over the last decades with some success.

IMPORTANT SPECIES DURING MIGRATION AND IN WINTER

Due to number of occurring individuals and regular presence, we propose two groups of birds as important in the area during winter and the migration period. Those are ducks and waders.

Ducks

Wigeon *Anas penelope*, Gadwall *A. strepera*, Teal *A. crecca*, Mallard *A. platyrhynchos* and Pintail *A. acuta* are present in the salina in high numbers during the winter. Their population starts to increase in October and they remain in the area until February (Figure 4.15). Particularly numerous are Wigeon, Teal and Pintail. They can be **present with over 2000 individuals per day**, which is comparable with some protected wetlands in the Albanian part of Adriatic coast (Karavasta lagoon; BirdLife International, 2017). Gadwall and Mallard started to winter in the salina in recent years, though the population of both rarely exceed 100 individuals.

Garganey *A. querquedula* has a different phenology; it is the only duck wintering in Africa. It is present in high numbers in the salina only during the spring migration particularly in February and March (Figure 4.16) when **the population regularly exceed 2.000 individuals**. In 2006, over 8.000 Garganeys were recorded in a single day. Autumn migration seems to bypass the salina completely.

The phenology of Shoveler *A. clypeata* is a combination. Ducks are present during the winter, but **peaks in number during the spring migration in March** (Figure 4.17), when up to 1000 birds can be present. Some Shovelers stay also during the summer with a few pairs

presumably breeding in the area (Studija zaštite 2015). The number starts to increase again in August.

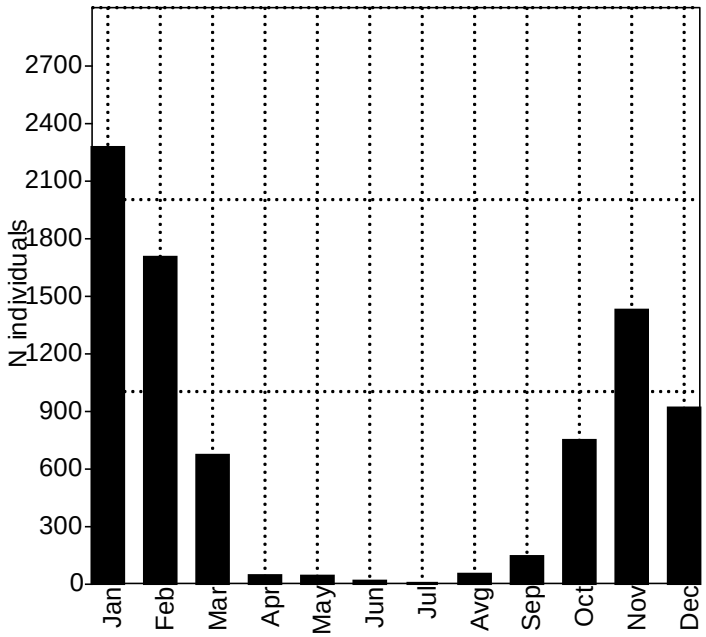


Figure 4.15. Phenology of Wigeon *Anas penelope*, Gadwall *A. strepera*, Teal *A. crecca*, Mallard *A. platyrhynchos* and Pintail *A. acuta* in Ulcinj salina (averaged across all surveys in a particular month).

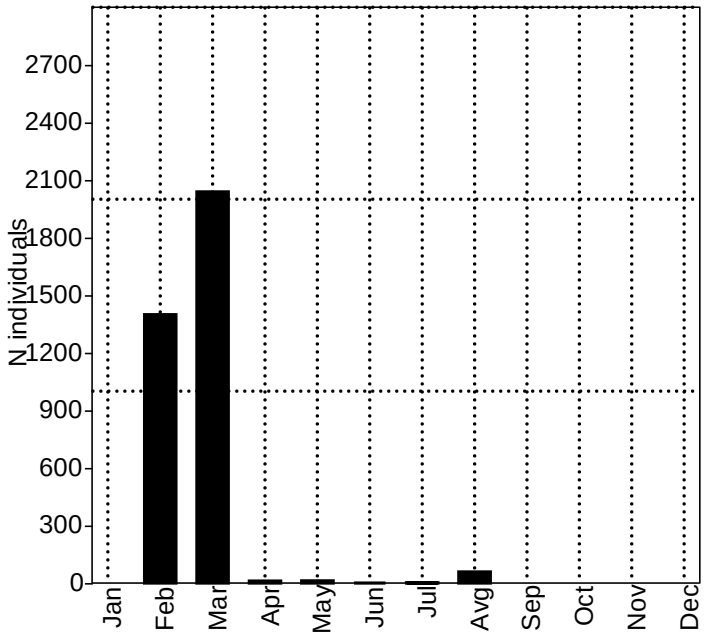


Figure 4.16: Phenology of Garganey *Anas querquedula* in Ulcinj salina (averaged across all surveys in a particular month).

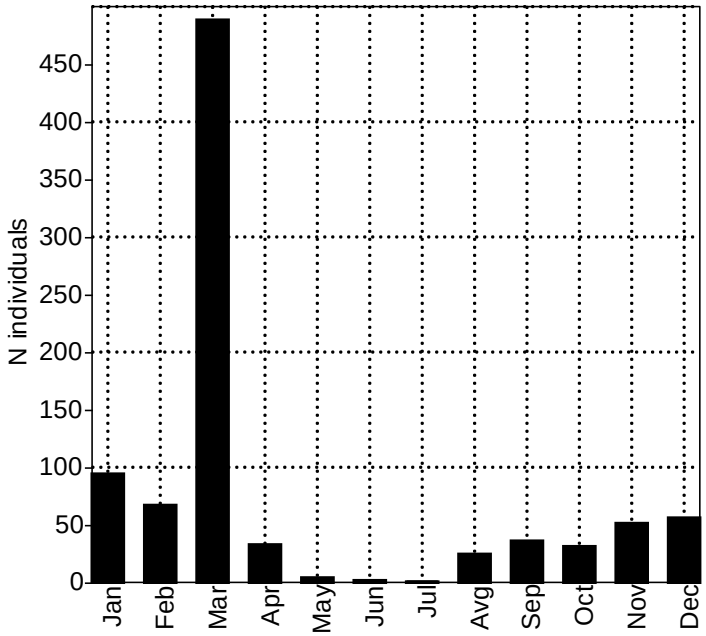


Figure 4.17: Phenology of Shoveler *Anas clypeata* in Ulcinj salina (averaged across all surveys in a particular month)

Waders

Among waders, three distinctive phenologies can be noted. Lapwing *Vanellus vanellus*, Golden plover *Pluvialis apricaria* and Snipe *Galinago galinago* are typical wintering birds (Figure 4.18). The highest numbers coincide with December and January. Over 2.000 Snipes were known to winter in the past; in recent years the number hardly exceeded 100 wintering birds. Lapwing easily exceed 2.000 wintering birds in some years, such as it was in 2011, even 4.000 birds. Over the past few years, the number of wintering Lapwings has dropped below 1000.

Curlew sandpiper *Calidris ferruginea*, Black-tailed godwit *Limosa limosa*, Ruff *Philomachus pugnax* and Greenshank *Tringa nebularia* are very numerous during spring migration which starts at the end of February, peaks in March and ends in May (Figure 4.19). The number of each species, with the exception of Greenshank, can easily exceed 2.000 birds per day when migration is in a full swing.

Grey plover *Pluvialis squatarola* and Dunlin *Calidris alpina* winters in the salina, but also increases in number during the spring and autumn migration (Figure 4.20). The population of Dunlins can reach a stunning 10.000 individuals in a single day (i.e. 26.1.2006). In the 20 times larger area of Ebro delta (Spain) only three times more Dunlins is estimated to winter, while in 50 times larger Venice lagoon (Italy) only twice as many Dunlins are present during the winter (BirdLife International, 2017).

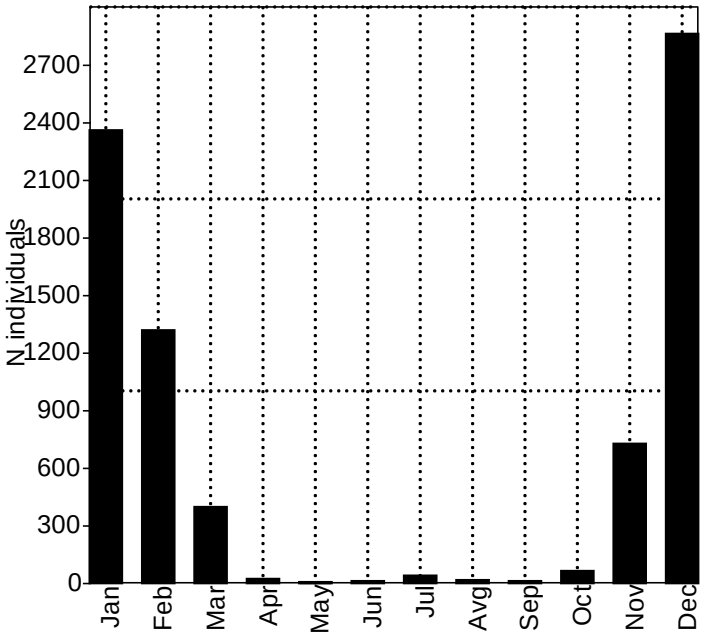


Figure 4.18: Phenology of Lapwing *Vanellus vanellus*, Golden plover *Pluvialis apricaria* and Snipe *Galinago galinago* in Ulcinj salina (averaged across all surveys in a particular month).

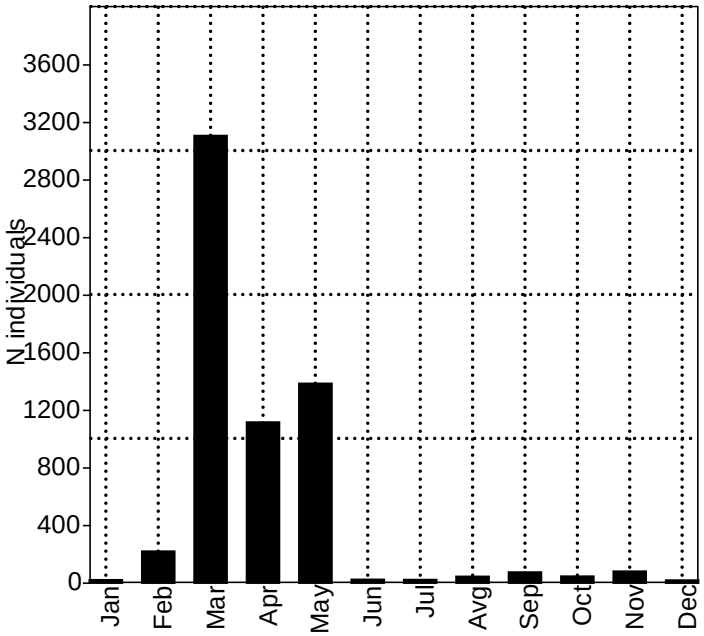


Figure 4.19: Phenology of Curlew sandpiper *Calidris ferruginea*, Black-tailed godwit *Limosa limosa*, Ruff *Philomachus pugnax* and Greenshank *Tringa nebularia* in Ulcinj salina (averaged across all surveys in a particular month).

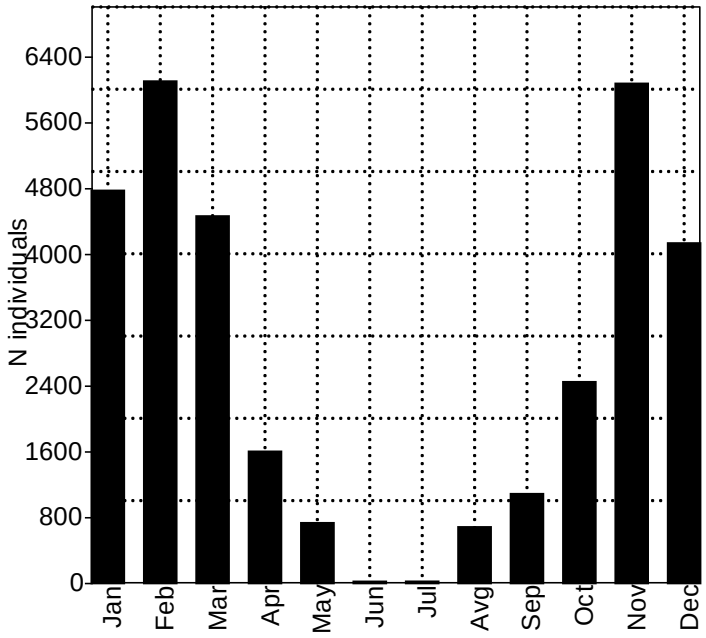


Figure 4.20: Phenology of Grey plover *Pluvialis squatarola* and Dunlin *Calidris alpina* in Ulcinj salina (averaged across all surveys in a particular month).

NUMBER OF WINTERING AND MIGRATING BIRDS

There is a distinction in understanding the number of wintering and the number of migrating birds that should be kept in mind. The majority of wintering birds are present in the area the whole winter. The number fluctuates with some birds that fly to or from a neighbouring wetlands, but the majority of population is constantly present. Radical changes in size of population occur only in case of severe events, like cold and ice on the water, or hunting in the wetland etc. Presence of migrant birds, on the other hand, change through-out the season considerably due to turn-over effect.

In this analysis, we consider the three most abundant groups: waders, ducks, and herons with cormorants. Waders in this analysis are birds from the genuses *Calidris, Tringa, Pluvialis, Vanellus, Limosa, Actitis, Numenius, Gallinago* and *Phylomachus*. As ducks we consider all birds from the genuses *Anas, Netta* and *Aytia*. Among herons, egrets and cormorants we include genuses *Casmerodius, Egreta, Ardea, Platalea* and *Phalacrocorax, Microcarbo*.

A long term average indicates that about 8.000 to 9.000 waders spend winter in Ulcinj salina yearly (Figure 4.21). In particular years, the number can be much higher, i.e. in winter 2006 and 2007 over 13.000 waders were counted. In some years less than 1.000 were recorded, as it was during IWC 2015. **During the peak migration period in March and November, over 10.000 birds can be present daily**, but in particular years even significantly more. The absolute

maximum for spring migration occured in March 2006 when over 18.000 waders were counted in a single day and for autumn migration in November 2003 when almost 12.000 waders were recorded.

A long-term average shows that about 1.000 to 2.000 ducks spend winter in Ulcinj salina (Figure 4.22). In particular years, the number can be even higher. **In 2006, there were over 2.000 ducks and in 2011 over 3.000 respectively**. In some years less than 1000 ducks winter in the area. During spring migration over 3.000 birds are present daily, while during autumn migration up to 1.500. In 2006 over 11.000 ducks were counted during spring migration on a single day.

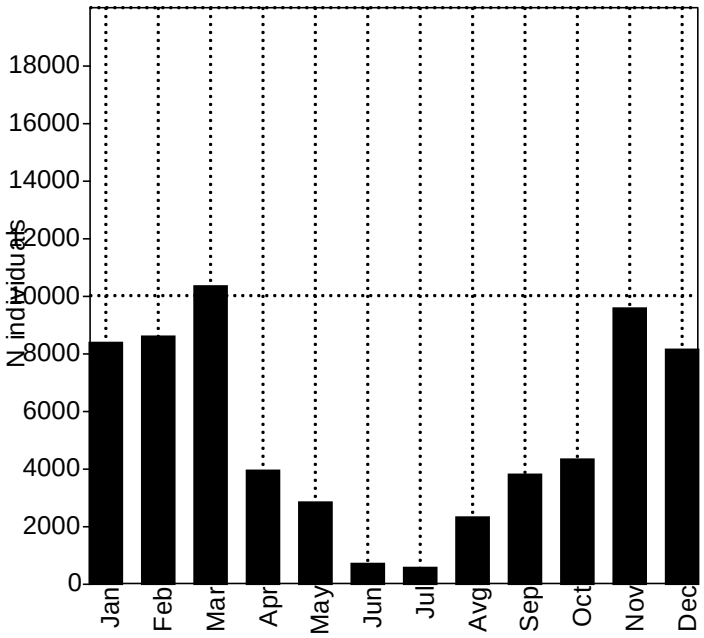


Figure 4.21: Phenology of waders in Ulcinj salina (averaged across all surveys in a particular month).

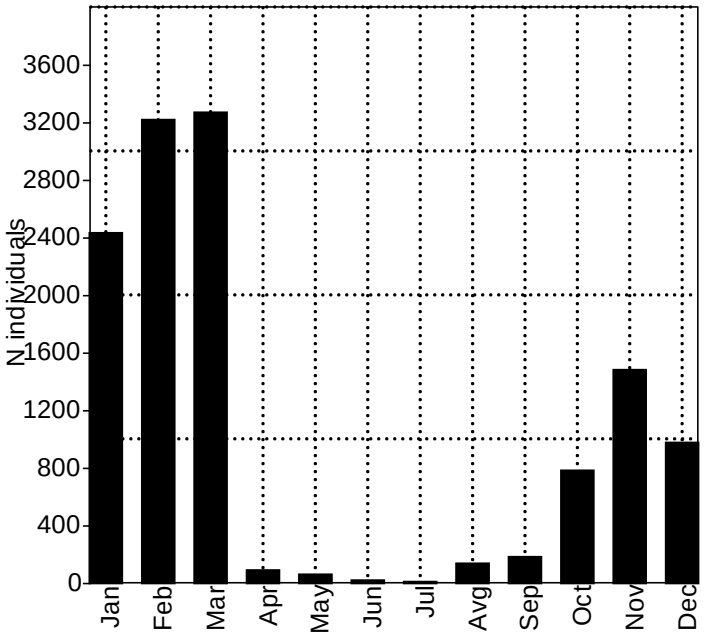


Figure 4.22: Phenology of ducks in Ulcinj salina (averaged across all surveys in a particular month).

Between 400 and 600 herons, egrets and cormorants regularly winter in the salina. The most numerous are in autumn, when 800 individuals are regularly present and in some years even more than 1.000 (Figure 4.23). The number of counted Great egrets and Little egrets per day in some years exceed the 1% threshold for designation of the salina as an internationally important area. **Considering the turn over effect, we conclude that both species are probably regularly present in internationally important numbers.**

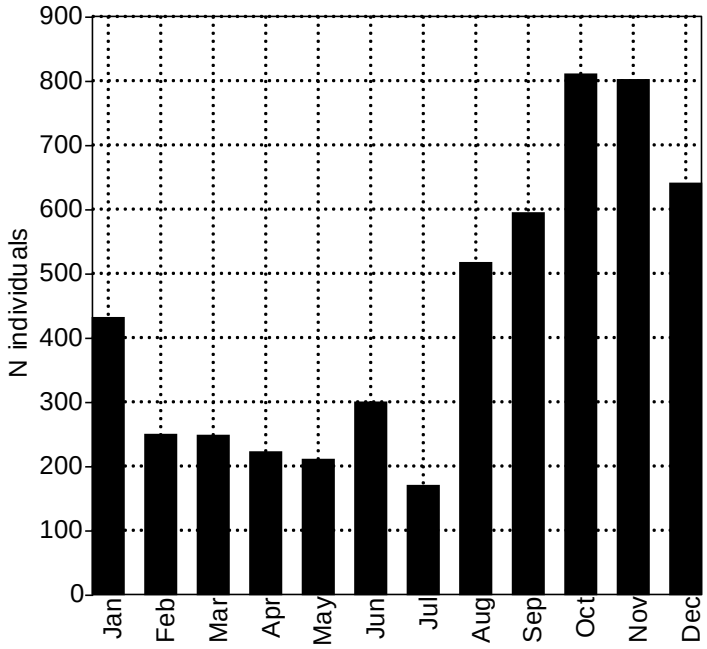


Figure 4.23: Phenology of herons and cormorants in Ulcinj salina (averaged across all surveys in a particular month).

We estimate about 11.000 water birds winter in the salina regularly and up to 15.000 in some years. During migration, there are regularly about 15.000 birds present daily, during some years up to 20.000. **There is no doubt that, due to the turn-over effect, many more than 20.000 birds visit the salina during each spring and each autumn**. In March 2010, a visible migration on the Adriatic coast near Ulcinj salina was investigated. Almost 40.000 birds were counted from a single observation point (Sackl et al. 2014). According to Sackl et al. (2017) individual birds, during migration, can stay in stoppover site Ulcinj salina for as few as 3 days only. **We believe therefore, that the internationally important number of over 100.000 migrating water birds regularly depends on Ulcinj salina as a resting and feeding point.**

When comparing data with the two closest IBA wetlands on the Albanian coast we note that, in the slightly bigger Drini delta, between 9.000 and 17.000 birds were recorded in January 1995 and 1996 respectively. In the approximately four times larger Karavasta lagoon, between 45.000 and 68.171 birds were recorded in January 1995 and 1996 respectively. Although those are both natural ecosystems, the numbers of wintering birds are comparable with numbers in Ulcinj salina when differences in size are considered.

REED-BED SPECIALISTS

The reed *Phragmites communis* is not a typical plant for the salina. Nevertheless, in recent years, reed has overgrown a considerable part of the area; in particular, beside Jezero 2 and

both Zoganjski basins. Some birds specialized to this type of habitat have already settled in the area. They do not occur in big numbers but they enhance the bird diversity of the salina. We must emphasize also that data on reed specialized birds in this report are underestimated, since we did not use any special techniques of investigation that are usually applied to survey them (play-back, netting).

With 30 to 70 breeding pairs, the Great reed warbler *Acrocephalus arundinaceus* is the most common breeding bird in reed beds. Due to its very loud song, it is very distinguishable during the breeding period. Two important species are Bittern *Botaurus stellaris* and Water rail *Rallus aquaticus*. They spend the whole day well hidden in the reed bed, becoming more active during the night, when they can be more easily detected using play-back of their song.

GLOBALLY ENDANGERED SPECIES

Globally endangered species are listed in one of IUCN endangered categories as Critically endangered, Endangered, Vulnerable or Near threatened. This means that they are endangered at the global level. There were 17 globally endangered species recorded in Ulcinj salina (Table 4.5). The majority of them were present in small numbers too insignificant to have them considered as important for the area. Six species were present in numbers indicating that the area is, at least from time to time, of vital importance for them.

We present all six species with phenograms, where bars are calculated as average number of birds recorded during all surveys in a particular month. We consider this number to be good proxy for the number of regularly occurring birds in the area.

Table 4.5: Globally endangered species (N-number of recorded individuals; presence = % of surveys in which species was recorded; N of surveys = 50). With "*" are marked for Ulcinj salina important globally endangered species as estimated by this report. "+" species breed in surrounding, in salina only occasionally collect food so no relevant quantitative information exists.

	N	Presence		N	Presence
Anser erythropus	3	2	*Vanellus vanellus**	19.387	72
*Aythya ferina**	981	16	*Calidris canutus*	149	34
Aythya nyroca	47	6	*Calidris ferruginea**	3367	22
Podiceps auritus	1	2	*Limosa limosa**	6157	50

*Pelecanus crispus**	918	56	*Limosa lapponica*	7	10
Aquila clanga	2	4	*Numenius arquata**	595	84
Circus macrouros	2	4	*Numenius*	1	2
Falco vespertinus	11	8	*Streptopelia turtur*[+]		
Haematopus ostralegus	24	18			

Common pochard *Aythya ferina*

According to IUCN, the Common pochard is a Vulnerable species on a global level. It inhabits an extremely large range of territory, but the population is decreasing rapidly, in Europe by almost 50% in last 20 years (IUCN database). In Ulcinj salina, the Common pochard is present only sporadically during the winter and spring migration (Figure 4.24). Actually it was present in important numbers only two times. First on 22.3.2006 (330 individuals) and second time on 16.1.2016 (508 individuals). Available information indicates that in the salina, the species is currently not very relevant for conservation measures, since its presence is too unpredictable. On the other hand, 3.000 to 20.000 individuals winter in Montenegro (BirdLife international 2017), so **it is possible that in future the salina could become a more important area for the species**.

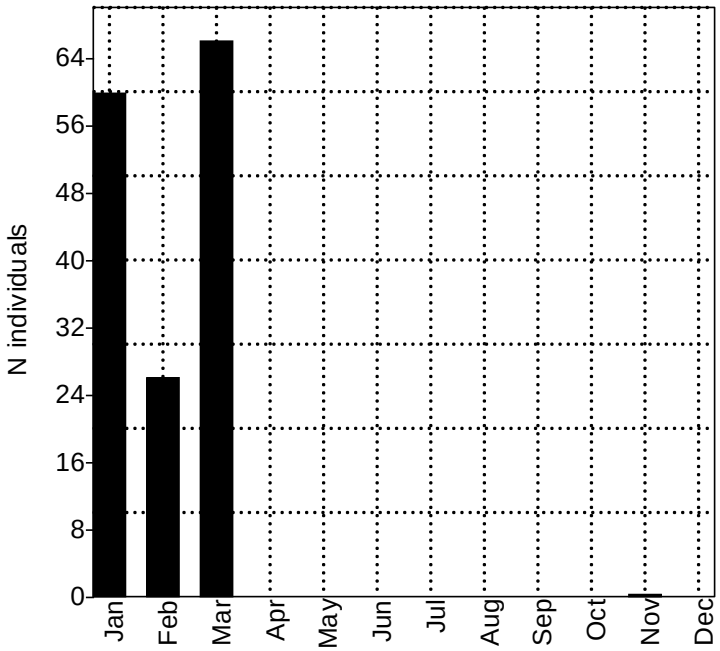


Figure 4.24: Number of individuals (averaged across all surveys in a particular month) of Common pochard *Aythya ferina* in Ulcinj salina.

Dalmatian pelican *Pelecanus crispus*

According to IUCN, the Dalmatian pelican is a Vulnerable species. In the last years, its population in some key localities increased, also on Skadar lake (Vizi, personal communication), but it is still decreasing rapidly elsewhere (IUCN database). In Ulcinj salina it is present irregularly and in small numbers on yearly basis, but it is a regular and abundant visitor, with up to 100 individuals in the flock, during the post-fledging period (Figure 4.25). Ulcinj salina is not a breeding area for the species and it probably never will be, but it is an internationally important post-breeding area. **During autumn, Ulcinj salina regularly hosts >1% of the regional population of the Dalmatian pelican, which makes it internationally important.**

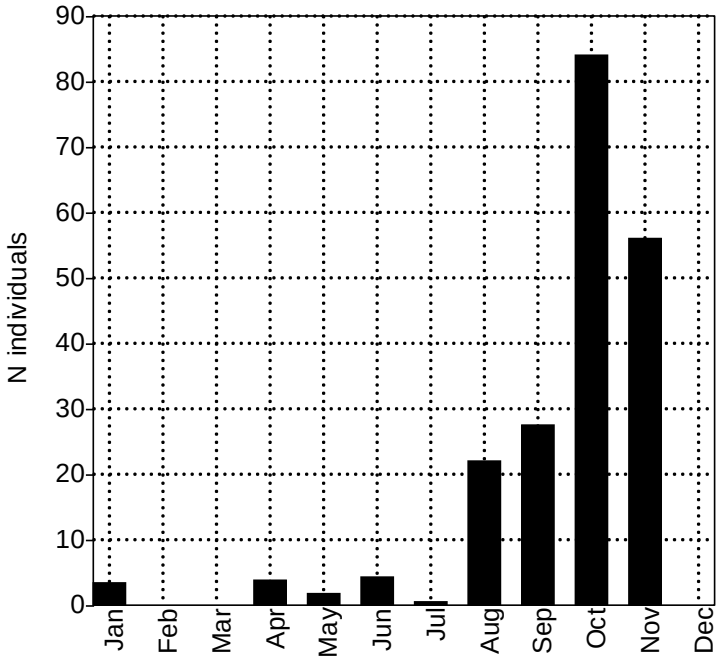


Figure 4.25: Number of individuals (averaged across all surveys in a particular month) of Dalmatian pelican *Pelecanus crispus* in Ulcinj salina.

Lapwing *Vanellus vanellus*

According to IUCN, the Lapwing is a Nearly threatened species. It is suspected that its population in Europe is decreasing at a moderately rapid rate. In Ulcinj salina, it is a year-round regularly present species in insignificantly small numbers during breeding season, but in large, important flocks during the winter. In the area, about 2.000 individuals regularly winter (Figure 4.26) and in extreme years up to 5.000. **Ulcinj salina is probably the most important wintering ground for Lapwings in Montenegro and one of the important areas in the region** (BirdLife International 2017).

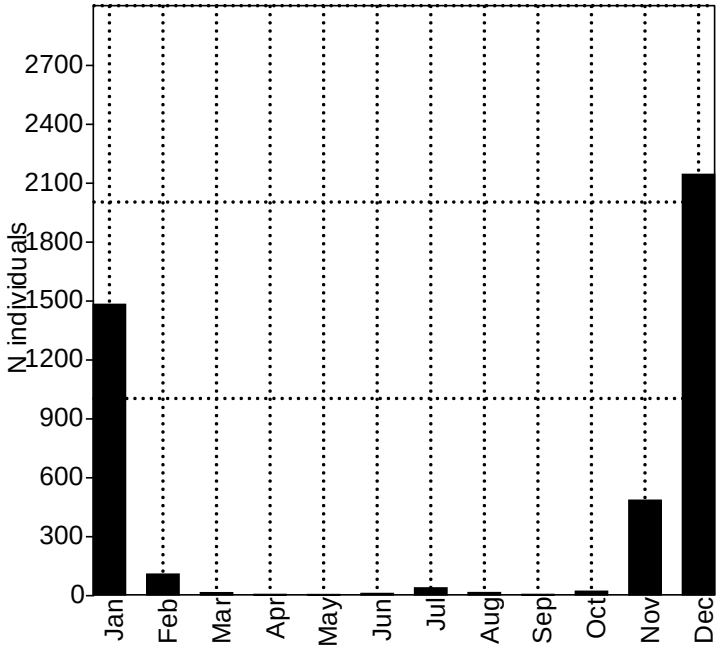


Figure 4.26: Number of individuals (averaged across all surveys in a particular month) of Lapwing *Vanellus vanellus* in Ulcinj salina.

Curlew sandpiper *Calidris ferruginea*

According to IUCN, the Curlew sandpiper is a Near threatened species. It is suspected that its population in Europe is decreasing at a rate close to the threshold for the species to become a Vulnerable species (IUCN database). In Ulcinj salina, it is present only sporadically during the spring migration and in particular in May (Figure 4.27). In some springs, flocks of several hundred birds were recorded. In Europe up to 2.000 Curlew sandpipers winter (BirdLife International 2017); there is no information on the number of migrating birds.

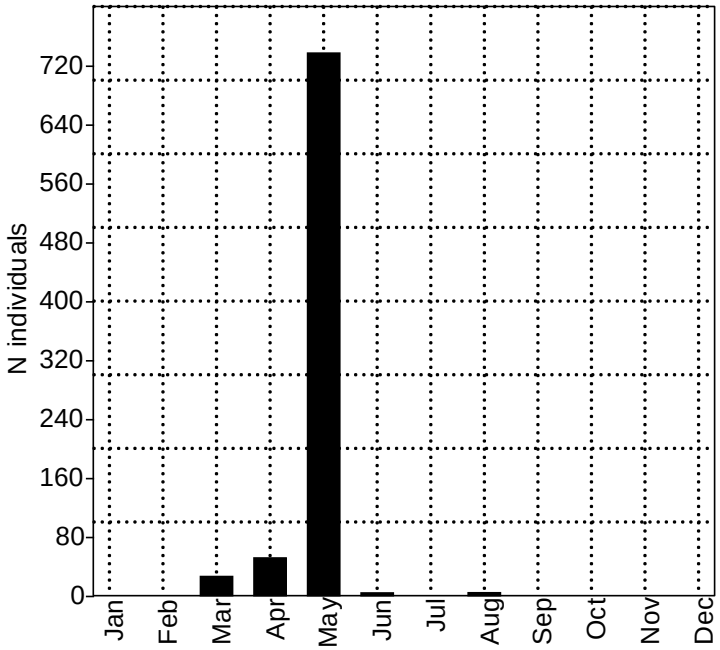


Figure 4.27: Number of individuals (averaged across all surveys in a particular month) of Curlew sandpiper *Calidris ferruginea* in Ulcinj salina.

Black-tailed godwit *Limosa limosa*

According to IUCN, the Black-tailed godwit is a Near threatened species. Although it is widespread and has a large global population, its numbers have declined rapidly in parts of its range. (IUCN database). In Ulcinj salina, it is spring migrant. It is most numerous in March, with flocks of 1.000 individuals regularly present (Figure 4.28). **In 2006, the number of individuals exceeded the 1% threshold for designation as international important area**.

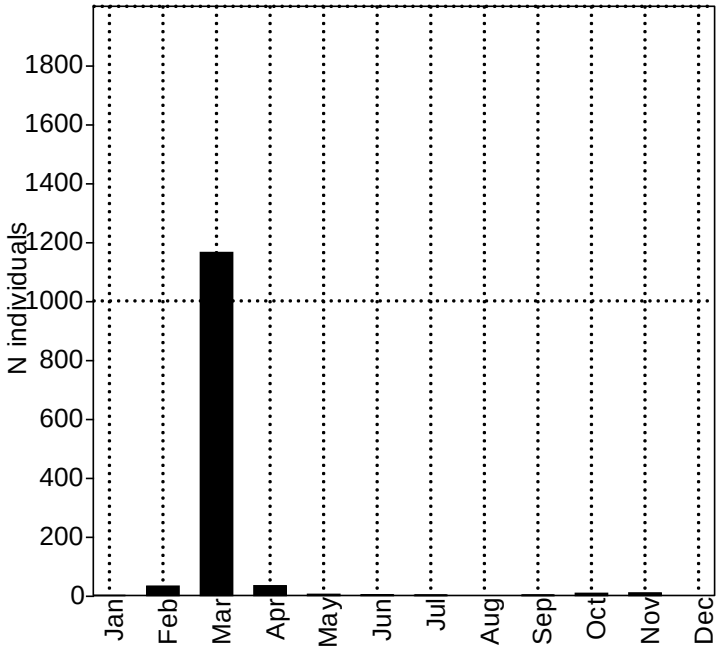


Figure 4.28: Number of individuals (averaged across all surveys in a particular month) of Black-tailed Goodwit *Limosa limosa* in Ulcinj salina.

Eurasian curlew *Numenius arquata*

According to IUCN, the Eurasian curlew is a Near threatened species. It is widespread and common in many parts of its range, but recently a decline in population was recorded in several key populations (IUCN database). In Ulcinj salina, it is regularly present throughout the year. The number of birds is small in particular from April to September, during the winter it increases up to 50 birds (Figure 4.29). **It is possible that Ulcinj salina is the most important wintering ground for Eurasian curlew in Montenegro** (BirdLife International 2017).

