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PROPOSAL FOR INCLUSION OF SKADAR LAKE IN THE LIST OF WETLANDS OF INTERNATIONAL IMPORTANCE

I General data:

1. Country: Republic of Montenegro, Federal Republic Yugoslavia

2. Name of the site: SKADAR LAKE

3. Key for types of wetland sites: 18 (11)

4. Geographic coordinates

19 degrees 03 minutes - 19 degrees 30 minutes **East**
42 degrees 03 minutes - 42 degrees 21 minutes **North**

5. Area: The Lake size is variable depending on season from 370 - 540 km2. At medium water level the Lake covers 475 km2 .

6. Basic natural features: Natural freshwater lake, tectonic- karst origin. Relatively shallow maximum depth only 9m. Northern coast flat, gradually descends toward the Lake's bottom and covered with lush vegetation. Southern coast is steep and rugged. Climate is submediterranean with mild and rainy winters (the lowest average monthly temperature of water in January is 7,3°); summers are dry and hot with maximum air temperature over 40° C and temperature of water over 27° C. Water is of bicarbonate type and it originally fits into category of oligotrophic waters, while nowadays it tends to mezzotrophy specially in summer season and local level. Northern coast is covered with spacious (area of over 20.000 ha) wetland zone with lush reed vegetation. (*Phragmites communis*), spacious area covered with water lilies, *Nymphaea alba*, *Nuphar luteum*, and with heath peas (*Trapa sp.*) which are characteristic for the Lake. Parts of this wetland zone which are shallower and periodically flooded are overgrown with sedges (*Cerex elata*) and with characteristic type of willow (*Salix fragilis*). The driest parts of the wetland are overgrown with oak woods with *Quercus robur scutariensis* and *Fraxinus oxycarpa*. Southern coast and islets in the Lake are steep, rocky with sparse submediterranean shrubbery (*Carpinus orientals, Punica granatum, Paliurus spina-christi, Ficus carica, Phillyrea sp.*).

There are significant layers of peat in some parts of the Lake's bottom. It is overgrown with submersive plants (*Chara, Potamogeton, Valisneria, Myriophyllum, Ceratophyllum* etc.)
Fauna is rich and diverse. Fauna of invertebrates is characterized by the presence of endemic species of underground crabs (*Amphipoda*) and, what is important for ecosystem, there are numerous populations of decapode crabs (*Palaemonetes varians*), freshwater shells (*Anodonta, Dreissena*) and snails (*Viviparus, Planorbis*). There are numerous larvae types of insects (*Odonata, Orthoptera, Ephemeroptera*).
Fauna of fish is lush and it mainly consists of cyprinids. The most numerous are the following species: *Cyprinus carpio, Alburnus albidus arborella, Rutilus rubillio, Scardinius erythrophthalmus, Carassius auratus.* Salmonids are rare and they appear in some places (*Salmo dentex, S. marmoratus, S. trutta, S. gaidneri*). The lake is rich with eel (*Anguilla anguilla*) and close connection with the sea is proven by presence of following fish species: *Alosa fallax, Accipenser sturio, Citharus lingautula* etc. Fauna of mammals is represented by water vole (*Arvicola terrestris*) and otter (*Lutra lutra*).

7. Ownership, user, management: Public enterprise for National parks of Montenegro (Organizational unit : "National park Skadar") lake and partially private ownership.

8. Basic function and use of the area: Protection and exploitation of natural resources (birds, fish, peat) and tourism.

9. Status of a protected area

a) Category: National park

b) Authority to enforce announcement the Protection Act:
Assembly of the Republic of Montenegro

c) Year when the Protection Act was announced: 1983

d) Protection regulation: Some parts of this location are under strict protection (permanent ornithological reservates of scientific importance).

e) Basic function: Protected locations exclusively for scientific purposes. Other parts are used (hunting, fishing; peat, gravel and sand exploitation) up to the level which does not disturb balance of ecosystem.

f) Preservation degree: The whole site is preserved but only locally polluted, and due to inadequate degree of fishing the relation between

fish population has been disturbed and even excessive hunting of marsh birds has been registered. Certain effects of gradual eutrophization have been observed.

g) Arrangement programs: National park Skadar Lake made up the Program of protection, improvement and exploitation of natural resources from the National park Skadar Lake, which was adopted in 1988.

h) Managing body: Public enterprise - National parks of Montenegro within which National park Skadar Lake operates as an organizational unit. Managing bodies within this public institution are: the director, managing board and Scientific council.

i) Funds intended for protection and improvement of the site: Following funds have been spent for protection of the site:

