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THE REPUBLIC OF MONTENEGRO
MINISTRY OF ENVIRONMENTAL PROTECTION AND PHYSICAL PLANNING
Podgorica, Montenegro

NATIONAL ACTION PLANS

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Country: Montenegro

National action plan 1
INVENTORY AND MAPPING OF SENSITIVE AREAS

Geographical scope
This action plan is to be implemented in Montenegro

General Description
It is noted many times that species which in the past were fairly common in the Mediterranean region are becoming more and more rare because of the disappearance of the very sensitive biotopes and areas to which they are strictly confined. Recently recognized sensitive areas in the Coastal zone of Montenegro are Posidonia meadows in the Sea and Halophyte vegetation on sand dunes and mud-clay soil.

a) Sea grass meadows

Marine fanerogams are specific plants, secondary adapted for life in submerged conditions. All seaweeds are very important for maintenance of stability of numerous ecosystems and in the Mediterranean region, in connection with that, *Posidonia oceanica* (L.) Del. meadows have the most important role (Molinier, Picard, 1952). Meadows of the sea grass *Posidonia oceanica* (L.) Del. are the typical and richest biocenoses in the Mediterranean Sea because they are creating important habitat necessary for leaving, feeding, reproducing, sheltering, …etc. of many organisms. Also “matte”-complex of Posidonia rhizomes and roots together with sediment, are playing important role in stabilizing sandy bottoms and diminishing the erosive effect of the currents and waves on the coast.

So, it isn’t strange way this phanerogamic plant, in general, has been examined a lot. But information about benthos flora for the area of Montenegrin coast are rather scarce and meadows of Posidonia are poorly known so it seems there are numerous colonies of this species in this region (Peres and Gamulin-Brida 1973; Špan & Antolić, 1983; Stjepčević & Parenzan 1980) but more detailed data are sparse (Mačić, 2000; 2001). In the late nineties in coastal waters of Montenegro more detailed investigations were lasting several years, with accent on Boka Kotorska Bay. We find out presents of three species: *Posidonia oceanica*, *Cymodocea nodosa* and *Zostera noltii.* UTM maps of spread (10x10km) were made for coastal waters of Montenegro and data from literature about spread of *Posidonia oceanica* are additional with new localities (Mačić, 2001a). (Fig. 1.)

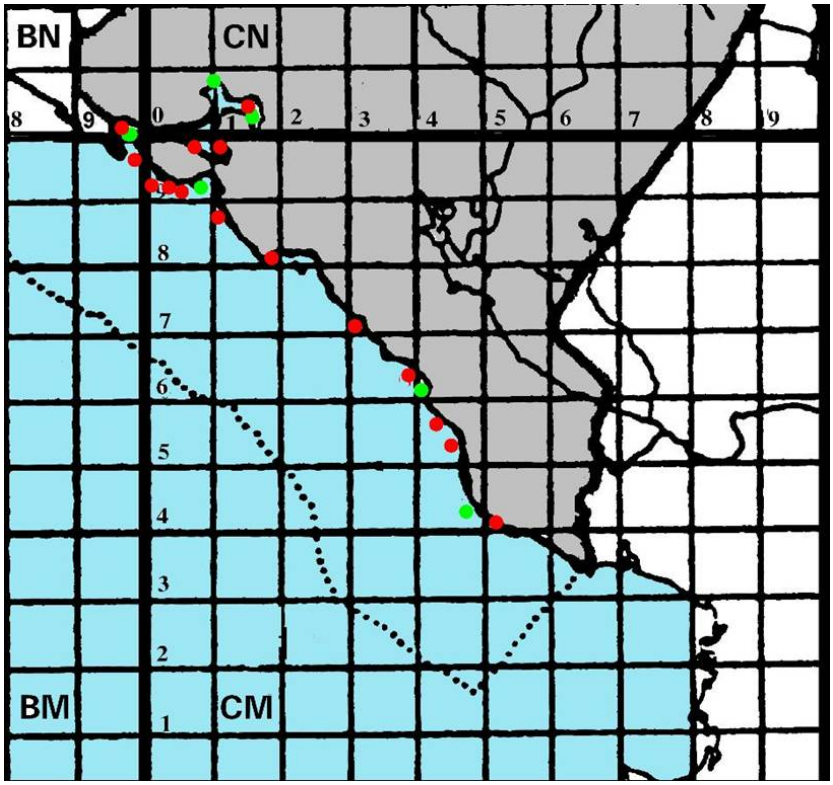

Fig. 1. UTM map (10x10km) for *Posidonia oceanica* distribution

The data obtained from these studies have shown that meadows of *Posidonia oceanica* are covering important parts of the Montenegrin bottom, extending to max. depth of 33m. For the first time we made some study of phonology for this sea grass and we find out significant differences between meadows in inner parts of the gulf and those from external parts. Differences in morphological parameters and disappearance of meadow from Risan bay are consequences of negative effects of human activity. Contrary on that, meadow in Herceg Novi bay and in some localities in the open sea are typically developed. Also we registered vary rare phenomenon of successful germination of seeds and we find out remains of flowering and fruiting (Mačić, 2001a).
Also we made some anatomical and physiological analysis for *Posidonia* in Boka Kotorska Bay. Obtained data are indicating that Pb and Cr concentration in sea grass from this area were higher then those of the same species from the other areas of Mediterranean sea (Mačić 2001). This isn't a strange regarding that Bay is the zone with strong anthropogenic influence, but because of bioaccumulation potential of these metals in sea grasses we have to examine possible toxic effect on plants and animals and possibility of using these plants to detect the presence of metal pollution.
Up to now in Montenegro sea grass *Posidonia oceanica* is not protected in national legislature (Red list) as an rare or endangered species. But meadows of *Posidonia* are protected from trawling with national low of fisheries (trawling is forbidden above depth of 50m and in less than two nautical miles from the coast) (National Gazette 55/03) . Eider protected in this manner in practice this legislation is often not respected.
So we are hoping that further research and monitoring will provide necessary data for defining state and possible trend of future development of the *Posidonia* meadows, possible treats and necessary conservation measures.

b) Halophyte vegetation

All halophyte plants Montenegrin beaches are endangered. Other beaches are considerably smaller in comparison with the beach "Velika plaža", significant as the last refuge of the beach plant species, which still exist here in the preserved fragments. The most endangered plant species in Montenegro is Sand Lily *Pancratium maritimum,* which can be found only on this locality in the narrow zone of psamo-halophyte vegetation on the beach itself. This species has

disappeared from other habitats in Montenegro and it is included on national "Red List" (*Act on Protection of Rare, Endangered and Threatened Animal and Plant Species* (Sluzbeni list RCG, 36/82)).

Halophyte vegetation of Velika Plaza includes two main vegetation belts:

I Xerohalophytic vegetation belt composed by two pioneer vegetation associations: a) *Xantio-Cakiletum maritimae* (Beg. 1941) Pign. 1953 and b) *Agropyretum mediterraneum* (Kuhn) Br.-Bl. 1933 covers so-called young dunes.

II Vegetation belt of the psamophytic association *Thero-Brachypodietalia* Br.-Bl. 1947 - Mediterranean pastures and dried meadows.

I. a) The association of *Xantio-Cakiletum maritimae* survive in extreme ecological conditions, under direct impacts of salted water and winds. It is indicated small cover of plants on the xero-halophytic vegetation belt. Plant species[1] that makes this association are: Sea Rocket (*Cakile maritima* Scop.)*, Xantium italicu,.* Pricky Saltwort (*Salsola kali* L.), *Euphorbia peplis* L, *Euphorbia paralias* L.*, Polygonum maritimum* L, *Atriplex hastata* L., *Echinophora spinosa* L., Sea Holly (*Eryngium maritimum* L.), *Agropyrum junceum* (L.) P. B., *Medicago marina* L., *Inula crithmoides* L., *Lagurus ovatus* L, *Cuscuta sp.* L.

I. b) *Agropyretum mediterraneum* association following and combine to the *Xantio-Cakiletum maritimae* association. Its position is a bit farther from the Sea that attract following species[2]: *Agropyrum junceum* (L.) P. B., *Echinophora spinosa* L., Sea Holly (*Eryngium maritimum* L.), *Euphorbia paralias* L, *Medicago marina* L., *Ammophila arenaria* Lk., *Pancratium maritimum* L., *Calystegia soldanella* (L.) R. BR., *Pseudorlaya pumila* (L.) Grande, *Lagurus ovatus* L, *Xantium italicum* Mor., *Cakile maritima* Scop., *Euphorbia peplis* L, *Polygonum maritimum* L., *Atriplex hastata* L., *Aegilops ovata* L.*, Lepturus cylindricus* Trin. *Lepturus incurvus* Sch et Thel., *Vulpia ciliata* Lk., *Schoenus nigricans* L., *Blackstonia perfoliata* (L.) Hud., *Bromus tectorum* L, *Juncus maritimus* Lam, *Euphorbia terracina* L., *Inula crithmoides* L., *Reichardia picroides (L.) Roth*. These plants expand to the rear of Velika Plaza

Insufficient data are available about the distribution and characteristics of halophyte vegetation in Buljarica, Tivatska Solila saltpans, mouth of Sutorina river.