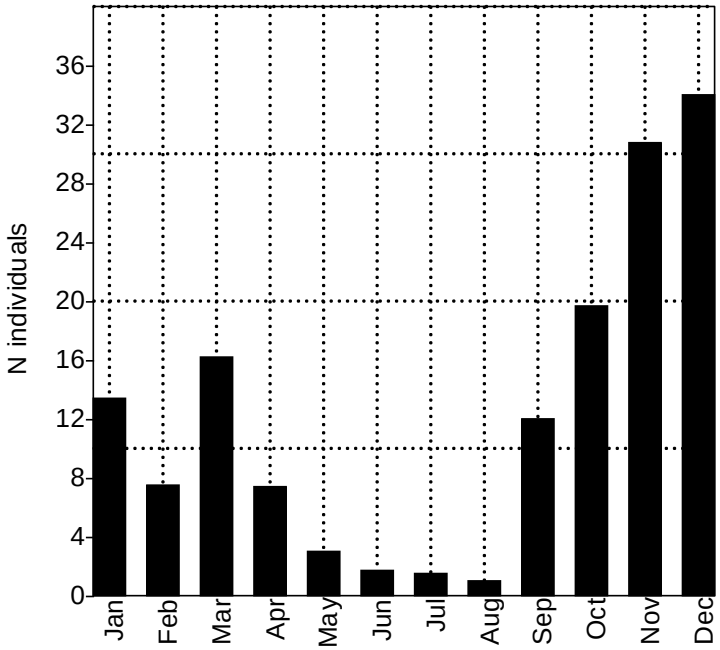


Figure 4.29: Number of individuals (averaged across all surveys in a particular month) of Eurasian curlew *Numenius arquata* in Ulcinj salina

4.3. Other vertebrates

4.3.1. Mammals

Of about 70 species of mammals known for the coastal area of the Montenegro (Caković, Milošević 2013), four are confirmed for Ulcinj salina, plus unknown number of species of small mammals and bats (Table 4.6). According to Stevanović and Vasić (1995), there are at least 15 species of bats in Montenegro. On the basis of available literature, Eurasian otter *Lutra lutra* is probably present in the area, albeit not in large numbers. Confirmed was also the sporadic presence of Red fox *Vulpes vulpes* and Jackal *Canis aureus* (Studija zaštite 2015). The most common of the large mammals and possibly the only one present throughout the year is the rabbit *Lepus europaeus*. Numerical and taxonomical composition of small mammals (mice, voles, shrews, etc.) and bats in the area was not investigated. Our observations confirmed the presence of both.

Although not of taxonomical interest, we found many tracks of domestic dogs and cats. They can be a nuisance for free living animals in the area by preying on their nests and by causing general disturbance.

Table 4.6: Mammals known to be present in the salina with annotation if the species is present in the Annex of the Habitat directive.

Species	ANNEX
Lutra lutra	II, IV
Vulpes vulpes	
Canis aureus	
Lepus europaeus	
small mammals – undefined species	
bats – undefined species	some species

4.3.2. Reptiles and Amphibians

Of 11 species of amphibians and 30 species of reptiles known for the coastal area of the Montenegro, relatively few inhabit area of Ulcinj salina (Caković, Milošević 2013). Due to relatively small proportion of dry land and due to more or less salty waters, salinas are not an ideal ecosystem for herpetofauna. Nevertheless we registered some species which are probably permanent although not numerous dwellers in the area (Table 4.7).

Among reptiles there are at least two turtles, Hermann's tortoise *Testudo hermanni* and European pond turtle *Emys orbicularis*. For the later, we believe that the outer canal is the most suitable habitat, with water permanently present and with soft banks. But we found several carapaxes of dead animals also in the dry basins in the middle of the salina, indicating, that at least sporadically they extend their home range throughout the area.

Two species of snake, Dice snake *Natrix tesselata* and Grass snake *Natrix natrix*, are present, both adapted to life beside the water where they catch the majority of their prey. Possibly Dice snake, specializing on a diet of fish, is more numerous, while the Grass snake,

predominantly preying on amphibians that are not numerous, is less abundant. Of lizards, we found the European legless lizard *Pseudopus apodus* - according to our observations the most numerous reptile in the area, Balkan green lizard (*Lacerta trilineata*) and Dalmatian wall lizard (*Podarcis melisellensis*). The presence of another lizard is possible, but expert work is necessary to confirm our observations. This could be the Italian wall lizard *Podarcus sicula*, common on Adriatic coasts north of Montenegro, or the Balkan wall lizard *Podarcis taurica*, common south of Montenegro.

Previous studies reported the presence of a globally endangered species of green frog – Albanian water frog *Rana* or *Pelophylax shqiperica*. We found individuals resembling this species, but only with genetic studies the exact taxonomic status can be confirmed or rejected. Nevertheless our opinion is that the species is very scarce in the area. **Amphibians, with rare exceptions, cannot survive in waters with increased salinity**. Practically all waters in Ulcinj salina are brackish at least. We found green frog (possible Albanian water frog) in three localities – a small pond beside abandoned buildings and halls at the entrance to the salina in a concrete enforced basin full of rain water beside the building housing the water pump and in an adjacent water hole. The surface of all three bodies was only a few square meters and characteristic of all three habitats was that salinity did not exceed 4g per litre, which is practically fresh water. **Those were also the only localities in the salina where we confirmed fresh water conditions**. For that reason, our opinion is that amphibians are not to be considered as important for the process of designation of the area as a protected site. Other areas, more suitable for frogs should be included into conservation measures for the endangered Albanian water frog.

Table 4.7: Reptiles and amphibians known to be present in salina with annotation if the species is present in the Annex of the Habitat directive (* - species must be confirmed with genetic studies).

Species	ANNEX
Testudo hermanni	II, IV
Emys orbicularis	II, IV
Natrix tesselata	IV
Natrix natrix	
Lacerta trilineata	IV
Pseudopus apodus	IV
Podarscis melisellensis	IV
*Pelophylax shqiperica**	

4.3.3. Fish

In waters of the salina basins, 18 fish species from 4 higher taxa were registered (Studia zaštite 2015; Table 4.8). The list definitively is not final. During periodical water pumping, many species from the sea can be transported into the basins of the area. Also, a drainage canal is connected with the Bojana River and with surrounding marshes, so all salt-tolerant freshwater species can be expected too. Depending on conditions of the water in the basins, which change constantly and rapidly (temperature, salinity, depth, etc.) different species at different

times take turns at being the most competitive and dominant in the waters. During our investigations, for example, a rather common species was a pipefish (subfamily Syngnathinae). For that reason, we believe that the fish community in the salina is extraordinary dynamic. The question is which species can, under such dynamic conditions, grow to adult size, to be interesting as a food source for some birds feeding on larger fish.

Table 4.8: Fish taxon known to be present in the salina (from Studia zaštite 2015) with annotation if the species is present in the Annex of the Habitat directive.

Species	ANNEX
Anguilla anguilla	
Aphanius fasciatus	II
Atherina boyeri	
Chelon labrosus	
Dicentrachus labrax	
Deltentosteus sp.	
Diplodus annularus	
Diplodus vulgaris	
Diplodus sargus sargus	
Gobius sp.	
Lithognathus mormyrus	
Liza ramada	
Liza saliens	
Liza aurata	
Liporhrus sp.	
Mugil cephalus	
Mullus surmeletus	
Platichthys flessus luscus	
Pomatosch ulgaris istus sp.	
Sarpa salpa	
Solea lascaris	
Solea vulgaris	

4.4. Water invertebrates

According to a previous study (Studia zaštite 2015), brine shrimp (*Artemia sp*.) was a keystone species in Ulcinj salina, attracting masses of birds and acting as a very important food source for them. In October 1999, the productivity of this species was measured (Hegediš et al. in litt.) in three basins of reservoir 2, which were used to accumulate hypersaline waters. At the time of sampling, the water had about 200 g of salt per litre. The biomass of brine shrimps in the reservoir was estimated at 24 tons. But the reservoir is, from the bird point of view, rather unattractive. Water in it is usually over 1m deep, and beside occasional gulls or pygmy cormorants swimming and/or diving in the water, very few birds were observed there.

During our field work in 2017, we sampled waters for water invertebrates in Jezero 1, Jezero 2, Basin 7, 24, 25, 29, 32, Stojski 1, Reservoir 2. We used a triangular net which filters in one sweep about 39 litres of water, we sample only water near the shore. **In our samples, no brine**

shrimps were present. Even sampling in one of the basins of reservoir 2 ended with a similar result - no brine shrimps. Two other lower crab species were the most abundant (Figure 4.30). One Isopod from the family Sphaeromatidae (*Sphaeroma sp.* or *Lekanesphaera sp*.) and one Amphipod from the family Gammaridae (*Gammarus sp*.). Occasionally, in smaller numbers, two other species with bigger bodies occur, one Isopod from the family Idoteidea (*Idotea sp*.), the other is a shrimp, probably from subgenus Caridae. Taxonomy of lower crabs is complicated and detailed determination should be done by experts for this animal group.

Figure 4.30: Two most abundant lower crab species in waters of the salina: Isopod from the family Sphaeromatidae (upper) and Amphipod from the family Gammaridae (lower). Red line is 1 cm.

The abundance of crabs changed from sample to sample, but in general they were more abundant in waters overgrown with Beaked widgeonweed (*Ruppia sp*.) and sea lettuce (*Ulva sp*.) than in waters without vegetation. Their abundance did not change significantly from April to June (Figure 4.31; Kruskal Wallis H=1,4 , p=ns). In Jezero 1 and Jezero 2 typically there was one organism per 1 to 5 litres of water. The highest density was recorded in basin 32 with 12 to 16 organisms per 1 litre of water.

Sampling of the sediment in Jezero 1 and Jezero 2 (10x10x10cm of the sediment was sieved through 1mm mesh) revealed, that 0 to 3 Polychaeta no longer than 2 cm were present. For that reason, we suspect that lower crabs from groups Amphipoda and Isopoda are the most important animal species in basins. **They are the main source of food for water birds; hence, we regard them as a keystone species of this ecosystem**. They can survive in waters of different salinity, but drying of the water reduces their abundance, thus affecting other animals.

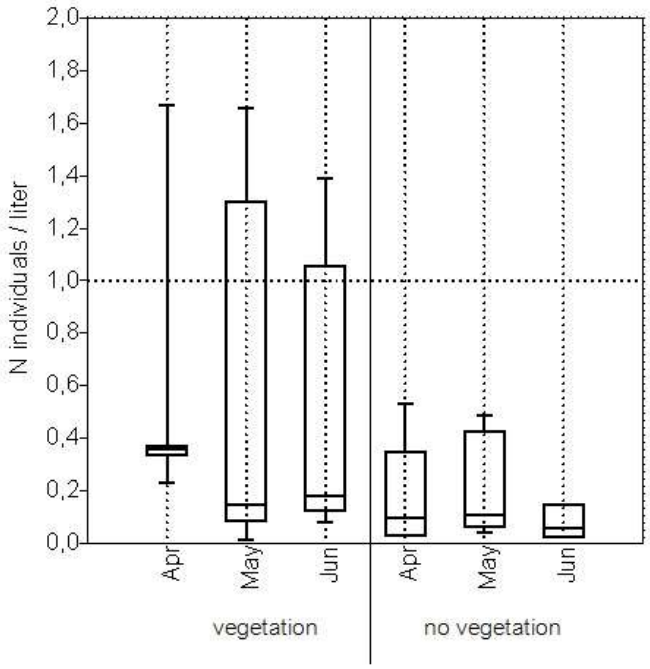


Figure 4.31: Number of individuals per litre of water of lower crab species in Jezero 1 and Jezero 2 in April, May and June. Median, quartiles and minimum, maximum are shown for parts of the lake with vegetation and parts of the lake without the vegetation. Altogether 42 samples were taken in 6 different localities.

Especially in channels with permanent water, but occasionally also in basins, a population of invasive blue crab *Callinectes sapidus* was found (Figure 4.32). The species originated from the western part of the Atlantic and was introduced to Europe by humans. It is already common in the southern part of the Adriatic. It can survive in a high range of salinity and it is also tolerant to high water temperatures, the most common is in estuaries. It probably came to occupy the salina basins through the system of sea water pumping. The species is edible, tasty, very fertile and fast growing.

Figure 4.32: Blue crab *Callinectes sapidus* in one of the canals in the salina.

4.5. Land invertebrates

Invertebrates are an unimaginably diverse group of animals. While in Europe there is almost 500 breeding bird species and about 270 Mammals, experts believe that there must be over 100.000 invertebrate species. Common for all is that communities are more diverse in the Mediterranean compared to any other biogeographical region, so the invertebrate community in the salina must consist of many species. In this report, we confine ourselves to presenting a few land invertebrates that we recorded in the area (Figure 4.33), since none of us is an expert in invertebrates and our results would therefore be highly skewed and possibly misleading. We can only encourage experts in different invertebrate groups to come to the area and fill this gap in knowledge.

Figure 4.33: In the salina there are many invertebrates known in Europe only from the Mediterranean region, like this *Empusa fasciata* mantis on the left and Plain tiger *Danaus chrysippus* on the right.

4.6. Landscape values

Salt exploitation through solar evaporation in coastal areas has been practised in the wider Mediterranean for thousands of years. Salt production and trade has been one of the most important productive industries, and its importance in history is comparable to the gold or silk trades.

Most of the traditional (artisanal) salinas in the Mediterranean have been abandoned or transformed into large-scale or industrial ones in the last decades. Few *Artisanal salinas* today can compete with *industrial salt works*; but both types of salt production in the Mediterranean share similar principles of operation where seawater circulates through a series of successive basins, finally reaching high concentration of natrium chloride. The difference between the traditional and industrial salt-making area is in their outline, dimension and exploitation mode. This difference is important and explains the value of traditional salinas for preservation of cultural heritage, tradition and especially landscape values. As there is no commercial differentiation between industrial and traditional salt, artisanal salinas, with operating costs much higher compared to industrial ones, have been gradually abandoned during the last century. This is why artisanal salinas are a threatened landscape in the Mediterranean and in Europe. Traditional salt production in the Mediterranean is one of few economic activities which can be considered truly sustainable, with hardly any impact on the natural environment and even with a favourable influence on biodiversity. Traditional salinas, with their geometric network of basins and channels, contribute to the formulation of remarkable, but also highly endangered and vanishing landscapes in the Mediterranean.

Ulcinj salina, in comparison to the majority of traditional salinas in the Mediterranean, only has a short history of less than one hundred years. At the time of its construction, it was designed similar to other Mediterranean salinas. However, it later evolved into a semi-industrial salina. Despite this, it still retains the special landscape, natural and cultural values of an artisanal salina and **can be considered one of the most important assets of Montenegro**.

5. State of nature

5.1. Changes in biodiversity

5.1.1. Vegetation

In the five years since salt production ceased, about one third of the crystallization area become covered with predominantly halophyte vegetation, which indicates a rather quick succession process. It is very likely that in the next five years, without proper management, the whole crystallization area will become overgrown. It is not possible to predict with certainty, but when key abiotic conditions in the crystallization change due to desalination, non-salt tolerating plant species will start to invade the area and this would eventually lead to a change in habitat type. The current Natura 2000 habitat type 1310 of the salina will be replaced by some common habitat type probably not listed as Natura 2000.

Similar basic conclusions can be made also for Evaporation III and Evaporation IV area, while in Evaporation II area, succession is already at an advanced stage. Succession in basins in Kneta and Evaporation I area is still at a relatively early stage, which is a consequence of the fact that water is present here for much longer that in other areas. Succession is advanced only in some narrow, marginal parts of the basins.

There is a clear evidence of a rapid succession when comparing reed stands and halophyte stands are in the past and today. According to CZIP (2017), area covered by halophytes used to be 60ha, in 2017 it was at least 112 ha (Figures 7.1, 7.2, 7.4). Reed stands area has changed from 8 ha to at least 62 ha in 2017 (Figure 7.3).

There are also prominent intra-annual changes in biodiversity, mainly due to changes in water conditions. With non-operational pumps, during winter precipitations, the basins fill with water, while during summer droughts, water completely evaporate (Figure 5.1). The changes from land environment to water and back again has huge influence on biodiversity of the area, by directing the succession and influencing survival of water plants such as sea lettuce (*Ulva sp*.) and widgeonweed (*Ruppia sp*.).

Figure 5.1: During spring 2017, the abundance of water in basin 26 facilitated lush growth of sea lettuce and widgeonweed, creating a breeding habitat for at least 25 breeding pairs of Black-winged Stilts (left). During the summer, all the water evaporated (right). Large green patches of lettuce turned to large white patches of dead lettuce. Not a single bird was noted in basin in this period.

5.1.2. Breeding birds

There are breeding data available for some birds with a time span of more than 10 years, which is sufficient to analyse changes in their populations. We present a population change in number of breeding birds that was calculated by comparing breeding data from 2003 to 2007 with breeding data from 2015 to 2017. In practice, this is a change in population in the last 10 to 15 years and we call it here a “long-term change”. In the text, we also present some older data.

Black-winged stilt

Thirty years ago, the Black-winged stilt was considered as a spring migrant, not as a breeder. In the last 20 years, it has become a confirmed breeder. Since regular monitoring began (from 2003 on), its **breeding population has not shown significant changes** (Figure 5.2).

About 100 breeding pairs were estimated by Puzović et al. for 1988 (Studija zastite 2015). For the period 1976 to 1980 Šmuc (1980) list Stilt only as a spring migrant. At the beginning of May 1978, he counted 20 and at the beginning of May 1980, 24 birds respectively. He did not conduct any surveys in the second half of May or in June when the nests are most easily confirmed, so it is possible that he just missed the breeding season of this species, which would explain his findings. Nevertheless, in 2017 we counted over 150 Stilts already at the end of April, that is about 6 times more, so even if Stilts were breeding in the salina back in 1980, they were probably much less numerous than they are today.

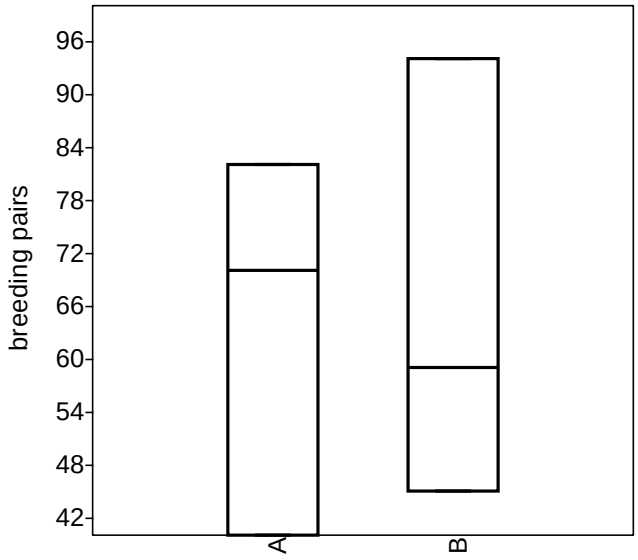


Figure 5.2: Number of breeding pairs of Black-winged stilt, A-period 2003-2007, B-period 2015-2017. Median, minimum and maximum shown (Mann-Whitney U=6, z=0,177, ns).

Stone curlew

For 1988 Puzović et al.(1992) estimated 30 breeding pairs, while Šmuc (1980) in 1978 and 1980 found only 2 to 3 breeding pairs.

Since regular monitoring began (from 2003 on), the **breeding population has increased significantly** (Figure 5.3). It is possible that more research time in the last years effected better results, or that the Stone curlews have benefited from conditions since salt production stopped. The basins in the crystallization area, where we found majority of the breeding pairs, are now mostly dry during breeding time.

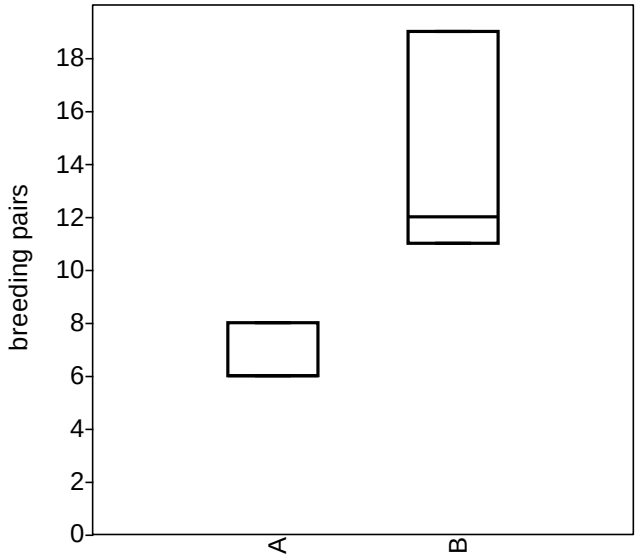


Figure 5.3: Number of breeding pairs of Stone curlew, A-period 2003-2007, B-period 2015-2017. Median, minimum and maximum shown (Mann-Whitney U=0, z=-1,96, p=0,05).

Collared pratincole

Puzović et al (1992) estimated that in 1988 there were up to 90 breeding pairs, while Šmuc (1980) concluded that in 1978 and in 1980 there were about 50 individuals which were breeding outside of the salina. His observations were only until beginning of May; in our opinion, that was too early for estimating breeding abundance of the species.

Since regular monitoring began (from 2003 on), breeding population **has not shown significant changes** (Figure 5.4).

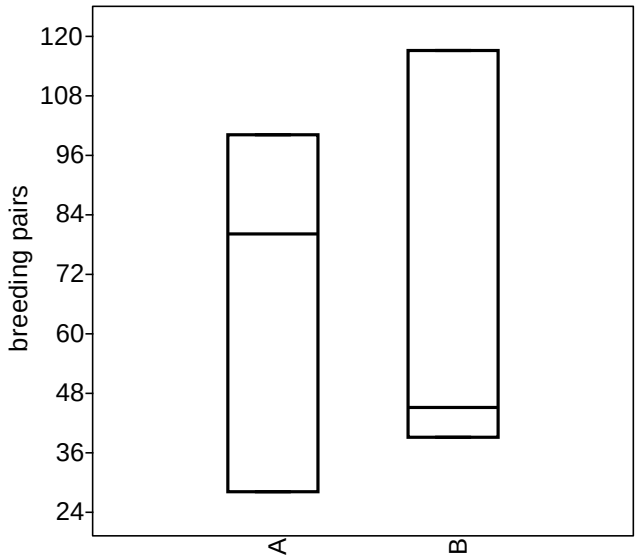


Figure 5.4: Number of breeding pairs of Collared pratincole, A-period 2003-2007, B-period 2015-2017. Median, minimum and maximum shown (Mann-Whitney U=6, z=1,77, ns)

Kentish plover

Puzović et al. (1992) estimated 50 breeding pairs in 1988, while Šmuc (1980) estimated 15 to 20 breeding pairs a decade earlier.

Since regular monitoring began (from 2003 on), the breeding population has not shown significant changes (Figure 5.5), but considering also old data **it could be that, in the more distant past, the breeding population was smaller.**

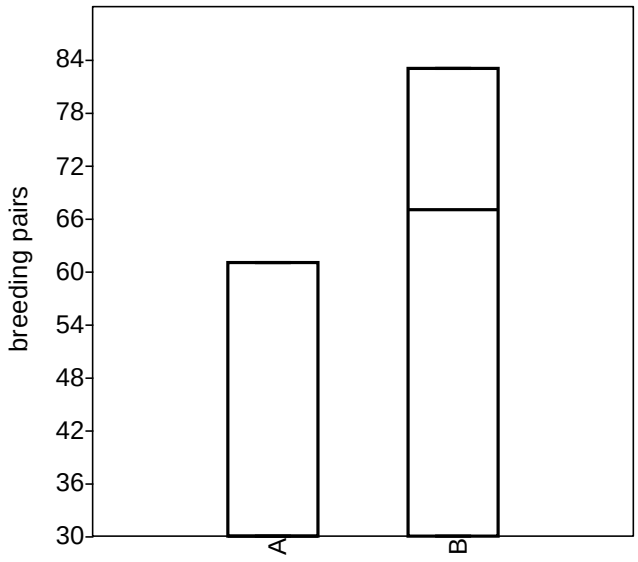


Figure 5.5: Number of breeding pairs of Kentish plover, A-period 2003-2007, B-period 2015-2017. Median, minimum and maximum shown (Mann-Whitney U=3, z=-0,92, ns)

Little tern

From about 100 breeding pairs (similar number was estimated also by Puzović et al. for 1988), the number went down significantly to about 70 (Figure 5.6). **Our presumption is that this could be due to changes in the management of the area**, resulting in smaller surface of suitable breeding grounds for the species. Accordingly, terns start to nest on less suitable areas, resulting in many failed nesting attempts. Observations of Šmuc (1980) at the beginning of May 1978 and 1980 were too early for correct breeding estimation.

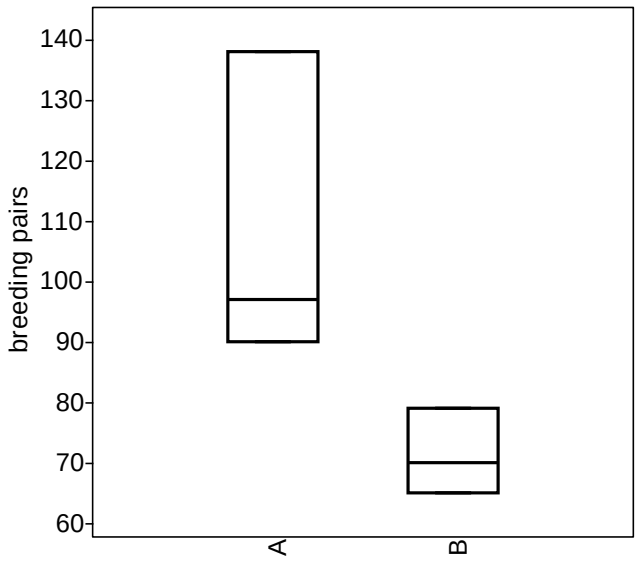


Figure 5.6: Number of breeding pairs of Little tern, A-period 2003-2007, B-period 2015-2017. Median, minimum and maximum shown (Mann-Whitney U=0, z=-1,95, p=0,05)

Common tern

For 1988 Puzović et al (1992) did not find Common tern as a breeding bird, nor did Šmuc (1980) for 1978 and 1980.

Since regular monitoring began (from 2003 on), the breeding population has not shown significant changes (Figure 5.7).

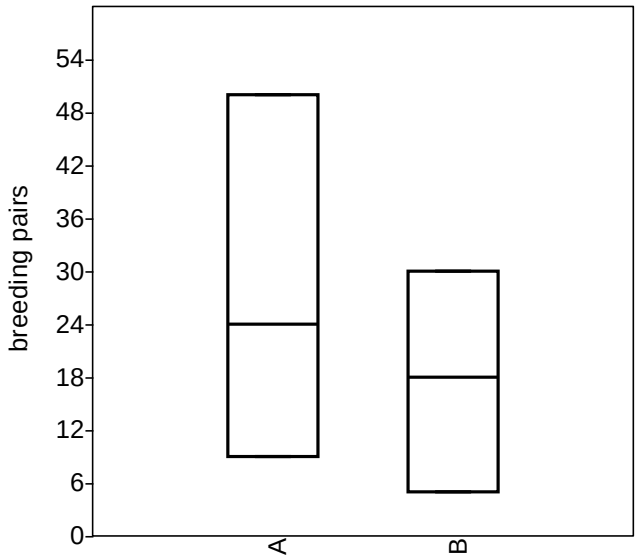


Figure 5.7: Number of breeding pairs of Common tern, A-period 2003-2007, B-period 2015-2017. Median, minimum and maximum shown (Mann-Whitney U=3, z=-0,92, ns)

5.1.3. Wintering birds

When comparing IWC numbers of waders, ducks and coots from the period 2004 to 2011 with the period 2013 to 2017, some differences become noticeable. **The average number of ducks has increased about threefold, the number of coots a stunning 30 times, and the number of waders, at the same time, decreased by about fivefold**. Changes were all significant (Figures 5.8, 5.9, 5.10). Number of the three most common herons decreased significantly in the same period (Figure 5.11), while the number of Pygmy cormorant increased, but not significantly. We also compared the number of all birds counted in the salina in both periods and there was no significant difference (Figure 5.12). Obviously, the abundance of birds in the period 2004 to 2017 did not change, but bird composition did. In recent years, there are more birds inhabiting relatively deep, open water surfaces (i.e. ducks, coots) and less birds inhabiting extremely shallow water bodies and/or wet mud beds (i.e. waders). After 2013, the salina ceased to produce salt. Management of the basins and the water regime changed significantly. Due to destruction of mechanical equipment, there was much less control over the water

level, and conditions become less predictable. There was also no maintenance of dikes. **These could be the most important reasons** for the change in the bird community, but not necessary the only ones.

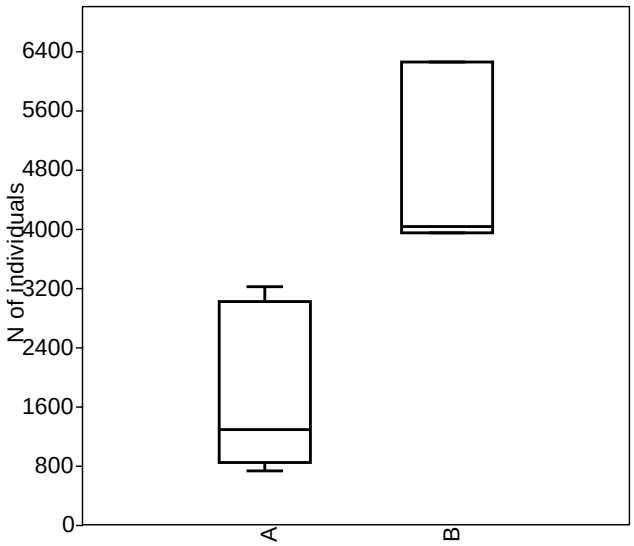


Figure 5.8: Number of ducks during the IWC in Ulcinj salina. A = 2004 to 2011, B = 2013 to 2017 (Mann Whitney U=0; z=-2,28; p = 0,02).

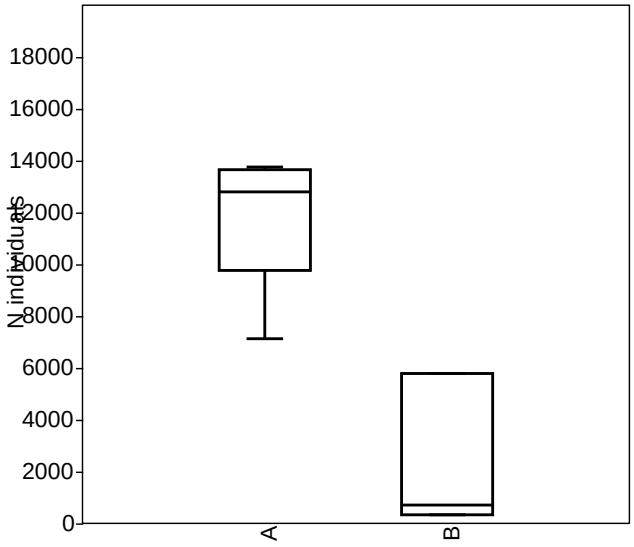


Figure 5.9: Number of waders during the IWC in Ulcinj salina. A = 2004 to 2011, B = 2013 to 2017 (Mann Whitney U=0; z=-2,55; p = 0,01).

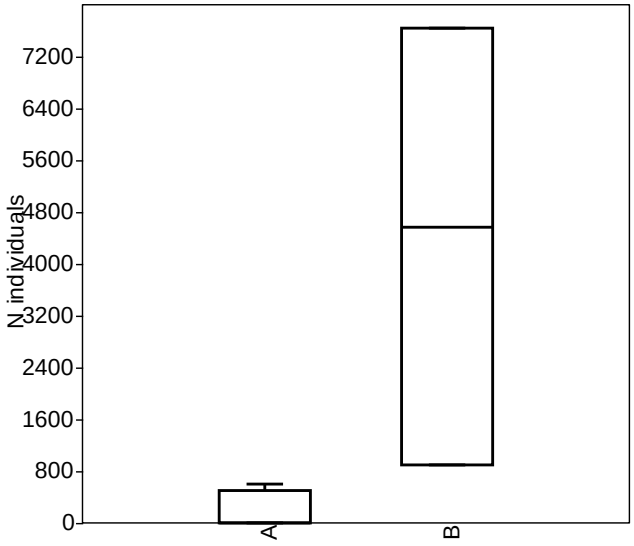


Figure 5.10: Number of coots during the IWC in Ulcinj salina. A = 2004 to 2011, B = 2013 to 2017 (Mann Whitney U=0; z=-2,56; p = 0,01).

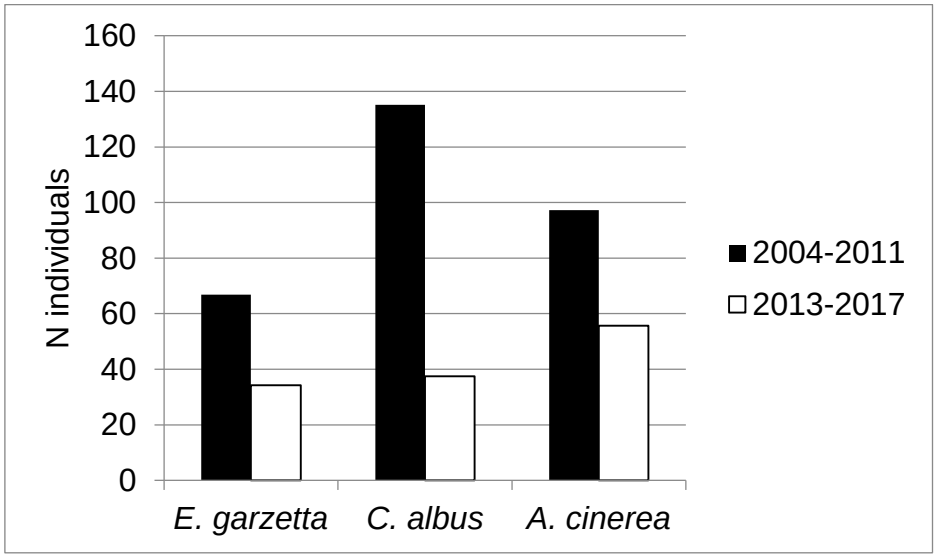


Figure 5.11: Number of three most common herons during the IWC in Ulcinj salina. (Mann Whitney for all three together U=2; z=-2,17; p = 0,03).

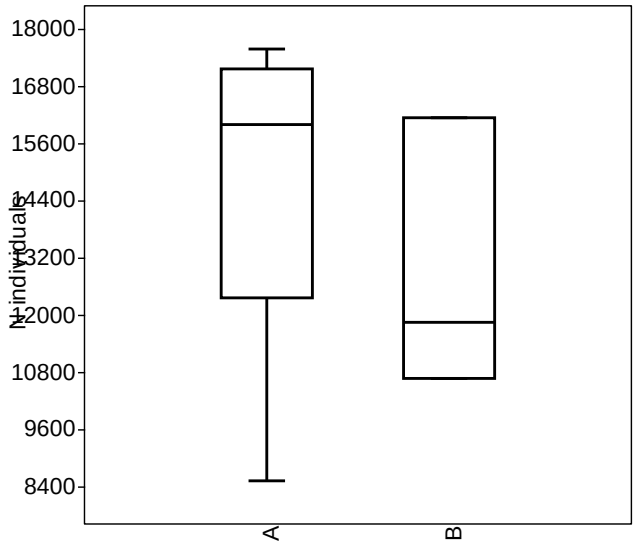


Figure 5.12: Number of all counted birds during the IWC in Ulcinj salina. A = 2004 to 2011, B = 2013 to 2017. (Mann Whitney U=8; z=-1,04; ns).

5.1.4. Water invertebrates

Brine shrimps typically live only in a hypersaline environment, although they can survive also in brackish waters. The common explanation is that only in waters with over 100 g of salt / litre are they sufficiently competitive to outgrow other invertebrates and only hypersaline waters are so poor in potential predators, that they do not have significant influence on populations of brine shrimps. In spring 2017 (probably it was not much different in all years after the end of salt production), the maximum salinity of waters in basins was 40 g / litre, which is probably not enough to sustain a population of brine shrimps. Also in one of the basins in reservoir 2, where we measured salinity at 70g/litre, there were no brine shrimps present. The sample was taken in June. We were sampling only in a water column and not in sediment, so presence of possible cysts of brine shrimps was not considered.