1992	282000 dinars
1993	123544 dinars
1994	269750 dinars

II Specific data

1. NUMBER OF BIRDS

The following categories are given in 4 tables below:

a) nesting birds (in pairs)
b) number of winter visitant birds
c) number of birds migrating in spring
d) number of birds migrating in autumn

+ this species appear sporadically in minimal number
? data have not been gathered
( ) cited data could not be considered reliable

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Species of birds listed in the Red Book and candidates for the Red Book

Species	a	b	c	d
Phalacrocorax pygmaeus	2000	6000	6000	6000
Pelecanus crispus	18	-	50	50
Ciconia ciconia	-	-	5-6	?
Marmonetta angustrifostris	-	-	+	-
Oxyura leucocefala	-	+	-	-
Haliaetus albicilla	?	?	?	?
Falco peregrinus	-	+	+	?
Crex crex	(50)	?	200	200
Otis tarda	-	-	-	-
Numenias tennuirostris	-	-	-	-

Endangered birds species in Europe

Species	a	b	c	d
Gavis stellata	-	-	-	-
Gavis arctica	-	50	-	-
Podiceps auritus	-	+	-	-
Phalacrocorax carbo sinensis	(-)	150	200	300
Ph. aristotelis desmarestii	-	-	10	-
Botaurus stelaris	80	(50)	200	300
Ixobrychus minutus	500	-	2000	?
Nycticorax nicticorax	-	-	300	500
Aredola ralloides	500	-	2000	4000
Egretta garzetta	(300)	+	1500	2000
Egretta alba	-	300	-	-
Ardea purpurea	150	-	400	600
Ciconia nigra	-	-	-	+
Plegadis falcinellus	?	-	200	150
Platalea leucorodia	-	-	80	-
Cygnus cygnus	-	+	-	-
Anser euythropus	-	+	-	-
Aythya nyroca	150	500	500	500
Pernis apivorus	-	-	+	-
Neophoron percnopterus	-	-	+	+
Gyps fulvus	-	-	+	+

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Circaetus gallicus	-	-	+	+
Circus aeruginosus	8	30	30	30
Circus cyaneus	-	-	+	+
Circus macrourus	-	-	+	+
Circus pigargus	5	-	20	20
A. brevipes	-	-	-	+
Buteo rufinus	-	5	-	-
Aquila pomarina	-	+	-	-
Aquila clanga	-	-	-	-
Aquila heliaca	-	+	-	-
Aquila chrysaetos	-	+	+	+
Hieraaetus fasciatus	-	-	+	+
Pandion haliaetus	-	-	+	-
Falco naumanni	-	-	+	-
F. columbarius	-	-	+	-
F. eleonorae	(+)	-	-	-
F. biarmicus	(+)	-	+	+
F. cherrug	-	-	-	+
Alectoris graeca saxatilis	80	150	150	150
Porzana porzana	?	-	+	-
P. parva	-	-	+	-
P. pusilla	(+)	-	+	-
Grus grus	-	(+)	-	-
Himantopus himantopus	-	-	15	15
Recurvirostra avosetta	-	-	(+)	+
Burhinus oedicnemus	20	50	50	50
Glareola pratincola	-	-	30	200
C. morinellus	-	-	+	+
Pluvialis apricaria	-	-	+	-
Philomachus pugnax	-	-	2000	1000
Gallinago media	-	+	+	+
Limosa limosa	-	300	10000	5000
Tringa stagnatilis	-	-	50	-
T. glareola	-	-	1000	200
Gelochelidon nilotica	-	-	+	+
Sterna caspia	-	-	20	50
S. sandvicensis	-	+	+	
S. hirundo	150	-	500	300
S. albifrons	-	-	300	300
Chlidonias hybridus	80	+	300	200
C. niger	-	-	500	1000
C. leucopterus	-	-	300	500
Bubo bubo	+?	+?	+?	+?
Asio flammeus	-	-	+	+

Caprimulgus europaeus	-	-	?	300
Alcedo atthis	150	500	500	500
Coracias garrulus	-	-	100	?
Dryocopus martius	-	-	+	+
Dendrocopus syriacus	80	100	100	100
Melanocorypha calandra	300	-	1000	1000
Calandrella brachidactyla	500	-	100	1000
Lullula arborea	-	50	-	-
Ahthus campestris	+?	-	?	?
Acrocephalus melanopogon	-	-	?	?
Hippolais olivetorum	50	-	?	?
Ficedula parva	-	-	?	?
F. albicollis	-	-	500	?
Lanius collurio	300	-	1000	?
L. minor	50	-	?	?

Birds species with significant populations in Europe

Species	a	b	c	d
Turdus torquatus	-	+	-	-
S. cantilans	500	-	2000	2000
S. melanocephala	50	-	?	?
Regulus ignicapillus	-	100	?	?
Sitta neumayer	300	?	?	?
Serinus serinus	-	200	500	500
Emberiza cirlus	-	-	500	?