In the area of Tivatska Solila saltpans the halophyte vegetation belt is developed on mud – clay substrate and composed by associations of Salicornietalia Br.-Bl., such as association Salicornietum herbaceae; succulent halophyte association Artocnemetum fruticosi Br.-Bl. which is similar to previous but has a variant sub-association nova aeluropetosum litoralis; and association Limonio Artemisetum caerulescentis H-ic. distributed on driest habitats. Following species contribute to these associations: *Aeluropus litoralis, Agropyron elongatum, Agropyron litorale (syn. Elymus picanthus), Artemisia coerulescens, Aster tripolium, Atriplex littoralis L., Bupleurum*

[1] A. Mijovic, 1994.
[2] Ibid

tenuissimum, Carex extensa, Equisetum telmateia, Inula crithmoides L., Juncus acutus L., Juncus maritimus Lam, Lepturus incurvus Sch et Thel.(syn Pholiurus incurvatus), Limonium angustifolium (Tausch) Turill (L. narborense), Medicago arabica, Obione portulacoides (L) Moq (syn Halimione portulacoides), Phragmites communis L., Picris echioides , Plantago maritime, Polygonum maritimum L., Puccinellia festuciformis, Rupia maritima L. ssp. Spiralis, Salix sp., Salicornia fruticosa L., Salicornia herbacea L., Salsola soda L., Scirpus litoralis, Scirpus maritimus, Spergularia marina, Suaeda maritime, Triglochin maritimum

Justification

Posidonia oceanica meadows and *Halophyte vegetation*, both, are among most important ecosystems in Mediterranean Sea, but under high anthropogenic pressure and unfortunately they are vary sensitive. Negative human impacts are many: intensive sectoral development (tourism, urbanization), change / degradation of natural habitats to urban – tourist areas, euthrophication, changes in turbidity, transparency, sedimentation, industrial pollution, physical damage of plant, introduced species etc.

Regarding that, growing of *Posidonia oceanica* is very slow (ortotropic rhizomes 1m per century) and recovering of meadow is long lasting process. On the other hand, narrow belts of Halophyte vegetation are distributed on natural areas attractive for further development of tourist facilities.

Aim of the Action Plan is to provide relevant information about Halophyte vegetation and sea grass meadows in order to create the base of advanced knowledge which should be replicated on other sensitive habitats in Coastal area of Montenegro. Information on both types of sensitive areas should be organized in computer databases (inventories) and presented on accurate maps. It will serve as a tool for monitoring of disturbances in order to apply adequate protection measures.

Targets

Because of high anthropogenic pressure on sensitive habitats it is necessary conduct Inventory and mapping of Halophyte vegetation and Sea grass meadows. Capacity building of responsible institution should be improved that is of importance for their further activities addressed to the conservation of other sensitive habitats.

Specific objectives should be achieved in the component of Action Plan devoted to inventory and mapping of Sea grass meadows, as follows:

- Mapping of already registered locations in Boka Kotorska Bay
- Provide better knowledge of phonological parameters of the *Posidonia* meadows on the open sea
- Mapping of the *Posidonia* meadows on the open sea
- Raising public awareness
- Monitoring changes

Mapping and inventory of Halophyte vegetation has following specific objectives to be achieved:

- Mapping of compact areas of Halophyte vegetation (Velika plaza in Ulcinj and Tivatska Solila saltpans)
- Mapping of small and fragmented areas of Halophyte vegetation (Buljarica, mouth of Sutorina river, other beaches)
- Integration of key information on Halophyte vegetation into relevant physical plans (for coastal municipalities)
- Raising public awareness
- Monitoring of changes

Action plan

Targets and objectives mentioned above need to be achieved in a well co-ordinated series of actions presented in the Action plan. Each objective has been derived into actions followed by a brief description. The actions are prioritised in four time-scale categories as follows:

- Immediate : completed within the next year
- Short : completed within the next 1-3 years
- Medium : completed within the next 1-5 years
- Long : completed for the period more than 5 years

Implementation of the Action Plan is planed for both of components in the period of five years and comprise following actions:

COMPONENT - A – SEA GRASS MEADOWS

1 Mapping in the Boka Kotorska Bay where the Posidonia meadows are already recorded in the literature

Action A. 1.1.: Aerial photography
Mapping of sea grass meadows by using aerial photography and computer image processing is increasingly widely used to marine investigations in the past few years and combined a high degree of accuracy with rapidity of processing makes obvious utility of this methodology.
Because of bathymetric distribution the plant assemblages in the Boka Kotorska Bay are in greater part clearly visible in aerial photographs, so image processing techniques make it possible to produce biocenosis maps.
For appropriate realization of air photographs has to be taken into account many weather parameters and techniques, so this action is planned for winter 2004/05.
Responsibility: Institute for Marine Biology
Time-scale: immediate
Action A. 1.2.: Checking the results of aerial photography by scuba diving
Checking the results of aerial photography and providing stable base for further processing of photographs are supposed to be taken by scuba diving. This action will be realized by the transect method and random localization using a GPS positioning system.
Responsibility: Institute for Marine Biology
Time-scale: immediate
Action A. 1.3.: Creating accurate digitalized map of *Posidonia* meadows in the in the area of Boka Kotorska Bay
Combined the results of previous actions on the and of process we will made a biocenosis map using GIS (Geographic Information System) and validation of the data will be done by comparing with field data. GIS can be used for creating database and in this way we will be in occasion to set up long-term monitoring program.
Responsibility: Institute for Marine Biology
Time-scale: short

2 Provide better knowledge of phonological parameters of the *Posidonia* meadows on the open sea
Action A. 2.1.: Transect method for zones were meadows of *Posidonia* are not described
The transect method has been used frequently to map biocenoses but it is applicable on small surfaces. Transects has to be performed trough the area of interest and for Montenegrin coast it can be used for getting idea about meadows of *Posidonia* in general and for making appropriate plan where to apply further phonological analysis.
Responsibility: Institute for Marine Biology
Time-scale: medium
Action A. 2.2.: Phenological analysis

This technique established in late eighties provides information about condition of *Posidonia* meadows. Rapidity, easily repeatable process and possibility to carry out analysis of meadows at any depth are the advantages of this technique. For basic phenological information number, length and width of different categories of leaves (adult, intermediate, juvenile), length of leaf sheaths, coefficient "A" and LAI (Leaf Area Index) has to be measured.
Measurements of meadow density, type and state of the limits, percentage of plagiotropic rhizomes together with lepido-chronological analysis are providing accurate estimates of general "health" of meadow, primary production and possible trend.
Responsibility: Institute for Marine Biology
Time-scale: medium

3 Mapping of the *Posidonia* meadows on the open sea
Action A. 3.1.: Decision were to carry out mapping
On the base of previous actions further locations for the mapping should be selected. Preliminary are defined following locations: Trašte (outfall pipe), Budva (intensive tourism), Bar (port) Velika Plaža (illegal trawling) will be priority zones. Process of mapping on other locations has to be similar to the mapping process applied for Boka Kotorska Bay as follows

Action A. 3.1.1.: Aerial photography
Action A. 3.1.2.: Checking the results of aerial photography by scuba diving
Action A. 3.1.3.: Creating accurate digitalized map of chosen *Posidonia* meadows in the open sea

Responsibility: Institute for Marine Biology
Time-scale: medium
Action A. 3. 2. Use of acoustic seabed classification
Mapping by aerial photographs is very well applicable for the upper limits of *Posidonia* meadow but for higher dept it is not possible to carry out with the same accuracy. In that case we can use acoustic seabed classification-the organization of the sea floor and direct subsurface into seabed types or classes, based on characteristics of an acoustic response. For each recorded echo we tagged coordinates from GPS so we have necessary information for positioning of classified seabed.
For this purpose we can use the QTC VIEW system and than using software QTC IMPACT groups of echoes representing different seabed types (*P. oceanica* meadow, send, rock, etc.) could be identified.
Responsibility: Institute for Marine Biology
Time-scale: medium
Action A. 3.3. Additional contribution for digitalized map of chosen *Posidonia* meadows in the open sea
Combined the results of acoustic seabed classification and already created digitalized map using GIS provide accurate biocenosis map and base for sustainable management.
Responsibility: Institute for Marine Biology
Time-scale: long

4 Raising public awareness
Action A. 4.1.: Organization of lectures, tribunes, exhibition
In a purpose of raising public awareness these actions should provide better knowledge about important rules of *Posidonia* meadows so the programs of conservations and monitoring of these ecosystems should be raised on higher level.
Responsibility: Institute for Marine Biology
Time-scale: long
Action A. 4.2. Elaboration of brochures
Brochures showing important rules and positions of *Posidonia* meadows will be elaborated and distributed to local population, fishermen, and tourists in order to spread awareness on the importance of its protection.
Responsibility: Institute for Marine Biology
Time-scale: medium
Action A. 4.3. Excursion- introduction of *Posidonia*