Considering that also in the period of salt production, salinity of water in the basins, except for reservoir 2, crystallization and evaporation IV was lower than 100 g/ litre, we suspect that brine shrimps were never abundant in the part of the ecosystem most interesting for birds. **Therefore, it could be that brine shrimps were never a keystone species in this ecosystem**.

On the contrary, we found thriving populations of Amphipods and Isopods, which just **might be a keystone species** in the area. Unfortunately, there are no data to conclude what the situation of those species was during the period of salt production. Were they present at all? Were they abundant? But since those species survive only in water, we are convinced that current water regime does not work in their favour. During the drought the population crashes and after the rain, when water return, it need quite some time to colonize the basins again.

5.2. Current Status of the Ulcinj Salina at the International Level

The Ulcinj Salina has been already recognized at the international level for its biodiversity value. It is known as the biodiversity hotspot in wider region. Therefore, it attracts the interest of international treaties and organizations.

5.2.1. Emerald Site 'Velka Plaza and Solana Ulcinj'

Emerald Sites are designated under the Bern Convention of which Montenegro is party. Emerald sites are usually selected as biodiversity hotspots or the most valuable natural sites with national importance, and it is also a case of the site Velka Plaza and Solana Ulcinj (Figure 5.13). The site was approved by the Bern Convention in 2007 under the code name "ME0000004". It covers 2839.49 ha and includes the whole Solana, Velika Plaza and surrounding coastal area.

Emerald sites do not have a real legal protection, therefore it is more process of quality recognition than designation.

Figure 5.13: Emerald sites Velika Plaza I Solana (with bright red borderline), and Padine Rumije (East and North from the Solana aligned with the country borders and covering Sasko lake.

5.2.2. Important Bird and Biodiversity Area 'Ulcinj saltpans'

The selection of Important Bird and Biodiversity Areas (IBAs) is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The whole concept was developed by the Birdlife International, global ornithological umbrella organization. In Montenegro, the affiliate Birdlife International partner is Centre of Protection and Reserch o Birds of Montenegro (CZIP).

The selection criteria are developed for a global level, and separately also for Eurpean region thanks to specific local conditions.

Ulcin Solana is designated as IBA ‚Ulcinj saltpans', code YU040. The site delineation is the same as borders of the Ulcinj Solana. The site was designated for it importance for breeding and feeding waders, several of which are species of European conservation concern. The site is currently cosnidered as ‚IBA in danger'. More information about the IBA are in the subchapter ‚SDF for Special Protection Area (SPA)'.

5.3. Designation of the Ramsar site in the Ulcinj salina

The Convention on Wetlands or the Ramsar Convention is an intergovernmental treaty that provides the framework for national actions and international cooperation for conservation and wise use of wetlands and their resources. Each country can join the Convention. When an area becomes protected as a Ramsar site, this becomes a Wetland of International importance. Arguments for inclusion of the Ulcinj salina as a Ramsar site are:

<u>Criterion 1</u>

Ulcinj salina is 1477 ha large complex of lagoon systems for salt production, where salt production was stopped 5 years ago. Due to a combination of hypersaline and brackish environment, they are inhabited by unique species, forming a special type of ecosystem. It is a rare example of wetland which has been created and maintained by humans and nature. There are only about 170 salinas in the Mediterranean region, of which about half are still operating. About three quarters are located in Spain, Greece, Italy, France and Portugal (Walmsley 1999). **The Ulcinj Salina has a very high ecological value and it is important beyond national level in particular for birds and plants.**

<u>Criterion 2</u>

In the Ulcinj salina, **we recorded 19 globally endangered birds and one endangered amphibian species** (Table 5.1). At least six of them are present regularly, reaching quantitative criteria.

Table 5.1: Globally endangered species according to IUCN red list (* at the European level, the species is considered as "possibly extinct"; importance – Ulcinj salina is important for the species due to regular presence and/or size of population)

Species	group	IUCN status	importance
Lutra lutra	Mammals	NT	
Anser erythropus	Aves	VU	
Aythya farina	Aves	VU	+
Aythya nyroca	Aves	NT	
Podiceps auritus	Aves	VU	
Pelecanus crispus	Aves	VU	+
Aquila clanga	Aves	VU	
Circus macrouros	Aves	NT	
Falco vespertinus	Aves	NT	
Haematopus ostralegus	Aves	NT	
Vanellus vanellus	Aves	NT	+
Calidris canutus	Aves	NT	
Calidris ferruginea	Aves	NT	+
Limosa limosa	Aves	NT	+
Limosa lapponica	Aves	NT	
Numenius arquata	Aves	NT	+
*Numenius tenuirostris**	Aves	CE	
Streptopelia turtur[+]	Aves	VU	
Pelophylax shqiperica	Amphibia	EN	

Criterion 3

Several birds breed in Montenegro only in the Ulcinj salina such as the Greater flamingo, Black-winged stilt, Collared pratincola, and Kentish plover. A habitat type "Salicornia and other annuals colonising mud and sand" is very rare and fragmentally distributed on the eastern coast of the Adriatic, but abundant in the Ulcinj salina. Many birds (herons, cormorants, etc.) that breed in vicinity are dependent on the Ulcinj salina as a food source, especially on abundant lower crab community in the water. **The site significantly contributes to biological diversity of the region.**

Criterion 4

Waters in the Salina only rarely freeze during the winter. When water bodies in the mainland are covered with ice, the **Ulcinj salina provides an important refuge for many water birds**.

Criterion 5

During autumn and spring migrations, up to 20.000 birds can be present in the Salina in a single day. This indicates that, due to turn-over effect, the **Ulcinj salina regularly supports many more than 20.000 birds during both migrations, possibly even over 100.000**.

Criterion 6

According to WPE5 (Water bird population estimates, fifth edition; 2012), the area regularly supports more than 1% of the population of 4 water bird species (Table 5.2). Another four species reach 1% threshold value, but not regularly (Table 5.3). If turn-over effect is considered, we belive that also those birds regularly exceed 1% threshold. **So at least eight species fullfil Ramsar criterion 6.**

Table 5.2: Water birds regularly reaching 1% threshold population size.

Species	Period	population size	threshold size (WPE5)
Dalmatian pelican	post-fledging period	>80	60
Pygmy cormorant	post-fledging period	>290	290
Greater flamingo	year-round	> 700	600
Spotted redshank	autumn migration	> 1000	850

Table 5.3: Water birds irregularly reaching 1% threshold population size. Due to turn-over effect we consider them as species fullfiling Ramsar criteria too.

Species	population size in some years	threshold size (WPE5)
Great egret	>500	460
Little egret	>600	560
Spoonbill	>140	120
Marsh sandpiper	>400	240

The proposal of the Ramsar site is submitted to the Convention secretariat in the format called "Information Sheet on Ramsar sites" (RIS). As clarified in the study, "…The CZIP takes the responsibility to officially submit the Ramsar Format for National Reports to the Ministry of Sustainable Development and Tourism, and the Ministry should decide on the basis of the Format…". Ministry, responsible for environment, informed Ramsar Bureau in July 2015 about the intention of the Republic of Montenegro to propose the area of Ulcinj Salina to be included on the Ramsar list of Wetlands of International Importance, following the completion of the already started procedures of assignment of a protection status to the area concerned at the national level. Therefore, we suggest taking into account the above-mentioned criteria when preparing the Ramsar site for submission, including the list of bird species in Tables 5.2 and 5.3 as suggested objectives (Criterion 6). **Fulfilment of the 6 criteria for designation of the Ramsars sites and clear demonstration of international importance of the area for birds and biodiversity indicates the urgent need for submission of application of the area to be listed as the Ramsar site.**

Ministry, responsible for environment, informed Ramsar Bureau in July 2015 about the intention of the Republic of Montenegro to propose the area of Ulcinj Salina to be included on the Ramsar list of Wetlands of International importance, following the completion of the

already started procedures of assignment of a protection status to the area concerned at the national level.

5.4. Standard Data Form (SDF) for the future Natura 2000 sites

As specified by the ToR of the study, the existing data about biodiversity should be gathered in the 'SDF and RIS format, appropriately encoded in the existing GIS database within the EPA'. Such request was unachievable for the following reasons:

Standard Data Form (SDF) is a reporting format for the EU (candidate) country to submit to the European Commission specific information about candidate Natura 2000 sites. The SDF format is specified by the European Commission Implementing Decision (L198/39) dated 30.7.2011. The SDF is electronically uploaded as one file for the whole country in the xml format that contains information about each Natura 2000 site (both SCIs and SPAs) classified by the country. The file is uploaded to the Reference Portal for Natura 2000 maintained by the European Environment Agency in cooperation with the European Topic Centre on Biodiversity. The file itself does not include GIS layer, which is submitted separately as site borderlines.

SDF is filled in separately for each site incl. SPA and pSCI. If they are in an overlap (as supposed in the case of Ulcinj salina), two SDFs in one xml file are submitted.

The information submitted in the SDF to the European Commission should be up-to-date. In case of Montenegro, the Natura 2000 will not be proposed sooner than in 4 years. Therefore, it makes no sense to try to fill in the full SDF for Ulcinj salina now, because it will be definitely outdated at the date of the official submission.

Hence, it is clear that the SDF cannot serve for recording findings from the field, i.e. as a technical "species occurrence database". The data have to be analysed before being filled into the SDF. Usually, information in the SDF is based on a combination of the field inventory and expert judgement also because the SDF for each site includes characteristics that can be analysed only by a comparison of all classified sites (e.g., Global Assessment and Relative Surface in part 3 for habitat types – Ecological Information).

Based on the facts, below we list all the species that can be currently included in the SDF as habitat types, species or birds of Community interest with information relating to which respective part of the SDF it should be included in. It is necessary:

1) To check the lists before the final preparation of the SDF to the European Commission, and to include in the SDF only those that reach the qualitative criteria;

2) To define the qualitative information about each species and habitat type after the last vegetation season before the official submission. For that, a responsible person also needs to know information about respective species and habitat type in the country due to a need to compare quality of all proposed sites. Natural changes are

very fast incl. the Ulcinj salina, especially thanks to abandonment of traditional use (salt works).

Structure of the SDF and parts relevant for the study

The SDF is composed of the following Chapters:

1. Identification (administrative information incl. responsible body)
2. Site location (general information about location, area, biogeographical region, etc.)
3. Ecological information (the most important part specifying target habitat types and species and their quality at the site as well as country level)
4. Site description (general site character, threats, ownership, etc.)
5. Site protection status (at national and regional level)
6. Site management (basic information that do not substitute a set of management measures that are usually developed after confirmation of the site by the European Commission)
7. Map of the site (submitted separately as shapefile)

SDF for potential Site of the Community Interest (pSCI)

pSCI is a site classified under the Habitats Directive for habitat types (Table 5.4), animal (Table 5.5) and plant species.

The borders are proposed as for the protected area.

Table 5.4: List of Habitat types of the Community importance (Annex I of the Habitat Directive)

code	Name	ANNEX I	Priority
1150	Coastal lagoons	X	X
1310	Salicornia and other annuals colonising mud and sand	X	
1410	Mediterranean salt meadows	X	
1420	Mediterranean and thermo-Atlantic halophilous scrubs	X	

Table 5.5: List of animal species listed on Annex II and Annex IV of the Habitat Directive

Species	ANNEX II	ANNEX IV
Lutra lutra	x	x
Testudo hermanni	x	x
Emys orbicularis	x	x
Aphanius fasciatus	x	
Lacerta viridis		x
Podarcis melisellensis		x
Ophisaurus apodus		x
Natrix tesselata		x

For the purpose of the Natura 2000 designation, only species from the Annex II are relevant. Species from the Annex IV are usually protected by other tools than a protected area designation. They are part of the chart to indicate an importance of the site from the species protection point of view.

List of plant species:

Plant species of Community interest were not found in the area.

SDF for Special Protection Area (SPA)

An SPA is a site classified under the Birds Directive for bird species. It is tightly linked to the existing Important Bird Areas that overlap the salina. Because of a previous decision of the European Court of Justice, there is a need to designate each IBA that meets criteria for the SPA selection (Case C-235/04). Criteria for the SPA selection in Montenegro have not been developed and approved by the Ministry of the Sustainable Development and Tourism. Therefore, the below mentioned list should be revised later when criteria for SPA selection are known. For the time being, we suggest to consider the SPA proposal in the same borders as the already recognized IBA "Ulcinj Saltpans", code YU040 (Figure 5.14). In addition, we suggest aligning delineation of both Natura 2000 sites to the one borderline.

Figure 5.14: Ulcinj Saltpans IBA delineation, Source: www.datazone.birdlife.org (August 2017).

So far, 63 bird species from the Annex I of the Bird Directive were recorded in the Ulcinj salina. Not all can be used as qualifying for the SPA. In EU practice, BirdLife criteria for selection of IBA areas are used to select qualifying species, but many of those criteria imply a good overview over bird populations in the country. Since this is not the case in Montenegro, we propose for this occasion to select qualifying species according to three simplified criteria:

1) Ulcinj salina is known as the only breeding place in Montenegro for the particular species;

2) Ulcinj salina is suspected to be one of the most important breeding places in Montenegro for particular species;

3) Endangered species that are abundant and / or regularly present during winter or during migration; the site is suspected to be one of the most important sites for wintering and migratory birds in the country.

According to these criteria we propose the list of bird species as conservation objectives in the future SPA (Table 5.6).

Table 5.6: List of bird species listed on Annex I of the Birds Directive we propose to be qualifying species for SPA, with status, population size and estimated population trend in Ulcinj salina.

Species	**Status**	**Population***	**Trend**
Pelicanus crispus	staging/wintering	<100	increasing
Phoenicopterus roseus	resident	>700	increasing
Himantopus himantopus	breeding	45-130	Stable
Glareola pratincola	breeding	28-100	Stable
Charadrius alexandrinus	resident	30-78	Stable
Vanellus vanellus	wintering	>2000	Stable
Tringa totanus	staging	>1000	Stable
Philomachus pugnax	staging	>1000	Stable
Sternula albifrons	breeding	65-150	decreasing
Sterna hirundo	breeding	5-80	Stable
Coracias garulus	breeding	5-10	Stable

*-turn-over effect not considered in population size of migrating birds

6. State of resources and assessment of their valorisation

6.1. Salt

People of the Mediterranean have for centuries, more or less in the same natural way, produced salt out of sea water, using only the sun and wind. While the sea salinas have kept their status, this form of salt production has nowadays lost its importance. Salt used to be regarded as “white gold” and as having the potential to start wars, as well as a reason to establish trade routes. Even towns were named after salt. Nowadays, salt is merely a spice and even an enemy if consumed in excess.

The Ulcinj salina belongs to the top 10 largest salinas of the Mediterranean, though one of the smallest when it comes to annual production. Production in the salina began in 1935 and since then salt harvesting has been organized on an annual basis, except in four cases. Obtaining sea salt is simple: water naturally evaporates from a system of successively installed shallow basins, and it evaporates gradually under the influence of sun and wind until saturation, i.e. the moment when salt – NaCl - can no longer maintain itself in a liquid state and it begins to crystalize in special basins designed for crystallization, from which salt is then collected.

Salt is polymineralic and contains: K, Li, Sr, Rb, Ca, M, Al, Fe, Si, P, pieces of microorganisms from sea water, algae and planktons, which by decomposing create amino acids (proline, tryptophan, lysine, histidine). That is why the salt is frequently used for medical and balneological purposes, such as healing various diseases of a rheumatic nature, neurological disorders and complications, injuries of muscles, tendons and peripheral nerves, conditions after fractures, as well as post traumatic states.

Sea salt has the characteristics of antiseptics and antihystaminics, what makes it beneficial when it comes to curing skin allergic reactions.

After ‘salt harvesting’, the salt solution and the so-called fine peloid remains as a precipitate with a high content of iodine, bromine and magnesium, which are also very useful for medicinal purposes.

6.2. Peloid

Peloid is very greasy mud, dark grey, almost black in colour. It has a fine colloid structure (Ph 8.4-8.5), salty taste and a smell similar to the one of hydrogen sulphide. The main peloid deposits near the salina are 2-3km away from the sea and comprise 9km^2 of surface area. Peloid is covered with earth and sand. Reserves are huge and are estimated to comprise more

than 350.000 m^3. Ulcinj's peloid has been subject to numerous examinations, of which the last one was in 1985. Conditions for peloid forming are great: nearness of the sea, exuberant vegetation, and presence of plankton, shells and snails, which die and decompose. Peloid is a heterogeneous system that comprises Na, K, Si02, Al03, Fe03, CaO, MgO, CO2, bitumen, sand minerals, 3.30% of humid acids, organic matter and radioactive elements - uranium and radium. Components such as S, Ca, P, H2S, and CO2 penetrate through the skin and function as biologically active substances.

Indubitably, peloid discoveries in Ulcinj are of great importance. It opens up possibilities for various medical programmes and development of health and wellness tourism. Using peloid for medical purposes is called peloidotherapy and it represents very important mode of physical medicine. It manifests thermal and mechanical effects and positively affects local inflammatory processes, regenerative processes, trophic skin changes, as well as the nervous system (as analgesic and spasmolytic). That is why it is widely used in treating arthritis, arthrosis, peri-arthritis, tendinitis, bursitis, myalgia, fibrosis, spondylitis and dicopathia, posttraumatic contractures, slow callus formation, neuralgias and neuritis, lesions of peripheral nerves, chronic gynecological diseases, sterility, postoperative infiltrates, uncomplicated varicose syndrome (without ulcerations). It is also used for cosmetic purposes.

Peloid also innervates external interceptors, causing a chain of neurohumoral and neuroendocrine reactions; it triggers production of glucocorticoides through the cortices of adrenal glands, what has a positive influence on inflammatory processes.

According to research, the best quality mud can be found in Jezero 1.

6.3. Water

Before 2013, when production of salt was in full swing, the salina had two distinct and predictable states with regard to water levels (summarized from Studia zaštite, 2015): a "water" phase and "dry" phase. After the harvest at the end of summer, the salina's basins were water free. Numerous and heavy rain from autumn to spring convert it to a periodically or completely marshy and muddy habitat. Typically about 1/3 of the salina surface was under water, approximately 1/3 was muddy and the rest of the surface depended on the rain: it was dry, under shallow water or muddy.

Each end of April, workers started to pump sea water into the salina basins with two pumps of great capacity (3000 l/sec). Water intake was (and still is) at Cape Djerani, where the Port Milena canal reunites with the sea. Pumps drove water through a 3km long canal to the first basins of the salina from where water flowed over the rest of the basins. Typically, the depth of the water in those basins was 20-30 cm. The sea water was distributed among the basins mostly thanks to gravity.

The water was first released into Kneta with a surface area of 4.2 km^2. These basins took around 15 days to be filled with water. The depth of the water was from 20 to 60 cm (max 1m). These basins were constructed in 1980 and they represent 'the new salina'. In the old

part of the Evaporation I basins (Stojski 1, 2 and basins at the east), the water depth was around 30 cm. When leaving the Evaporation I area, the water salinity doubled to 55 grams NaCl/litre. With this water, Jezero 2 and basins of Evaporation II were filled. The water stayed for 12 to 15 days, the concentration of salt increased to 115 grams NaCl/litre. In the basins of the 3rd evaporation grade, which covered a total area of 0.55 km^2, the concentration of salt increased to 172 grams NaCl/litre. The salinity reached up to 218 grams NaCl/litre when the water finally flowed over 4th evaporation grade basins (with a surface of 0.2 km^2). In the both types of evaporation basins, the depth of water varies from 10 to 20 cm. From the basins of the 4th evaporation grade, water was filled with pumps to the crystallization basins that cover a total area of 0.76 km^2. The concentration of salt here exceeded 235 grams NaCl/litre. The water level in crystallization basins was only a few centimetres deep, and it was greatly influenced by the sun and winds, leading to sedimentation of the salt. The salt was harvested in the first half of September. In extreme cases, like in 2004, the harvesting was prolonged till the middle of November. During the process of salt production, seawater continues to be pumped into the salina; the inflow of water was interrupted only during rainy periods. Two accumulation basin complexes (Reservoir 1 and 2) were situated at the northern edge of the salina, with salt concentrations of up to 174 grams NaCL/litre. They stored the water that was not used during the last harvest period, and it was used to trigger the crystallization process. So, from the starting point of 38 grams/litre, water reached salt concentration of over 235 grams/litre at the end of production, i.e. in crystallization basins. Practically all water in the salina was hyper-saline (Figure 6.4). Surplus water from the salina was put into the Port Milena canal and returned to the sea.

After 2013, when salt production ceased, the hydrological regime changed. The majority of the pumps ceased to work and water was pumped to and out of the area only occasionally. The water level become less predictable, more dependent on natural conditions. The two phases became less distinctive, year to year, and seasonal changes became more pronounced, which can be illustrated by conditions in 2016 and 2017 (Table 6.1, Figure 6.2).

In the rainy year of 2016 (Figure 6.1), more than 90% of the area was completely flooded during the breeding season (Schwarz & Sackl, 2017), while in 2017, almost two thirds of the area was completely dry with cracked surfaces and only 3 basins were 100% covered with water (Table 6.1). This had a tremendous influence on the breeding success of birds. In 2016, many nests were destroyed by floods, in 2017 many nests on dry land were preyed upon.

Table 6.1: Frequency of distribution of basins with different percentages of water cover in June 2016 (recalculated from Schwarz & Sackl 2017) and June 2017. Percentages of water cover in basins was estimated in the field to the nearest 10%.

Range of water cover (%)	N (%) of basins in 2016	N (%) of basins in June 2017
0	0 (0)	26 (62)
1-25	0 (0)	3 (7)
26-50	0 (0)	3 (7)
51-75	4 (9)	1 (3)
>75	38 (91)	6 (14)
no data	0 (0)	3 (7)

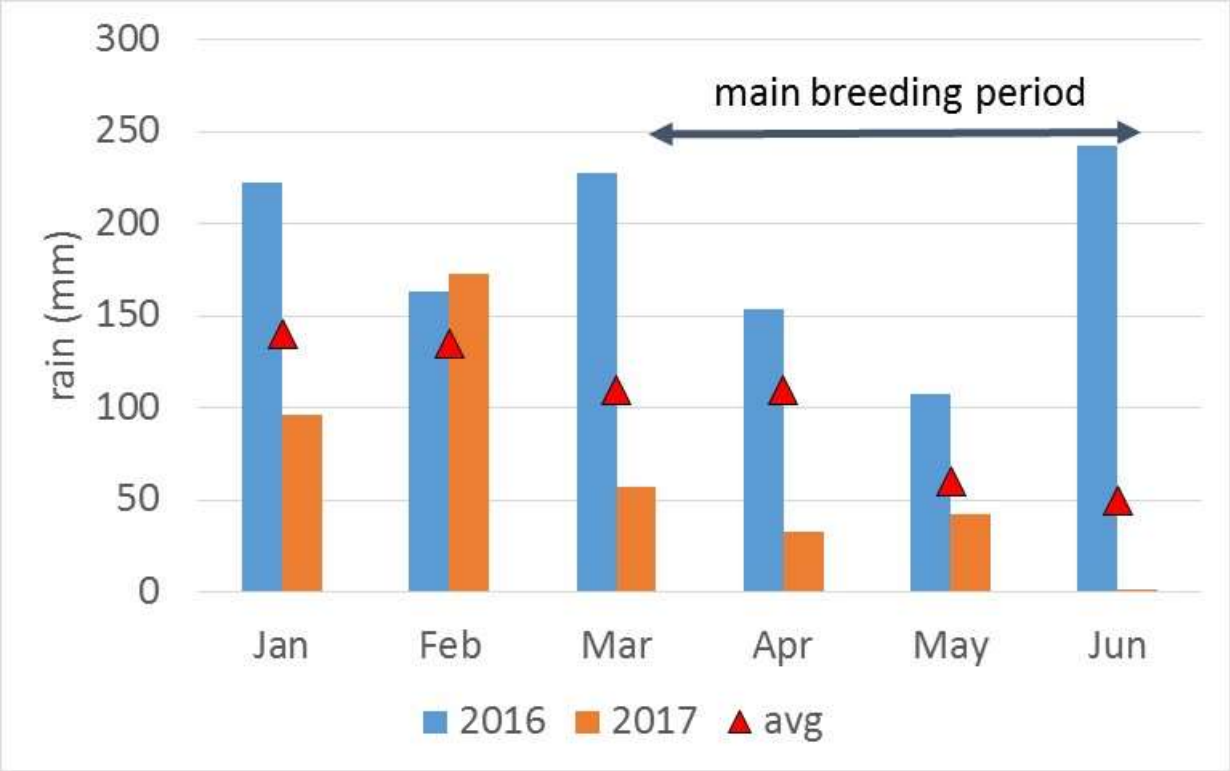


Figure 6.1: Monthly precipitation (in mm). There was considerably less rain during the main breeding period (April to June) in 2017 as well as in 2016, which had an influence on the breeding success of birds. Long-term precipitation average in red.

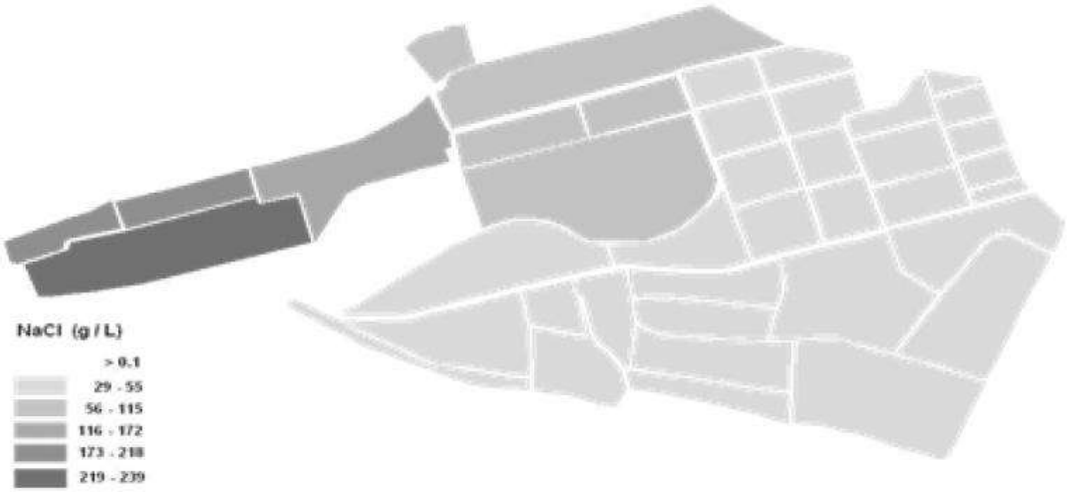
Figure 6.2: After 2013, when salt production ceased, the water level changes quite rapidly, which is bad news for breeding birds in the area. Basins 25 (in front) and 24 (at the back) in March and in June 2017.

In 2017 all started, as locals witnessed, with a very cold winter. For about a week, freezing temperatures (Figure 6.3) turned basins into ice-covered pools. At the end of February, all basins in Kneta and in the area of Evaporation 1 were under water which was so high that it disabled the use of many traditional pathways among the basins. Also some of the basins in Evaporation II, III, IV and crystallization area were filled with a flat layer of water. Until April, the basins in Kneta in Evaporation I were still flooded, but the water level decreased. Basins in Evaporation II, III, IV and in the crystallization area evaporated. Since the main source of water in 2017 was rain, the whole area has brackish conditions, with salinity of the water not exceeding 40g / litre The only exception was one of the reservoirs, with salinity reached 70 g / litre. **The condition was different as in time of salt production** (Figure 6.4). In May and June, the pump bringing in sea water did not work most of the time, so water levels decreased even further. By the end of June, all basins except Jezero 1, 2, basin 3, 12 and 13 were dry or only partially covered with a thin layer of water and/or wet mud. Salinity in Jezero 1 and 2 doubled in this period, mainly due to evaporation. (Table 6.2). All the water in the salina during the 2017 breeding period was more or less brackish.

Figure 6.3: Maximum daily temperature in January 2017 (for comparison, temperatures for less extreme January 2016 are presented)

Table 6.2: Seasonal change in 2017 salinity of water in Jezero 1 and 2.

month	February	April	May	June	August
salinity (g/l)	14	19	23	30	63



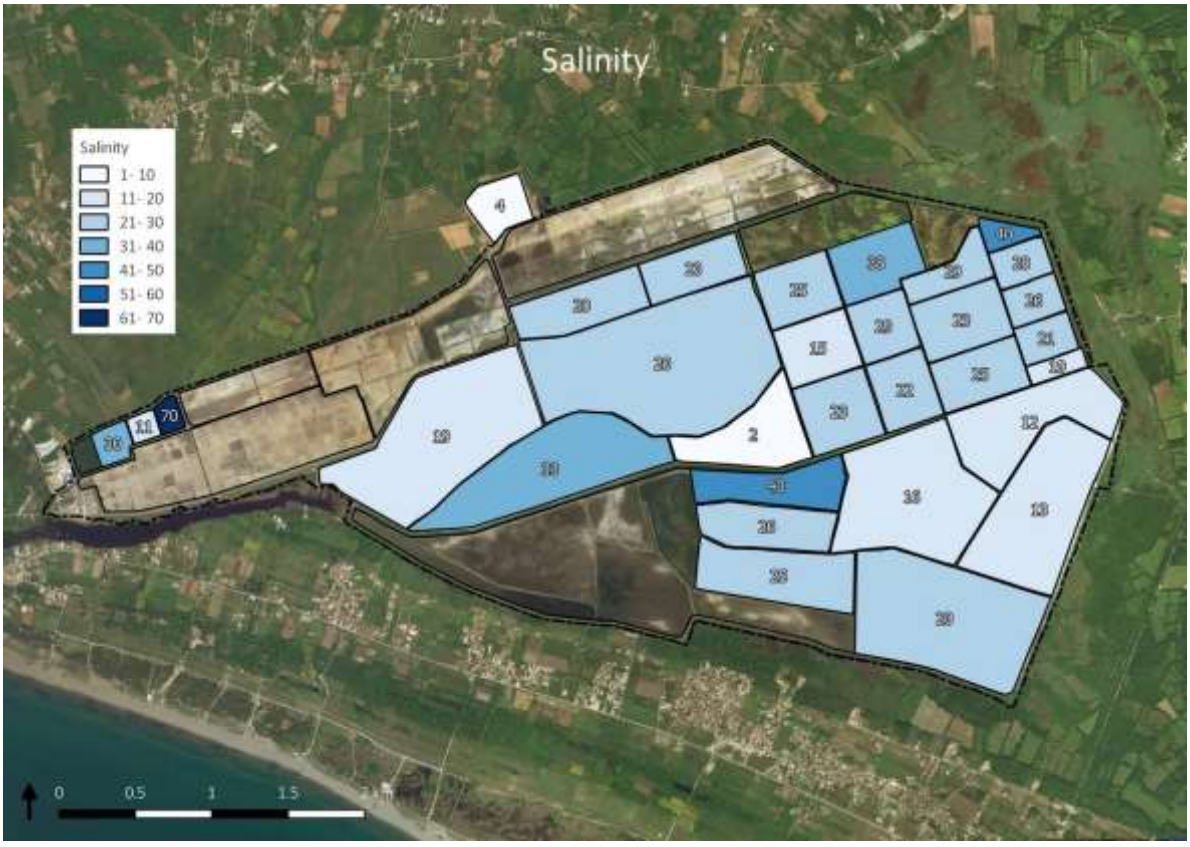


Figure 6.4: Salinity (g/litre) of water in basins. Upper figure during the years of salt production (Studia zastite 2015), lower picture in April 2017. Some basins in 2017 were not accessible or were dry during the sampling.

There were also significant seasonal changes in temperature of the water in 2017. From about 0°C in January it increased to 35°C in Jezero 1 at the end of June.

Radical changes in the water level, salinity and temperature of the salina in 2017 (Figure 6.5) resulted in rather harsh conditions for many organisms, significantly decreasing their chances of survival, from water invertebrates to birds dependent on water conditions for breeding or

feeding. Also, the low salinity, increased water temperature, low water level and anaerobic conditions facilitate growth of *Clostridium botulinum* bacteria (Espelund & Klaveness, 2014) increasing the risk of an outbreak of botulism.

Figure 6.5: During the peak of the breeding season in 2017, the majority of basins were dry with cracked surfaces.

6.4. Ecosystem services

The aim of this chapter is to estimate the value of ecosystem services in Ulcinj salina area based on (1) technical economic benefit transfer and (2) deliberative stakeholder value assessment. The findings are based on the results of the scenario and future use workshop (stakeholder consultation, hereinafter the "consultation") held in Ulcinj on 7th June 2017. Economic value of nature can assist decision-making in the context of - for example - cost and benefit analysis (CBA) of different policy options or in communicating the social value non-market benefits provided by the natural environment.

6.4.1. The assessed area

The Ulcinj salina is restricted only to the plots that have been used for salt production. The area is artificially made and originally developed only for the salt production. Other benefits incl. biodiversity value came later as a side effect.

Benefits of the Ulcinj salina are created not only by the site, but also by its interaction with its surroundings. And vice-versa, the broader area including the salina has got more potential for its future coordinated use. Therefore, when assessing an ecosystem services value, we took into account the broader area, covering 9.969 ha. This covers the salina, Ulcinj Municipality, Velika Plaza, and also the land in between the salina, Velika Plaza, and Bojana river. Its delineation is represented using Corine Land Cover analysis (Table 6.3, Figure 6.6).

Figure 6.6: Land cover map of the Ulcinj salina area, based on Corine Land Cover.

Table 6.3: Land cover / ecosystem categories represented in Ulcinj Saline broader area, according to Corine Land Cover classification.

CLC code	Level 1	Level 2	Level 3	Area (ha)
112	Artificial surfaces	Urban fabric	Discontinuous urban fabric	635,42
142	Artificial surfaces	Artificial, non-agricultural vegetated areas	Sport and leisure facilities	85,71
223	Agricultural areas	Permanent crops	Olive groves	290,44
231	Agricultural areas	Pastures	Pastures	497,81
242	Agricultural areas	Heterogeneous agricultural areas	Complex cultivation patterns	2142,21
243	Agricultural areas	Heterogeneous agricultural areas	Land principally occupied by agriculture, with significant areas of natural vegetation	1093,86
311	Forest and semi natural areas	Forests	Broad-leaved forest	1203,52
312	Forest and semi natural areas	Forests	Coniferous forest	44,91
321	Forest and semi natural areas	Scrub and/or herbaceous vegetation associations	Natural grasslands	190,69
323	Forest and semi natural areas	Scrub and/or herbaceous vegetation associations	Sclerophyllous vegetation	798,54
324	Forest and semi natural areas	Scrub and/or herbaceous vegetation associations	Transitional woodland-shrub	887,66
331	Forest and semi natural areas	Open spaces with little or no vegetation	Beaches, dunes, sands	173,89
411	Wetlands	Inland wetlands	Inland marshes	443,70
422	Wetlands	Maritime wetlands	Salines	1463,16
511	Water bodies	Inland waters	Water courses	17,46

6.4.2. Economic value by benefit transfer

The assessment of economic value of ecosystem services is based on benefit transfer method (EEA 2010). The value transfer approach relies on available economic data on ecosystem services per area. It can be used in case when it is too expensive to conduct original survey or we need an estimate of total economic value timely. Guidelines for cost-benefit analysis such as Guide to Cost-Benefit Analysis of Investment Projects (European Commission 2015) recommend using benefit transfer method as an alternative in policy appraisal of projects. Value/benefit transfer method transfers data from a study site to the policy site. The range of economic values of ecosystem services is usually high. The available estimates give a range of values ranging from 50 EUR per hectare per year to almost 20,000 EUR per hectare per year. That depends on the service provided, location of the site and its conditions. For these reasons, values should be adjusted to reflect the specificities of the context under analysis.