Additional endangered migratory species

Species	a	b	c	d
Riparia riparia	300	-	5-6000	?
Saxicola rubetra	?	-	500	?
Acrocephalus arundinaceus	1000	-	?	?
Lanius excubitor	-	+	-	-

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2. RARE SPECIES AND SPECIES REDUCED IN NUMBER

2.1 Animal species

Latin name	English name	Srbian name
Coluber qutrolineatus	banded colubrid	prugasti smuk
Coronella austriaca		smukulja
Elaphe longissima	colubrio	obicni smuk
Triturus cristatus	warty newt	veliki mrmoljak
Lacerta oxycephala	lizard	ostroglavi guster
Lacerta melisellensis	karst lizard	kraski guster
Algyroides nigropunctatus	littoral lizard	primorski guster
Lutra lutra	otter	vidra

2.2. Plant species

Latin name
Hemodactylus tuberosus (L.) Miller
Quercus robur ssp. scutariensis Cernj.
Petteria rementacea (Sieber) Presl.
Genista sericea Wulf. in Jacq.
Rhamnus orbiculatus Bornm.
Minuartia velenovskiy (Hohl.) Hay.
Lineria microcalyx Boiss ssp. ebelii Cufod.
Micromeria juliana (L.) Benth.
Scabiosa crenata Cyr.
Utricularia vulgaris L.

3. OTHER VALUABLE FEATURES

3.1. Ecological values

3.1.1. Rarity: Skadar lake is practically the only wetland site in this part of the Adriatic coast (Note: Significant data have not been received from Albania). Its uniqueness lies in the connection that this lake makes between flora and fauna of coastal zone on one side and inland zone on the other.

3.1.2. Diversity: Complexity of ecological conditions of lake and its surroundings is outstanding. Apart from the open lake water, we could

find spacious area covered with reed, "fields" of water lillies, water pea and other marsh plants. In shallower and dry parts there are flooded fields, willow groves and remnants of floodable oak woods. The whole system is connected with dry meadows, pastures, cultivable zones of the Zeta plain and half-desertificated terrains of Cemovsko field. On the other side, opposite coast makes unique submediterranean ecosystem with sparse soil cover, sparse vegetation and other communities which have many mediterranean elements. The whole system is exceptionally dynamic due to sudden and frequent changes of water level and to general, favourable climatic conditions.

3.1.3. Authenticity: Nature is in initial degree of pollution which could be brought to authentic state by reduction of pollution measures and by better regulated exploitation.

3.2. Scientific values

With its complex and extremely dynamic living communities, the Lake represents a real natural laboratory. Oportunities for research are specially favourable in field of limnology, ichthyology and ornithology. It is valuable for research of ecological relations between particular species, populations, groups, dynamics in living communities, connections with the Mediterranean and other parts of Europe (migratory birds) etc.

3.3. Economic importance: It is of vital importance. About 1.000 tons of fish of good quality is annually caught in the Lake (in the Yugoslav part of the Lake), considerable funds come from the hunting. There are possibilities for exploitation of peat, gravel and sand, but this would disturb existing natural resources. Works on construction of water supply system from the Lake to Coastal region are under way. In the northern coastal zone there is an agricultural belt the capacity of which is increasing by lowering of the lake's water level, which further causes damage to present natural values of the site.

3.4 Recreational values: Those are exceptional but not sufficiently used. Only sports hunting and fishing have been developed so far (without sufficient control). Possibilities for developing other recreational disciplines like: swimming, water-skiing, sailing, camping, making excursions and the like, are good but, unfortunately, due to the fact that there are no follow-up facilities, those possibilities have not been used up to their capacity. Also, possibilities for developing scientific tourism, photo-safari etc. are very favourable but not sufficiently used.

III Protection and Improvement Issues

Fundamental problems of protection of Skadar lake could be classified into two basic groups:

First group of problems are related to pollution effects on environment. Basic polluters are Montenegrin urban centers, specially Podgorica (communal waste are only partly treated), Niksic (communal and industrial waste-waters are only partly treated) and Cetinje (waste-waters are not treated), Aluminum factory in Podgorica as a separate unit, as well as agricultural "waste" waters which go to the Lake bringing axcess mineral fertilizers and pesticides remnants.

Second group of problems involves the problems concerning the Lake itself and uneconomical exploitation of its natural resources, first of all the fish (commercial fishing with high degree of poaching), the game (mostly marsh birds). Hunting and fishing in this wetland zone is the same as in many other hunting and fishing grounds, and control is insufficient while the pouching increased. Particular problem is related to re-introduction of international hunting tourism (which has not been given the proper control).

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