In a summer time organizing excursion including appropriate lectures, snorkelling and diving over the meadow with scope of introducing *Posidonia* and other organisms of meadow in the most entertainment and unforgettable way.
Responsibility: Institute for Marine Biology
Time-scale: long

5 Monitoring
Action A. 5.1. Marking the lower limit of the meadow
Buoys should be placed at the lower limit of the meadow in order to provide us possibility of monitoring changes in the long period. With accurate controlling in regular periods we will be able to detect trend of changes and provide appropriate data comparable with other parts of Mediterranean Sea. Also it will be test and proof for successfulness of undertaken measures on *Posidonia* meadows.
Responsibility: Institute for Marine Biology
Time-scale: short

COMPONENT - B – HALOPHYTE VEGETATION

1 Mapping of compact areas of Halophyte vegetation (Velika plaza in Ulcinj and Tivatska Solila saltpans)
Action B. 1.1.: Provide aerial photos, satellite images, topographic maps and photos.
Appropriate background images / photos need to be provided for analyses of investigated area. It should be used for further elaboration / producing digitised maps. Most of aerial photos, satellite images and topographic maps have to be procured from the market. All of them will be geo-referenced, deviations corrected and prepared in a digitised form.
Responsibility: Institute for the Protection of Nature
Time-scale: short
Action B. 1.2.: Provide training and conduct a GPS campaign
A GPS campaign for taking viewpoints relevant for halophyte vegetation belts in both areas need to be taken after the training of GPS device users.
Responsibility: Institute for the Protection of Nature
Time-scale: medium
Action B. 1.3.: Analyse data and create database for species contribute to the halophyte vegetation
All data on halophyte species need to be gathered and analysed. Data provided by fieldwork and GPS campaign should be used as well. A database for these species need to be created (Access) in order to be added to the maps (Arc Info)
Responsibility: Institute for the Protection of Nature
Time-scale: medium
Action B. 1.4.: Create a set of maps for distribution of halophyte vegetation
A set of digitised maps should be created using results from above mentioned activities in adequate software – Arc Info. Before start to work on preparation of maps a training of the staff on ARC Info – GIS software should be provided.
Responsibility: Institute for the Protection of Nature
Time-scale: medium

2 Mapping of small and fragmented areas of Halophyte vegetation
Halophyte vegetation has to be mapped on all locations where is distributed. Preliminary are defined following locations: Buljarica beach, mouth of Sutorina river but other beaches along coastline should be examined. Process of preparing databases / inventories and digitised maps has to be similar to the inventorying / mapping process applied for compact areas of halophyte vegetation, as follows:

Action B. 2.1.1.: Provide aerial photos, satellite images, topographic maps and photos.
Action B. 2.1.2.: Conduct GPS campaign

Action B. 2.1.3.: Analyse data and create database for species contribute to the halophyte vegetation
Action B. 3.1.4.: Create a set of maps for distribution of halophyte vegetation
Responsibility: Institute for the Protection of Nature
Time-scale: medium – long

3 Integration of key information on Halophyte vegetation into relevant physical plans
Action B. 3.1: Prepare a set of reports on distribution of halophyte vegetation
Reports should be prepared for each of six coastal municipalities in order to provide accurate maps for distribution of halophyte vegetation to be included into physical / urbanistic plans.
Responsibility: Institute for the Protection of Nature
Time-scale: medium
Action B. 3.2: Present the Reports on internal workshops in coastal municipalities respectively
Reports should be presented on a easy understandable way to the representatives of municipalities which are in charge for physical / urbanistic plans – Secretariats for urbanism
Responsibility: Institute for the Protection of Nature
Time-scale: medium

4 Raising public awareness
Action B. 4.1.: Organization of lectures and exhibition
Public lectures and exhibitions should be organized in coastal municipalities in order to increase public awareness and provide better knowledge about the ecological importance of halophyte vegetation.
Responsibility: Institute for the Protection of Nature
Time-scale: long
Action B. 4.2. Publish a brochure
This brochure should present ecological values and beauty of halophyte vegetation on a interesting and understandable way. This publication need to be prepared on national language and English, and widely distributed to local people and tourists as well.
Responsibility: Institute for the Protection of Nature
Time-scale: long

5 Monitoring
Action B. 5. Conduct monitoring of changes
Changes in halophyte vegetation should be monitored in the frame of the Biodiversity monitoring programme, annually.
Responsibility: Institute for the Protection of Nature
Time-scale: long

Priority
Priority is to collect as much as possible data about Sea grass meadows and halophyte vegetation, prepare accurate maps of their distribution and provide capacity building of responsible institutions applying advanced methodologies.

Responsibility
The responsibility for implementing this Action Plan is shared between Ministry of Environmental Protection and of Physical planning, Institute for the Protection of Nature and Institute of marine biology.

Stakeholders
Stakeholders relevant for the implementation of Action Plan are Ministry of Environmental Protection and of Physical planning, Institute for the Protection of Nature and Institute of marine

biology, Ministry of Agriculture, Forestry and Water, authorities responsible for physical planning in coastal municipalities and local population, fisherman, diving clubs, and NGOs. Their roles and responsibilities are presented on following table

Stakeholders	Responsibilities and role
Ministry of Environmental Protection and of Physical planning	Financial support for carrying out the Action Plan
Institute of marine biology.	Conduct investigations, GPS sampling of viewpoints; develop data base (inventory) and maps; monitoring and public awareness
Institute for the Protection of Nature	Investigations, GPS campaign, develop data base (inventory) and maps; monitoring
Ministry of Agriculture, Forestry and Water	Financial support for carrying out the Action Plan
Diving clubs	Help in research and public awareness
NGO	Public awareness
Fisherman	Implementation of the conservation measures
Authorities responsible for physical planning in coastal municipalities	Apply information on halophyte vegetation into physical plan in order to prevent constructions in the areas of its distribution.

Prerequisites for implementation

The implementation of This Action Plan is primarily depending of financially support from national and international institutions. Before start execution of the plan it should be necessary procure following prerequisites: aerial photos, topographic maps, satellite images, two computers (graphic working stations) with licensed software (Arc Info), four GPS devices (two water proof). Foreign experts should be recruited for training of national staff working in both institutes on use ARC Info software.

Expected problems

Availability of the equipment
Availability of foreign experts
Weather conditions for field work
Availability of aerial photos

Implementation Calendar

COMPONENT - A – SEA GRASS MEADOWS

Implementation calendar will depend on the financial support and number of chosen sites for research. Parameters of phenology, lepidochronology and density could be realized every year, but aerial photography, their processing and echo sounding for GIS maps of *Posidonia* meadows are strongly depending of financial or technical support.

Activities	1 year	2 year	3 year	4 year	5 year
Aerial photography (Boka K. Bay)	xxx		xxx		
Aerial photography (open sea)			xxx		
Checking the results of aerial photography by scuba diving (Bay)		xxx		xxx	

Checking the results of aerial photography by scuba diving (open sea)				xxx	
Creating accurate digitalized map of *Posidonia* meadows (Bay)		xxx		xxx	
Creating accurate digitalized map of *Posidonia* meadows				xxx	xxx
Transect method for zones were meadows of *Posidonia* are not described	xxx	xxx			
Phenological analysis	xxx	xxx	xxx	xxx	xxx
Use of acoustic seabed classification			xxx	xxx	
Additional contribution for digitalized map of chosen *Posidonia* meadows in the open sea				xxx	xxx
Organization of lectures, tribunes, exhibition			xxx		xxx
Elaboration of a brochures					xxx
Excursion- introduction of *Posidonia*		xxx		xxx	
Marking the lower limit of the meadow				xxx	xxx

COMPONENT - B – HALOPHYTE VEGETATION

Activities	1 year	2 year	3 year	4 year	5 year
Provide aerial photos, satellite images, topographic maps and photos	xxx				
Provide training and conduct GPS campaign	xxx				
Analyze data and create database for species participate in halophyte veget.		xxx			
Create basic set of maps for distribution of halophyte vegetation		xxx	xxx		
Mapping of small and fragmented areas of Halophyte vegetation			xxx		
Prepare a set of Reports on distribution of halophyte vegetation				xxx	
Present the Reports on internal workshops				x	xx
Organization of lectures and exhibition				x	xx
Publish a brochure					xxx
Conduct monitoring of changes				xxx	xxx

Budget

Estimated coast of the activities in this Action Plan are listed below.