In our study economic values were extracted from the updated database of ecosystem services values developed within the EKOSERV project (Integrated valuation of ecosystem services in the Czech Republic, Technology Agency of the Czech Republic; Vačkář et al. 2014).

The database is combined with the TEEB database (Ecosystem Service Valuation Database, The Economics of Ecosystem and Biodiversity, De Groot et al. 2012). Monetary values were converted into EUR prices in 2016, based on exchange rates and consumer price index (OECD databases).

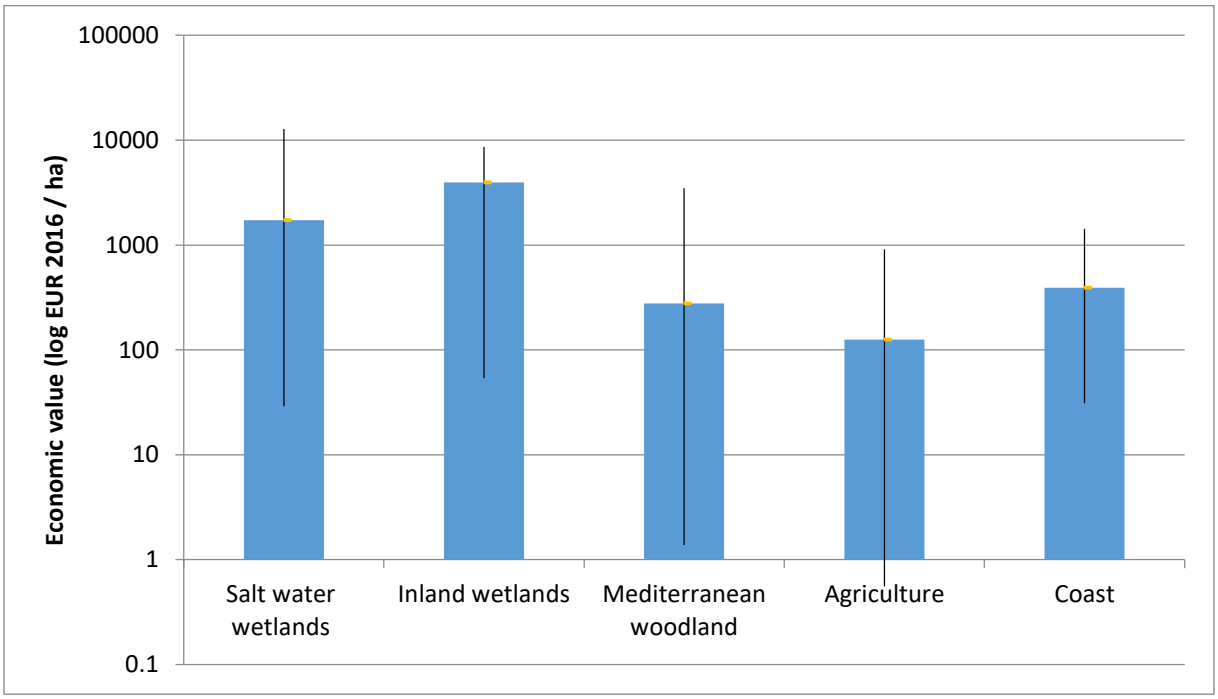


Figure 6.7: Economic value of ecosystem services for ecosystem types present in broader area of the Ulcinj salina, with indication of average, minimum and maximum values of provisioning, regulating and cultural ecosystem services per ecosystem type.

In broader area of the Ulcinj salina dominant land cover type are agricultural areas represented by heterogeneous agricultural use and agricultural landscape mosaic, with complex cultivation patterns (22%) and natural areas (11%). Important representation has been assigned to forests, occupying 12% of the area (predominantly coniferous forest). In the context of broader region, Salina is quite important land use type, covering 15% of the area. Other areas include sclerophyllous vegetation and shrubland, wetlands, grasslands and pastures, olive groves, and urban areas.

The highest value per unit area was detected for inland wetlands, followed by salt water wetlands (Figure 6.7). The artificial land types were excluded from the analysis, as they are not providing substantial natural benefits. Agricultural land was assigned values of services for agricultural ecosystems, forests for Mediterranean woodlands and beaches for coastal ecosystems.

Based on benefit transfer, the total economic value can be estimated at 5 842 016 EUR annually. That means that every year the area of Ulcinj salina of 9,969 hectares provides the regular flow of ecosystem services nearly 6 million EUR according to this quite conservative estimate. This is an average value of ecosystem benefits of 586 EUR/ha. The value estimate is based on the various estimates of ecosystem services benefits for all categories of ecosystem

services, including provisioning, regulating and cultural. The estimate of total value has to be considered as a minimal conservative estimate, because benefit transfer methods do not incorporate local specific benefits. However, these benefits are reflected in the social valuation method reported below, based on deliberative rating of ecosystem services by stakeholders participating at the workshop. Therefore, this estimate of economic value is complementing a social deliberation approach to uncovering the total value of the Ulcinj salina area.

6.4.3. Scenarios for the assessment of ecosystem benefits

The consultation organized on 7th June 2017 in the Municipality of Ulcinj was designed as a "scenario and benefit" workshop. The basis of the consultation was the discussion of possible shared scenario vision for the area and deliberation of the suitable future use and benefits of the area. As a basis for the consultation, 3 scenario storylines were developed, envisioning the future visions for the development of the area:

Scenario I. Nature conservation and eco-based tourism

As the Ulcinj salina area is valuable from the biodiversity point of view, but lacks the formal protection up to now, the first scenario introduces special protection in the form of a nature park. The nature protection scenario recognizes the country / EU / global importance of the site and its species of special importance, e.g. for EU Nature Directives. The nature protection imposes some legislative and other measures to protect the area. Salt ponds are renewed to maintain the habitats by appropriate water regime, salt production is operated because of eco-based tourism (and interpretation of the traditional mode of production), and as a conservation measure. Eco-based tourism is promoted based on the importance of the area for biodiversity.

Scenario II. Symbiosis of business (salt production, eco-based tourism) and nature conservation

In this scenario, local partners coordinate their actions. Salt production is balanced with special protection of the area. This scenario presents new locally-based business opportunities in the area. The salt is produced and marketed using local brand Ulcinj salina. There are opportunities to promote local sustainable and circular economy. Eco-based tourism is promoted based on the importance of the area for biodiversity, bringing also new business opportunities. New eco-design facilities are constructed nearby.

Scenario III. Salina as tourism resort

This scenario is based on a response to global challenges such as growth of tourism. Rapid infrastructure development of the area characterizes this scenario, with the pressure on habitats. New hotels and roads are constructed. Inflow of people and businesses means relative local prosperity, with new job opportunities for local people. Local habitats are being degraded.

The table below summarizes the parameters of 3 basic scenarios discussed at the consultation. The results of the scenario deliberation were more qualitative, trying to find shared views and points of shared interests or conflicts.

Table 6.4: Parameters of various scenarios discussed at the workshop.

Scenario	Scenario I.	Scenario II.	Scenario III.
Salt production	+	++	-
Salt trade	-	+	-
Nature conservation	+	+/-	--
Mass tourism	--	-	+
Eco-based tourism	+	+/-	-
Local economy	+/-	+	++
Circular economy	-	++	-
New jobs	+/-	+	++
Green jobs	+/-	++	-
Environmental change	+	+/-	--
Ecosystem services*			

**Ecosystem services/benefits were assessed during the benefit group discussion*
Scale used: ++ substantial positive change (substantial increase), -- substantial negative change (substantial decrease), + slight positive change, - slight negative change, +/- almost no change

Participants of the scenario workshop assessed initial scenarios and how the situation could change for different pre-defined parameters (Figure 6.8). The most pronounced salt production was under Scenario II, otherwise there was either only small increase or small decrease. Nature conservation was perceived as in conflict with mass tourism. Where nature conservation gained, the opinion of group discussion was that tourism declines. However, an exception was eco-based tourism, which was in synergy with nature conservation. Local economy could gain under all scenarios, but a sustainable circular economy prospered most under the second scenario. A similar pattern can be found for jobs; however, green jobs would decline under Scenario III. In aggregate, most favourable was Scenario II scoring 11, followed by Scenario I scoring 7.5. Scenario III was perceived as highly unfavourable with negative effects on society, scoring -3.5. The view of the extent of change differed between the groups, with highest differences in rating the economical parameters (effects on local economy and jobs). This reflects the uncertainty in the final outcomes of scenarios.

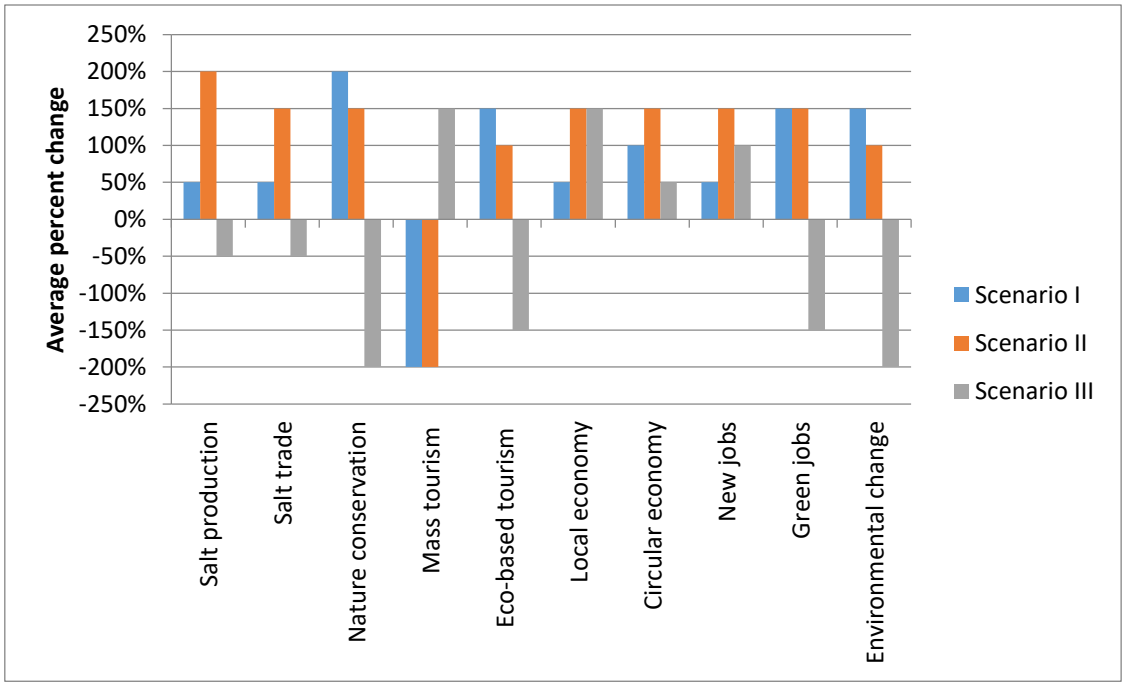


Figure 6.8: Results of focus groups assessment of various parameters in initial scenarios. The chart presents percentage change in different parameters based on focus group scoring.

6.4.4. Social ranking of ecosystem benefits

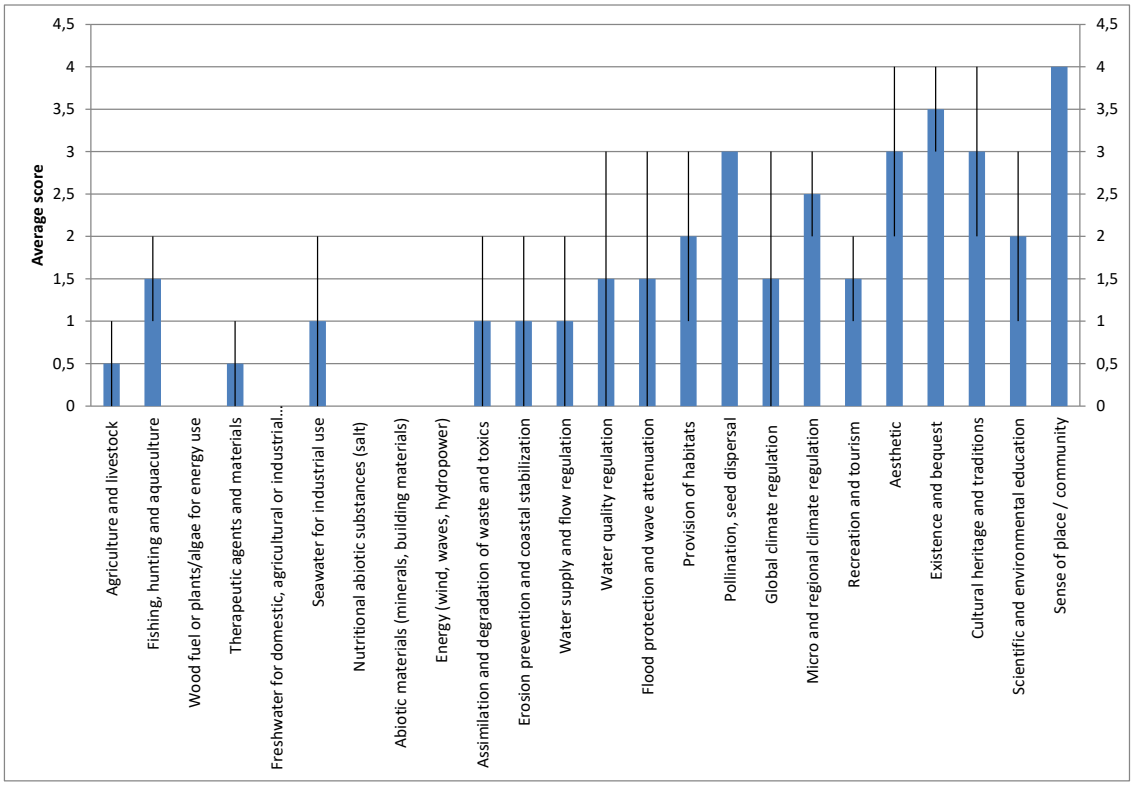


Figure 6.9: Average scores for ecosystem services and benefits based on discussions and two focus groups ratings. The basis shows the average score and the bar shows range of scores (lower and higher end of scoring).

Results of focus group rating of ecosystem services of Ulcinj salina area are shown in Figure 6.9. The graph presents the average score and the range of scores assigned by two focus groups at the benefit and scenario workshop. Provisioning services very often received zero scores. Participants perceived that provision of ecosystem services from the area is at very low levels. This is the case for freshwater, abiotic materials or energy. The special case is the abiotic process of salt production (by evaporation in salt ponds). Here, the participants assigned also zero scores, as currently, there is no salt production. However, the potential for salt production as well as other provisioning services could be high, as can be seen from changing values in different scenarios (Figure 6.11).

The highest average score was given to the sense of place/community (highest possible score of 4 assigned by both groups; Figure 6.10). The Ulcinj salina area is therefore considered absolutely essential for the local sense of place and community. The cultural sense of place and community was followed by cultural heritage and tradition and aesthetic benefits, with a small variation among the groups. Both groups agreed on the importance of pollination and seed dispersal (both groups gave this benefit 3 points, perceiving it as very important). The pollination and seed dispersal service represents also biodiversity and habitat importance with regard to key ecological guilds connected to the salina habitat types and occurrence of rare species of insects and plants. Other regulating ecosystem services scored between 1 to 2.5 points, which means participants felt these services are of little or only average importance for the area.

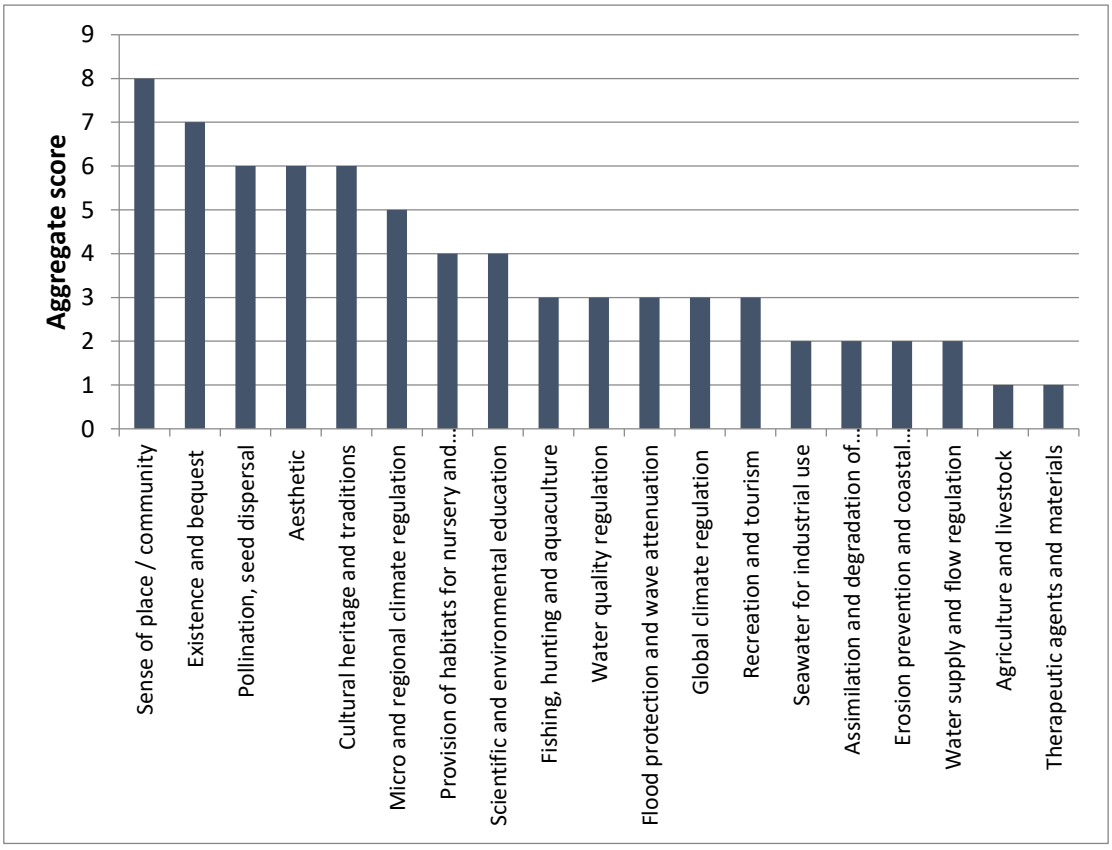


Figure 6.10. Aggregate score based on the sum of scores received by both groups. This aggregate score reveals the aggregate collective perception of ecosystem benefits.

Aggregate score for both groups gives the notion of which ecosystem benefits received greatest importance in focus groups discussions. As Figure 6.10 summarizes, the most important was a sense of place/community, which means cultural ecosystem service. Existence and bequest value received 7 points score, followed by ecological service of pollination and seed dispersal, representative of important supporting and regulating ecological functions. Cultural ecosystem services of aesthetic appreciation of the environment and cultural heritage and traditions were also scoring high in the ranking exercise. The chart shows important aspects of Ulcinj salina area, which has been really part of cultural identity of the region and people still appreciate its cultural importance as a social-ecological system, with cultural ecosystem services rated as even more important than its ecological functions.

6.4.5. Change of ecosystem benefits across scenarios

The participants of the scenario and benefits workshop were asked to assess the change of ecosystem benefits across different scenarios (Figure 6.11). The majority of negative changes in ecosystem benefits accompany Scenario III. This scenario presents the most ecologically insensitive and unsustainable development of the area. Under this scenario, not only provisioning but especially cultural ecosystem services are rapidly declining. The most favourable changes occur again under Scenario II, closely followed by Scenario I. Scenario III presents again substantial negative changes in ecosystem benefits, therefore presenting actually the costs for the whole society. In conclusion, shared scenario as defined by Scenario II presents positive social value based on the ecosystem benefits assessment, incorporating also long-term and non-marketed benefits provided by the unique social-ecological system of Ulcinj salina.

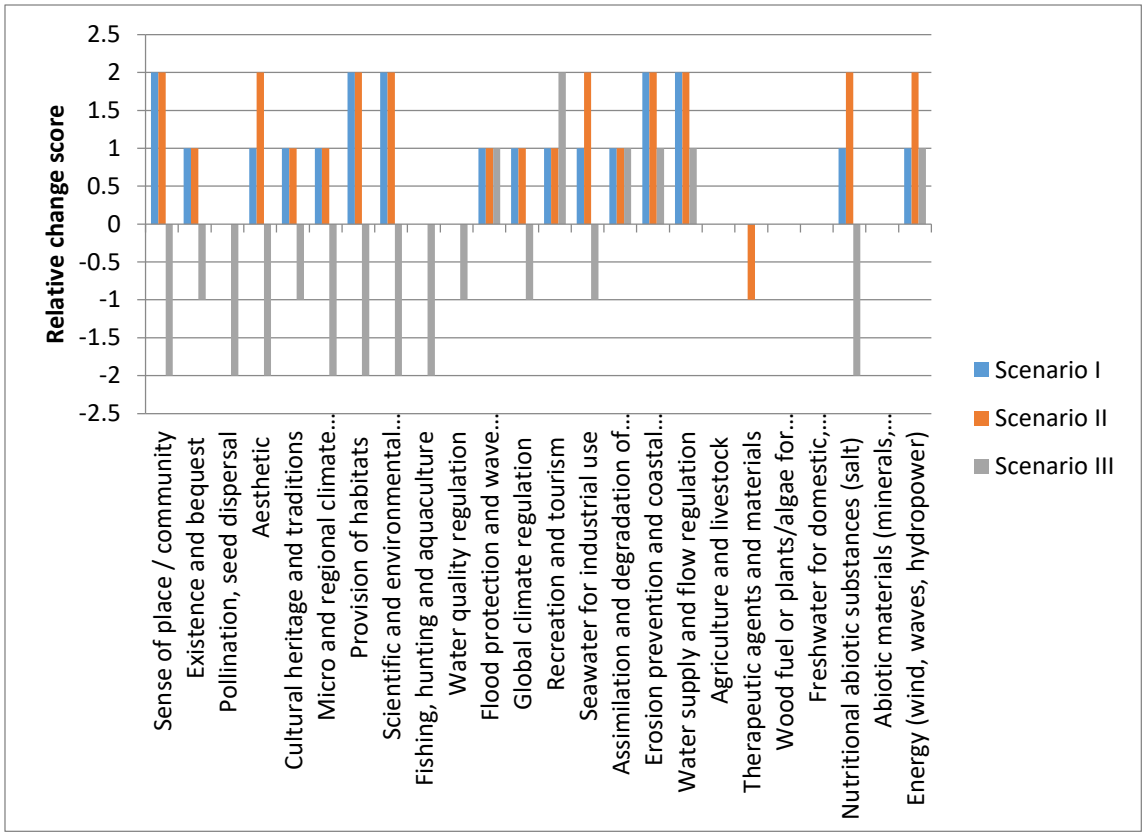


Figure 6.11: Relative changes in ecosystem benefits across scenarios. Zero line represents no change as compared to current state.

6.4.6. Results and recommendations

The area of Ulcinj salina provides measurable benefits to the society. In monetary terms, the broader area provides a social value of 5.8 million EUR per year, which translates into the average value of 586 EUR/ha. However, the area provides broader social values which have been assessed during the workshop focusing on scenarios and benefits of future use of the area. This value is rather conservative estimate based on benefit transfer.

Participants of the consultation were able to find a shared scenario vision for the area, based on balanced nature conservation and socioeconomic development (business together with recreation). Some conflicts among stakeholders emerged but despite this, participants have been able to deliberate on key aspects of desired future development and use of the area.

At the scenario part of the workshop, participants discussed a shared vision for a region. They agreed that the Scenario II – Symbiosis of business (salt production, eco-based tourism) and nature conservation was the most preferred and appropriate for sustainable development of maximization of benefits of the region. According to this scenario, salt production is completely restored, along with trade and boost of local economy. One focus group proposed to allow a development of 10% of the Ulcinj salina area maximally, limited to the area of the existing salina's facilities or to completely exclude such development.

The Scenario II was the most acceptable for all participants at the workshop ("shared vision"). Moreover, the Scenario II delivers the most benefits for the society from the Ulcinj salina area (Figure 6.12). Cultural ecosystem benefits of Ulcinj salina area were considered more important (received higher scores of importance) than regulation services and ecological functions. Provisioning services scored least in the social value ranking. However, the participants scored the current state of ecosystem benefits, and there is potential to receive benefits not currently recognized as realized.

The most important benefits for the current state were sense of place and community, aesthetics, cultural heritage and traditions, existence and bequest values and pollination and seed dispersal. If the scenario II would be implemented, the benefits of the area would increase significantly, including also enhancement of regulation and some provisioning ecosystem services such as abiotic salt and energy production, micro and regional climate regulation, provision of habitats for biodiversity, and flood protection and wave attenuation.

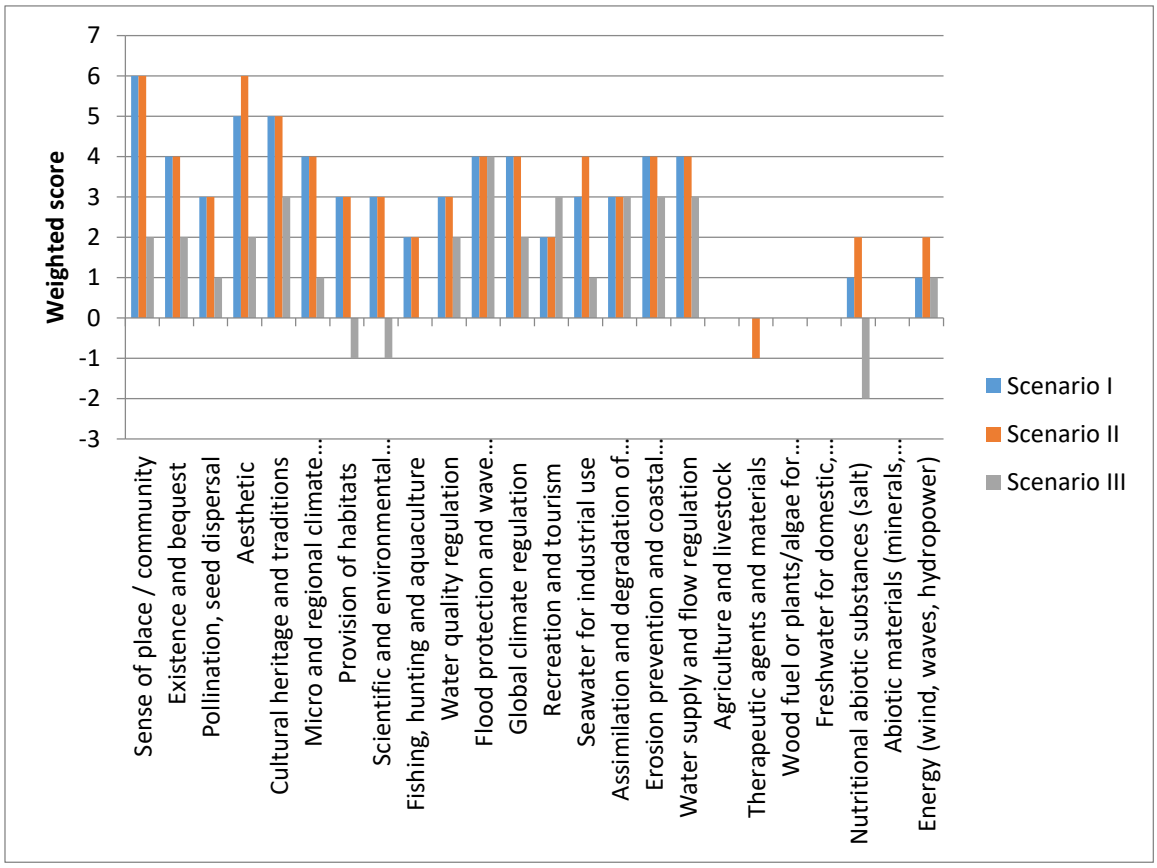


Figure 6.12: Weighted score for benefits delivered in different scenarios.

The future development of the Ulcinj salina area requires a participative shared action. Scenario vision combining sustainable use, nature protection, and economic opportunities using ecological specifics of the area (Scenario II) was shared by all workshop participants. This can maximize the benefits of the area for all stakeholders and a society as a whole.

7. Cartographic presentation of the distribution of most significant habitats and species

7.1. Vegetation

Maps (Figures 7.1 to 7.4) represent distribution of most common species and habitat types in the salina.

Figure 7.1: Cartographic presentation of Mediterranean salt meadows (3.15 ha). Only the northern part of the area and a 200 m belt around the central dike were mapped.

Figure 7.2: Cartographic presentation of Mediterranean and thermo-Atlantic halophilous scrubs (28.3 ha). Only the northern part of the area (not including the crystallization area) and a 200 m belt around the central dike were mapped.

Figure 7.3: Cartographic presentation of Phragmites australis stands (62 ha).

Figure 7.4: Cartographic presentation of Salicornia (81.4 ha). Only the northern part of the area (not including the crystallization area) and a 200 m belt around the central dike were mapped.

7.2. Birds

In 2017, flamingos were the most numerous in Jezero 2 and adjoining basins 19 and Zoganjsko 2 (Figure 7.5), but they were seen also in Jezero 1, Stojski 1. In April, they all moved for a while to basin 6. In other basins, they were present only sporadically and/or in small numbers. In summer, after a considerable drop of water level, when the eastern part of Jezero 2 was left with very shallow water, the flamingos moved to Jezero 1.

Figures 7.6 and 7.7 shows position of large breeding colonies of Collared pratincole and Little tern in 2017.

Figure 7.5: The area that was most often used by a flock of flamingos in spring and early summer 2017.

Figure 7.6: Position of breeding colonies of Collared pratincole with 10 or more pairs in 2017.

Figure 7.7: Position of breeding colonies of Little tern with 10 or more pairs in 2017.

8. Opinion regarding the placing of the Ulcinj salina under protection

Article 29 of the Law on Nature Protection defines criteria for assessment of the importance of the area for conservation and potential declaration of the protected area. The criteria are presented in the table 8.1, complemented with the short description on how these criteria could be applied for the Ulcinj salina.

Table 8.1: Criteria for assessment of the importance of the area for conservation and potential declaration of the protected area.

Criteria	Relevance for the Ulcinj salina
Authenticity and autochthony, i.e. degree of originality	Ulcinj salina represents one of the last salt works on the Eastern shore of the Adriatic Sea; although a man-made ecosystem, it supports conditions for a variety of species and habitats and is considered an authentic Mediterranean landscape.
Representativeness, i.e. the relic degree, endemicity, uniqueness in its type, rarity	The area is inhabited by several rare and endangered species, some of which became dependent on this type of habitat.
Diversity, i.e. the richness in natural phenomena and processes	Ulcinj salina is one of the most important biodiversity areas in the region; its importance is demonstrated in rich fauna (especially birds and halophytes) and very characteristic and rapidly vanishing habitats. It is listed or fulfils criteria for several international criteria for identification of sites with rare or endangered species and habitats (presence of the IUCN Red data book listed species), agreements (Ramsar Convention, Important Bird Area) and European conservation directives (SPA, pSCI) and networks (EMERALD).
Integrity, i.e. the functional unity	The area of the salina is well embedded in the wider landscape and forms a particular ecosystem with clear delineation and borders.
The attractiveness of the landscape, age, conservation of an area	Network of geometric basins, mixed with canals of the salina constitutes a very attractive landscape
Function and importance of protected natural asset:	Ecological value of the area is complemented with cultural values of the area, represented both in the material and

ecological, historical, cultural, educational, scientific and developmental	non-material values (tradition of salt-making process) and provides opportunities for raising awareness, education and science and research work.
Endangerment of the protected natural asset	The area is highly endangered as abandonment of the traditional land use (salt production) could drastically change ecological character and landscape values of the area.

The value of the Ulcinj salina in terms of its natural landscape and cultural **values goes beyond the national borders and is considered an area of international conservation importance**. This type of man-made ecosystem is becoming increasingly rare in the Mediterranean. It is unique in its type or appearance and is a typical representative of this type of landscape as similar areas of traditional salinas can only be found in a few places in the region. The salina still holds traces of the authentic forms or these can be reconstructed in an original manner.

9. The proposal for category, mode and zone of protection

Classification of the area into one of the protected area categories is based on the definition of the primary management objective; this is requested by the international (IUCN) standards and is reflected in Article 30 of the Law on Protection of Nature in Montenegro.

The ecological character of the Ulcinj salina is defined by the maintenance and control of the water regimes. In this area, hydrological conditions are not determined fully by a natural hydrological cycle, but are managed by man, following traditional patterns related to sustainable salt production and harvesting. To retain this character, maintenance of the water regimes is essential also in the future. At the time of preparation of this Protection Study, it was unclear whether: (a) stable water regimes would be ensured in future via the re-establishment of salt production; or (b) management of waters and related water infrastructure would become part of the activities and tasks of a protected area and its management.

The decision of (a) or (b) above is crucial for determination of the management category for the future protected area. If approach (a) is taken, then traditional land use and use of natural assets which created the ecological and landscape framework of the area would be re-continued meaning that the biodiversity of the area would be supported by continuation of land use practices that are characteristic of the primary management objective of the IUCN protected area category V (Protected Landscape). If approach (b) is taken, then managers of the protected area would maintain water tables and discharges exclusively for the needs of biodiversity (and for demonstration purposes), and this would qualify as a management objective for the IUCN protected area category IV (Habitat/Species Management Area), where man controls conditions and natural processes in a protected area for the benefits of particular species and habitats.

It is clear from the above that it is not possible at this stage to definitively decide on the proposed category of the protected area of Ulcinj salina. Therefore, three options for determination of the protected area category are presented in the chapter *Category of the future protected area* and two scenarios (one with three sub-scenarios) are given in the chapter *Concept of protection*.

9.1. Category of the future protected area

Legal background to the types of protected natural assets (Article 20) and categorization of protected areas (Article 30) is provided in The Law on Nature Protection. Categories of protected areas, as described in the Article 30, are closely correlated to the IUCN protected area categories.

In order to retain the ecological character of the Ulcinj salina and its current biodiversity values, it is essential to maintain the man-made system of control and maintenance of hydrological regimes, where losses of waters due to evaporation and sun insolation are artificially replaced by pumping sea-water into the area. Consequently, in times of excess waters, including during the times of flooding caused by high rainwaters (or after the salt harvesting period), waters were and need to be also in the future, pumped out of the area to the sea.

9.1.1. Option 0: Protected area category III (IUCN)

Some documents, for example the Spatial Plan of Montenegro until the year 2020, propose that the Ulcinj salina be assigned the status of Natural Monument, which corresponds to an IUCN protected area category III site. The study on declaring the Delta Bojana-Buna a Regional Nature Park proposes the establishment of a transboundary Biosphere Reserve "Skadar Lake and Bojana (Buna) Delta" where Ulcinj salina would also be part of the Biosphere Reserve with the status of "Natural Monument".

The definition of the IUCN PA ctg.III says: "**Category III** protected areas are set aside to protect a specific natural monument, geological feature or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value".

The emphasis of the definition of the IUCN PA category III sites is on (natural or culturally-influenced) »features«, and »sites« not on »ecosystems«. Ulcinj salina is not a »feature« nor is it a »site« and neither a »form«; it is a man-made ecosystem and specific landscape, clearly distinguished from the original natural ecosystem, which was a coastal wetland and floodplain. Typically, a landscape can comprise several (natural/cultural) features and sites, but cannot be considered as a feature itself. Mediterranean salinas are one of the most prominent and important landscape types in terms of both protection of nature and cultural values.