COMPONENT - A – SEA GRASS MEADOWS

Activity	No. Sites	Costs estimated in USA $
Aerial photos, Satellite images	10	5.000
Checking the results of aerial photography by scuba diving	10	5.000
Creating accurate digitalized maps of *Posidonia* distribution	10	5.000
Transect method for each area *Posidonia* is distributed	20	5.000
Phenological analysis	20	3.000
Use of acoustic seabed classification	10	4.000
Organization of lectures, tribunes, exhibition	5	1.000
Elaboration of a brochures		1.000
Excursion- introduction of *Posidonia*	1	2.000
Marking the lower limit of the meadow	5	10.000
Computers (two), Software (Arc Info) and training		44.000
Echo-sounding		5.000
Laboratory supplies		2.000
International expert consultant		7.000
		TOTAL 100.000

COMPONENT - B – HALOPHYTE VEGETATION

Activity	Costs estimated in USA $
Aerial photos, satellite images, topographic maps	4.000
GPS campaign (>15 locations) and quick training on use GPS device	10.000
Analyses of data (literature + fieldwork)	5.000
Create database (Access)	1.500
Create a set of maps (Arc Info)	3.000
Computers (two), Software (Arc Info) and training	44.000
Prepare six reports on distribution of halophyte vegetation	6.000
Internal workshop (presentation of the reports)	6.000
Public lecturers / presentations	6.000
Publish a brochure	1.000
Field work cost (monitoring of changes)	5.000
International consultant	6.500
	TOTAL 100.000$

Total costs for both components are 200.000 USA $

Monitoring

In order to verify success of the Action plan there are several monitoring activities. First of all elaborated GIS maps of Halophyte vegetation and *Posidonia* meadows will be reviewed as well as inventories and reports. Progress in strengthening of public awareness should be monitored using standard questionnaires and interviews.

Investment portfolio

As it was pointed out in the National Report, Inventory and mapping of both types of sensitive areas is defined as national priority that should serve as an successful model for further replication on other sensitive habitats in the Coastal area. Process of preparing inventories / databases and digitised maps should provide capacity building in both institutions responsible for performing GIS base interpretation of biological data.
The international assistance from various funding sources is required for the implementation of this NAP. Partial contribution form the side of Montenegro will be provided from available sources, including increased participation form the Government and private sector, both.

This Action Plan could be fulfilled with appropriate financial support in the next 5 years. Estimated cost of the Action Plan is 200.000 USA $ in total, but this cost could be changed that depending of costs for the procurement of expensive equipment, particularly ARC Info software package.

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Country: Montenegro

National action plan 2

ACTION PLAN FOR THE DALMATIAN PELICAN IN MONTENEGRO

Reviews

This action plan should be reviewed and updated every five years. An emergency review will be undertaken if sudden major environmental changes, liable to affect the individuals occurring in the Montenegrin wetlands.

Geographical scope

This action plan is to be implemented in Montenegro

Threats and limiting factors

1. Disturbance - **high**
2. Nest destruction and shooting - **low**
3. Disruption of functioning of the fishery and hunting enterprises - **critical**
4. Habitat degradation in breeding and wintering areas - **low**
5. Contamination by heavy metals and pesticides - **unknown**
6. Climatic changes - **unknown**

Conservation priorities

General Description

1. Introduction

The Dalmatian Pelican *Pelecanus crispus* is classified by IUCN as Globally Threatened in the Category Lesser Risk/conservation dependent (Hilton-Taylor 2000). It was formerly listed as Vulnerable, due to its small and declining population. At the European level, it is still considered as Vulnerable species (Tucker & Heath 1994). Species' nesting population is local and confined to the South eastern Europe, Middle East and Central Asia. World population of Dalmatian Pelican is estimated to be stabilized between 15,000 and 20,000 individuals. (Hatzilacou 1993 and Crivelli et al. 1997 in BirdLife International 2002). Newest estimates of nesting population are between 4031 and 5196 pairs (Crivelli et al. 2000, Wetlands International 2002). Only about 10 % of the population nests in the Mediterranean region: 15-20 pairs in Albania, 7 pairs in Montenegro, 250 pairs in Greece and 120 pairs in Turkey (Hoffman et al. 1996). The Mediterranean population is, however, considered to be stable (Perennou et al. 2000).

The Dalmatian Pelican is included in the Appendix II of the Bern Convention, in the Annex I of the EU Wild Birds Directive, in the Appendix I of CITES, in the Appendix II of the Bonn Convention and in the Agreement for the Conservation of African-Eurasian Migratory Waterbirds (AWEA), under the Bonn Convention. In Montenegro, the Dalmatian Pelican is included in the list of Strictly Protected species. Nevertheless the regulation is not fully implemented and the existence of the last colony is now under high risk. From more than 50 breeding pairs during the 70's, now Montenegro shelters not more than 7 nesting couples (Rubinič, Saveljić & Vizi, in prep. 2004). This large reduction calls for a very urgent Action Plan. The AP will identify the main threats and the main actions to be undertaken in order to enhance the population of the species and to restore some of the degraded habitats.

2. Background information

2.1. Distribution

The Dalmatian Pelican is a colonial waterbird that breeds in Montenegro. Most of the data reported by different authors concern nesting birds. The only breeding place of Dalmatian Pelican in Montenegro now is Skadar lake. By the end of 19th century, the species bred in Zogajsko blato that was transformed into Ulcinj saltpans in the 30's.

First occurrence records of Dalmatian Pelican at Skadar Lake are published by Brusina in 1891. Brusina only records species' presence on the lake. In 1894 in Hum bay (now an ornithological reserve Pančeva oka), 39 pairs are recorded building nests (Führer 1894). Most probably, an error occurred when this work was printed. As Führer explained, he took eggs from 15 nests, leaving eggs from remaining 14 nests untouched, the total number of nests adding to actually 29 nests. Remaining nests were later destroyed by flooding (Führer 1894). In 1896, a colony of 20 pairs was recorded (Reiser & Führer 1896). After Reiser and Führer, detailed research of birds from Skadar lake is missing completely and records on pelican's occurrence are lacking.

During the1965, 42 pelicans were recorded in the mating season at the same place they were breeding at the end of 19th century (Ivanović 1970). The author detected colony disturbance by hunters. Intensive research on Dalmatian Pelican begun by Vizi in 1972 in May 1972 and he visited the colony for the first time and recorded 20 nests with 16 to 18 young birds. Vizi continued his research in subsequent years and recorded severe disturbances by predators and flooding (Vizi 1975).

The original colony was displaced due to the human disturbance in 1975, and existed until 1990 mainly in another place, Crni žar – a peat island, situated about 1500 m to the South (Vizi 1979).

The number of nesting pelicans had been gradually increasing up to 1977, when it reached its maximum of 52 pairs. In 1978, the colony had been again destroyed by high water level (Vizi 1979). During the 80's pelicans were mainly nesting on Crni žar as well as on Pančeva oka.

Number of successfully fledged young pelicans was continuously low, although disturbances were not recorded (Vizi, pers. comm.). In 1990, 21 pairs were recorded on Crni žar but all the eggs and a young bird were later destroyed by hail (Vizi, pers. comm.).

During 1991 and 1992 the colony was situated on a stone island Grmožur. Continuous disturbance by tourists resulted in complete abundance of the colony in subsequent years (Vizi 1995a).

In the period from 1993 to 2001, the nesting of Dalmatian Pelican has not been recorded on Skadar lake.

Recent record of nesting pelicans on Skadar lake has been confirmed on 11th of July 2002 when 5 pairs leading 2 fledged youngs were seen while flying with a sport plane on the height of 300 feet over hardly accessible colony in Pančeva oka.

On the same place in 2003 during two visits, 7 pairs with 10 successfully fledged youngs were recorded only 20 m away from nesting rafts set there by the recommendation of MedWet (Perennou et al. 2001).

Figure 1. Number of nesting Dalmatian Pelicans on Skadar lake from 1894 to 2003 with number of successfully fledged youngs, type of disturbance and nesting location (*year when all the eggs and/or youngs were completely destroyed; [1]Type of disturbance: F-flooding, H-hunting, E-egg collection, P-predation, G-hail, T-tourism; - data is missing).(Rubinič, Saveljić & Vizi, in prep. 2004).

Year	N. of pairs/ nests	N. of youngs	Breeding success	Type of disturbance[1]	Nesting location	Reference
1894	39(29)	-	-	E, F	Pančeva oka	FÜHRER 1894
1896	20	-	-		Pančeva oka	REISER & FÜHRER 1896
1965	21	-	-	H	Pančeva oka	IVANOVIĆ 1970
1967	30	-	-		-	TERRASSE ET AL. 1969
1972	20	16-18	0,8-0,9		Pančeva oka	VIZI 1975

1973	24	18	0,75		Pančeva oka	VIZI 1975
1974*	16	0	0	P	Pančeva oka	VIZI 1975
1975	29	11	0,38		Crni žar	VIZI 1979
1977	52	46	0,88		Crni žar	VIZI 1979
1978*	-	0	0	F	Crni žar	VIZI 1979
1979	-	3	?		-	VIZI 1979
1983	11	6	0,55		Crni žar, Pančeva oka	VIZI, pers. com.
1984	11	5	0,45		Crni žar, Pančeva oka	VIZI, pers. com.
1986	8	9	1,13		Crni žar	VIZI, pers. com.
1987	14	19	1,36		Crni žar	VIZI, pers. com.
1989	29	7	0,24		Crni žar	VIZI, pers. com.
1990*	21	0	0	G	Crni žar	VIZI, pers. com.
1991	7	2	0,29	T	Grmozur	VIZI 1991, VIZI 1995
1992	15	11	0,73	T	Grmozur	VIZI 1995
2002	5	2	0,4		Pančeva oka	This work
2003	7	10	1,43		Pančeva oka	This work
Average (SD)	19 (±11,7)	9,8 (±11,2)				

3. Life history

3.1. Breeding

Breeding colonies of the Dalmatian Pelican in Montenegro are located only on Skadar lake. Dalmatian Pelicans have bred on three ecologically different places inside Skadar Lake.

First and most frequent nesting locality is Pančeva oka. Pančeva oka (meaning "Pelican's pools" in local language) is a vast complex of dead and living flooding vegetation which represents a base for formation of 11 m deep layers of Sphagnum peat-bog. The complex spreads along north coast of lake from Morača river to Albanian border and covers an area of about 5 km^2. Pančeva oka is a complex of hardly-accessible floating peat-bog rafts, freshwater pools and thick Salic vegetation. Among other vegetation *Salix alba*, *S.fragilis, Typha angustifolia, T.latyfolia* are found there. Pelican's colony is situated on a floating raft of peat on the southern edge of the Pančeva oka complex and is surrounded by big colonies of Cormorant *Phalacrocorax carbo*, Pygmy Cormorant *P.pygmeus*, Little Egret *Egretta garzetta* and Squacco Heron *Ardeola ralloides*. The Pelican's colony is on the edge of bigger pool and not far from open water (Rubinič, Saveljić & Vizi, in prep. 2004).

Pelicans' nests were found in the second location, the Crni žar. The area covers few square kilometres and lies south to the Pančeva oka. This is a complex of mostly living floating vegetation, most of which is formed by *Nuphar luteum, Nymphea alba, Phragmites australis, Trappa natans*. Numerous small islands are formed by dead vegetation and peat. On the islands *S.alba* and *S.fragilis* are growing. Pelican's colony was situated on a raft of dead vegetation, surrounded with the colony of Common *Sterna hirundo* and Whiskered Terns *Chlidonias hybrida* and few other non-colony nesting species of waterbirds (Rubinič, Saveljić & Vizi, in prep. 2004).

Third locality where pelicans were found nesting during 1991 and 1992 is Grmožur island. The rocky island is found close to NW coast of the lake, between Virpazar and Seoca settlements. The island is not more than few hectares big, mostly bare. Vegetation, present mostly on highest points of the island, consists of few *Ficus carica, Punica granatum* and *Vitex agnus-castis*. Pelicans' nests were situated close to the water, only few meters from the coast (Rubinič, Saveljić & Vizi, in prep. 2004).

3.2. Wintering and passage

The main winter quarters of the Dalmatian Pelican are located in coastal areas of the Mediterranean and Caspian Seas as well as the Persian Gulf (Crivelli 1994). In Montenegro the most important wintering and passage sites are Ulcinj salt-pans, Skadar lake and Šasko lake (Saveljić & Rubinič, in prep. 2004).

The number of wintering individuals in Ulcinj salt-pans is between 5 and 20 individuals with the maximum of 56 individuals, registered on November the 14th 2003 (Saveljić & Rubinič, in prep. 2004)

3.3. Feeding

The adult Dalmatian Pelican eats only fish and feeds alone or in groups (Crivelli *et al*. 1991). The composition of its diet has been studied in detail at the colony of Skadar lake (Vizi 1981). Rudds (*Scardinius erythrophtalamus*) and Rovellas (*Rutilus rubilio*) were their main prey. Other species including Eel (*Anguilla anguilla*) and Gibel (*Carassius auratus gibellio*) were also consumed.

The chicks' diet is a bit different from the adults. At least during first days of their life, chicks are fed with shrimps (Bino *pers. obs.*). The diet changes with the age of the chick. Small size eels and mullet become predominant after 1-2 weeks from hatching. After that period the diet becomes similar with that of the adults.

3.4. Habitat requirements

The Dalmatian Pelican needs safe breeding and roosting sites. Those sites are surrounded with water and thus totally isolated from the mainland in order to avoid predators (Fox, Pine Marten, Jackal, Ferral Dogs and Ferral Cats) as well as human intruders (Crivelli 1994). The absence of adequate roosting sites and heavy disturbance prevent pelicans using an area at any time of the year.

The hydrological regime and natural changes of the wetlands are further key factors in successful feeding and breeding. Flood effects on Skadar lake ripped off the pelican's nests several times and completely reduced the breeding success (Rubinič, Saveljić & Vizi, in prep. 2004).

4. Threats and limiting factors

4.1. Disturbance, nest destruction and shooting

The disturbance of pelicans during the nesting season at Skadar lake is intense. The nesting season of pelicans at Skadar lake coincides with the fishing season, so the disturbance is permanent: during day there are the fisherman with nets, while during the night, the disturbance is caused by illegal fishing using electric devices and lamps. Fortunately, the pelican nests are unreachable, hidden in the marsh, only found by ornithologists, therefore the nests are quite safe. The greatest disturbance of pelicans is in their feeding areas.

During winter time, the Dalmatian Pelicans mostly can be found in the Ulcinj salt pans areas, where they often rest. The number of withering individuals in Ulcinj salt pans is between 5 and 20 individuals, with maximum of 56 individuals, registered on November 14th, 2003 (Saveljic and Rubinic, in prep. 2004). There is occurrences of illegal hunting at Ulcinj salt pans, fortunately not on pelicans. However, the presence of hunters is the limiting factor for the longer rest at this location.

Nest destruction: There is a great impact on nest destruction on Skadar lake due to the frequent changes of water level in the Panceva oka location, which represents a danger for eggs to be submersed in water. Earlier nesting areas of pelicans on Skadar lake were on the frequent waterpaths of the tourist boats, and due to the disturbance of many tourists who were taking pictures of the birds, the pelicans would destroyed their eggs by their weight and disturbance.

5. Conservation status and recent conservation measures

The Dalmatian Pelican Pelecanus crispus is classified by IUCN as Globally Threatened in the Category Lower Risk/ conservation dependent.

The Dalmatian Pelican is protected as threatened specie by the Decree on Protection of Rare, Scarce, Endemic and Endangered Plant and Animal Species (Official Gazette of Montenegro

36/82). According to this decree it is forbidden to disturb, hunt and kill, the rare, scarce, endemic and Endangered plant and animal species and their juvenile forms. The decree further does not allow to remove, damage and destroy any nest of rare, scarce, endemic and threatened species.

Justification

Republic of Montenegro / State Union Serbia and Montenegro is a contracting party for International Conventions that are defining the Conservation status of Dalmatian Pelican as a Globally Threatened Species. Montenegro has just started process of the preparation of its own Biodiversity Strategy and Action Plan that should include certain measures devoted to conservation of endangered / threatened species such as Dalmatian Pelican. On the other hand, Dalmatian Pelican is well known symbol of conservation efforts in Montenegro, which was applied on of the National Park "Skadar Lake" logo. Consequently, this Action Plan, as a national priority, will improve the conservation status of the species at Skadar Lake and neighbouring sites as well.

Targets

This Action Plan has three goals of different time-scale: short, medium and long-term. For each goal management objectives are foreseen, whose fulfilment is through a set of described actions.

The Action Plan aims

1. In the short term, to prevent further decline of the species below the level of 2003 in the population size of the Dalmatian Pelican
2. In the short term, to maintain the present breeding and wintering distribution range of the species.
3. In the medium to long term, to increase the population size of the Dalmatian Pelican to a level at which it no longer qualifies as Endangered species in Montenegro

The aim and general objectives are grouped under four headings:

- Improve the policy and legislation
- Ensure the species and habitat protection
- Undertake monitoring and research
- Raise public awareness

Each objective has been derived into a series of actions followed by a brief description. Each action is given a priority rating and time-scale during which the action should be carried out. Four categories of priorities are used:

- essential : an action that is needed to prevent a large decline in the population which would lead to the species extinction;
- high : an action that is needed to prevent a decline of more than 20% of the population in 20 years or less;
- medium : an action that is needed to prevent a decline of les than 20% of the population in 20 years or less;
- low : an action that is needed to prevent local population declines or which is likely to have only a small impact on the population across the range

Time-scale is classified in five categories:

- Immediate : completed within the next year
- Short : completed within the next 1-3 years
- Medium : completed within the next 1-5 years
- Long : completed within the next 1-10 years
- Ongoing : an action that is currently being implemented and should continue

1. Policy and legislation

1.1. *Improve and Implement Legislation*
Activities:

- Ensure strict control regime over the ornithological reserve "Panceva oka" (Skadar lake) which is breeding place for Dalmatian Pelican. Access to the site shouldn't be allowed for fishermen.
- Promote the protection of Dalmatian Pelican into designated areas of Ulcinj salt-pans and Šasko Lake.
- Promote a ban on burning reedbeds on key sites