The importance of the role of natural features which form the core of the IUCN PA definition of the PA category III site is furthermore explained (Dudley et al., 2008). IUCN PA ctg.III sites comprise sites with:

Natural geological and geomorphological features: such as waterfalls, cliffs, craters, caves, fossil beds, sand dunes, rock forms, valleys and marine features such as sea mounts or coral formations;

Culturally-influenced natural features: such as cave dwellings and ancient tracks;

Natural-cultural sites: such as the many forms of sacred natural sites (sacred groves, springs, waterfalls, mountains, sea coves etc.) of importance to one or more faith groups;

Cultural sites with associated ecology: where protection of a cultural site also protects significant and important biodiversity, such as archaeological/historical sites that are inextricably linked to a natural area.

In the national legislation on nature protection in Montenegro, the emphasis of the definition of "Monument of Nature" is on (natural or natural-historical) "forms" and not on "features" and/or "sites"; however, careful reading of the definition reveals that the wording used actually confirms that the word "forms" covers exactly the same meaning as described in the IUCN definition by using terms "features" and "sites": the Law on Nature Protection (Official Gazette of Montenegro, no. No: 01-790/2, 3rd August 2016), defines the Monument of Nature as follows:

"*Monument of nature shall be a mainland and/or a marine area, with one or more natural or natural-historical forms, which have ecological, scientific, aesthetic, cultural or educational value.*

Monument of nature may be established on natural, half-natural or anthropogenic area. It is prohibited to perform in the area of the monument of nature or in its imminent environment, which is the integral part of the protected natural asset, activities or actions that could endanger features, values and the role of the very monument of nature."

IUCN (Dudley et al., 2008) furthermore describes as distinguishing features for the IUCN PA category III sites in the following: "*usually relatively small sites that focus on one or more prominent natural features and the associated ecology, rather than on a broader ecosystem*". Again, this clearly indicates that Ulcinj salina cannot be listed as Natural Monument as it is neither a "small site" nor does it focus on natural features but rather on the very specific ecosystem. Emphasis of category III management objectives is *not on protection of the key species or habitats and especially not ecosystems*, but only of particular natural features. Typical examples of IUCN PA category III sites in the European context are waterfalls, exceptionally large or tall trees, cliffs etc.

The above justification clearly shows that the IUCN protected area category III is not an appropriate assignment of the category for the future protected area of Ulcinj salina.

9.1.2. Option 1: Protected area category IV (IUCN)

If the salt-making process (where the key component is maintenance of the water regimes which is in correlation both with salt production and biodiversity conservation) is not restored, the manager of the protected area will have to control waters and maintain the water infrastructure as part of its day-by-day management activities with the objective of maintaining favourable conditions for safeguarding habitats and species.

In this case, the IUCN PA category that should be established is **category IV** (managed nature reserve); the definition given by Dudley et al. (2008) for such areas is as follows: "[Such areas] *aim to protect particular species or habitats and management reflects this priority*. *Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats*".

The primary objective of IUCN PA category IV sites is to *maintain, conserve and restore species and habitats*, *and* – if not in opposition to the primary objective – *development of public education facilities and appreciation of the species and/or habitats concerned*.

Among distinguishing features that are typical for the IUCN PA category IV sites one can say that these areas are usually established to help protect or restore flora, fauna species and/or habitats (these areas may not be self-sustaining and will require regular and active management interventions to ensure the survival of specific habitats and/or species).

It has, however, to be noted that the size of ctg. IV Protected Areas is often relatively small, mainly due to the fact that maintenance through active management interventions of large areas is often costly.

A Nature Park as defined in above-cited law is described as follows: "*A nature park shall be a spacious natural or partly cultivated mainland and/or a marine area, which is characterized by a high level of biological diversity and/or geological values with significant areal, cultural and historical values and ecological features of national and international importance.*

It is prohibited to perform actions, activities and services in the nature park that could endanger features, values and the very role of the park."

If the area will be managed for conservation purposes only, namely for securing conditions for very specific species (like the Flamingos, Collared Pratincoles, Little Terns, halophytes, specific habitat types), certain management activities will be needed to secure the favourable conservation status of these species and habitats. **This is a typical example of the IUCN protected area category IV**.

9.1.3. Option 2: Protected area category V (IUCN)

If salt production is re-established, the area will continue to be a typical example of the IUCN PA **category V** – Protected Landscape.

For the restoration and maintenance of traditional salt-production in order to provide conditions for specific man-made ecosystem with particular biodiversity and landscape values, the IUCN definition of the PA category V covers the proposed conditions and management objectives: "*A protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value, and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values*".

The primary management objective of the IUCN PA category V Protected Landscape is: "*to protect and sustain important landscapes/seascapes and the associated nature conservation and other values created by interactions with humans through traditional management practices"*.

Ulcinj salina was created and maintained by people and nature and only carefully balanced interaction between man and nature enabled specific conditions which are favourable for

salina species and habitats. Many of them became dependent on maintenance of the traditional land-use practices in the salina. If the management practices in the salina would be abandoned or intensified (i.e. industrial salt production instead of traditional salt-making) the biodiversity values of the area would be lost. Ulcinj salina is therefore a typical or one of the best examples to provide a clear understanding of the extent to which humans can sustainably use natural resources while at the same time preserve biodiversity.

Other objectives that fulfil the criteria of the IUCN PA category V sites include: 1. contributions of the area to broad-scale conservation by maintaining species associated with cultural landscapes; 2. values and heritage by providing conservation programmes (subsidies, compensations, payments, development and support in promotion of natural products etc.) in heavily used landscapes; 3. provision of opportunities for enjoyment, well-being and socio-economic activity through recreation and tourism (if not in opposition to the primary management objective and definition of a protected area). Such areas act as models of sustainability (if sustainability is such that lessons can be learnt for wider application). IUCN PA category V sites also offer opportunities for recreation and tourism consistent with traditional life style and economic activities.

Hence, the designation of Ulcinj salina as a Nature Park, which is the equivalent of the IUCN PA category V site, would by all means be the most effective approach, both in terms of reaching conservation landscape and socio-economic goals, and on condition that a balance is reached between the extent of re-establishment of traditional salt production, other uses of natural resources (such as particular forms of sustainable tourism and visitation) and management for conservation. Even within the IUCN PA category V, Protected Landscape zones with stricter protection regimes can be established. In the case of Ulcinj salina, such areas would include areas of no access and disturbance and areas with strictly controlled water regimes.

Based on the current state and after consideration of pros and cons of all above specified options, our suggestion is that salt production is restored and Ulcinj salina becomes an IUCN V protected area – Protected Landscape.

9.2. Zonation

Zones and regimes of protection are defined by the Article 31 of the respective law:

- protection zone I – strict protection regime;
- protection zone II – active protection regime;
- protection zone III – sustainable use regime.

The protection zone I – strict protection regime shall be implemented on a protected area or on its part with slightly modified characteristics of a habitat of exceptional ecological importance. This protection enables natural biological processes, preserving the integrity of habitats and living communities, including exceptionally valuable cultural assets.
Within the protection zone I with the strict protection regime:

- use of natural resources and construction of facilities shall be prohibited;
- scientific researches, as well as monitoring of natural processes shall be restricted;
- visits for educational purposes shall be allowed in a restricted extent;
- in case of fire, natural disasters and accidents, plant and animal diseases and pest overreproduction, protection, rehabilitation and other necessary measures shall be implemented.

The protection zone II – active protection regime shall be implemented on a protected area in which the characteristics of natural habitats are slightly modified, up to the level that does not threaten functional and ecological importance of the habitats. This protection shall cover the valuable landscapes and objects of geoheritage.
Within the protection zone II with the active protection regime, the following actions may be implemented:

- intervening with the aim of restauration, revitalization and total improvement of protected area;
- controlled use of natural resources in the protected natural resource, without consequences for primary values of their natural habitats, populations, ecosystems, features of landscapes and objects of geoheritage.

Within the protection zone III with the sustainable use protection regime, the following actions may be implemented:

- intervening with the aim of restauration, revitalization and improvement of protected area;
- developing of settlements and accompanying infrastructure in an extent that does not impact negatively on the basic values of the area;
- refurbishing of the objects of cultural and historical heritage and traditional construction;
- preserving traditional activities of the local population;
- selective and limited use of natural resources.

Regardles to legal zones, we see in salinas four areas with different purposes (see Figure 9.1):

1.) nature protection priority area, where the main goals will be related to nature protection;
2.) salt production priority area, where the main goals will be related to salt production;
3.) nature protection & salt production combined area where both activities will work in cooperation;
4.) administrative area.

Figure 9.1: Proposed areas in salina: Red line = nature protection priority area; yellow line = salt production priority area; green line = nature protection & salt production combined area; blue line = administratrive area.

In **nature protection priority area** all will be subordinate to protection of nature. In particular during breeding season this means no human activities. Basins, dikes and water level will be managed in accordance to needs of the nature.But still, area can be used in extensive way for salt production too i.e. basins can be used for concentration of the water and simmilar.

In **salt production priority area** all will be subordinate to salt production, but since this will still be part of protected area, nature friendly ways of production will be always considered first in particular if they will not cause additional costs in production and if they will not reduce considerably amount of salt harvested. Basins, dikes and water level will be managed to salt production needs.

In **nature protection & salt production combined area** not very intensive procedures of salt production will take place (predominantly as evaporation areas). Maintanance of basins, dikes and water level will predominantly follow needs of salt production. Outside salt production period water level will be managed in accordance to needs of the nature. There will be some

limitations in salt production during breeding season from April to June, but very few otherwise. We see salt production activities similar as they were in years when salt was alredy produced here. We see great nature conservation potential of this area in particular during bird migration and wintering period, when salt production activities are naturaly limited or even non existent.

In **administrative area** there will be probably (similarly as it used to be) place for administrative buildings, warehouses, educational room for visitors, here it is possible also to develop some nature friendly touristic facilities.

Our suggestion is that areas are assigned as legal zones as stated in the table 9.1.

Table 9.1: A suggestion of assignement of legal zones.

Area	**Protection zone**
nature protection priority area	Similar to the I protection zone regime with the exception that the hydrological regime will be managed across the entire Salina
salt production priority area	II
nature protection & salt production priority zone	II
administrative area	III

More detailed regimes for all areas must be elaborated in management plan for the salina.

If salt production will not be restored in the area, the delimitation of the areas can be the same. The only difference will be, that all areas will be managed in accordance to needs of the nature.

10. Borders of protected area

The area of Ulcinj salina is surrounded by artificially dredged channels which represent the border between the different ecosystems (agricultural and urban on the outer part and salina habitats in the inner part). It is therefore obvious that the channel line should represent the border line of the protected area. In addition, rivers and channels are the best possible natural barriers for prevention of unauthorised access to the area which cause disturbance for the wildlife. For detailed delineation of the future borders of the designated site, two possible options could be considered (Figure 10.1).

1) Borderline based on cadastral data (yellow line)

The advantage of this option is a clear inclusion of all parcels that are fully or partially in the area of the salina. A challenge is that parcels in some parts exceed the area of the salina which causes inclusion of parts that are not relevant for protection (on the East). The Porto Milena outflow section, which is highly degraded, is excluded from the proposed territory of the protected area.

2) Borderline aligned with natural borders in the field (red line)

This option offers to delineate borders with channels flowing around the salina, together with Porto Milena outflow section. This option, however, provides easy recognition of a designated site in the field by all stakeholders. The borderline would be drawn in the centre of the channel. The option to exclude only part of the Porto Milena outflow section should further be considered. The Porto Milena section is of no major importance neither for the biodiversity of the area nor for salt production, but it might be considered as important land for development of the tourism strategy.

A major shared characteristic of both options is their visibility on the map. We suggest using option 2) with one modification – to exclude the Porto Milena from the future protected area.

The total length of the border line is 18.68 km. Out of this, 16.55km follow the drainage channel line - the channel is included in the border - and 2.13 km follows the northern shore of the channel Port Milena near industrial and administrative buildings of the salina complex. In this section, the border follows artificially constructed structures around and it includes the entire salina and the surrounding channels. The difference between the two proposed options lies in the exclusion of the channel Port Milena and the remains of the previous lagoon in Option 1 (yellow line).

Figure 10.1: Two options for delineation of future borders of a protected site. In yellow is a borderline aligned with parcels, in red a borderline is aligned with channels around the salina.

Other relevant data are presented below:

Surface of the area proposed for protection: 1,477 ha
Coordinates: 19°18’5,71’’E / 41°55’25,14’’N
Cadastral parcels: According to the cadastral record of the Real Estates Authority, the

Ulcinj salina covers the following cadastral parcels: KP 30/2, 30/3, 376, 377, 358, 359, 360, 362, 363/1, 363/2, 364, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407 I 410, all in K.O. Ulcinj Field, as well as KP 1242/2, 1258/5, 1258/6, 1258/7 i 1270, all in K.O. Zoganje.

11. Concept of protection

Ulcinj Salina is a man-made landscape and the cooperation between man and nature created a very specific ecosystem. Although the transformation of former coastal wetland and lake ecosystem into saltworks took place very shortly (less than 100 years ago), main patterns of human interventions into natural processes were never so dramatic that coexistence between man and nature would not be possible. On the contrary, there are several habitats and species which not only settled in the area but through time became dependent on traditional salt making process which is based on evaporation of saline waters under the sun and winds but where natural hydrological circle is heavily controlled and directed by man.

This introduction was needed to explain that the conservation values of the Ulcinj Salina can only be preserved if the hydrological regime with related infrastructure of dykes, basins and channels will be maintained in the same manner as it was until the year of abandonment of the salt production in 2013.

This can only be achieved in two ways; either by reconstruction of the traditional salt-making process and careful consideration of the needs of the wildlife and habitats when managing natural resources in the area (option A) or by establishment of the protected area where man will maintain and control water regimes and habitats following the traditional salt-making patterns (option B); this can be achieved through establishment of a protected area with staff, which is capable and qualified to maintain the infrastructure and land for controlled water flows and discharges.

11.1. Threats

There are several classifications of direct and indirect threats to protected areas (i.e. Lockwood et al. (2006), RAPPAM (Ervin, 2003) etc.). For the identification of the threats to the Ulcinj salina area, the description of threats (direct and indirect) and underlying causes as identified in Feary et al. (2015) were used to enable further analyses and comparison with similar protected natural areas (Table 11.1); data from the Studija zaštite, 2013 were used as a baseline consideration.

Table 11.1: The description of the threats and underlying causes according to Feary et al. (2015).

DIRECT THREAT	Relevance for Ulcinj salina area	Description and importance of the threat for conservation (none, minor, medium, strong, devastating); if the threat is in brackets means that no relevant data to confirm the impact is known
On-site pollution, impact of chemicals	Solid waste is a bigger problem mainly along the areas which were used for salt storage and refinery and can have a negative impact on the ecosystem, species and also visitation and tourism/recreation and human health. Traces of potential chemicals are not known.	Medium
On site impoundment/ diversion of streams and rivers, groundwater withdrawal	The entire area is man-made and the hydrological regime is maintained by man; pumps are dysfunctional and water infrastructure is so damaged that they do not enable any control over water tables and discharges which causes negative impacts on the ecosystem and species.	Devastating
Excessive livestock grazing	Uncontrolled and in some parts too extensive grazing has a negative impact on biodiversity, ecosystem and species, causes erosion of the habitats and could negatively affect also salt-making and visitation.	Strong
Mining	Not relevant for the area.	Not applicable
Infrastructure and industrial development within the protected area	Part of the area where salt was stored and refined has already been urbanised. At the time of construction, it had a negative impact on the ecosystem and species. The infrastructure within the rest of the area is mainly limited in dimension and impact on nature.	Minor
Unsustainable tourism	There is no tourism in the salina at present, just visitation of the area which can be considered as one of the opportunities of protected area management. Visitors cause damage directly to the habitats and species by wondering off regular paths and also indirectly by disturbance.	Potentially strong
Excessive resource extraction; overharvesting, including poaching, hunting, fishing, fuel-wood extraction,	Hunting, poaching and to a lesser extent fishing are the main threats from this category. They have negative impacts on ecosystem and species, but could also influence visitation.	Strong

logging (legal and illegal)		
War and civil strife	Not relevant for the area.	None
Inadequate or incompetent technical and protected area management actions, processes and resources	The area has no adequate management staff in place and not enough management actions are undertaken.	Strong
Invasive species of plants and animals	The area is still only partially affected by invasive alien species, perhaps more in the case of fauna species. Currently it does not seem there would be any prominent damage from alien species.	Moderate
On-site cataclysmic natural events (such as fire, flood, earthquakes, …)	Natural events that can or could negatively affect ecosystems, species, infrastructure and properties include: harsh winters, potential floods, droughts, fires and earthquake.	Potentially devastating
INDIRECT THREAT		
Off-site pollution	Polluted inland and sea waters can intrude into the area, the same can happen with polluted air. Port Milena channel outside the protected area is a potential threat (illegal sewage waters from the buildings, etc.. Data on pesticides, herbicides and chemicals are not known.	(Strong?)
Off-site damming of streams and rivers. Diversion of water, groundwater withdrawals	Although the area was formerly connected to the Zoganjsko jezero, with the construction of the salina, this connection was interrupted by an artificial canal surrounding the entire area.	(Minor?)
Inappropriate land use and sea use	Abandonment of the traditional salt-making process is the main cause of the loss of biodiversity, cultural and landscape values and has a negative impact also on social life and tourism development.	Devastating
Climate change	The impacts of climate change in the area concerned on ecosystem and species is not evaluated, but it is suspected to be high.	(Strong?)
UNDERLYING CAUSES		
Human population growth, higher consumption, material aspirations	The impacts of these threats are reflected in uncontrolled development of mass tourism in the beach areas in the vicinity of the salina and abandonment of some traditional land-use practices which also supported biodiversity (extensive agriculture). The consequences are also reflected in increased waste generation.	Potentially strong
Inadequate economic, legal and political systems, inappropriate socioeconomic, political and governance mechanisms	Lack of political will to overcome problems related to landownership and other property and management induced problems is an obstacle in declaring it an area for protection and thus ensuring long-term conservation of ecosystem and species.	Strong

Breakdown or dysfunction of social, cultural or political relations	Ulcinj area is a multi-national region with a good tradition of cooperation.	None
Values and attitudes incompatible with conservation goals	Interest in other uses of the resources of the area has been expressed in the past but no legal or spatial documentation at present allows for development of the entire area	None
Inappropriate governance and management, lack of technical and human capacity, low levels of human resources for protected area management	There is no management at present in place	Not applicable
Lack of information, knowledge and education, inadequate recognition of relevant knowledge systems	Low level of awareness of the values and also threats among the local population and stakeholders is potentially threatening the area due to lack of interest and thus absence of political pressure for protection.	Moderate

11.2. Option A: Restoration of the salt production and park management

11.2.1. Salt production in the world

Salt has lost its historic significance due to its inexhaustible reserves; development of transport; mechanical salt harvesting and mechanical water regulation in the process of salt production. Decline of high revenues from taxes on salt, technical innovation and different administrative approach to management have resulted in salt trade to lose its monopolistic position and the role of political force that had for centuries.

Production of sea salt is simple: natural evaporation of water in the system of successive shallow ponds. Water gradually evaporates under the influence of the sun and wind until it reaches the stage when molten salt - NaCl can no longer maintain its molten state and crystallises in a specially designed crystallization ponds from where it is harvested. In addition to sea water, the salt can also be harvested from saline inland waters, stone (mine salt) and artificially (vacuum evaporation).

Having lost their former significance many salt works found themselves in the transition. Larger salt works maintain their position easier and undergo a process of modernisation, while small scale salt works transform or shut down. Trend of shutting down small scale salt works started in 1930. The largest number of them was closed in the period 1950-1990 mostly in industrialized countries, while in the Eastern and Southern Mediterranean countries traditional salt production has not been interrupted. Small scale salt works of Western

Mediterranean are being transformed into fish farms or converted into protected areas, or they undergo process of urbanisation or change their purpose.

There are three methods used to produce salt:

- Evaporation of sea water under the influence of the sun
- Thermal-evaporation, boiling of salt water
- Rock salt mining

11.2.2. Description of salt production in Ulcinj Salina

The production process in Ulcinj Salina consists of two parts.

The first part refers to seasonal production of raw salt from seawater using solar evaporation method. This salt is harvested and stored in specially constructed storage facilities. Salt produced using this method i.e. "raw salt" is suitable for maintaining roads during winter, where salt is used to prevent ice forming on road surfaces. This salt is also used as raw material for obtaining final-finished product in Salina or as raw material for other producers.

In the second part of salt production, this salt, as a semi-finished product, is processed in the refinery. During processing salt is washed, dried, grounded and packed in adequate packaging, depending on the customers' requirements. This part of the production process takes place throughout the year. This production process depends on the amount of salt harvested in the process of seasonal production. Lack of domestically produced salt can be replaced by imports from sea salt works. This is necessary for the continuous supply of the market and execution of contractual obligations to customers. Salt imported in such manner does not contain characteristics of salt produced from Ulcinj Salina and it only occurs in cases when domestic salt production is significantly reduced.

11.2.3. Production of "raw" salt - seasonal production

Process of salt production is carried out by pumping seawater at Cape Đerane using two pumps with a capacity of 1,500 litres /s into specially constructed canal 3km in length that leads to evaporation ponds. Water is pumped from a depth of 6 meters and this water is exceptionally clean because there is no industry and no urban settlements in the vicinity of the extraction point.

By free fall through system of canals and locks (timber dams between ponds and canals) sea water is channelled from one pond to other until it becomes more saturated with salt. Pumped sea water contains 3.5°Be only to reach density greater than 21°Be once it passes through successively connected canals and prior to being discharged into the crystallisation ponds. This water is diverted into crystallisation ponds where the further process of salt concentration takes place. Specific weight of salt crystals makes them heavier than water and they fall to the ground forming a salt plate. Water used to obtain salt is discharged from the pond, and new saturated water is supplied to already formed salt plate and the process of

growth of salt plates continues. This process continues as long as favourable climatic conditions allow, with plenty of wind and sun.

Water intake begins in early April and continues to the point the entire surface of Salina is filled with seawater. Intensive evaporation of seawater begins mid-May, when the production cycle begins. Water within Salina is circulated using system of pumping stations and free movement of water. Evaporation is performed exclusively by the sun and the wind through the continuous movement of water. Water movement and evaporation process create stocks of highly concentrated saturated salt water in seven reservoirs with a capacity of approx. 750.000m³, which serves the production as raw materials in case of rainy season, to quickly establish a production cycle. First salt crystals in crystallization ponds are obtained in early June and this process continues until mid-August, when thickness of salt plate reaches 5-10cm. At this stage harvesting of salt begins.

Harvesting salt is carried out manually, which poses a particular problem in terms of duration of the harvest and the quality of the harvested salt. Harvesting takes 30 to 35 days. Salt harvested from ponds is transported by wagons to salt washing system and then stored in 45,000 tons storage facility.

11.2.4. Processing "raw salt" in the refinery

From the storage facility salt is transported again to the washing system from where it is sent to the spinner in the form of suspension. Following spinning with a capacity of 10 t/h, salt is dried in an oven with a capacity of 10 t/h until it reaches 0.8-1% of moisture. After drying, salt is iodised and sent to intake pits from where it is distributed for packaging, if necessary. Packed salt is placed on pallets and stored in the final product storage facility ready for shipment or sale.

Total production capacity:

Production net area of Salina is 12.840.000m².
Production gross surface 13.555.422m²
Area of processing plant, storage facility and administration building is 33.281m²
Surface of crystallization ponds is 765.067m²
Surface of concentrated water reservoirs IV, V, VI and VII amounts to 173.915m²
Production capacity of raw salt is 30,000 tons of salt.
Capacity of highly concentrated saturated salt water reservoirs are approximately 750.000m³.
Storage capacity of unprocessed salt is 45,000 tons.
Storage capacity of finished products is approximately 1,000 tons.
Capacity of finalization/processing is-10 t / h.

11.2.5. The „Harvest" of Salt

For salt production the term "harvest" - "salt harvest" is used. This term is usually used to describe harvesting agricultural products but also for collection of salt. In fact, crystallisation of salt or transformation of salina seawater to sodium chloride is a process where small crystals merge together to form large crystals and as such they become heavier than water

and fall on the bottom of the pond, continuing to merge to form the salt plate. Therefore, for collection of salt in Salina, the term "salt harvest" is used.

Since its construction, salt has been harvested each year in Ulcinj Salina with the exception of three cases: war year of 1943, in 1968 and 2002 due to the heavy rains that melted the salt in ponds. Last salt harvest salt was organized in 2013.

Salt harvest is carried out from crystallization ponds where sea salt is deposited and formed salt plate is sufficiently thick to enable high-quality and cost-effective harvest. There are 101 ponds. The average dimension of an individual pond totals 96.0 x 70.4m (overall approximate dimensions equals 7.575m²) with total surface area of 765.067m². Pond side are coated with wooden boards entrenched with wooden stakes. The embankment, i.e. coating is a 35-40cm high and 60 cm wide. Ponds are formed on waterproof ground of clay. Between ponds there are canals lined with stone for water intake. Canal is 1.0 m wide.

Salt harvest in Salina is carried out in a single harvest and until 1969 it was carried out in a primitive manner. Harvesting salt was done manually. Ponds areas were divided into 10x10 squares where salt was collected to form piles. A décauville track was laid between the piles of salt. Workers then manually wheel in platform wagons with excavator bucket capacity of 0.75 m³, load in salt into the wagons and again manually push the wagons from the ponds. The track between the ponds is then extended to the dual gauge of side embankment (one for full, the other for empty wagons). Transfer from the ponds to the track was performed by using the turntable. At the end of the salt embankment, the salt from the wagons was poured out into concrete duct where hopper mounted on a crane is placed. Once the hopper is filled with salt the crane lifts the cargo and unloads it onto a conveyor belt, forming salt piles. Salina had four cranes for salt piles each with capacity of 50 tons per hour or total of 200 tons per hour. Mobility of cranes was enabled by transmission tracks with track gauge of 2.80 m. Once pilled, salt is covered with Marseilles tiles placed directly onto salt piles.

Since 1969 the production process was introduced with "self-propelled transporter". This transporter consist of two massive tubes that move over the salt plates and it is mounted with an endless conveyor belt that carries salt into the hopper at the end of the conveyor that fills trolleys – small electric industrial locomotives that haul up to 6 wagons whit the capacity of 1.2m³ each.

Workers move along the self-propelled transporter and collect salt manually using shovels to transfer the salt onto conveyor belt of the transporter. The length of the transporter equals length of two salt ponds. The transporter is electrically driven.

Using railway tracks, salt is transported via trolleys in "kip" where the salt is unloaded onto conveyor belt to a large covered storage facility.

This method of collecting/harvesting salt is outdated and represents a limiting factor in quality and quantity of the collected salt. Salt harvested in such manner is dirty and must be washed, causing a technical loss up to 20%. In addition, collection is slow and of limited capacity and there is a risk of salt melting in ponds due to lengthy harvesting process and late summer rain falls.

Machine for salt collection that was supposed to replace workers with shovels was procured in 2003. However, it turned out that the salt ponds in Salina were not suitable for operation of this machine and they needed to be reconstructed where two or four ponds were to be merged in one salt pond, which was rather costly investment at the time. Furthermore, salt plates 5 to 10 cm thick could not withstand the weight of the machine, although manufacturer company "Serra" from Spain guaranteed that the machine would be able to collect salt from salt plates thickness of 3 cm. After unsuccessful attempt to collect the salt in 2006 harvest, this machine was no longer used and the “standard” way of salt production was re-established using shovels and self-propelled transporter.

** Industrial plant for salt production was built in 1984. Using the principle of thermocompression salt was obtained from highly concentrated salt water (18 ° -23 ° Be). This plant, then worth 7.505 million Deutschmarks, was built by the German company "Lurgi" from Frankfurt. The projected capacity was 67,000 tons. However, the plant operated with high material costs and its operation was accompanied by many problems. The operation of the plant did not solve a series of fundamental issues, there were no operating instructions, no explanations for many stages of the process, and the plant was in fact unfinished. Operation of such plant was risky, but still there were efforts to establish a regular production. The plant achieved its peak production in 1988 of total 34,763 tons (the same year total of 24. 590 tons was produced using standard way of salt production – and total production amounted to 59 353 tons using both production processes, with record sales of 47,281 tons of salt). Due to frequent outages and repairs, inability to procure spare parts due to economic sanctions, the plant has ceased production in 1994. At the time the plant was preserved only to be dismantled and sold as scrap metal ten years later.*

11.2.6. The Final Product

Finalization of the production is carried out in salt refinery. Following production process- salt harvest, the salt is stored in a covered storage facility. Storage facility protects the salt from rain and possible melting. Salt from salt piles is taken by excavator to receiving “hopper” from where the salt is washed and transported by screw conveyor to spinner that separates water and salt. From spinner salt is transported to a dryer, where the process of drying is carried out, and from there by a screw conveyor salt is transported to salt grinder and baskets to be packed in different packages.

Salt used as raw material for other production processes

Salt has a significant role as an input/raw material in other production processes. It is mostly used in the chemical industry, food industry, textile and leather processing industry. In the chemical industry salt is mainly used for water softening, while in food industry salt has a wide application. The most important industry for Salina is meat processing industry. Depending on its purpose, salt must be processed and packed in suitable packages.

Salt used in final consumption

This salt is used for customers' consumption. This group of customers includes not only households, but also large customers – restaurants and hotels. With further processing this product may have other uses such as, for example: dishwasher salt; cosmetic salt...Depending on the type of customer, there are different requirements for packaging.

However, in the process of finalization of the product there are a lot of shortcomings, and the final product that comes from Salina cannot meet market demands, in terms of quality, design or the quantity of daily production. There are a number of limiting factors, the most important being outdated finalisation facility that must be replaced as well as lack of technological discipline, and low level of knowledge of employees.

The predominant product is 25kg package, but in addition to this there are also some smaller packages for example, 5kg and 10kg. However most of the stored salt is sold unprocessed - in its raw state as salt used for maintaining roads during winter. This salt is sold in bulk and loaded directly into trucks. There are no additional costs other than labour costs for loading the product into trucks. Salt used for road maintenance is the cheapest product and as such it cannot ensure operation of the company.

This method of processing-finalization of the product, type of product, sales method, the volume of production and sales, do not meet the needs of today's market and salt from Ulcinj as such is not competitive. In order to regain market position it is necessary to invest in the final product. Create and design new products and make a quality product that will meet the stringent requirements of the market.

Types of final product - Salina produced and supplied to the market following products:

- Salt for human consumption,
- Salt for industry,
- Salt as intermediate product, for roads

These products differ not only when it comes to their intended use but also in terms of method of processing and finalization. Salt for human consumption that comes in package of 25kg is a predominant product of Salina, while other products are processed and packed in accordance with the requirements of the market and customers.

The existing range of products does not meet market demand, either in quantity of produced salt or its quality. To become competitive in the market Salina must produce and finalize the product with the following requirements[1]:

Contain a minimum of 97 % pure sodium chloride in dry matter;

- That the water content is at most 3%, except for the fine salt wherein the water content may be greater than 0.5%,
- Be white in colour, although a barely visible shade of another colour is permitted;

[1] Rulebook on quality and other requirements for salt for human consumption and salt for food production (Official gazette of SCG no. 31/2005.)

- Not contain foreign impurities and to be odourless;
- Not contain more than 0.05% of mineral impurities which are insoluble in hydrochloric acid
- 20% solution must be neutral to litmus,
- Granulation of fine salt is such that 90 % of the salt can pass through a sieve with a mesh size of 0.5 mm diameter
- Granulation of grinned salt is such that 90 % of the salt can pass through a sieve with a mesh size of 1.25 mm diameter
- Granulation of large salt is such that 90 % of the salt can pass through a sieve with a mesh size of 3 mm diameter,
- Iodine content of the salt should range from 12 to 18 mg/kg of salt; potassium iodide from 16 to 24 mg / kg or potassium iodate 20 to 30 mg / kg.

Due to the high presence of magnesium, sea salt is very hygroscopic and additives are used as anti-caking agent. Manufacturers use additive E536 potassium ferrocyanide in table salt. It is used as a stabilizer and anti-caking agent in an amount of up to 10mg / kg. Also additive E535 - sodium ferrocyanide can be used exclusively as an addition to table salt. It can be used in small doses. For additive E536 and E535 side effects are unknown. There are also other anti-caking additives.[2]

The new range of products - The main prerequisite for the introduction of new products – salt packages, is a fundamental rehabilitation or procurement of new equipment for packing salt. This equipment must ensure that produced salt meet the required standards which have already been mentioned (dehydrated, white, adequate granulation, etc.). This applies in particular to salt for human consumption, which must be produced in different grain sizes: fine, grinned and large. It is possible to introduce new products if Salina is equipped to produce salt of such quality.

11.2.7. Investments in the process of production and processing – description of essential components

When calculating the costs of renovation and maintenance of systems in Salina, only the data from 2003 were available for calculation. This comprises prices some 15 years ago. In addition, these prices were without VAT. And what is most important; we have not received adequate information on many parts of infrastructure or equipment. In calculation only main works and infrastructure were taken into consideration; so for example, an assessment of restoration of the administration building and associated facilities was not included (e.g., paving in the area of the buildings, complete restoration of electrical installations and plumbing, etc.). Depreciation is very important item, which is not possible to evaluate without a special

[2] Rulebook on quality and conditions of use of additives in food and other requirements for additives and their mixtures, (Official gazette of SCG no no. 56/2003, 4/2004, 5/2004)

study. Data was obtained from various sources, mostly in cooperation and analysis performed by Mr Vasko Radović.

Supply canal - Supply canal that brings water from the sea into evaporation ponds must be reconstructed. To ensure normal operation of the pumps, prevent the loss of pumped water, preserve water quality and physical protection of the canal, it is necessary to install the pipes and cover the canal. Covering the canal would enable expansion of the narrow road that goes alongside the canal and thus create good conditions for better communication of the settlement that has developed in this area. This investment in the amount of 600,000.00 would eliminate the loss of sea water which now amounts to 50% and eliminate the negative impact **of the settlement that has developed alongside the canal.**

Evaporation ponds "Knet" - There are certain discrepancies in levelling of evaporation ponds. It is necessary to eliminate the uneven water depths ranging from 10 to 70 cm. Investments in these ponds would shorten the time of filling them with water from 14 to 7 days, and thus shorten the total time of filling the area of Salina with water. The output concentration of saturated salt water from this area would be increased from current 5.5°Be to 8°Be which practically means that useful area would be increased in relation to the existing. In addition to levelling, it is necessary to make a concrete bridge at the crossing points from one pond to another to enable crossing of construction machinery to maintain earthen embankments. Total investment in these ponds is € 500,000.00.

Dams - Dams/locks are wooden and are opened and closed manually. They are difficult to handle and in order to make them more efficient and reduce costs it is necessary to automate these dams and make them electrically driven. The value of this investment is € 500,000.00.

Embankments/Dykes - Embankment separating canals and ponds are quite eroded. It is necessary to repair –rehabilitate embankments using excavator and regularly maintain thereafter. The funds required for this investment amount to € 1,500,000.00.

Pumps - Water moves by free fall in salt ponds. However, in addition to this at crossings from evaporation pond to storage ponds and crystallization ponds, as well as for realising waste water and rain water from ponds electric pumps are used that must be restored. Those pumps are 31, 9 and from 16 to 36-75kwh with capacity of 250 l/s and 600 l/s and they carry out a complete circulation of the water within the main surface of the salt ponds. It is necessary to replace the existing pumps with a stronger pump capacity of 900 l/s and to replace pipeline from the pump to the ponds. This investment would enable more water and faster circulation of water within ponds. Their value amounts to € 300,000.00.

Crystallization ponds - It is necessary to invest in crystallization ponds. Certain works to be carried out in the operational area of 31,4ha such as merging two ponds into one by removing embankments that separate them, changing complete coating and adjusting the height of the coating and levelling the ponds. Also works to be carried out in area of 14ha which is not currently in operation such as improvement of embankments, canals and substrate, ponds merging and cleaning plaster and sediments that result from the process of production of salt.