Priority: essential
Responsibility : Public Enterprise National Parks of Montenegro (PENP) - National Park Skadar Lake, Institute for the Protection of Nature (INP), Ministry of Environment (MOE)
Stake-holders : PENP, INP, MOE, local communities, municipalities Podgorica and Ulcinj, local NGOs, scientific institutions, etc.
Time-scale: immediate

1.2. *Promote sustainable development in wetlands*
An integrated approach to the conservation of wetlands should be promoted which will also benefit the conservation of other species. Such an approach will need to address the protection of sites from development, pollution, changes in the hydrological regime, tourism and fishing policy etc. The welfare of local people should be taken in account. The involvement of local communities in conservation and management is of critical importance.
Activities:

- Promote the zonation of "Panceva oka" ornithological reserve (Skadar lake) to be used as the successful conservation model for further replication of the protection of Dalmatian Pelican on its breeding places in Montenegro
- Promote "Panceva oka" sustainable tourism development model (outside of the core area) on other key sites for the Dalmatian Pelican (Šasko lake, Ulcinj salt-pans) as ecotourism and naturalistic tourism

Priority : essential
Responsibility : PENP, MOE, INP
Stake-holders: PENP, MOE, INP, Touristic organization of Montenegro (TOM), local communities and local NGOs
Time-scale: short/ongoing

1.3. *Strengthen the International cooperation*
Activities:

- Establish and enhance co-operation with biodiversity conservation authorities in neighbouring Albania. Cooperation among scientific institutions of both countries should be enlarged on the protection of biodiversity in key wetlands, especially in trans-border sites. Promote joint / team work and information exchange. Improve co-operation between NGOs from both countries.

Priority: medium
Responsibility: MOE, PENP, INP, Local NGOs
Stake-holders: MOE, PENP, INP, REA office in Shkoder, municipalities of Podgorica, Ulcinj and Shkoder, local NGOs, etc.
Time-scale: short/ongoing

1.4. *Elaboration, coordination and implementation of National Action Plan for Dalmatian Pelican in Montenegro*.
Activities:

- Prepare, coordinate work of institutions and ensure implementation of the National Action Plan for Dalmatian Pelican

Priority: essential
Responsibility : INP, MoE
Stake-holders : MoE, INP, local municipalities, local NGOs, hunter associations, scientific institutions, etc.
Time-scale : short

2. Ensure the species and habitat protection

2.1. *Ensure the protection of sites relevant for Dalmatian Pelican in Montenegro*
2.1.1. *Designation of protected areas*

- Designation of protected areas important for breeding / feeding/ nesting places and wintering areas over the territory of Montenegro

Activities:

- Ensure the protection of key breeding sites at Skadar see as special ornithological reserves with the limited access
- Ensure the designation of Ulcinj salt-pans and Šasko Lake as Protected Areas.

Priority: essential
Responsibility: MOE, INP, municipality Ulcinj, local NGOs hunters associations.
Stake-holders: MOE, INP, Fishery Department (MAF), local fishing enterprises, local municipality, local NGOs, hunters associations, scientific institutions, etc.
Time-scale: immediate/ongoing

2.1.3. *Ensure safeguarding of the Dalmatian Pelican colony*
Activities:

- Encourage the establishment of statutory (temporarily or permanently) core zones prohibited for disturbances around the colonies. Human intrusion should be forbidden, including fishermen, birdwatchers, photographers, tourists or even unauthorized researchers.
- Hire two wardens from January-July to safeguard the existing colony in "Panceva oka" and potential sites of new colonies from intruders
- Establish a non-intrusion zone 200 m around the existing colony and potential new colonies at Skadar lake

Priority : essential
Responsibility : PENP, MOE, Ministry of Interior (MoI), INP, local fishermans
Stake-holders : PENP, MoE, MoI, INP, local fishermans, local municipalities Podgorica and Ulcinj, local NGOs, hunters associations, scientific institutions, etc.
Time-scale : immediate/ongoing

2.2. *Placing the Information Boards and Warning signs*
Activities:

- Warning signs should be placed at 200 meters on each access to the protected areas relevant for Dalmatian Pelican.
- Key instructions how to behave in surroundings of protected areas as well as information about the sites should be presented on Information Boards accompanied to Warning Signs.

Priority : high
Responsibility : PENP
Stake-holders : PENP, MoE, MoI, INP, local fishermans, local municipalities Podgorica and Ulcinj, local NGOs, hunters associations
Time-scale : immediate

2.3. *Stimulate nesting through the use of artificial structures*
Activities :

- Technical design and construction of the artificial structures appropriate for the nesting of Dalmatian Pelican
- At the specific locations on Skadar Lake and Šasko Lake that are relevant as shelters for the Pelicans, adequate artificial structures - floating rafts should be placed

- Advertise in media locations of Information Boards and Warning signs

Priority : essential
Responsibility : Centre for the Research and Protection of Birds (CRPB), PENP, INP
Stake-holders : CRPB, PENP, INP local municipalities, local NGOs, hunters associations, scientific institutions, etc.
Time-scale : Short/ongoing

2.4. *Improve the hydrological management*
Carry out proper water management of the Ulcinj salt-pans.
Activities :

- Harmonization of inflow and outflow water regime should be done at Ulcinj salt-pans

Priority : medium
Responsibility : Ulcinj salt-pans authorities
Stake-holders : Ulcinj salt-pans authorities, INP, municipality Ulcinj, local NGOs
Time-scale : short/ongoing

2.5. *Control over the pollution*
Activities :

- Prevent wastewater discharges and dumping of waste from the catchment areas of Dalmatian Pelican Protected sites
- Provide regular monitoring of the Euthrophication on Pelican sites and their vicinity

Priority : medium
Responsibility : MoE, Public Utilities in Podgorica and Ulcinj, local municipalities and Centre for Ecotoxicological Research (CER)
Stake-holders : MoE, CER, Public Utilities in Podgorica and Ulcinj, local municipalities, INP, local NGOs
Time-scale : short

3. Carry out monitoring and research

3.1. *Monitor breeding birds*
Activities :

- Annually monitor the number of breeding pairs and their reproductive success using trained staff only

Priority : essential
Responsibility : Centre for the Protection of Birds, Institute Ornis balcanica, INP
Stake-holders : MOE, INP, local municipalities, local NGOs, hunters associations, scientific institutions, etc.
Time-scale : ongoing

3.2. *Monitor wintering birds*
Activities :

- Monitor the number of wintering birds every mid-January on all registered and potential wintering sites

Priority : essential
Responsibility : Centre for the Protection of Birds, Institute Ornis balcanica, INP
Stake-holders : MOE, INP, local municipalities, local NGOs, hunters associations, scientific institutions, etc.
Time-scale : short/ ongoing

3.3. *Monitor ecological change*
Activities :

- Monitor water level, water quality and ecological change at key wetland sites

Priority : essential
Responsibility: CER, Republican Hydrometeorological Institute (RHI), INP

Stake-holders : CER; RHI; INP; MOE, local municipalities, local NGOs, scientific institutions.
Time-scale : short

3.4. *Monitor prey populations*
Activities :

- Monitor fishery catches at the key Dalmatian Pelican sites in mutual cooperation of responsible institutions.

Priority : high
Responsibility : PENP, INP, local fishermans (individuals), Faculty of Biology
Stake-holders : MOE, INP, Fishery Department (MAF), local fishermans, Ministry of Agriculture, Forestry and Water management (MAFWM), local municipalities, local NGOs, scientific community.
Time-scale : medium

3.5. *Identify mortality causes*
Activities :

- Monitor dead Pelicans and identify the causes of death.

Priority : low
Responsibility : Nature History Museum (NHM) , Hunter organizations (HO),
Stake-holders : MOE, INP, NHM, HO, MAFWM), local municipalities, local NGO, scientific institutions, etc.
Time-scale : medium

3.6. *Survey the socio-economical aspects*
Activities :

- Procurement the socio-economical study on conflicts between the interest of people to exploit resources (peat) in areas important for Pelicans and need for the conservation of these sites.

Priority : medium
Responsibility : Team of Independent consultants
Stake-holders : MOE, INP, PENP, Ministry of Economy, local municipality, NGOs, scientific community
Time-scale : medium

3.7. *Introduce the Cost-benefit analysis in the considerations*
Activities :

- Procurement of the Cost-benefit analysis in order to identify and promote the economical benefits of the conservation of the Dalmatian Pelican and its protected areas.

Priority : Low
Responsibility : Team of Independent consultants
Stake-holders: MOE, INP, PENP, Ministry of Economy, local municipality, NGOs, scientific community
Time-scale : Low

3.8. *Monitoring of the Dalmatian Pelican dispersal*
Activities :

- Colour Ringing of the young Dalmatian Pelicans living on Skadar lake
- Establish appropriate data base
- Regular data retrieval and maintain of the data base

Priority : medium
Responsibility : INP
Stake-holders : MOE, INP, PENP, Scientific Institutions, etc.
Time-scale : medium

4. Raise public awareness and undertake training

4.1. *Raise public awareness*
Activities :

- Inform wetland resources users, variety of decision-makers at local and national level about the importance of the preservation of the Dalmatian Pelican.
- Undertake public awareness campaigns with hunters, fishermen, local communities, tourist agencies and officials involved in the Dalmatian Pelican conservation.
- Organize talks in primary and secondary schools in the area of Skadar lake
- Organize excursions for primary and secondary school
- Produce publications (leaflets, booklets, posters, etc.) about the national and international importance of the key sites.

Priority : high
Responsibility : CRPB
Stake-holders : MOE, INP, CRPB, local fishermans and hunters, Ministry of Education, local municipalities, local NGOs.
Time-scale : short/ongoing

4.2. *Undertake Training*
Activities :

- Provide training for members of biodiversity conservation orientated NGOs on environmental education, conservation and management of birds, wildlife in general and wetlands
- Provide training for wardens in PENP and HO on the key biodiversity conservation issues, protection of birds as well as conservation of the Pelicans

Priority : medium
Responsibility : INP
Stake-holders : INP, PENP, HO, MoE, MAFWM, local municipalities, local NGOs,
Time-scale : short

4.3. *Promote sustainable types of tourism*
Activities :

- Organize bird watching tours in key sites and promote sustainable types of tourism. Core of Protected areas for Dalmatian Pelicans and their buffer zone (200m) should be excluded from the tours

Priority : medium
Responsibility : PENP
Stake-holders : MoE, INP, PENP, Ministry of Tourism, TOM, local municipalities, local NGOs
Time-scale : short

Prerequisites for implementation

The survival of the Pelicans colony at Skadar lake is the main prerequisite for the implementation of the Action Plan. Usually the preparation and the implementation of the Action Plan needs a lot of time. Time is spent not only in the preparatory phase but also in seeking funds, in organizing the work, in preparing institutional agreements etc. Meanwhile the colony itself is under high risk from the above-mentioned threats. If it disappears then it will be no need for an Action Plan. That means that the Montenegrin authorities should support any preliminary conservation action that would ensure the survival of the colony.

The active participation of all the stakeholders is another basic condition in the implementation of the Action Plan. Stake holders include the administration (Ministry of Environment, Institute for the Protection of Nature, Fishery Department –MAF), local municipalities, local NGOs, scientific institutions, local fishing enterprises and others. All the stakeholders should be highly involved in the process in order to implement successfully the foreseen activities of the Action Plan.

Expected problems for implementation

Apart from the financial problems and the further decrease of the number of breeding pairs there are no other particular problems for the implementation of the Action Plan.

Financial problems could be resolved through active fund-raising activities with local and international donors.

Short-term conservation activities have to be undertaken in order to ensure at least the stability of the breeding population. As any other study of applied ecology, our project has some implementation risks that are related with the uncontrolled natural and human factors. Among natural factors that could risk the implementation of the project are:

1. Natural ecological catastrophes

- Harsh weather conditions (stormy weather, hard rain, strong wind, extremely low or high temperatures, floods of nesting sites, etc.)
- Starvation due to very low food resources
- Epidermis or illness among birds

2. Human impact

It is already known that the human factor expressed as human disturbance is the main factor influencing the breeding community of birds in Montenegro. If colonies are visited or mistreated by humans then the number of breeding birds will fall, their reproductive success will be very low or null, and the long-term result will be a further reduction of the number of Dalmatian Pelicans.

The influence of human factor is one of the most difficult to be measured. The only short-term way to prevent its bad impact is the protection of breeding sites (wardens). The long-term method is the raise of public awareness in order to convince the locals that birds such as the Dalmatian Pelican, represent an enormous economical interest for the development of ecotourism. But the second method is hard and very time consuming. The project would try to control as much as possible the negative human impact but we need first to stress that there are always possibilities that human factor could be harmful for birds and the project.

Implementation Calendar

Activities	Timing
1.1 Improve and Implement Legislation	
Ensure strict control regime over the ornithological reserve "Panceva oka" (Skadar lake) which is breeding place for Dalmatian Pelican. Access to the site shouldn't be allowed for fisherman.	Permanent, after establish the strict control regime in 1st year.
Promote the protection of Dalmatian Pelican into designated areas of Ulcinj salt-pans and Šasko Lake.	3rd year
Promote a ban on burning reedbeds on key sites	4th and 5th year
1.2. Promote sustainable development in wetlands	
Promote the zonation of "Panceva oka" ornithological reserve (Skadar lake) to be used as the successful conservation model for further replication of the protection of Dalmatian Pelican on its breeding places in Montenegro	1st year
Promote "Panceva oka" sustainable tourism development model (outside of the core area) on other key sites of Dalmatian Pelican (Šasko lake, Ulcinj salt-pans) relevant for ecotourism and naturalistic tourism	1st-5th year
1.3. Strengthen the International cooperation	
Establish and enhance co-operation with biodiversity conservation authorities in neighbouring Albania. Cooperation among scientific institutions of both countries should be enlarged on the protection of biodiversity in key wetlands, especially in trans-border sites. Promote joint / team work and information exchange. Improve co-operation between NGOs from both countries.	Permanent, after establish the Joint Body (MN-AL) in 1st year.
1.4. Elaboration, coordination and implementation of National Action Plan for Dalmatian Pelican in Montenegro.	
Prepare, coordinate work of institutions and ensure implementation of the National Action Plan for Dalmatian Pelican	1st-5th year
2.1.1. Designation of protected areas	
Designation of protected areas important for breeding / feeding/ nesting places and wintering areas over the territory of Montenegro	2nd-3rd year
Ensure the protection of key breeding sites at Skadar see as special ornithological reserves with the limited access	1st year
Ensure the designation of Ulcinj salt-pans and Šasko Lake as Protected Areas.	2nd year
2.1.3. Ensure safeguarding of the Dalmatian Pelican colony	
Encourage the establishment of statutory (temporarily or permanently) core zones prohibited for disturbances around the colonies. Human intrusion should be forbidden, including fishermen, birdwatchers, photographers, tourists or even unauthorized researchers.	Permanent, after establish the core zones in 1st year.
Hire two wardens from January-July to safeguard the existing colony in "Panceva oka" and potential sites of new colonies from intruders	1st-5th year
Establish a non-intrusion zone 200 m around the existing colony and potential new colonies at Skadar lake	1st year
2.2. Placing the Information Boards and Warning signs	

Warning signs should be placed at 200 meters on each access to the protected areas relevant for Dalmatian Pelican	1st year
Key instructions how to behave in surroundings of protected areas as well as information about the sites should be presented on Information Boards accompanied to Warning Signs	1st year
2.3. Stimulate nesting through the use of artificial structures	
Technical design and construction of the artificial structures appropriate for the nesting of Dalmatian Pelican	1st year
At the specific locations on Skadar Lake and Šasko Lake that are relevant as shelters for the Pelicans, adequate artificial structures - floating rafts should be placed	1st year
Advertise in media locations of Information Boards and Warning signs	1st year
2.4. Improve the hydrological management	
Plan for the harmonization of inflow and outflow water regime should be implemented at Ulcinj salt-pans	1st-3rd year
2.5. Control over the pollution	
Prevent wastewater discharges and dumping of waste from the catchment areas to the Dalmatian Pelican Protected sites	2nd year
Provide regular monitoring of the Euthrophication on Dalmatian Pelican Protected sites and their vicinity	1st-5th year
3.1. Monitor breeding birds	
Annually monitor the number of breeding pairs and their reproductivity using trained staff only	1st-5th year
3*.2. Monitor wintering birds*	
Monitor the number of wintering birds every mid-January on all registered and potential wintering sites	1st-5th year
3.3. Monitor of the ecological changes	
Monitor water level, water quality and ecological change at key wetland sites	1st-5th year
3.4. Monitor prey populations	
Monitor fishery catches at the key Dalmatian Pelican sites in mutual cooperation of responsible institutions.	1st-5th year
3.5. Identify mortality cause	
Monitor dead Pelicans and identify the causes of death.	1st-5th year
3.6. Survey the socio-economical aspects	