This investment would provide greater surface for crystallization which would result in higher production. The value of said investment is € 600,000.00.

Machine for collecting salt - In 2003 Salina procured a machine for collecting salt which has been in operation only experimentally. This machine or procurement of a new machine suitable for salt-pans in Salina is worth up to € 350,000.00. Procurement of this machine would reduce the need for physical seasonal workforce from 150 to 5-10 skilled workers, the time of collection of salt from 35 days to 15-20 days and soiling of salt. In addition to reducing costs, this investment would reduce the risk of storms that could damage the formed salt plate.

To maintain this manner of collecting salt it would be necessary to solve the problem of soft ground of ponds, increase the height of ponds and merge several ponds into one.

Accumulation of highly concentrated water - The surface of these reservoirs/ponds is 17ha. There are 4 ponds with total capacity of 460.000m³. In these reservoirs is necessary to replace the pipes, valves and replace the lining on the inner side of reservoirs to reduce water loss. This investment would eliminate losses during the filling of reservoirs ant its value is € 300,000.00

Track - Track used to transport collected salt must be fully reconstructed. Reconstruction works comprise of filling, placement of new rails and railway ties, as well as renewal of trolleys and wagons. The value of this investment is € 400,000.00.

The optimal solution would be to introduce trucks/dumpers that would be used to transport salt, but in this case removal of rails and pavement of embankment is a perquisite. However it is necessary to previously examine the capacity of these rail embankments because they are designed for small industrial compositions and not for heavy trucks.

Storage facility - The optimal solution for the storage facility is an overall reconstruction of the existing facility. The value of this investment is estimated at € 300,000.00.

Necessary equipment - Procurement of trencher and small excavator for salt production operations and maintenance of infrastructure is required. The value of this investment is € 120,000.00.

Salt Refinery Plant - Prices of Salt Refinery Plants differ and depend on the producer. Prices are also influenced by the equipment of the salt refinery plant. Refinery Plant of Salina should include the following: spinner, dryer, separator, mills, automated packaging system and palletizing. Refinery should consist of three lines:

1.) Line A – dryer, fan; vibrating separator, mill, spinner with capacity of 12t/h.
2.) Line B - salt packaging machines 1kg – cardboard package with conveyors and palletizer
3) Line C - salt packaging machines 5 and 10 kgh in polyethylene bags.

New refinery would solve the problems of processing semi-finished product and the obtained final product would be competitive in the salt market also outside of the region. The refinery would allow redesign of the final product and introduction of new products in line with the market demand. In addition, the new automated refinery would significantly reduce the number of executors, reducing them only to supervision. Estimated costs of the refinery would amount to € 3,150,000.00.

Machinery - Machinery implies purchase of two to three excavators. One for the maintenance of the embankment type tracked Poclain excavator and one for small scale repairs on the peripheries of the embankment and of the canal, as well as a loading bucket that would transport salt from storage-hangar to hoppers from where salt is distributed to finalisation facility. The value of the excavator is €250,000.00. In addition, it is necessary to procure two forklifts of sufficient capacity whose value amounts to 50,000.00 €.

Other:

IT equipment - Investment is needed in IT system which will enable automatic regulation of dams between the lake and canals, regulation of work in the salt refinery plant and efficient management, movement of water and finalization of the product. The value of IT equipment and software is € 275,000.00.

Marketing - Completion of works must be followed by modern marketing techniques so new products can be introduced to the salt market. Costs depend on the selection of marketing model and marketing activities and potential market. The amount of € 200,000.00 should be allocated for marketing activities and in the following stages this amount be significantly increased.

Consulting projects - Preparation of project documentation, supervision and consulting services should be carried out by professionals in this field. The value of such services is up to € 200,000.00.

11.2.8. Sub-scenarios for Option A (investments and costs)

Sub-scenarios for basic investments were elaborated for Sub-scenario 1a - basic salt restoration process for enabling salt production for re-starting the process of production and processing of basic product – salt for roads; Sub-scenario 1b provides for an upgraded process, which includes the entire investments for scenario 1a and adds the refinery. Investments and costs for Sub-scenario 1c (limited salt production on part of the salina only) can not be evaluated precisely until the extent of the salt restoration process would be established. As for now, a yearly production allowing some 4.000 tons has been taken into account for this sub-scenario.

Investments for the sub-scenario 1a (salt for roads)

Table 11.2 summarises the estimation of costs for enabling basic salt production in the Ulcinj salina. The costs are calculated on the presumption that the whole salina will gradually be restored to enable yearly salt production of a minimum of 25.000 tons.

Table 11.2: Cost estimation for enabling basic salt production in Ulcinj salina.

No.	Description of investment	Value in €
1.	Rehabilitation of supply canal / placement of pipes and covering canal	600.000,00
2.	Evaporation ponds levelling	500.000,00
3.	Procurement of new pumps with equipment	300.000,00
4.	Automation of dams/locks	500.000,00
5.	Rehabilitation of embankments	1.500.000,00
6.	Rehabilitation of reservoirs	300.000,00
7.	Crystallization ponds	600.000,00
8.	Machine for salt collection	350.000,00
9.	Replacement of pumps	300.000,00
10.	Track / rails	400.000,00
11.	Trencher and small excavator	120.000,00
12.	Salt storage area	300.000,00
13.	Machinery	300.000,00*
14.	Other	700.000,00**
15.	Unforeseen expenses	230.000,00
	Total:	7.000.000,00

Investments for the sub-scenario 1b (salt for human consumption)

Investments were estimated on the premise that the entire area will be reconstructed for salt production and costs for basic restoration works under sub-scenario 1a were added as these works are essential to start with the salt production. The key investments in this sub-scenario are related to the refinery.

Table 11.3 below presents investments in infrastructure, equipment and basic supportive activities needed to upgrade the salt making process with options to produce salt for human consumption.

Table 11.3: Investments in infrastructure, equipment and basic supportive activities

Processing-finalisation

	Salt refinery: Total A+B+C	3.150.000,00
1.	Line A:	
1.1.	Dryer, fan	
1.2.	Separator	
1.3.	Mill	
1.4.	Spinner	

2.	Line B:	
2.1.	salt packaging machines 1kg – cardboard package and palletizer	
3.	Line C:	
3.1.	Salt packaging machines 5 and 10 kg in polyethylene bags	
4.	New hall for refinery	150.000,00
5.	Unforeseen expenses	200.000,00
	Sub-total	3.500.000,00
6.	Costs for enabling basic salt production	7.000.000,00
	Total:	10.500.000,00

●Specification of investments for machinery (has to be added to any of the sub-scenarios)

1.	Transport means for transport of workers	50.000,00
2.	Backhoe loader for finalization	200.000,00
3.	Forklifts (two)	50.000,00
	Total:	300.000,00*

●Specification of other costs (has to be added to any of the sub-scenarios)

1.	IT equipment	100.000,00
2.	Consulting projects	300.000,00
3.	Marketing	300.000,00
	Total:	**700.000,00

Conclusive remarks on both sub-scenarios 1a and 1b

Table 11.4 shows the costs for investments only for both proposed sub-scenarios.

Table 11.4: Costs for total investments for both proposed sub-scenarios.

Sub-scenario 1a	Production (incl. Machinery and other costs)	7.000.000,00
Sub-scenario 1b	Finalization-processing	10.500.000,00

Total investment in any of the above sub-scenarios (1a or 1b) would achieve the following effects:

- reduction of salt water loss in the supply canal and dilution of salt water in ponds, resulting in increased production
- expansion of crystallisation ponds would result in larger surface area to collect salt. Current production capacity would be increased to at least 40,000 tons (when it comes to the production of salt for road maintenance or even industry, only large quantities could lead to profitability).
- procurement of machine for collecting salt would reduce the number of workers involved, but also the number of days required to collect salt, which would significantly reduce the risk of rain which could melt the salt in ponds.
- given that the method of salt production under the influence of the sun (which is necessary to maintain biodiversity) does not provide a high level of purity, it is therefore

necessary to invest in the equipment - refinery to improve the quality of the salt. This investment would also reduce the number of workers engaged in the packaging department and technical loss of salt in the process of washing and obtain a quality product that would meet international standards and be more competitive in the market. Also note that purchase of salt and packaging under the brand "Ulcinjska so" significantly reduces the credibility of each brand.

Investments for the sub-scenario 1c (limited salt production on part of the salina only)

The investment costs for this sub-scenario were just estimated and not evaluated, as it is not clear at the moment on how extensive an area the salt production process would need to be restored. An estimation of an initial investment of 4.000.000 EUR was taken. The idea is to enable basic production in the yearly amount of up to 4.000 tons, mainly for demonstration and just limited sale (as souvenirs, perhaps for roads too).

11.3. Option B: protected area actively managed for biodiversity with salt production for interpretation purposes only

If there will be a decision not to start with salt production again, the area will have to be managed by the protected area management authority. The biggest component of the daily maintenance works (which could be otherwise taken over by salters if the area would be managed for salt production) will be the burden of the park employees. However, basic investments in the water infrastructure and maintenance works will have to be made anyway. We did not calculate those expenses for investments as at the moment it is not clear on how extensive an area these works should be undertaken. However, it was estimated that an initial investment in the water infrastructure in the amount of 3.000.000 EUR would be needed.

The number of workers needed in full-time and seasonal capacities for running the protected area with only very limited capacities for salt production for demonstration purposes only is given in the table 11.6, together with a minimum staff needed to manage the protected area and the water regimes. Yearly operational costs, including salaries, materials, maintenance works and external services, including basic maintenance of (already reconstructed; see under “Investments”) water management infrastructure, but with no major investments in the protected area infrastructure are presented in the same table.

11.4. Operational costs for Option A

Operational costs are elaborated according to the degree of the salt making restoration process and type of the final salt product (Option A, sub-scenarios a, b and c). Sub-chapters 11.4.1., 11.4.2. and 11.4.3. provide description of the major operational costs. Evaluation of theoperational costs in financial terms for each of the three sub-scenarios is presented in sub-chapter 11.6.

11.4.1. Operational costs for restoration of the salt production for semi-finished product (salt for road maintenance) and basic management of the protected area (Sub-scenario 1a)

This production option includes the overall production process with crystallization stage and storage of raw salt. Data from the early 2000s show that the production costs of this type of salt are approximately 33.00 euros per tonne, including storing but with high initial investment and no depreciation value. This is a high price and does not cover production costs, because the selling price of this type of salt is the lowest. Sale could not cover the production costs and profit and return on investment would not be achieved. It would be necessary to increase the capacities, ensure the sale (which is fairly difficult) in the markets in the region where there is already a large selection of products. This type of production requires the employment of special expertise, namely: Wassermann with specific skills; worker to operate with electromechanical pumps; field workers; Operators for excavators and loaders; staff to organize harvest; administration.

For this production option, Đerane pumps must be operational and pump seawater for a period of 6 months, from March/April to October. Pump 31, which is the most important part of the salina, is operational for the period of 6-8 months, while pump 9 is used for storing and adding water in the reservoirs, pump 16 is used to discharge waste water and rain to prevent flooding of the terrain and damage to embankments and canals. Except for pump 16, in the period of October to March, the remaining pumps do not have to be operational apart from meeting biodiversity needs. It is especially important to note that **preservation of biodiversity requires operation of pumps 12 months a year, and not just for a limited period required for salt production.**

The production cost in Ulcinj is high due to the large share of fixed costs and hiring seasonal workers for collecting salt.

The number of workers needed in full-time and seasonal capacities are evaluated, together with a minimum staff needed to manage the protected area. Yearly operational costs, including salaries, materials, maintenance works and external services, including basic maintenance of (already reconstructed; see under “Investments”) water management infrastructure, but with no major investments in the protected area infrastructure are presented in the table 11.6.

11.4.2. Operational costs for restoration of the salt production and development of the final product (salt for human consumption) and basic management of the protected area (Sub-scenario 1b)

The final product (salt for human consumption) requires the purchase of a **new refinery** for processing semi-finished product into fine edible salt. The refinery does not require a significant increase in employees in relation to the dependant production. In addition, the purchase of a refinery could compensate for possible production losses due to bad weather conditions by importing salt which would be processed. However, such an option would have to be approached with caution so as not to damage the reputation of the brand "Ulicnjska so" by importing salt.

The refinery would be located within the existing area of the salina because otherwise the costs of transportation of domestic raw salt would be increased. On the other hand, if the refinery is located, for example, near the Port Bar, the costs of importing salt would be reduced and this would possibly affect the cost of transport because of the proximity of the railway to Port Bar.

When the refinery was operational, the prices of salt from the salina were as follows: Packaging 25/1 = 0,09 € / kg; Packaging 10/1 = 0,10 € / kg; Packaging 5/1 = 0.11 € / kg; Packaging 1/1 = 024 to 0.28 € / kg. Today the refinery is not equipped to produce a high quality final product. Development of the final product would require a well-designed marketing strategy and meeting strict modern standards of quality.

The number of workers needed in full-time and seasonal capacities are evaluated, together with a minimum staff needed to manage the protected area. Yearly operational costs, including salaries, materials, maintenance works and external services, including basic maintenance of (already reconstructed; see under "Investments") water management infrastructure, but with no major investments in the protected area infrastructure are presented in the table 11.6.

11.4.3. Operational costs for just limited production of the salt production for semi-finished product at limited area and basic management of the protected area (Sub-scenario 1c)

This production option involves the symbolic production of salt as a tourist attraction while preserving tradition and partly achieves non-commercial profit and along with other activities in the salina, this option could cover the cost of production.

However, this production option also requires certain interventions, i.e. repairs of supply canals, reconfiguration of embankments, canals, dams and especially preservation of biodiversity that require a large surface of salina, or reconstruction according to the stages of collecting salt. For this production option a detailed analysis of the state of salt works and terrain must be carried out.

Assuming that it would be possible now to use the existing infrastructure, and that the Đerane pump, supply canal, pump 31, embankments and canals are operational, it would be possible to reduce the movement of water from 153 days which is needed for classical production to 100 days for symbolic production. It is necessary to optimize the study of the hydrological regime as follows:

-once seawater is pumped in and circulated to evaporation pond - Štojski 1; pump 31 would be used to pump water to pond-Jezero 2; and then to evaporation pond III; a certain proportion would be diverted to storage reservoirs, as a reserve of salina water, and finally to selected and prepared crystallisation ponds. Preparation of ponds requires rolling terrain / soil, repair of formwork and cleaning from sedge.

After the formation of the salt plates in the selected ponds, salt is collected manually and transported to the storage facility.

In this way, it is possible to harvest a few thousand tonnes of salt and the campaign–harvest would be carried out for the purpose of tourist valorisation of the area and preservation of tradition. Collected salt could introduce a new product "salt flower" that does not require special technological processing and forms on the surface of the water. This type of salt fetches a high price, but it must be produced under strict technological standards and requirements.

11.5. Operational costs for Option B

If there will be a decision not to start with salt production again, the area will have to be managed by the protected area management authority. The biggest component of the daily maintenance works (which could be otherwise taken over by salters if the area would be managed for salt production) will be the burden of the park employees. However, basic investments in the water infrastructure and maintenance works will have to be made anyway. We did not calculate those expenses for investments as at the moment it is not clear on how extensive an area these works should be undertaken. However, it was estimated that an initial investment in the water infrastructure in the amount of 3.000.000 EUR would be needed.

The number of workers needed in full-time and seasonal capacities for running the protected area with only very limited capacities for salt production for demonstration purposes only is given in the table 11.6, together with a minimum staff needed to manage the protected area and the water regimes. Yearly operational costs, including salaries, materials, maintenance works and external services, including basic maintenance of (already reconstructed; see under “Investments”) water management infrastructure, but with no major investments in the protected area infrastructure are presented in the same table.

Table 11.5 provides an overview of the core programmes and subcomponents that would be needed for management of the protected area in the area of Ulcinj salina.

Table 11.5: Management programmes and key sub-programmes

Programmes	Sub-programmes

	1	2	3	4	5	6
1.Conservation of the the salt-pan ecosystem with its particular habitat types, species and cultural values	Water regime management	Species and habitat management	Cultural heritage sites management	Patrolling and enforcement	Cooperation with external scientific research	Monitoring
2.Enabling visitation, provision of information about the area and its values, raising public awareness and reaching support for the Park	Guidance for visitors, visitor management (booking, directing the visitor's flows)	Education and awareness (programmes and activities)	Political outreach and decision making support	Public outreach (P.R.) and constituency support		
3.Contribution to the sustainable use and benefits for the local communities through cooperation with local and regional stakeholders	Tourism and recreation	Sustainable use of natural resources	Promotion of the local products			
4. Operations and maintenance	Access and secondary road maintenance	Maintenance of the visitor's infrastructure	Maintenance of the water and other major infrastructure	Maintenance of equipment		
5. Effective management and administration	General administration and management	Administrative and financial management systems	Staff training	House keeping		

These programmes will be needed to achieve conservation goals for the Ulcinj salina regardless of the decision on continuation of the salt production under one of the three sub-scenarios or not. It should be noted, however, that if the salt production process is restored, several tasks and activities, especially 1.1., 1.2., 3.2., 3.3., 4.3., 5.1., 5.2, 5.4. and others could be co-shared will with the staff of the salt-making provider which would dramatically reduce the costs of management of the Ulcinj salina protected area.

Estimation of the basic yearly operational costs for management of the Ulcinj Salina as a protected area is provided in the sub-chapter 11.6. It has to be noted that the costs for investments into the park infrastructure that will be needed in the later stages (visitor's infrastructure, reconstruction of buildings for the management staff, major equipment etc.) are not included in this basic estimation.

11.6. Yearly operational costs for Option A and Option B

Summary of the operational costs for any of the proposed scenarios and sub-scenarios are presented in the table 11.6. For description of the (sub)scenarios see the text above.

Table 11.6: Summary of operational costs for all proposed scenarios

	Reconstruction of the salt production and management of the protected area (Option A)			Management of the protected area with salt production for demonstration only (Option b)
	Sub-scenario 1a: salt for road	Sub-scenario 1b: salt for human consumption	Sub-scenario 1c: limited salt production on a limited area	Protected area management operational costs
No. of full-time employees for salt-making	46	61	21	16
No. of full time employees for protected area management	9	9	9	11
Seasonal workers	168	168	30	20
Total FT and seasonal workers	223	238	60	47
Total year's **operational costs** for salt production and protected area management (in EUR)	**1.150.000**	**1.350.000**	**500.000**	**600.000**
Estimated yearly profit (in EUR)	0,00	150.000	n.a.	n.a.
Estimates of the **initial investments**	**7.000.000**	**10.500.000**	**4.000.000**	**3.000.000**

11.7. Salt market analyses with estimation of salt production costs per year

11.7.1. Salt market analysis

Changes in the global and European salt markets which caused the collapse of nearly 200 small and large saltworks in the Mediterranean, mostly in the period after the Second World

War, based on the importation of low-cost produced salt in other areas (the world's largest salt producers are China and the USA, salt producers from northern Africa and imported rock salt are of particular importance for the Balkan region).

The main market for products of Ulcinj Saline was Montenegro and neighbouring countries of the former federal state which are now independent states (Kosovo, Bosnia and Herzegovina, Serbia, and Macedonia). These were traditional markets for Ulcinj salt in a time when Saline was dominant in production of sea salt. Sea salt from Ulcinj maintains positive image in the region and this should be used for marketing purposes. However, its participation in these markets following interruption of production decreases from year to year. Poorly designed marketing strategy, inadequate product quality and decreased production have resulted in poor placement of Ulcinj sea salt in these markets despite very good presumptions that situation could have been different if innovations in the final product were introduced on time.

Gap in the market made by Ulcinj Saline was filled by small companies engaged in import and processing of salt in small processing plants. Various types of salts of different origin can be found on the market. In addition to salt from Tuzla, there is rock or vacuum-sealed salt from Romania, Russia, Belarus, as well as sea salt from Egypt, Israel, and Greece. It should be noted that saltworks from Tuzla that produce salt from saline groundwater and by means of artificial evaporation holds a very good position in the region. Salt produced in Tuzla meets the market standards in terms of both quantity and quality, however, according to all scientific research sea salt is "healthier" (fact that it is obtained naturally from sea water is an advantage compared to saline groundwater from which the salt is obtained by thermo-compression, evaporation, boiling at high temperature whereby salt is separated from saline water) and this could benefit Ulcinj Saline to obtain a good position in the salt market, if it manages to achieve favourable price and good quality of salt. It is important to note that granulation of salt crystals produced in Tuzla is 0-1 mm which makes it unsuitable for road maintenance, while granulation of sea salt is 0-4mm and this makes it more efficient to melt ice, which means that road salt in the region is mostly imported from Egypt and Tunisia. [3]

Production of salt in former Yugoslavia in 1991 amounted to 390,000 tons, and in 1996 production amounted to 142,000 tons. Decreased consumption was a result of breakup of state but also new developments in application and use of salt. Salt is at least used for human consumption and large portion is used in chemical industry and for road maintenance during winter. Breakup of Yugoslavia was followed by closure of many large chemical industrial centres that procured significant amounts of salt.

Table 11.7: Potential for salt consumption in the region:

[3] Dr. Abdulah Ahmetović, dipl. Ing. „Tehnički, ekološki i ekonomski aspekti korištenja soli za posipanje (održavanje) puteva u zimskom periodu“, www.solanatuzla.com/bosanski/tema_2.pd

State	Population	Consumption t/g
Serbia	8.000.000	185.000
Kosovo	2.000.000	25.000
Montenegro	650.000	5.500
West Macedonia	800.000	30.000
Total	11.450.000	245.500

Up to 40% of all consumed salt is used for spreading roads in Serbia and up to 60% in Croatia.

In Croatia 120,000 tons of salt is used annually. Salt production in Croatia amounts to around 20,000 tons and is mainly produced in saltworks Pag while remaining needed quantities are imported from Turkey, Algeria, Morocco, Bosnia and Hercegovina.

Up to 3,000 tons is used for road maintenance in Montenegro. In Montenegro about 5,500 tons of road salt and salt for food industry is used annually. Considering the theoretical potential annual production of 25,000 tons of raw salt and its processing and average sales of 21,000 tons, Ulcinj Saline should export more that 80% of production given the small size of Montenegrin market. In a saturated European market dominated by low-cost salt from other countries (Italy distributes large quantities of salt to Montenegro), sale of large quantities of salt would be demanding job and it would require an effective marketing strategy and optimisation of costs.

Salt is the product significantly affected by the price of transport because the ratio of value of salt per tonne and transportation costs in all saltworks in not very favourable. Compared to the competition, Ulcinj Saline has favourable geographical position to become target market for Kosovo, Serbia and Macedonia. For example, transport costs affect the price of salt from Ulcinj as follows: transport up to 300km costs cca.15,00 euros/ton, from 300-600 km. 18,00 euro/ ton and transport over 600km approx. 22,00 euros/ton. In addition to geographical orientation towards target market, it is necessary to assess target consumers by product innovation and choice of the optimal marketing strategy.

11.7.2. Option A, sub-scenario 1a: Semi-finished product – salt for road maintenance

This production option includes the overall production process with crystallization stage and storage of raw salt that has a lowest sale price. Sale of this product could not cover the production costs and profit and return on investment would not be achieved. It would be necessary to increase the capacities, ensure the sale which is fairly difficult because the European market is saturated with cheap imports from other continents (North Africa, China...) and also in the regional markets main customers of salt for roads are public utilities that conduct their procurement in accordance with public procurement system in which Ulcinj Saline could not compete with large companies.

This type of production requires (as per available data until 2013) employment of special expertise, namely:

Wassermann with specific skills; worker to operate with electromechanical pumps; field workers; Operators for excavators and loaders; staff to organize harvest; administration (Table 11.8).

Table 11.8: Estimate of number of workers

1.	Wassermann with specific skills	10
2.	Electromechanical specialist, management and maintenance of pumps	12
3.	Field workers – maintenance	4
4.	Operators for excavators and loaders for maintenance of dams and canals	2
5.	Maintenance of electro - mechanical equipment	8
6.	Administration – staff / commercial sector, finances, accounting, marketing.	10
	Total full-time employed	**46**
7.	Seasonal workers to collect salt -during harvest	160
8.	Seasonal workers trolley drivers - during harvest	8
	Total seasonal labour force - during the harvest app. 40 - 45 days	**168**
	Total permanent seasonal workers	214

For this production option pumps Đerane must be operational and pump seawater for a period of 6 months, from March/April to October. Pump 31, which is the most important part of Saline, is operational for period of 6-8 months, while pump 9 is used for storing and adding water in the reservoirs, pump 16 is used to discharge waste water and rain to prevent flooding of the terrain and damage to embankments and canals. Apart from pump 16, in the period October to March, remaining pumps do not have to be operational for the purpose of salt production (but they need to be operational to regulate hydrological regime under the management of protected area and preservation of biodiversity, which is not taken into account in this calculation that comprises of salt production cost only!).

Table 11.9: Estimated annual costs of salt production ("road salt", Option A, sub-scenario 1a; Chapter 11.6. of the study) based on existing data of salt harvests (up to.2013) in Ulcinj saltworks are:[4]

1.	Electricity	Operating time	Unit price	Total in €

[4] *Data are historical (up to 2013) in the period when Ulcinj Salina was operational (estimate of initial investment for rehabilitation of infrastructure is not included in the budget) and assuming that equipment and ponds were functional. Calculation includes only maintenance costs, basic material costs (materials and services), operating costs (estimate for full-time and seasonal workers), but it does not include other expenses, such as. depreciation rate of infrastructure, equipment, other maintenance costs, other staff costs and similar. Feasibility study is required for detailed analysis*

1.1.	**Pumps**			
1.1.1	Pump Djerane	1x132 kWh x 24h x 180 days = 570.240 kWh	0,10	57.024,00
1.1.2.	Pump 31profile	1x75 kWh x 24h x 180 days = 324.000 kWh	0,10	32.400,00
1.1.3.	Pump 16 profile	1x75 kWh x 24h x 180 days = 324.000 kWh	0,10	16.200,00
1.1.4.	Pump 9 profile	1x75 kWh x 24h x 60 days = 108.000 kWh	0,10	10.800,00
	Pumps total:	kWh 1.164.240	0,10	116.424,00
1.2.	Wheeled transport, washing and storage (estimate)			20.000,00
	Total electricity			**136.240,00**
2.	**Fuel, oil...**			
2.1.	large excavator	8 lit/h x 6h x 240 days	1,00	11.520,00
2.2.	trolley	8 lit/h x 12 x 45 days	1,00	4.320,00
	Total fuel			**15.840,00**
3.	**Labour costs**			
3.1.	Fill time (46)	46 x 1.000,00 € x 12 months		552.000,00
3.2.	Seasonal (168)	168 x 30,00 € x 40 days		201.600,00
	Total for salaries			**753.600,00**
4.	Other costs			**100.000,00**
	Total costs	**(1+2+3+4)**		**1.005.680,00**

Price of produced salt per ton for annual production of 30,000 tons = **33.52 €/t** (1,005,680/30,000), and for an annual production of 25,000 tons = **40.23 €/t** (1,005,680/25,000)

Purchase price of road salt on the global market ranges from 30 to 48 €/t. The production costs in Ulcinj (up to 2013) were high due to large share of fixed costs, especially for hiring seasonal workers for the purpose of collecting salt and therefore purchase price cannot cover the production costs.

With regard to the purchase price of raw salt (valued at 40 €/t), if salt would have been produced and sold for this purpose only, break-even point of profitability would be approximately 25,000 tons (25,142 t x 40 €/t = 1,005,680 €).

According to data of importer of salt from Slovenia, the lowest purchase price of this type of salt from Egypt (loaded on a tanker) is slightly above **10 EUR/t** (DK Sol ltd., trading company of goods and services).

Note: The average annual production of salt for the period 2003-2012 in Ulcinj Saline amounts to 16,762 tons/year (Table 11.10).

Table 11.10: *Salt production in Ulcinj Saline 2003 – 2012.*

Year	***Salt production in tons***
2003.	30.189
2004.	20.000
2005.	15.028
2006.	6.000
2007.	20.000
2008.	15.200
2009.	17.000
2010.	11.200
2011.	10.000
2012.	13.000
2013.	10.000
Average	**16.762**

11.7.3. Option A, sub-scenario 1b: salt as final product (for human consumption)

Production of salt as the final product for human consumption comprise of process of **basic production of salt** (the same as for "road salt"; Option a, sub-scenario 1a; Section 11.6. of this Study) and **upgrade of process of refining salt.**

New refinery would process semi-finished product into fine edible salt. The refinery does not require a significant increase in employees in relation to the dependant production. In addition, the purchase of a refinery could compensate for possible production losses due to bad weather conditions by importing salt which would be processed. The refinery should be located within the existing area of the Saline because otherwise the costs of transportation of domestic raw salt would be increased. On the other hand, if the refinery is located, for example, near the Port Bar, the costs of importing salt would be reduced and this would possibly affect the cost of transport because of the proximity of the railway to Port Bar. In addition to said it would be necessary to prepare good marketing strategy, assuming that salt meets stringent quality standards.

Table 11.11: The estimate of annual costs of salt production ("road salt"; Option A, sub-scenario 1a; Chapter 11.6. of this Study)

1.	Electricity	Total in €

1.1.	**Pumps**	
	Total	116.424,00
1.2.	Wheeled transport, washing and storage (estimate)	20.000,00
	Total electricity	**136.240,00**
2.	**Fuel, oil...**	
	Total	**15.840,00**
3.	**Labour costs**	
	Total	**753.600,00**
4.	Other costs	**100.000,00**
	Total costs	**1.005.680,00**

Table 11.12: Processing-finalisation costs:[5]

	Type of cost	€
1.	Electricity	80.000,00
2.	Working loaders and forklifts	28.000,00
3.	Salaries for 15 full-time employees in the processing of salt	150.000,00
4.	packaging, iodination,	200.000,00
	Total:	**458.000,00**
	Basic production	**1.005.680,00**
	Processing-finalization costs	**458.000,00**
	Total costs	**1.463.680,00**

Price of salt produced for human consumption per ton for annual production of 25,000 tons = **58.54 €/t (**1,463,680 / 25,000).

Purchase price of salt for human consumption on the global market ranges from 90 to 150 €/t. Due to outdated and depreciated refinery unit, it was not possible to produce a quality final product and that resulted in low prices of salt that could not cover costs of processing. With low quality, these refinery units would not be able to meet the high standards for sale of salt for human consumption in the European market.

Prices of salt for human consumption up to 2013 were the following:

Package 25/1 = 0,09 €/kg = 90 €/kg
Package 10/1 = 0,10 €/kg = 100 €/kg
Package 5/1 = 0,11 €/kg = 110 €/kg
Package 1/1 = 0,24-0,28 €/kg = 240 – 280 €/kg*

[5] Data for the existing refinery assuming that rafinery is operational

(these are the values when Saline was operational, and today these prices in the market might not be as high).

If we were to assume that it all produced salt would have been sold, of which 10,000 tons of salt for human consumption and 15,000 tons per year for roads (average annual production of salt for the period 2003-2012 in Ulcinj Saline amounts to 16.762 t/year), the annual balance would be as follows:

Income:

Salt for human consumption package 25/1 = 10,000 tons x 100 €/t ... 1,000,000 €
Salt for roads 15,000 tons x 40,00 €/t .. ..600,000 €
Total income .... 1,600,000 €

(Basic) cost of production with refinery ..... .1,463,680 €
Profit before taxation * .... 136,320 €

* Note: no investment, assuming that existing equipment and state of area can ensure the assumed production and processing. In the case of investment, loan repayment plan would have to be included in calculation, with preliminary planning to increase production, define quality and types of products, market positioning, reduction of employees and similar.

11.7.4. Option A, sub-scenario 1c: partial salt production - salt flower

This option involves production on limited surface area as a tourist attraction while preserving tradition and partly achieves non-commercial profit and along with other activities in Saline this option could cover the cost of production. The concept is based on the assumption that new high-quality product, the salt flower, reaches a high market price. It is necessary to add that the market for such products is relatively small and can be quickly saturated with imported products and products from remaining small saltworks in the Mediterranean, especially in the Adriatic.

However, this production option also requires certain interventions, i.e. repairs of supply canal, reconfiguration of embankments, canals, dams. A detailed analysis and forecast of the design process of collecting salt should be prepared. For this production option a detailed analysis of the state of salt works and terrain should be carried out and management and optimization of the hydrological regime should be revised.

This concept could shorten the time of movement of water (and also pumps operation - but pumps are necessary to maintain the conditions for biodiversity) for approx. 1/3 as follows: - once seawater is pumped in and circulated to evaporation pond- Štojski 1; pump 31 would be used to pump water to pond-Jezero 2; and then to evaporation pond III; certain proportion would be diverted to storage reservoirs, as a reserve of saline water, and finally to selected and prepared crystallisation ponds (rolling terrain / soil, repair of formwork and cleaning from sedge). After the formation of the salt plates in the selected ponds, salt is collected **manually** and transported to the storage facility.

In this way, it is possible to harvest a few thousand tons of salt and the campaign –harvest would be carried out for the purpose of tourist valorisation of the area, education and preservation of tradition. The "salt flower" that does not require special technological processing provided that it is white and pure (hence the need for "salt-pans), it requires greater investment in product development, marketing, promotion and design (e.g., designed packaging).

Table 11.13: Estimate of the annual cost of production of salt flower on limited pool area *

1.	**Electricity**	Total in €
1.1.	Pumps	
	Total approx.	80.000,00
1.2.	washing, storage	10.000,00
	Total	**90.000,00**
2.	**Material Costs**	
	Total	**10.000,00**
3.	**labor costs ****	
	Total	**300.000,00**
4.	Other costs	100.000,00
	Total costs	**500.000,00**

** required pool surface can be determined by a special analysis in order to assess the quantities of production; the table above shows only indicative data based on expert assessment. To achieve production of about 50 tons of salt flower annually approximately 200 hectares of pool area is required according to estimates.*

It is estimated that this type of production, for approximately 2,000 to 4,000 tons of raw salt and 50 tons of salt flower, requires engagement of following expertise: full time employees: 5 “waterman”, 6 workers to operate electromechanical pumps, operators for excavators and loaders 2, field workers 5, staff 3 (total: 21 persons) and seasonal workers: 30 persons.

For collection of salt is necessary to engage seasonal workers who would collect salt flower and salt with shovels from several crystallisation ponds (harvest method used to 2013 would not be applied), stack them up in ponds and cover the stacks with tiles or transport the salt to the storage facility. Salt collected in such manner would be sold as salt flower or raw material for other products that use high quality salt (chocolate salt ...). Using this method of production of salt flower, relatively small amounts of salt can be obtained which could be sold as road salt in domestic market or as a souvenir for visitors (but without major financial income).

Price of salt flower produced per ton for annual production of 50 tons = **10.000 €/t** (500,000/50), or 0,2 € / kg.

Purchase price of salt flower on the global market can reach a value of 13 €/kg to € 54/kg, but it is sold in small quantities. This type of salt, though in a small amount, saltworks Pag sells at the price of 40.00 €/kg. Experience from other saltworks, which started producing and selling salt flower show that sale of about 20 or 30 t of salt flower per year requires a period of 10 or 20 years.

Due to small scale market and target customer groups and the unknown "brand" of Ulcinj salt flower, it is unrealistic to expect that annual production quantities of salt flower from Ulcinj can be sold at said price in a short period of time. Also, it is not realistic to expect that all quantities of other salt products (road salt) would be sold at said price.