Procurement the socio-economical study on conflicts between the interest of people for the exploitation of resources (peat) in areas important for Pelicans and need for the conservation of these sites.	3rd year
3.7.Introduce the Cost-benefit analysis in the considerations	
Procurement of the Cost-benefit analysis in order to identify and promote the economical benefits of the conservation of the Dalmatian Pelican and its protected areas.	3rd year
3.8. Monitoring of the Dalmatian Pelican dispersal	
Colour Ringing of the young Dalmatian Pelicans living on Skadar lake	1st-5th year
Establish appropriate data base	1st year
Regular data retrieval and maintains of the data base	1st-5th year
4.1. Raise public awareness	
Deliver the information (Leaflet. poster) about the importance of Dalmatian Pelican conservation to the wetland resources users and variety of decision-makers at local and national level.	2nd year
Undertake public awareness campaigns with hunters, fishermen, local communities, tourist agencies and officials involved in the Dalmatian Pelican conservation.	2nd year
Organize talks in primary and secondary schools in the area of Skadar lake	3rd and 4th year
Organize excursions for primary and secondary school	4th and 5th year
Produce publications (leaflets, booklets, posters, etc.) about the national and international importance of the key sites.	5th year
4.2. Undertake Training	
Provide training for members of biodiversity conservation orientated NGOs on environmental education, conservation and management of birds, wildlife in general and wetlands	4th year
Provide training for wardens in PENP and HO on the key biodiversity conservation issues, protection of birds as well as conservation of the Pelicans	3rd year
4.3. Promote sustainable types of tourism	
Organize bird watching tours in key sites and promote sustainable types of tourism. Core of Protected areas for Dalmatian Pelicans and their buffer zone (200m) should be excluded from the tours	3rd - 5th year

Budget

Activities	Explanation	Budget
1.1 Improve and Implement Legislation	Project office space should be established in the INP. Project office supplies need to be provided.	15.000 $
1.2. Promote sustainable development in wetlands	Procurement of the Study. Following equipment should be provided: GPS device, one PC, licensed software (Arc Info), satellite images, topographic maps and aerial photos	22.500$
1.3. Strengthen the International cooperation	Travel costs and accommodation should be provided	5.000 $
1.4. Elaboration, coordination and implementation of National Action Plan for Dalmatian Pelican in Montenegro.	Procurement of the Plan. Costs for the meetings.	40.000$
2.1.1. Designation of protected areas	Inventories for Protected Areas should be completed (INP). Costs for the fieldwork of INP associates should be covered.	5.000$
2.1.3. Ensure safeguarding of the Dalmatian Pelican colony	Salaries for 2 wardens (5 years), equipment, including observing towers and one boat with costs for fuel	32.000$
2.2. Placing the Information Boards and Warning signs	Fixed and floating Information Boards and Warning signs should be constructed and placed at 9 locations	3.000$
2.3. Stimulate nesting through the use of artificial structures	Technical design, construction and placing of the artificial structures – floating rafts on Sasko lake (2) and Skadar Lake (2)	4.000$
2.4. Improve the hydrological management	Procurement of the Plan	500$
2.5. Control over the pollution	Monitoring of the Euthrophication should be one part of the overall Monitoring programme which will be estimated under 3.3.	
3.1. Monitor breeding birds	Monitoring of the Breeding birds should be one part of the Monitoring programme for Birds which will be estimated under 3.2.	
3.2. Monitor wintering birds	Monitoring programme for Birds (for 3.1. and 3.2.) will be Conducted for the period of 5 years	14.000$
3.3. Monitor of the ecological changes	Monitoring of the Euthrophication (2.5.) as well as water level, water quality and ecological change at key wetland sites (3.3.) will be conducted	15.000$
3.4. Monitor prey populations	Expertise of the content of disgorges. Reports on the content of disgorges should be done.	1000$
3.5. Identify mortality cause	Expertise (X-ray or dissection of deaths), Reports should be done	1.000$
3.6. Survey the socio-economical aspects	Procurement of the Study	2.500$
3.7.Introduce the Cost-benefit analysis in the considerations	Procurement of the Cost-benefit analysis	2.500$
3.8. Monitoring of the Dalmatian Pelican dispersal	Colour Ringing of young. Create and retrieval of the Data Base.	2.000$
4.1. Raise public awareness	Organize the round tables, workshops and public stands. Prepare and deliver leaflet, posters. Organize the excursions.	5.000$
4.2. Undertake Training	Organize training workshops (2x)	2.000$
4.3. Promote sustainable types of tourism	Organize bird watching tours. Two boats should be rented as well as 2 mini buses.	10.000$
Total		**182.000$**

Monitoring

Activities planned by the Action Plan should be monitored in order to provide fulfilment of its the goals. Following aspects should be applied:

- Size and number of the protected areas relevant for Dalmatian Pelican
- Size of the population of Dalmatian Pelican
- Level of public awareness

These aspects are of direct importance for success of the project.

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Country: Montenegro

National action plan 3
ASSESSMENT – REVISION OF THE STATUS, REGIME AND MANAGEMENT PRACTICE OF PROTECTED AREAS

Key words: Protected Areas, evaluation, inventories, management options, management model

Rationale:
More than thirty years experience shown management practice applied has not been satisfactory to the status and regime of existing Protected Areas (PA) on Coastal Zone.

Budget:
Duration: 2 years
Geographic scope:
Local **X**
National **X**
International
Type of project:
Data collection **X**
Protection **X**
Interaction with fisheries
Capacity building **X**
Others **X**
Relevance to international treaties:
CBD **X**
ACCOBAMS
Bern Convention
CMS
RAMSAR
CITES
GFCM
Other:

Objectives: Define appropriate management option for PA in the Coastal zone. Revise status and regime of existing PA protection.

Specific objectives: Evaluate existing Protected areas; launch appropriate management options. Renovate inventories of Protected areas. Once completed analyses of management options, proposal for the pilot – successful Protected Area management model in two variants should be done. Replication of the model on other protected areas/sites should come consequently.

Priorities:
In-dept evaluation of existing Protected areas.
Analyses of management options adequate for exiting PA on Coastal zone
Launch successful management model for existing and new PA

Assumptions: Relevant stakeholders involved. Protected Areas evaluated, appropriate management option developed and applied on the pilot site.

Expected results / outputs:
Renovated inventories for PA; New Management plans

Indicators of achievement of objectives: Inventories of PA, Management plans

Actors: Institute for the Protection of Nature, PE Coastal Zone Management Agency

Total cost estimated 71.000$

Country: Montenegro

National action plan 4
IDENTIFICATION OF THE NEW PROTECTED AREAS NEEDING APPROPRIATE STATUS OF PROTECTION ON THE COASTAL ZONE

Key words: New Protected Areas, status of protection, evaluation,

Rationale: Many of valuable natural habitats on the Coastal zone are not ecologically evaluated to be designated as Coastal or Marine Protected Areas. Enlargement percentage /size of Protected areas (PA) is required in numerous documents adopted at national and international scale.

Budget:
Duration: 2 years
Geographic scope:
Local **X**
National **X**
International
Type of project:
Data collection **X**
Protection **X**
Interaction with fisheries
Capacity building
Others
Relevance to international treaties:
CBD **X**
ACCOBAMS
Bern Convention
CMS
RAMSAR
CITES
GFCM
Other:

Objectives: Evaluate natural habitats desire adequate protection as Protected areas. Enlarge percentage / size of PA in Coastal zone and Montenegro

Specific objectives: Prepare evaluation studies for future / new Protected Areas. Define their status, regime of protection and Management accordingly Natural habitats should be evaluated in following areas: Ulcinj, Bar, Buljarica, Jaz, Tivat, Lustica and Kotor

Priorities:
Ecological evaluation of new PA
Protection of the unknown biodiversity in new PA and prevent its possible loss

Assumptions: Active participation of key stakeholders in designation of new PA and defining of their future management

Expected results / outputs: New Protected areas designated and established

Indicators of achievement of objectives: Ppercentage / size of PA in Coastal zone and Montenegro

Actors: Institute for the Protection of Nature, PE Coastal Zone Management Agency, Ministry of Environmental Protection and Physical planning

Total cost estimated 45.000$

Country: Montenegro

National action plan 5
ANALISES OF OPPROTUNITIES FOR AND FORMULATION
OF AN APPROPRIATE FUNDING STRATEGY FOR BIODIVERSITY CONSERVATION

Key words: P,

Rationale: Existing funding sources for biodiversity conservation activities are poor and very limited.

Budget:
Duration: 2 years
Geographic scope:
Local **X**
National **X**
International
Type of project:
Data collection
Protection
Interaction with fisheries
Capacity building
Others **X**
Relevance to international treaties:
CBD
ACCOBAMS
Bern Convention
CMS
RAMSAR
CITES
GFCM
Other: **X**

Objectives: Prepare a list of potential national / local funding sources for biodiversity conservation, both, private and state owned. Create questionnaire and conduct interviews with responsible persons in potential funding sources. Present Report on results from interviews. Prepare and present draft Strategy. Final text of the Strategy adopted by the Government.

Specific objectives:

Priorities:
Develop national Strategy for funding system of biodiversity conservation.
Provide commitment of key founding sources, both state and private ones
Attract private funding sources for investing in the conservation of biodiversity in Coastal Area

Assumptions: A

Expected results / outputs:
Establish a Joint Working Team, Prepare questionnaire, interviews conducted and presented in the report, Prepare and adopt Funding strategy for biodiversity conservation

Indicators of achievement of objectives: Funding strategy adopted and widely published

Actors: NGO Eco Team, Ministry of Environmental Protection and Physical planning, PE National Parks of Montenegro

Total cost estimated 52.000$