11.8. Vision for the visitation and appreciation of nature in Ulcinj salina

Sustainable tourism development in protected areas and its incorporation in the tourism plans of the wider areas requires careful consideration of - often conflicting - aims of conservation and tourism. Before planning any tourism or recreational activities, it is essential to consider biodiversity, cultural, spatial, social and economic conditions of the wider area and identify relevant stakeholders to be involved in the planning process to assess the impacts of nature based tourism on the protected area, local communities and development and tourism business. A key tool for such an assessment is the estimation of the number of visitors the protected area could accommodate without having adverse impacts both on nature and local people. Two other essential components of the assessment include considerations on how to manage traffic in the protected area and how to avoid inappropriate infrastructure development.

The above issues are effectively addressed in the development of a **sustainable tourism strategy and marketing** where the assessment of current tourism uses is cross-checked with the biological, social and economic situation in the protected area and beyond, evaluation of "supply and demand" options, trends in tourism of the wider area and visitation of the protected area, together with analyses of the tourism offers and considerations of the interests of the local stakeholders. This process is concluded by the definition of the mission statement with goals and plan of activities (www.parksandbenefits.net). An essential component of such a sustainable development strategy for a protected area is the **visitor management strategy**, usually composed of evaluation of the monitoring of the visitation flows, provision of guidance and information for visitors and methods for the restriction of undesirable activities and movements of visitors within the protected area.

Such a process should be applied also in the development of the visitation concept for the protected area of Ulcinj salina and tourism development in the wider area of Ulcinj.

Conceptual orientations for visitation and appreciation of nature in Ulcinj Salina

The vision for the future of the Ulcinj salina as a protected area should be directed towards protection of the natural and landscape values and cultural heritage of the area as well as into promotion of the sustainable use of natural resources. The latter allows for the development of the tourism potential and visitation of the area if this does not pose the risk of negative impacts on the primary management objectives and conservation priorities.

Assessment of the current visitation patterns and impacts of visitors

The current number of visitors to the Ulcinj salina are low. The management authority, Javno preduzeće Nacionalni Parkovi Crne Gore, is collecting the number of visitors who enter the area through the entrance gate (Table 11.14).

Table 11.14: Number of visitors in Ulcinj salina per month in 2017 (statistics from JP Nacionalni Parkovi Crne Gore)

Month	January	February	March	April	May	June	July	August	September	TOT
N visitors	6	-	148	255	166	150	-	135	95	955

Despite the low number of visitors, observations made by the consultants in the warm half of the year 2017, and information provided by the local experts on monitoring (CZIP, pers.comm.), lead to the conclusion that adverse impacts of visitors on biodiversity and physical environment (erosion, trampling of vegetation, etc.) are extremely high, mainly due to uncontrolled and unrestricted movement of visitors across the entire salina. These effects are especially evident in the disturbance of birds, both during their breeding and migration/wintering periods. Any future design of the visitation routs and movements of visitors should be carefully planned to avoid such undesired situations. The process should be supported by surveillance and a ranger service. The current managers of the area try to impose at least a minimum surveillance and control over the visitors (periodically, random), but the availability of staff and resources is currently far below the optimal level to prevent disturbances. In addition, pressures are created also by hunters and poachers who are hunting in the area and causing indirect disturbance by walking across the entire salina.

The current state of the infrastructure for enabling access and enjoyment of the area is poor. There were some paths marked years ago, but all the needed infrastructure indicating the use of the paths is in the process of decay or has been destroyed. Observation towers should immediately be closed and removed as they present a danger to visitors who climb them. The Museum of salt-making and information point close to the entrance of the salina are not in use and are deteriorating. Visitors can only access some limited information on the internet site and from a few out-dated information boards in the area.

Future perspectives

It is expected that the establishment of the protected area, development of infrastructure for visitation and management of visitor flows supported by an effective promotion campaign, will give rise to an increase in the number of visitors. Of course, one has to be realistic and acknowledge the long distances visitors will need to cross if they are to enjoy the most attractive elements of the biodiversity of the area (i.e. flagship species, including highly attractive Flamingos or Pelicans). In addition, although there are tens of thousands of tourists just across the dunes that delineate the salina from the “sun, sand, sea” mass tourism beach area of Velika Plaža, it has to be noted that the tourists on the beach do not come to the area

to walk about and enjoy nature under the hot Montenegrin sun and, hence, cannot be considered as the major potential target group of visitors to the salina.

However, at this stage it is impossible to provide accurate estimations of such an increase in visitation as neither the target groups of visitors nor the extent and contents of visitation opportunities are defined. Any development of sustainable tourism and visitation strategy should be based on the presumption that the protected area cannot tolerate mass tourism and related supportive infrastructure. Identification of potential target groups (including school groups) for visitation is an essential prerequisite in preparing plans for visitation of the area.

It is expected that the offers for visitors will be based on the most popular and often used means and various tools that are applied in typical "park visitation offers":

- individual visitation (for individuals, families, small groups) on marked paths, both on foot or by bicycles and various forms of guided tours, also thematic, and for various target groups (supported by the information points and centres, Museum, observation towers, information boards, trails, cycling routes, toilets, small refreshment facilities, entrance points with information materials and options for purchasing park and local products, etc.),

- organisation of small events in nature, lectures and presentations or creative workshops with a range of educational programmes, including events co-organised with the local community.

In defining the concept of visitation and tourism offer for Ulcinj salina, it is essential to consider the following:

1. Impacts of increased visitation on the natural environment

   Two methods of assessment of impacts of human presence on natural areas are most often used in practice; the first one consists in assessing the carrying capacity of the area and the other method is Limits of Acceptable Change (LAC method). Both methods result in defining the maximum number and distribution of visitors in the area at the same time and in time periods and their impact on the environment. Both methods also help in identification of restrictions and definition of zones, where access is more or less free (but strictly limited to marked paths) and areas which are temporarily or permanently limited or closed for visitation. In this process, activities and their spatial range that are appropriate for the site are also defined.

2. Control of the motorised access to the area and within it

   Ulcinj salina is an extensive flat area and the distances are sometimes too long for an average visitor to cross as they require several hours of walking. Whenever limitations on access are introduced, an alternative and environmentally friendly replacement should be sought. In case of Ulcinj salina, it would be desirable to consider the introduction of public transport to the area from Ulcinj. The concept of visitation of the salina should distinguish between areas open for visitation and those permanently or temporary closed, network of shorter and longer walking paths, cycling route and also

introduction of an electric environmentally friendly vehicle for visitors who could enjoy the natural beauties without leaving the vehicle.

Figure 12.4 show the direction of the "long" route (where visitors can walk, cycle and the road should also be used for an electric train for organised groups of visitors) in the length of approx. 14.000 m (initial part of this circular route will have to be walked/driven by electric train twice, when entering the area and when leaving it so the total walking/driving distance is approximately 16.000 m). The "short" walking path goes to the observation point where the tower is already set up (but needs to be replaced by a new one due to safety reasons) between the Jezero 1 and Jezero 2. The distance to be crossed for walkers and cyclists is 3.500 m from the entrance to the crossroad with the dyke between the Jezero 1 and 2 (this is already part of the circular route as described above) and additional 500 m to the observation tower.

3. Infrastructure development

The size of the area and its physical characteristics of the Ulcinj salina area allow mainly for development of short visits ranging from several hours up to a maximum of half a day and/or excursions. This implies that there is no need to establish accommodation facilities inside the park area, in particular as there are many such offers in the near-by settlements. But, on the other hand, access to the entrance point to the salina is too far away from the Ulcinj accommodation facilities so consideration should be given to possible organisation of public transport to the area of the salina.

Part of the area of Ulcinj salina, where there used to be the main infrastructure for salt storage and refinery and objects for management of the company, is already urbanised. In addition, part of the area along the channel Porto Milena inside the salina (reaching the crystallisation basins on the opposite side) has also low conservation value which can hardly be restored. A feasibility study is needed to consider and evaluate the potential for development of some forms of environmentally acceptable tourism activities, including the spa complex which should be based on the natural features of the area (salt, mud, hypersaline waters, etc.). It has to be noted, however, that the impacts of such an investment should be assessed not only through their direct impact on the environment but also by considering side effects (increased number of visitors, access, pollution, use of energy and chemicals, noise, etc.).

The so-called "park infrastructure" includes creation and maintenance of paths and roads for visitors and other supportive objects for visitation and enjoyment of nature and landscape. This infrastructure can be built in phases; some parts will consist of existing infrastructure for salt production purposes. The common problem with "park infrastructure" in many protected areas is that resources for setting up such infrastructure are available, but money for its maintenance (and staff) is often lacking. Funding for supportive activities, such as promotion and provision of information on the opportunities that are offered by protected areas, are often under-estimated.

Assessment of the needed investments for "park infrastructure" development

It is too early to provide accurate information about the needed investments in the infrastructure of the protected area of the Ulcinj salina in a situation where visitation of the area is still in its conceptual phase and much relevant data is missing. Only the main components of the basic infrastructure investments can be identified at this stage; for those only **rough indicative costs** are given:

- 1.Reconstruction of the longer route which will be used by walkers, cyclists and for the electric vehicle for transportation of the visitor's groups in the length of 14.000 m: 560.000 EUR
- 2.Reconstruction of the (shorter) walking path on the dyke between the Jezero 1 and 2 and new observational tower: 10.000 EUR
- 3.Purchase of the electric vehicle for transportation of 50 visitors: 400.000 EUR
- 4.Reconstruction works on the Museum and info point, setting up exhibits: 40.000 EUR
- 5.Entry point with interactive contents for visitors, toilets: 50.000 EUR
- 6.Other infrastructure (observation towers, benches with sun shelter, fences, obstacles for minimising disturbance by visitors, information panels etc.): 100.000 EUR

This preliminary and only indicative estimation shows that at least **1.060.000 EUR** will be needed to set up the infrastructure for visitation and control of visitors. It also has to be noted that some investments cannot be spread over a time period (purchase of the train, for example), but also that some of them are not essential for the first phase (total reconstruction of the longer route in a manner which would enable operation of the electric vehicle, purchase of the electric vehicle). It has to be noted that also operation and maintenance of the infrastructure will require additional founds.

Assessment of potential revenues from visitation of the area

There is not enough data and information for the estimation of potential incomes generated from the visitation of the area. At this stage of conceptual solutions and proposals, without having information of potential and acceptable number of visitors and target groups, such estimations could be very misleading.

It is therefore proposed that some figures could be drawn out from the model of good practice that was implemented in a similar ecosystem type, although half the size of Ulcinj salina, that is in the Secovlje Salina Nature Park, Slovenia. The park is (similarly to Ulcinj salina) located a few kilometres away from the main coastal tourism resort along the Adriatic coast in Slovenia – Portorož (see detailes in a box at the end of the chapter).

Based on the assumption that the average price of sold tickets in the Secovlje Salina Nature Park as stated on the www.kpss.si in 2012 and the ratio of visitor groups in the Park in the year 2012 should be estimated between 3 and 4 EUR, the following income from ticket sales is calculated: 3,5 EUR x 50.000 visitors = 175.000 EUR/year (=year 2012).

Taking into account the double size of the Ulcinj area in comparison to the SSNP (perhaps also double the numbers for the carrying capacity thresholds), the expected numeric estimation

for the calculation of potential annual visitation of the Ulcinj Salina should be between 50.000 and 100.000 visitors. This means that annual basic income from visitation (only ticket sales – using 3,5 EUR for the average price of the ticket) should be **between 175.000 EUR and 350.000 EUR**.

One has to note, however, that the number of visitors to the protected area will increase gradually, and the process should be supported by an intensive promotion campaign, visitor infrastructure development and maintenance and promotion of the programmes for visitors.

Sečovlje Salina Nature Park – case study – generation of incomes from visitation

Description of the area

The Sečovlje Salina Nature Park (SSNP) covers 750 ha. It is situated in the extreme southwestern part of Slovenia, in the southern part of the Piran Municipality. The northern part of the Park, where traditional salt production is still practiced, is called Lera. The Park's southern part, called Fontanigge (344 ha), is managed as a strict nature reserve with limitations for visitor's access; the traditional salt making process ceased in this part of salina in the late 1960s. The area of Lera covers 294 ha and is separated into a crystallization zone and a seawater condensation zone. The park has two land entrances, with access to both areas by sea on a boat as well.

Park's carrying capacity assessment

The park's carrying capacity was estimated on the basis of the carrying capacity indicators for the sustainable visitation scenario. They were selected based on a subjective judgment regarding the specific features of the area under consideration.

With regard to the considered environment's ecological capacity, which is linked primarily to the changes of biophysical environment owing to the "tourist use," and social carrying capacity that presents the attitude of both the local population and visitors to the environment, use of natural resources and environmental pollution as well as satisfaction of both with the offer and development of visitation in protected areas, the Sečovlje Salina Nature Park's management stipulated as the upper limit of the still acceptable max. 50,000 visitors per year, which means that 300 visitors at the most can frequent the Park at the same time, or 900 visitors at the most per day.

Visitation patterns 2010 - 2012

Detailed data on visitors were gathered in the analyses for the period 2010 – 2012. Some findings of these analyses are indicated below:

- of the total of 127,440 visitors in the 2010 – 2012 period (35,010 in 2010; 47,430 in 2011 and 45,000 in 2012), the area of Lera, where active salt-making is still ongoing and where the Visitor Centre is located, was visited by 77,9% visitors; the Museum of salt-making at the area of Fontanigge was visited by less than a third of all visitors;
- the park was entered via land by 91% of visitors;
- a good third of visitors opted for guided tours (this included also school groups);
- domestic visitors prevail (76% of all visitors);
- more than 46% of visitors were primary/secondary school children and students, adults represent 28 % of the visitors and pensioners almost 6%; the rest are business partners and media;
- most visitors came between April and August, the least visitors came between December and February;
- no significant correlations between the number of visitors and amount of precipitation and air temperature was found.

Based on the national legislation, an entrance fee is charged for the visit of the Park (www.kpss.si); the ticket and price varies for diverse visitor groups (children, pupils, students, retirees, adults, family tickets, etc.).

Source: Škornik, I.: *A contribution to the knowledge of climate change impacts on biodiversity and visitation in Sečovlje Salina Park* in: Vranješ et al. (eds.) Climate change and management of protected areas: Studies on biodiversity, visitor flows and energy efficiency. SOLINE Pridelava soli d.o.o. / Triglav National Park, Portorož & Bled, 2013

12. Managing of the area

12.1. Definition of the optimal management and governance model

What is governance?

The concept of governance has two dimensions. One dimension involves the process by which decisions are made, or the quality of governance, also known as good governance. The second dimension concerns who makes decisions, regardless of the process used. Who makes decisions determines the governance approach or type of governance regime that will define overall management responsibility for a protected area. Typology of protected area governance types (adapted from Dudley et al., 2008 and Lausche, Burhenne, 2011) are as follows:

Governance by government (state-owned or state-controlled)

Historically, the classic approach to protected areas governance has been governance by government, meaning usually that the land or sea involved is state-owned or state-controlled. Management is entirely the responsibility of the government, based on a distinct legal mandate. Worldwide, this remains the dominant governance approach for protected areas and will continue to serve as the foundation of most protected area systems in order for governments to fulfil global, regional and national commitments to conserve biodiversity.

In the classic protected area, the government makes decisions and is held directly accountable under the law. Normally, the lead government agency or a statutory corporation is given the operational powers and responsibilities necessary to establish and manage individual protected areas and the protected areas system in accordance with the relevant legislation.

The government agency responsible for protected areas normally has significant discretion to delegate or assign certain responsibilities or services to other government or non-government entities by order, contract, concession, lease or other means. Final responsibility and accountability for the actions taken by those entities, however, remains with the specialized agency, the minister in charge or the government in general.

Co-management (shared governance) where arrangements are expanded to partnerships with and among communities, NGOs, private individuals and corporations

The concept of co-management as a governance approach may be adapted and expanded to a variety of situations. One of its principal strengths is its flexibility to actively involve multiple stakeholders and decision-making relationships, including government agencies, NGOs, local communities, indigenous peoples, private entities and private landowners. The lowest influence from other stakeholders is detected when they are only involved in active consultations. Other options include seeking consensus, negotiating (involving in decision-making) and developing specific agreements, sharing authority and responsibility in a formal

way (e. g., via seats in a management body) and – the form where no interference or contribution from the agency in charge is detected: in such a case authority and responsibility is transferred from the agency in charge to other stakeholders.

Governance by indigenous and local communities

Governance by indigenous peoples or local communities over those land areas to which they have ownership or resource use rights and which they are managing for long-term conservation (indigenous and community conserved areas (ICCAs)) is associated with voluntary conservation. Since it is not realistic to expect that local communities in the Ulcinj area will become owners of the land in the salina, this model could not be applied in the area concerned.

Governance by private property owners (individual or corporate; PPA)

The PPA is another special governance type associated with voluntary conservation, similar as the ICCAs. PPAs have a number of features that distinguish them from ICCAs. Most importantly, such areas are held under freehold title or under lease from the state, and are normally managed by private individuals, NGOs or corporations. ICCAs, in contrast, are managed as common property held collectively by the indigenous group or local community concerned.

12.2. Optimal management model for the Ulcinj salina protected area

Two main scenarios are provided for the future of the Ulcinj salina; the first one foresees restoration of the salt-making process (in three forms, ranging from limited salt production mainly for demonstration and non-commercial purposes, continuation of the process that was in operation until the year 2013 (salt for roads) or upgrading the process by refining the salt and selling salt for consumption) and the opposing option of establishing a protected area where water regimes will be maintained by active interventions and maintenance.

The question of land-ownership rights over the territory of the Ulcinj salina is at the moment under the consideration of the legal case. If the land is owned by a for-profit company, it is unlikely that the company would be willing to surrender its rights over the land for conservation purposes, if not for other reasons, because of high costs for management of the area for conservation.

Depending on the decision whether option A or B will be applied, the decision of the optimal management model should accordingly be taken.

If any of the proposed scenarios for re-continuation of salt production will be applied, **it is recommended to use the management model of state-delegated management in a form of a public-private partnership**. In this case, the Government of the Republic of Montenegro should delegate the rights and obligations for management of both the protected area management and the use of natural resources for salt production to a private company. The

production process and activities needed for both salt production and conservation purposes in the case of a traditional salina are inter-related, especially in securing the artificial maintenance of the water regimes.

For the production of the salt, the government is entitled to issue a concession; such an agreement should contain a specific duty on the concession holder to deliver the public service of protection of nature/management of the state designated protected area. However, it has to be noted that the Republic of Montenegro should provide partial funding for the management of the protected area concerned. According to the concession contract, all the assets, infrastructure and investments in the protected area should remain the property of the Republic of Montenegro after the concession contract expires. This is the biggest pitfall of the concession contract for management of the park: if the land and infrastructure in the park remains in public ownership, all the investments of the company are treated as "donations" or "investments into foreign infrastructure" which could hamper its capacity to attract international investments into infrastructure, respectively to pour its own money into property that it will not own in the future and that it therefore cannot use as security or declare as an asset in its accounting.

The management of the area should strictly follow legal provisions as stated in the act of designation of the protected area (and is thus not given solely into the hands of a for-profit company). Motivations for the company to take part in such a model of public-private partnership may include interest in gaining 'green' certification for an associated development project or making an investment for the future.

The table below indicates some of the strengths and weaknesses of the state-delegated management in the form of public-private partnership for running a protected area where extensive use of natural resources is taking place:

Table 12.1: Strengths and weaknesses of the state-delegated management in teh form of public-private partnership where extensive use of natural resources is takking place.

Strengths	Weaknesses
Innovative and sustainable financing model...	…but it does not imply that secured financing sources (contribution from the state budget and from the company) are sufficient for efficient management of the area.
Sharing of the work tasks inside the company for both commercial interests and conservation goals….	…but on-going education and awareness on environmental issues is needed to be performed for the employees to understand protected area goals and objectives.
"Company thinking" could prove effective for running the public service of nature protection…	…but as the company is run for profit, this should never jeopardize conservation interests.
Park management staff often lacks experience in financial management which form the basis of the company management…	…but in running the park as an area of public interest, additional care should be invested in complete transparency of the financial management, costs and investments.
Company cares for economic growth…	….but park is run on "non-profit" basis so balance between "development and

Strengths	Weaknesses
	investments" and "conservation and preservation" should be sought.
Current leadership of the company might "like birds and flowers" in the park…	…but what if the company leaders are changed and replaced / will they care for nature, too?
State contribution to the budget of the company for running the park might be too low…	...but this should not prevent efforts of the company to invest in nature and development of the local communities in and outside the park.
Being a company running a park might be an advantage in certain situations (i.e. no need to perform public tenders for purchase of urgent equipment or repair)…	…but can be an obstacle in application to certain international tenders for projects where companies are automatically not-eligible as applicants for projects.

If the area of Ulcinj salina will be declared a **protected area where no commercial salt-production will be continued** (that would require a for-profit company to run the salt-making process), then the area would function as a typical protected area where governance by government or co-management models could be applied.

The Law on Nature Protection does not define types of administration bodies that shall be responsible for respective categories of protected areas (the only exception being a national park). The system of protected areas in Montenegro allows the establishment of a management body that is the most suitable using a case by case approach.

The particularity of the Ulcinj salina is underlined by a combination of its country and regional importance with a significant influence on the Ulcinj municipality area. The model of co-management with shared responsibilities between the central and municipality institutions and other stakeholders seems to be the most appropriate for the area concerned. This could be attained through the establishment of a "*Stakeholders Board*" as the highest strategic-decision body where representatives of different institutions and organisations and civil society are represented, including, inter alia, MSDT, Ministry of Finances, Ulcinj Municipality, landowners, EPA, NGOs, local tourism agency and others. The Board should decide about strategic directions of the area and should be consulted about the budget.

Within the scope of the project on elaboration of the current Protection Study, two new expert and political bodies were established: a Working Group and a Steering Committee. In addition, there is an operating body (Savjetodavno tjelo) already established and coordinated by the current management authority of the salina area. All three bodies should be considered when establishing an effective system of collaborative or delegated management for the area. Representatives of political, expert, scientific, non-governmental and other bodies at the local level already are represented in the abovementioned bodies.

12.3. Proposed optimum management model and protected area category assigment

Ulcinj salina has been recognised as an area of exceptional biodiversity, landscape and cultural values which has been created jointly by nature and man in a sustainable manner. The salt-

making process has supported both the local community and nature; Mediterranean salinas are one of very few examples where sustainable harvesting of natural resources is not only beneficial for humans but also supports conditions for biodiversity, especially some highly specialised and also threatened habitats, communities and species.

Vast changes on the global market of salt were seen especially after the Second World War, when extensive quantities of cheaply produced salt from North Africa, but also China and other parts of the world, flooded the European salt market. Traditional and other small Mediterranean salinas, where production costs are higher than in other types of salt production or where the labour price is much lower, caused a decline of several tens of salinas, especially on the northern part of the Mediterranean coast. There are some other factors influencing the sale of salt, among them also the effects of climate change, which cause even milder winters and thus reduce the demand for salt for roads, which form the most important part of salt consumption in several countries. Ulcinj salina, with its outdated production methods, intensive labour requirements and badly maintained infrastructure, was not an exception in this process.

On the other hand, the importance of Ulcinj salina for the protection of biodiversity, especially endangered habitats and birds on the EU and international levels, has been recognised and highlighted. One of the key conclusions from the Study is that, in order to maintain the biodiversity values of Ulcinj salina, water regimes will have to be maintained in almost the same manner and area as when the salina was still operational in terms of salt production.

In order to evaluate and identify possible options for securing conditions for biodiversity and at the same time consider eventual social and economic benefits of the management options for maintenance of the ecological character of the salina with essential control over the water regimes in this man-made ecosystem, two options (one with three sub-scenarios) were considered in the context of ecological, social and financial aspects (Table 12.2).

Option A is concentrated on complete or partial reconstruction of the salt making process where different key salt products are dominating: in sub-scenario 1a the main salt product is salt for roads (following the principles of production in the salina until the year 2013), in sub-scenario 1b upgrading of the production process with refinery for production of edible salt is considered; both these sub-scenarios are based on the assumption that the quantities of salt to be produced need to be high in order to cope with low prices of the product and high production costs and thus require restoration of almost the entire territory of the salina. In the sub-scenario 1c only a limited surface of the salina would need to be restored for gaining salt product (but the rest of the area would have to be restored in order to meet the requirements of biodiversity through controlling water regimes) and new product (salt flower) would be the key selling item. All three sub-scenarios are also supportive of the requirements of biodiversity conservation and management of the protected area to be established.

Option B is analysed based on the presumption that the area will be managed as a protected area where salt will be produced in a strictly limited area for promotional and educational purposes only.

Table 12.2: Investments, yearly operational costs, potential profit (from salt production only!) and costs of production of the salt product for the options/sub-scenarios:

Option A			**Option B**
Sub-scenario 1a (road salt)	Sub-scenario 1b (edible salt)	Sub-scenario 1c (salt flower)	Park management with water regime regulation
Initial investment costs			
7.000.000 €	10.500.000 €	4.000.000 €	3.000.000 €
Operational costs (incl. basic management for biodiversity)			
1.150.000 €	1.350.000 €	500.000 €	600.000 €
Estimated annual profit (from salt products only)			
0 €	Up to 150.000 €	Up to 70.000 €	n.a.*
Production costs for a unit / expected market price			
40,23 €/t / 40 €/t	58,54 €/t / 100 €/t	0,1 €/kg / 30 €/kg	

*In due time, projected profit from visitation could reach between 175.000 € and 350.000 € per year.

It is evident from the table above that Option A/sub-scenario 1a is **not profitable** as the price of the salt of this type are extremely low on the market, demand for this salt is fluctuating (milder winters due to climate change) and high quantities of salt needed to be produced and sold. The costs of initial investments are also very high.

Option A/sub-scenario 1b shows an even potentially (small) profitable production, but this sub-model has to be viewed in the context of the fact that the above numbers are projected for an annual production of 25.000 tons of edible salt. This quantity goes beyond the capacity of the salina in the last 10 years of operation and above all it is unrealistic to expect that one could sell all of a large quantity of edible salt on the saturated European market. In Montenegro, overall production of all types of salt, not only edible salt, represents only 1/5 of the calculated annual production quantity). Mainly for this reason we would be **hesitant to promote this sub-scenario as an optimal solution**.

It seems that the **most suitable option in the long term would be a COMBINATION of the option A/sub-scenario 1c and Option B**. In this concept, initial investment of approx. 4.000.000 EUR is needed. Operational costs for production of new, high quality salt products on a limited surface of the salina and costs of management of the park across the entire area of the salina would reach 1.100.000 €/year, while it is expected that in due time this model could generate between 245.000 € and 420.000 € from selling salt products and incomes from visitation of the park and related programmes. Only very limited quantities of the new product (salt flower) could be potentially sold on the European market and the number of visitors to the area will only increase gradually.

In terms of the proposed category of the protected area according to the international standards, if the site's ecological character will be maintained through maintenance of the traditional salt-making production, the area would fit into the IUCN PA category classification V (protected landscape). If the area will be managed exclusively for biodiversity conservation as a managed nature reserve, it would best fit into the IUCN PA category IV. If a **combination**

of the option A/sub-scenario 1c and option B will be implemented, then the area would still be best assigned as the **IUCN PA category V**.

As far as the optimum management and governance model is concerned, if the Option A/sub-scenario's 1a and 1b will be applied, then the concession model should be applied where a company should be given the right to use the natural resources, produce salt and manage the protected area at the same time. The same should be applied if a **combination of the option A/sub-scenario 1c and option B is in place, but in the form of joint or collaborative management where a company responsible for salt production and public authority for management of the protected area should share their responsibilities in decision-making processes**. If option B is applied, then any form of a public institution for management of the protected area should be promoted.

12.4. Key programmes in the management of the Ulcinj salina as protected area

The operations in the future protected area are classified in several programmes, and those are further divided into the sub-programmes that are listed below. A description of some of the key managerial tasks and needed operations are described.

Programme 1: Conservation of the salt-pan ecosystem with its particular habitat types, species and cultural values (sub-programmes: Water regime management, Species and habitat management, Cultural heritage sites management, Patrolling and enforcement, Cooperation with external scientific research, Monitoring)

Programme 2: Enabling visitation, provision of information about the area and its values, raising public awareness and reaching support for the Park (sub-programmes: Guidance for visitors, visitor management (booking, directing the visitor's flows), Education and awareness (programmes and activities), Political outreach and decision making support, Public outreach (P.R.) and constituency support)

Programme 3: Contribution to the sustainable use and benefits for the local communities through cooperation with local and regional stakeholders (sub-programmes: Tourism and recreation, Sustainable use of natural resources, Promotion of the local products)

Programme 4: Operations and maintenance (sub-programmes: Access and secondary road maintenance, Maintenance of the visitor's infrastructure, Maintenance of the water and other major infrastructure, Maintenance of equipment)

Programme 5: Effective management and administration (sub-programmes: General administration and management, Staff training, Administrative and financial management systems, Staff training, House keeping)

For the majority of the programmes and sub-programmes, more detailed activity plans will need to be prepared as a part of the management plan. In the following the essential

components of the managerial tasks needed for maintenance of the biodiversity values and ecological character of the area are described.

12.4.1. Water regime management

Achieving the optimal water regime is of ultimate importance for the future protection area. Water with its presence or absence dictates the structure of biodiversity and majority of important species and habitat types in Ulcinj salina need standing water. Here we give suggestions for the optimal water level for part of the salina, which is in our opinion the most important from a nature conservation point of view (Figure 12.1). For the rest of the area, the water regime should be prescribed later, after the decision on salt production in the area will be drawn up.

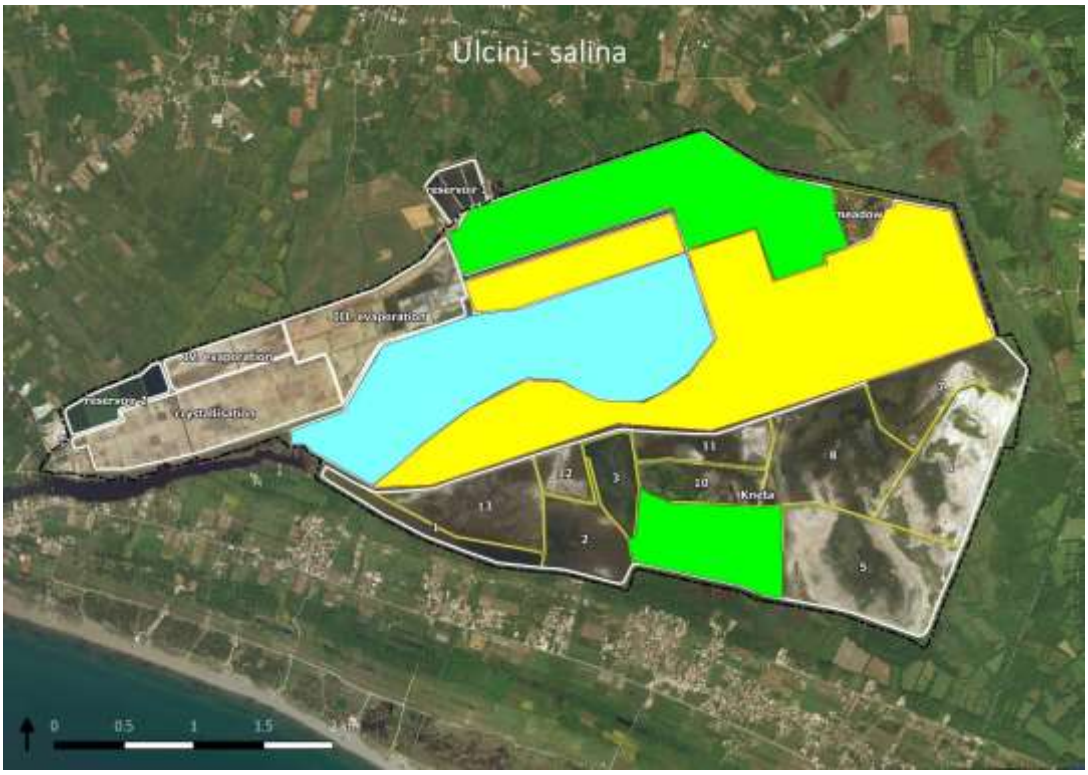


Figure 12.1: Suggested water regimes in part of salina important for nature protection. In blue – up to 1,0 m deep water (average cca 0,5 m) year-round (area of Jezero 1 and Jezero 2). In yellow– between 5 and 15 cm deep water year – round. In green – between 1. April and 31. August dry. In the rest of the year between 5 and 15 cm of water when possible. At least 4 months per year MUST be under the water, to supress succession of land vegetation! In Kneta, beside one area in green the rest can be under the 5 – 15cm water year round, it can also dry out during late spring and summer.

12.4.2. Maintenance of dikes and other infrastructure

In order to control water regime functional dikes are essential. For nature protection purposes the outer dikes must serve their function, while inner dikes (dikes within the area with the same water regime) can be left to natural degradation (Figure 12.2). In practice this generally means, that dikes, delineating broader areas known as evaporation I, II, Jezero 1, Jezero 2, Kneta, etc. should be maintained according to standards, while dikes within those areas not.

But in the areas that will be included in possible future salt production, also inner dikes must be maintained so that they will serve the industrial purposes. A detailed plan must be prepared in management plan.

Figure 12.2: Inner dikes in nature protection priority areas can be left to natural degradation, like shown on this picture.

12.4.3. Artificial islands for birds

To facilitate high breeding success in some birds, breeding islands should be created (Figure 12.3). Currently we suggest one large breeding island for flamingos in Jezero 2 and several small islands for Little and Common terns in Jezero 2. Here we give just a basic ideas for construction of the islands. Before start of this activities more tehnical document must be prepared.

Figure 12.3: Suggested optimal locations for artificial islands. Yellow for flamingos, green for terns. White is alterative location for flamingos. Blue area shows location where land bridge to green areas should be cut off.

Flamingos

Within yellow circle one breeding island made out of mud, size (cca.) 50-100 x 10-20 m (it is better to be more longitudinal than rotundinal) to host up to 1000 nests. In period from 1. February to31. August island must be 20-30 cm over the water level and it must not have a land bridge. To further encourage nesting (in first year the island will be a new structure for the birds it is possible that they will have a type of neophobia), after creation of the island 100 artificial mounds should be erected on one side of the island.

If, from tehnical point, it would be difficult to create an islands in the middle of Jezero 2, alternative location is marked on Figur xx with white circle. An island can be created on a dike separating Jezero 2 and basins 19, 18. On this location at least 0,5 m deep water should be enabled in at least 50m wide belt around the island.

Terns

Solution #1: islands

Along the dike which is most of the year under water (green lines in Jezero 1) – construction of 5 to 10 separated islands – they can be longitudinal in shape, at least 1 m wide and at least 20 m long. The best solution would be to raise current dike over water level. Every year freshly grown vegetation from islands should be removed (between February and first half of the April). If relatively precise water level control can be guaranteed, succession of land vegetation can be tackled with flooding the islands between September and March.

Blue circle indicate area, where existing dike should be removed so that there will not be a land bridge between islands and main dyke on the right (dike with a pathway (coloured in red) leading to observation house). Material from here can be used on islands. Preferable if mud is mixed with empty shells or small stones.

Solution #2: breeding rafts

Close to green lines breeding rafts securely anchored to the ground. Single raft should be 3x5 m or bigger – bigger is better, but it is more difficult to construct. There must be 4 or 6 rafts placed close to each other, at least two sets of rafts are recommended. Half of rafts covered with 3-5cm layer of sand (sand from Velika plaža is perfect), others with 5-10 cm layer of gravel (cca. 1-3 cm fraction of material). Each raft should have two ramps to the water, each raft must have 15 shelters for chicks and 10-20 cm high fence. Maintenance of rafts on yearly basis (between February and first half of April, to remove vegetation and to restore layer of sand/gravel).

Of both solutions, islands are more durable than rafts while rafts are more convenient in the case of fluctuating water level. But both solutions do not exclude each other, so both solutions can be adopted too.

12.4.4. Restricted access

In particular flamingos are very sensitive during breeding period so a zone of absolutely no disturbance must be guaranted for them and other important breeders (Figure 12.4). The zone must be visitors free between 1.st Februaty and 31. August. A wardening service should also be activated during this strict period.

Red in Figure 12.4 are paths that can be walked by visitors throughout the year. We advice this to be organised walks with a specialy trained guide. Outside breeding period (August to March) visitors with special permition can be allowed to walk on other dikes too.

Figure 12.4: Restricted area during breeding season in yellow, red lines denote possible walking paths for visitors.

12.4.5. Contribution to the sustainable use of natural resources and benefits for local communities

According to the Article 39 of the Law on Nature Protection, the use of natural resources in protected areas is possible; however, it is prohibited to use protected areas in a way that could cause degradation of the land and the loss of its natural fertility, degradation of the surface or the underground geological, hydrogeological and geomorphological values, decrease in the natural number of wild species of plants, animals and fungi, decrease in biological and areal diversity or pollution or endangerment of groundwater and surface waters.

The actions, activities and services that are not subjected to an environmental impact assessment in accordance with the special regulations, to the appropriate assessment and that are not defined by the management plan may be implemented based on the permit of the administration body (Article 40 of the Law on Nature Protection). The principles of preventive protection shall be adopted when deciding on the potential uses of the protected natural asset (Article 37 of the Law on Nature Protection).

The First Protection Study envisages several activities that are allowed and prohibited in different zones of the protected natural asset of Ulcinj salina; the following activities would be allowed in zone II:

1. water management for the purpose of obtaining salt and management of the habitats;
2. controlled scientific research and monitoring of natural processes;
3. controlled visits for educational, recreational and tourism purposes;
4. preventive, recovery and other necessary measures for the functioning of the salt production factory;
5. changes made to, only under specific conditions, up to five crystallizing basins;
6. special emergency measures to protect the ecosystem.

The zone III would allow the following activities:

1. interventions for the purpose of restoration, revitalization and overall improvement of protected natural resource;
2. salt production and all activities related to the production process of salt;
3. construction of facilities for salt production; and,
4. construction of tourism infrastructure (museum, day spa, restaurant, gift shop, observation post . . .);
5. scientific research and monitoring of natural processes;
6. controlled visits for tourism, educational, recreational and cultural purposes;
7. implementation of preventive and recovery measures;
8. emergency measures to protect the ecosystem in the event of natural disasters.

A different use of land parcels is prohibited in every zone, as well as hunting, settling of the allochthonous plant and animal species, capturing and harassing of the animals and others. The construction of any facilities is prohibited in zone II.

More detailed decisions about the allowed and prohibited economic activities and uses of natural resources in different zones can be drafted only after the decision on the future management model for the area is determined. Some of these would require elaboration of feasibility studies, including their financial sustainability (for example, development of different forms of tourism activities, like establishment of the outdoor spa facilities for tourists etc) or/and preparation of the special environmental impact assessments (for potential fish farming or plant-collection, for example).

12.4.6. Salt-making

It has been demonstrated in this and the previous Protection Study that **reconstruction of the traditional salt-making process would be highly beneficial for protection of biological and landscape diversity of the Ulcinj salina area** and that this activity **is fully compatible and supportive to conservation efforts**. It has to be noted, however, that industrialisation of the area of the salina, introduction of new technologies for salt production and urbanisation of the area would not be acceptable with the aims of protection of the area as a natural asset.

12.4.7. Grazing

By 2005, up to 500 sheep and 80 cows were grazing on the salina. Cows grazed along the 130 km long levees. Owners of livestock come from Stoj and the village Zoganje. Significant grazing was registered especially on the two inner levees between the basins of the 2nd evaporation grade and Zoganj 1 and 2, as well as the basin of the 1st evaporation grade and Knetas ("old" and "new" salina; Studia zastite 2015). In 2017, grazing still continued with approximately the same number of animals. Besides the mentioned areas, the Evaporation II area was very frequented by domestic animals, too.

Although grazing in general can have positive effects on biodiversity of protected area, slowing down the succession of vegetation in a biodiversity friendly way, it seems that in the salina this effect is not very significant. Although one of the highest number of animals was on Evaporation II, the area was in the most advanced stage of ecological succession. Domestic animals were noticed often also on the main dike, between Stojski 1 , Stojski 2, Evaporation I on the north side and Kneta on south side. In spite of this, grass had to be cut with machinery at the end in order to efficiently slow down the over-growing of the area. Besides, cows often ruminate on the floor in the middle of the dry basins, destroying delicate mud floor and facilitating the erosion of the dikes (Figure 12.5). Cows were seen also in the crystallization basins.

Our opinion is that under such conditions, grazing is not compatible with nature protection. There are some indications also that, in some years, uncontrolled grazing of domestic animals caused trampling of the nests of birds on the dikes (Schwarz & Sackl 2017), which is intolerable. The only acceptable grazing area is on the main dikes, which are accessible also with vehicles. In all other places, grazing should be prohibited.

Figure 12.5: Cows and ships are grazing animals that frequent Salinas. In particular heavy cows can damage with their hoofs salina infrastructure (dikes and floor of the basins).

12.4.8. Tourism and visitation

Tourism, at least as it is often performed in large numbers, is not compatible with the goals of protection of the natural asset. However, if developed with conservation in mind, tourism could be beneficial in generating the needed resources for management of the protected area. Tourism is a part of economic activities that are not necessarily part of the activities, performed within the scope of the public service of nature protection (=management of the protected area). Visitation, together with appreciation and enjoyment of nature and education, is part of the managerial tasks of a protected area management authority.

In the Ulcinj salina, there are visible attempts for tourism development: two towers for birdwatching, maps of the area on boards, walking and biking trails with information boards, and the museum with a souvenir shop. All these activities were financially supported by international donors or NGOs (CZIP). The museum was established in a cooperation with the Natural History Museum in Podgorica. The idea was to complement the salt work with tourism business that would increase the income. The weak point was that those activities have not been regularly supported either by the owner of the area nor by local or state authorities.

The First Protection Study lists activities that are proposed to be developed in the salina; these are mainly based on the assumption that salt-harvesting in the area will be continued: Information centre, visitors train, bike trail, a festival of salt, regional programmes, and also the system of entrance fees (tickets) for tourists (once the area is legally protected). At this stage a more conceptual approach towards the designing of a visitor management strategy and visitation plan is needed in which support from other stakeholders will need to be sought.

Tourism and visitation SWOT Analysis

For the purpose of potential tourism development, we offer the following SWOT analysis based on the current state:

Strengths • Specific landscape characteristic of the salina • Biodiversity value (though fast deteriorating state) • Geographical position close to Velika Plaza and Ulcinj Municipality (main concentration of tourists) • A potential for active salt work run also for tourism reasons	**Weaknesses** • Unclear position of the owner to a sustainable development of the area • Inaccessibility of the area for tourists (now) • Lack of systematic management • Nonexistence of policy documents on a sustainable tourism development of the wider area taking into account also the salina
Opportunities • Establishment of the salina as a "green central area" of the Ulcinj region • Harmonization of industrial, tourism, and biodiversity conservation activities in one place • Potential for a direct connection between Velika Plaza and the salina – an increase of interest of tourists to reach the place • Development of the local brand logo based also of the salt work harmonized with other interests in the area	**Threats** • Unclear ownership rights • Lack of systematic strategic planning of tourism development in the wider region • Lack of willingness to develop a joint plan for the salina supported by all stakeholders • A total loss of the quality of the salina (both from salt work and biodiversity point of view) due to long lasting inactivity, which is leading towards fast deterioration of the area

Recommendations

The following set of recommendations is based on our findings as well as on the aim to take the salina into account when planning sustainable development of the wider region. We split the recommendations into general and specific parts:

General recommendations

1) <u>Inclusion of the Ulcinj salina as an integral part of the wider Ulcinj region</u>

So far, all planning documents in the tourism sector consider the salina as a quite closed-off area devoted only to industrial purposes with a limited potential for tourism. This should be changed and the salina shall be considered as an integral part of the region.

2) <u>Establishment of a Regional Advisory Board on Tourism</u>

One of the identified challenges is a lack of communication among stakeholders (demonstrated at the stakeholder consultation workshop on ecosystem services).

We recommend the establishment of a Regional Advisory Board on Tourism composed of representatives of all important stakeholders in the region incl. the salina. The board should

have regular meetings and should provide advice to both local and state authorities on future steps in tourism development.

3) Development of the new Masterplan for Tourism Development in the Ulcinj region

As shown in the analysis of the existing policy documents on tourism, strategic planning taking the salina into account is missing although the salina covers a substantial part of the region. The only existing masterplan was published in 2003 and since then has not been updated or substituted by a new one.

We recommend drafting the "Tourism Development Masterplan for Ulcinj Region". The leading body shall be the Ulcinj Municipality in a cooperation with the Ministry for Tourism and Sustainable Development. The body coordination and editing of the document would be the tasks of the newly established Regional Advisory Board on Tourism.

Specific recommendation

Below, we list only basic recommendations, because more specific ones should be developed in cooperation with all important stakeholders in the field.

4) Elaboration of a special chapter on tourism development in the future management plan for the protected area

The salina will most probably be designated as a protected area soon. Thus, a management plan should be developed for the site based on legislative requirements. Usually, management plans for protected areas deal in the main with biodiversity conservation. In this case, we recommend enhancing the management plan by including a specific chapter on tourism development as one of the most important conservation measures for the site. Another specific chapter should be devoted to the salt works, which is an even more important measure on which the whole quality of the site is dependent.

12.4.9. Hunting

Ulcinj salina is an important part of the Adriatic flyway, a very busy corridor for migrating birds between the eastern part of Europe and Africa. It is part of the broader Black sea – Mediterranean flyway. Not so long ago, it was estimated that about 2 million birds were shot along this way (Schneider – Jacoby, Spangenberg, 2010). Hunting as an activity can have different influences on biodiversity, which in the salina affect mainly birds. As far as is known, in the salina only hunting with guns was conducted.

The direct influence of hunting is shown on dead birds and is, with some exceptions, the least concern. A much bigger problem is the indirect influence of disturbance. One shot usually kills one bird, but may flush / scare the whole flock away of hundreds or even thousands of birds. On breeding grounds, this usually means that birds temporarily abandon nests, exposing eggs or young to predators and this can drastically increase the number of failed breeding attempts. During migration or in winter, this unnecessary disturbance of birds tired from long flight or from shortage of food both significantly increases the possibility of death due to exhaustion. And we must have in mind, too, that a loud shot can flush birds in a radius of 1 km or even

more. Disturbance is created in part also by the presence of hunters and their dogs in the field. For those reasons, hunting as a sport is, in general, not compatible with nature protection areas.

Hunting can have detrimental international influences. When death hits birds on migration, this affects also the situation on breeding grounds or on wintering grounds in other regions / countries / continents, where birds were heading. It was this problem in particular that informed article 4(2) of the Bird directive:

»*Member States shall take similar measures for regularly occurring migratory species not listed in Annex I, bearing in mind their need for protection in the geographical sea and land area where this Directive applies, as regards their breeding, moulting and wintering areas and staging posts along their migration routes. To this end, Member States shall pay particular attention to the protection of wetlands and particularly to wetlands of international importance*.«

The Birds Directive, one of the top pieces of EU legislation for nature protection, specifically does not forbid hunting in Natura 2000 areas, but it must be guaranteed that activity will not reduce populations of hunted birds and cause detrimental disturbance to other protected species present in the area. Since birds, in particular water birds, usually dwell in multispecies groups, the latter is in practice very difficult to achieve. Shooting at one species inevitably means a high degree of disturbance for others. A very similar stand is taken on hunting in the Ramsar convention.

Another problem connected with hunting, in particular in wetlands, is accumulation of spent lead ammunition which can end in lead poisoning of wildlife and also of humans if certain kinds of food production are associated with the area. The highest concentrations of spent lead shots in Europe were found in Mediterranean wetlands (even >300 shots / m^2). Due to this problem, some European countries (Denmark already in 1985) ban lead shots for hunting in wetlands (Meteo, 2009).

»JP za uzgoj i zaštitu divljači Ulcinj« owns a concession for hunting in the hunting grounds of Ulcinj with a validity period of April 1st 2012 – March 31st 2022. It was granted according to the law (SLCG 2008: articles 14 to 19) issued by the Ministry of agriculture and rural development for the period of 10 years. In the area, there are three reserves, where hunting is prohibited. One is on Ada, one in Šasko jezero and one is 758,28 ha of the area in the old part of the salina. In the rest of the salina, hunting of game animals is allowed. Among birds that may be hunted are species that are important or potentially important for the salina (presented in this study in the first and second group; table 4.2, table 4.3, see also table 12.3). Beside them, Snipe, Tufted duck and Coot are SPEC 3 and Pochard SPEC 1 (globally endangered species).

Table 12.3: Important bird species for the salina that can be hunted (rare species in shaded rows).

Woodcock	*Scolopax rusticola*

Snipe	*Gallinago gallinago*
Greylag goose	*Anser anser*
Mallard	*Anas platyrhinchos*
Wigeon	*Anas Penelope*
Gadwall	*Anas strepera*
Pochard	*Aythya farina*
Tufted duck	*Aythya fuligula*
Teal	*Anas crecca*
Coot	*Fulica atra*

For all important birds which may be hunted, there is a time ban on hunting during reproduction and spring migration (mostly between 15.8. and 15.2.; MPVS 2010). According to the law (SLCG 2008: article 36), the period when hunting is prohibited can be extended if species in the area are endangered, which can be demonstrated by a small population size. In the salina, this definitively applies to at least some birds (shaded rows in Table xx). Even more problematic for the salina, according to the First Protection Study (2015), is illegal hunting, although the extent is supposed to have gone down in recent years. Nevertheless, during 56 survey days in 2012/2013, 17 poachers were counted and during 54 survey days in 2013/2014, 38 respectively (Saveljić et al. 2017). The problem of illegal hunting with the need of eradication is emphasized also in a strategic plan of development of the municipality of Ulcinj for the period 2015 to 2020.

Article 12, paragraph 3 of the Law on game and hunting (SLCG 2008) stipulates that: "Non-hunting areas are, among others, yards of rural households and industrial and non-industrial objects". In amendment and supplements of the Law on game and hunting from 2015 (SLCG 2015; article 3), it is written even more specifically, that: "Non-hunting areas are objects, manufacturing, storing areas of industrial facilities, mines, salinas, etc". It is unclear whether it applies to an area after the end of salt production that is still an industrial area, but definitively if salt production will be restored, hunting in the area will not be compatible with national law. Even if salt production will not be restored, and the area will become a protected area, hunting will not be allowed. In July 2015, the Municipality of Ulcinj took the official initiative of declaring the whole area of Ulcinj salina a hunting reserve, which in practice means to put a ban on hunting over the entire area of the salina. This is in accordance with a strategic plan of the Municipality of Ulcinj for the period 2015 to 2020. **Accordingly, hunting must be prohibited across the entire area of the salina!**

The position of the Ministry of agriculture (MA), expressed in the statement of 02.08.2017, is that from the moment of declaring the area of Ulcinj Solana a protected area according to the national legislation, the entire protected area will become „no-hunting" zone. This position paper also decribes procedures and obligations of the Municipality of Ulcinj and Javno preduzeće za uzgoj zaštitu i lov divljači „Ulcinj" for transformation of the area into „no-hunting" zone.

13. Consequences of adoption of an act of declaration of a protected area

Protected areas are the cornerstones of conservation and the restrictions arising from the act of declaration on limited or controlled use of natural resources is essential to protect biodiversity that will otherwise be degraded or even destroyed. The main criticism of protected areas and their impacts on society is that these areas threaten rights, uses and access of people. The advantages of biodiversity conservation, ecosystem services, including tourism, are that their preservation of cultural heritage in these spaces is widely acknowledged. These areas usually do not function as expected unless a system for compensation for limitations in use is in place. In addition, adverse impacts of limited uses and access could be balanced by maintaining ecosystem services.

Consequences of declaring Ulcinj salina a protected area will vary, depending on the management model that will be agreed (restoration of salt-making process and management for biodiversity or just public service of nature conservation, meaning management of the park). Both scenarios will have to take into consideration some form of management authority with experienced staff and resources that will strive to achieve protected area goals. The main question, however, remains the issue of land ownership rights, linked to the use of natural resources in the area concerned.

The Commercial Court of Montenegro, within its competence as defined by the Law and the fact that bankruptcy proceedings are conducted over the bankruptcy debtor i.e. Saline "Bajo Sekulic" in Ulcinj, provided the following statement about the consequences of adoption of an act of declaration of a protected area:

»*It is evident that in the process of considering the idea of a protected area of land owned by Ulcinj salina one must take account of a series of specific systemic issues, which cannot be partially considered or ignored. These issues will certainly condition any serious process, whereby the full legitimacy of any proceedings must be provided. We should point out that this area is linked to a particular company that in the process of conducting its activities invested its own resources in infrastructure and facilities, equipment and means that resulted in creation of artificial habitats and special accompanying biodiversity. It should be noted that the company purchased, with its own funds, property - primarily land - from previous owners to provide qualitative requirements for exercise of activities that are complex, because certainly the activities of any company cannot be limited only to production of salt and it is realistic to expect that the company uses other resources and abilities, and engage its resources in a way that is most convenient and profitable. Particularly if one bears in mind that in this case we are dealing with (city) construction land and the fact that configuration and location of the area indicate that some of its parts can be valorised in different ways without endangering the substance in the part of certain elements of biodiversity. Furthermore, the assets of this company are under a special regime of judicial bankruptcy proceedings and the said assets are managed in accordance with the bankruptcy regulations which allow a large number of participants to exercise their legal rights, as parities in current court proceedings over the said assets which are the subject of procedure of legal liquidation and process of selling for the purpose of settlement of acquired rights of all participants in the process, i.e. confirmed claims of creditors, claims that must be settled upon completion of hearings*

in specific disputes that are ongoing, and rights of numerous owners of capital (legal entities, workers, citizens, shareholders and owners of securities) to funds from selling of assets«.

It also has to be noted the normal expectation that the company use its own resources and abilities to develop the area according to the valid spatial and other legislation regulating the uses of the area and that these could not be limited only to salt production. But it also has to be noted that the declaration of a protected area in the salina territory in no way limits continuation of the salt production at exactly the level it attained at the time when the company purchased the rights over the salina. The cause for the gradual decline in the demand for salt production in recent years was most probably economic. By no means could the decline be attributed to limitations caused by protective measures for the area; on the contrary, from a nature conservation perspective, it would even have been desirable to restore the salt production process.

13.1. Land ownership rights

The applicable Law on Property and Legal Relations (Official Gazette of Montenegro, no. 19/09) defines an ownership right as the absolute authority over property, on the basis of which the owner has the right to hold, use and dispose of property within the limits prescribed by the law (Art 6), and, inter alia, recognises that there are also limits which are the consequence of declaring a property a protected natural resource, in accordance with the Law on Nature Protection.

The act on declaration of a protected natural resource produces immediate effects on the ownership rights of properties covered by the protection and imposes certain limitations on the ownership right of an owner whose property is located on the protected area as it has to use the property according to the act of protection in a way that does not harm the object of the protection.

The Law on Nature Protection prescribes how to eliminate or mitigate reductions of the ownership right caused by establishment of a protected area. The owner, whose right to use and dispose of property is the subject of limitations, is entitled to compensation for damage proportionate to the reduced incomes. The amount of the compensation is determined in the agreement between the controller and the owner if possible; otherwise the amount is determined by the court (Art 73). In such case, the compensation would be determined in accordance with the Law on Non-Contentious Proceedings (Official Gazette of Montenegro, no. 27/2009), probably analogous to the provisions on the procedure of compensation for expropriation of real estates (Art 158 – Art 165 of the Law).

The law prescribes that damage be determined by the reduction in income from property, thus it is obvious that the law allows only for compensation for concrete and tangible damages. An abstract damage. i.e. a non-existing, potential damage shall not be recognized by the Law on Nature Protection.

It is important to emphasize that placing of real estate under the regime of nature protection is not dependent upon the compensation for damage or by an agreement (or by a decision of a contentious court) on the amount of compensation. The Decision on protection as an

independent act imposes a duty on an owner of real estate to behave in accordance with the Protection act, even though the owner might suffer a damage. By contrast to the expropriation process – in which the final deprivation of property or its limitation is conditioned by an agreement or by a decision of a court on compensation for expropriated real estate, as well as by providing the payment for the compensation – the owner of real estate under the regime of protection is not, as it turns out, really privileged.

The Commercial Court provided the following position towards the issue of land-ownership rights:

"Proper perception of systemic issues of ownership of Ulcinj Salina cannot be validly formed on the basis of arbitrary and incomplete data and improvisations which are by nature always present in the form of layman perception of any problem or placement of opinions of individuals in a problematic and non-institutional forms, whereby these opinions are not based on clear and full facts with evident neglect and disregard of objective conditions.

The issue of property rights or ownership rights and content of this right in all countries, including Montenegro, is a subject of constitutional and legal definitions and guarantees, that assume the absolute right of ownership which can only exceptionally be restricted and only under special legal conditions. According to official and public data that can be obtained by examining the history of land acquisition, or manner and form of acquisition of land ownership, it is evident that Ulcinj Salina, as a legal entity and commercial company acquired right to land for decades and in a lawful manner, mostly by means of purchase of land from previous owners. One part of the land is registered as the property of Ulcinj Salina, while the other larger part is registered as land in use, whereby one must take into consideration an objective fact that according to previous regulations, the status of civil construction land prevented the land to be registered as property and owners were registered as users of civil construction land with full right to dispose of said land, and this is precisely the status of land of Ulcinj Salina i.e. user of land with full right to dispose of said land. Attempts made by some previous owners of the land (mainly natural persons) to reclaim certain parts of land through institute of restitution were without success as courts in particular cases and without exception, have ruled on the basis of the content of valid purchase contracts concluded between Ulcinj Salina as land buyer and previous owners as land sellers. On the other hand, long history of this company clearly indicates that the company constantly used and equipped the said land for the purpose of implementing activities of which the priority activity was production of salt. The above stated shows nothing that would indicate problematic issues of ownership, with the special condition that we are dealing with privatized company which as such, was transformed in the process of ownership and management transformation and privatization, whereby the Company's assets (land, buildings and equipment) were subject of assessment of capital by state institutions in charge, which resulted in issuing shares. Assets that were subject of use, as a consequence of regime of city construction land, could have been the subject of free disposal of land and therefore also an encumbrance, as is the case of all other companies (or any citizen) with the same regime of use of assets. It should be mentioned that the said land was advertised for sale in the process of bankruptcy proceedings, however sales were unsuccessful. However, if the land had been sold, then the buyer of the land, pursuant to Article 419 of the Law on Property and Legal Relations, would acquire ownership of the purchased property. In addition to this element it should be taken into account that in 2011 Ulcinj Salina asked the Privatization Council for an opinion on market price determined in the proceedings and acquired right of ownership on that basis, and that the Council has not yet made a decision that it is required to make in accordance with the Law on Property and Legal Relations.

In terms of the above, any view and opinion according to which measures and acts on proclamation of protected area are made in a casual manner in relation to the issue of ownership and compensation to owners, is considered highly irresponsible. When it comes to issues of use of property for the purpose of performing activities and ownership of the company, it cannot in any circumstances be concluded that opportunities and obligations should not be considered for this owner in terms of Article 63 of the Law on Nature Protection regarding declaration of public interest and implementation of the expropriation process, but only liability for damages and only in part of the revenue of commercial entity.

Furthermore, it cannot be ignored that Ulcinj Salina is in bankruptcy and that the bankruptcy procedure is performed by liquidating the assets of the bankruptcy debtor through a public asset sales announcement, which is a legal obligation of the court and all participants in bankruptcy proceedings (who are indeed many) and that the issue of possible application of pre-emptive right to purchase that belongs to the Government pursuant to Article 69 of the Law on Nature Protection, should be taken into account«.

13.2. The dispute over land ownership rights in Ulcinj salina

The Property Registration Sheet no. 182 KO Ulcinjsko Polje and the Property Registration Sheet no. 98 KO Zoganje, that encompass the area of potential protection, states that the Salt Factory has a right to use the listed real estate, and not the right to ownership. The Property Registration Sheets do not state who the owner of the land and facilities is.

The once socially-owned company had indisputably become privately-owned (firstly through a voucher privatization, and later by the sale of shares by state funds), but the question that still remains to be solved is whether the Salt Factory, despite the privatization, only has the right of use of natural resources (for salt-making process) or whether ownership rights arose.

When it comes to the issue of the land property rights, Eurofond claims land property rights at the Commercial Court in Montenegro, in accordance with Article 419 of the Law on Property Relations (Official Gazette of Montenegro, No.19/09). The statement of the Council for Privatization and Capital Projects is expected in the upcoming period.

The Commercial Court has issued the following statement related to the dispute over land ownership rights in Ulcinj salina:

»In relation to the existence of a possible dispute in relation to ownership right to land, it should be taken into account that the assets of Ulcinj Salina are under the regime of bankruptcy proceedings and liquidation of said assets, and that the rights of creditors cannot be achieved in any proceedings other than bankruptcy proceedings. The rights of mortgage creditors can also be achieved only in bankruptcy proceedings, and only under conditions stipulated by the Law on Insolvency of Business Organizations, applied in said bankruptcy proceedings, with all the limitations that such proceedings provide, and also issues of rights of different creditors, so the assumptions regarding any rights and status of mortgage creditors or any particular creditor outside of bankruptcy proceedings are only hypothetical.

In this particular case, the objective circumstance that Ulcinj Salina was not the main mortgage debtor and that the main mortgage debtors duly paid their obligations and said mortgages ceased to be effectual, should be taken into account. Today they bear no effective relation to the Ulcinj Salina or its land. An objective fact is that in bankruptcy proceedings, only the bankruptcy debtor, and at the expense of the bankruptcy estate, undertakes actions to protect biodiversity in the most essential part in order to implement the procedure of asset sale (purchase and maintenance of motor pumps, etc.), i.e. all at the cost of the bankruptcy debtor. It is also an objective fact that the bankruptcy debtor decided to lease the property to any interested party in the course of implementation of assets sale which was followed by a public announcement of offers and acceptance of offer of PU National Parks that took the property on lease and concluded a standard lease agreement, and all different views and opinions in relation to the status of the lessor and the lessee are juxtaposed to facts. Having in mind all stated here it must be noted that the change of property regime in the part of the protected area and the issue of damage raises the question of compensation for damages to all creditors and participants in bankruptcy proceedings who are entitled to settle their claims from the proceeds of assets sale of bankruptcy debtor.

Considering all the above, and taking into account the entire content of the Draft Protection Study for Ulcinj Salina, it is concluded that all activities from the Study relating to the protection aspects cannot be undertaken without the acceptance of the court and the Bankruptcy Trustee, because the fact that bankruptcy proceedings are conducted over the bankruptcy debtor i.e. Saline "Bajo Sekulic" AD in Ulcinj should not be ignored given that decisions regarding the rights and property of debtors are now under the jurisdiction of the court.

13.3. Financing of the protected area

Article 64 of the Law on Nature Protection stipulates that funds for activities of the Manager of the protected natural resource shall be provided:

1. from the state budget or the budget of local self-government in accordance with the annual programmes, plans and projects in the field of nature protection;
2. by production of salt;
3. by fees for the use of protected natural resources;
4. through donations;
5. by other sources in accordance with the Law.

Also, Article 111 of the Law on Nature Protection stipulates that the funds for nature protection are provided from the state budget or the budget of local self-government. The Plan for resources mobilization takes also into account possibilities and willingness for funding by:

1. Budget (at the state and local level);
2. International organizations and funds;
3. Business and tourism sectors;
4. NGOs through the implementation and development of project ideas.

Also, the establishment of a protected natural resource represents a very important issue in the political agenda of international organizations. Therefore, many donor organizations such as the GEF, MAVA Foundation, Prince Albert 2 of Monaco Foundation, Critical Ecosystem Partnership Fund (CEPF), IPA Funds, LIFE and LIFE + Nature, MTF Fund and UNEP-MAP of the Barcelona Convention and SAP BIO, represent potential opportunities within which the necessary infrastructure, human resource and technical managing capacities could be built and different types of eco-tourism and agricultural activities could be encouraged through the development of project ideas. As the protection of nature is also an international obligation, in particular regarding global values that are recognised in the salina, each assistance in co-financing to establish protective measures and promotion of natural values of the salina, is important for the preservation of the natural heritage.

Moreover, the salina has great cultural and natural values for the entire Ulcinj. Undoubtedly, the protection of these values will be assisted by national and international funds. Declaring the area a Ramsar wetland will open up more opportunities for funding. In addition, the state educational and protection programmes will be of great importance in the future. In the initial phase of establishing the area, it is necessary to determine the part of the budget to be provided by the Government, i.e. the local self-government and the manager for the development and the establishment of the protected natural resource.

As costs for establishing the protected natural resource, the following should be taken into account:

- Direct costs, which include costs of establishing and planning of the protected natural resource (administrative costs, costs of establishing, implementing control, monitoring and control activities, the construction of infrastructure to increase profits from tourism, subsidies, etc.).

- Operating costs - the loss of potential development opportunities and possible benefits: prevention of excessive industrial and infrastructural development of the area and intensive fishing activity. The direct value of the protected area stems from the possibility of direct use of the resources of the area for activities such as recreation, tourism, and fishing, services of geo-fund preservation, birdwatching, education and research. These activities can be commercial, which means that there is a market demand for such resources, or non-commercial, such as livestock grazing and the like. In accordance with the legislation (Art. 68 of the Law on Nature Protection), fees for the use of a protected natural resource have been defined in the way that natural or legal person (users) pay a compensation to the Manager of the protected natural resource, for the following:

    - entering the protected natural area;
    - providing services to visitors (guiding, observing naturalist collections);
    - using the name and logo of the protected natural resource;
    - birdwatching;
    - recording feature and commercial films, videos and commercials;
    - other actions, activities and services in accordance with the Law.

The amount, the mode of calculating and collection of fees is determined by the Manager of protected natural resource, with the consent of the Ministry i.e. the relevant local authority. The Manager is obliged to use funds obtained this way for the protection, development and improvement of the protected natural resource. Charging tickets for entering the protected natural resource and fees for recreational activities and ecosystem services, represent the most common and the most tangible profit of protected natural resources, but can only be applied for the areas that are declared as protected areas (Law on Nature Protection). Indirect benefits of protected resources originate from the ecological functions of the resource itself, such as protection from flooding, stabilization of climate conditions, habitats for plant and animal species etc.

Optional values of the area are estimates of the potential of the area itself in the future, such as the possibility of development of tourism, economic or agricultural branches, the use of biodiversity for educational, scientific and pharmaceutical purposes and the like. In the context of the salina, this includes the possibility of re-starting the production of salt. Non-usable values represent values that are there by themselves like natural and heritage values, traditionally kept by the people from that area, despite life conditions. Visits by birdwatchers and people from the eco-education branch, can profit from learning about and enjoying the bounty of nature. Collecting money is necessary to finance and maintain the area. A system for visitors can include special souvenirs and products of the Salt Factory, and a special offer can be "fleur du sol - salt flower".

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15. Appendix

In Crystallization area we assessed the coverage of each basin with vegetation from 0 (no vegetation) to 100 % (basin completely covered with vegetation; Table 15.2). To represent the coverage of each species we adopted the scale used in the Braun-Blanquet method for vegetation survey. Each value is presented and explained in table 15.1.

Table 15.1: Values of the Braun-Blanquet scale used in the survey

Value	Explanation
+	coverage low, less than 1 % of the studied surface
1	species covering between 1 and 5 % of the surface
2	species covering between 5 and 25 % of the surface
3	species covering between 25 and 50 % of the surface
4	species covering between 50 and 75 % of the surface
5	species covering between 75 and 100 % of the surface

Table 15.2: Vegetation coverage and species composition of crystallization basins

basin Number	basin coverage (%)	Salicornia europea agg.	Salsola soda L.	Polypogon monspeliensis (L.) Desf.	Parapholis incurva (L.) C.E.Hubb.	Atriplex prostrata Boucher ex DC. in Lam. et DC.	Spergularia salina J. Presl et C. Presl	Elymus pycnanthus (Godr.) Melderis	Dittrichia viscosa (L.) Greuter	Lolium perenne L.	Suaeda maritima (L.) Dumort.	Tamarix sp.	Hordeum marinum Huds.	Aster tripolium L.	Halimione portulacoides (L.) Aellen	Phragmites australis (Cav.) Trin. ex Steud.	Scirpus maritimus L.	Limonium narbonense Mill.	Polygonum aviculare L.	Plantago coronopus L.	Picris echioides L.
1	55	+	3	2	+	+	+														
2	5	+	1																		
3	30	1	2			+		+													
4	100	5	1	2	+			+													
5	90	2	4	3	+			+	+	+											
6	70	1	3								3										
7	25	+	3	+								+	+								
8	90	5	1	+	+	+	2				+										
9	70	5	1	2	+		2			+											
10	60	3	1			+															
11	100	5	4	1		+		+						+							
12	90	4	4	+	+			+		+					+						
13	70	1	2																		
14	100	3	4	2			+	+			1			+		+					

15	100	1	5					+						+			+				
16	95	5	2																		
17	40	5	+		+	+	+							+				+			
18	85	5	+		+		1											+			
19	65	5	+				1														
20	80	4	+	1	+	+	+						+								
21	15	+	2			+						+					+		+		
22	100	+	3	+		+							+								
23	60	+	4			+					+										
24	70	3	1																		
25	30	4																			
26	100	5	+																		
27	100	5	3																		
28	100	2	4	+	+		+														
29	70	2	2	+	2	1	2				+			+						+	+
30	40	4	+		+		1	+													
31	80	5	1				1														
32	40	3	2	+			+														
33	100	5	1	+				+			+					+					
34	100	4	4																		
35	95	5	2								+										
36	0																				
37	2	+	1																		
38	2	+	1																		
39	5	3	+								+										
40	10	5				+	+				+										
41	5	2	+																		
42	2	2																			
43	80	4	+																		
44	100	5	+													2					
45	90	4														2					
46	1	+	+																		
47	1	+	+																		
48	50	2																			
49	10	1	+																		
50	5	1	+																		
51	1	1																			
52	25	3	2								+			+		2	1				
53	85	5	3	+			2							4		3	3	+			
54	85	5	+	+										+							
55	80	5	+	+			1				+			2		1					
56	70	5		+			+				+			2		1	1				
57	10	3	+																		
58	1		+			+															
59	5	2	+			+															
60	10	2	+				2				+										
61	60	4	+								+										
62	40	1	2			+					+										
63	1	+	+											+							

64	5	+	+																		
65	2	4	2			+								+							
66	60	4	1				+							2		1					
67	5	4					+														
68	0																				
69	0																				
70	0																				
71	50	1	+								1										
72	1	+	+																		
73	10	3	+				1														
74	5	3	+				1				+										
75	0																				
76	0																				
77	0																				
78	1		+																		
79	0																				
80	0																				
81	0																				
82	0																				
83	5	+	+								1										
84	50	4	1																		
85	1					1	2						+								
86	5	1	+			+	2				+										
87	0																				
88	0																				
89	0																				
90	0																				
91	0																				
92	0																				
93	0																				
94	0																				
95	10	+	2																		
96	0																				
97	0																				
98	1			+																	
99	1		+	+	+		+											+			
100	1		+	+		+	+									+		+			