

Hellenic Republic
Ministry of Foreign Affairs
Hellenic International Development Cooperation Department



**Project title “Transboundary cooperation for the surface water
resources management
in the Aaos/Vjosa watershed”**

ANAH-16-2005

Activity 3 “Mapping of protected areas in Vjosa catchment”

Thessaloniki 2008



THE GOULANDRIS NATURAL HISTORY MUSEUM
GREEK BIOTOPE / WETLAND CENTRE



E C A T
Environmental Center for
Administration & Technology
T I R A N A



Η παρούσα μελέτη εκπονήθηκε από το Μουσείο Γουλανδρή Φυσικής Ιστορίας-Ελληνικό Κέντρο Βιοτόπων-Υγροτόπων (ΕΚΒΥ) στο πλαίσιο του έργου “Διασυνοριακή συνεργασία για τη διαχείριση των επιφανειακών υδάτων στη λεκάνη απορροής του Αώου/Vjosa ποταμού”. Το έργο χρηματοδοτήθηκε από την Υπηρεσία Διεθνούς Αναπτυξιακής Συνεργασίας (ΥΔΑΣ)- Hellenic Aid.

The present study has been prepared by the Goulandris Natural History Museum-Greek Biotope/Wetland Centre in the framework of the project "Transboundary cooperation for the surface water resources management in the Aaos/Vjosa watershed". The project was funded by the International Development Cooperation Department (YDAS)/Hellenic Aid.

Η πλήρης αναφορά στο κείμενο αυτό είναι:

Η πλήρης αναφορά στο κείμενο αυτό είναι:

Αποστολάκης, Α. και V. Simixhiu 2008. Mapping of protected areas in Vjosa catchment. Μουσείο Γουλανδρή Φυσικής Ιστορίας - Ελληνικό Κέντρο Βιοτόπων-Υγροτόπων (ΕΚΒΥ). Θέρμη, 32 σελ.

This document may be cited as follows:

Apostolakis A. and V. Simixhiu, 2008. Mapping of protected areas in Vjosa river catchment. Greek Biotope/Wetland Centre (ΕΚΒΥ). Thermi, Greece. 32 p.

Contents

Introduction	2
Description	3
Delineation of the Aaos/Vjosa watershed	3
Construction of the GIS	3
Spatial characteristics of the Aaos/Vjosa watershed	5
Protected areas	6
Protected areas in Vjosa catchment	15
Site name: Bredhi i Hotoves (Hotova Fir)	15
Site Name: Germenj – Shelegure - Leskovik	17
Site name: Vjose-Narta Landscape Protected Area	22
Site name: Piskal - Shqeri	26
GIS Description	27

Introduction

In the frame of the joint project “*Transboundary cooperation for the surface water resources management in the Aoos/Vjosa watershed*” between Greece and Albania, funded by Hellenic Aid, Ministry of Foreign Affairs, a detailed inventory of protection status in the catchment was compiled. Recorded information included the protection status on national and international level (e.g. National Park, Ramsar site etc) and had produced polygon shapefiles compatible with ArcGIS containing the boundaries of protected areas and the type of protection. All types of designation according to Albanian legislation and IUCN classification had been included (e.g. nature protection purposes, protection of waters from pollution, areas for aquaculture etc) for the Albanian sector of the catchment. All protection types according to Greek and international legislation in power had been recorded.

The objective of this activity was the registration of protected areas in the river catchment, including information regarding type of protection (e.g. Ramsar site, National Park etc) – main obligations arising from their designation and existing Management Bodies – their responsibilities.

The required information and a detailed description of Activity 3, are referred in Annex I of the present Agreement.

This is the final deliverable of Action 3 referred as “*Mapping of protected areas in Vjosa Catchment*”.

Description

Aoos/Vjosa is a transboundary river having its main springs in Pindos mountain range in Greece and its estuarine, Narta Lagoon, on the Adriatic coast in Albania. An orientation map is in Fig. 1 showing rivers watershed in the Balkan Peninsula. Detailed characteristics of the rivers watershed and sub basins are on the following chapters regarding river watershed analysis.



Fig. 1 Orientation map of Aoos/Vjosa watershed.

Delineation of the Aoos/Vjosa watershed

A Geographic Information System (GIS) was constructed in order to:

- Delineate river watershed and sub-basins
- Perform hydrologic analysis and extract some basic characteristics of Aoos/Vjosa watershed
- Store and organize spatial data for the protected areas in river watershed.
- Compose maps

Construction of the GIS

The GIS software used is ArcGIS 9.2 and ArcView 3.2 with the Image analysis extension. ArcHydro was also used (as ArcGIS extension) for watershed delineation and hydrologic analysis.

The initial spatial data layers that was inserted into the GIS was:

- Contour lines. Digitized from 1:50000 scale maps with an interval of 20 m
- Hypsographic points. Digitized from 1:50000 scale maps
- Hydrographic network. Rivers, lakes, streams and reservoirs, digitized from 1:50000 scale maps
- Road network. Digitized from 1:50000 scale maps
- Urban areas. Digitized from 1:50000 scale maps
- A draft boundary of river watershed. Digitized from 1:50000 scale maps after designed on the map by hand. A more precise delineation was performed later using GIS tools.

The projection system that we used is the EGSA'87 system with the following parameters:

Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: 24.000000
Scale_Factor: 0.999600
Latitude_Of_Origin: 0.000000
Linear Unit: Meter (1.000000)

Geographic Coordinate System: GCS_GGRS_1987
Angular Unit: Degree (0.017453292519943299)
Prime Meridian: Greenwich (0.000000000000000000)
Datum: D_GGRS_1987
Spheroid: GRS_1980
Semimajor Axis: 6378137.000000000000000000
Semiminor Axis: 6356752.314140356100000000
Inverse Flattening: 298.257222101000020000

Some of the above spatial datasets were in a different projection system, so we need to reproject them to EGSA87 in order to have a common projection system for all layers.

Some parts of the hydrographic network were automatically digitized from scanned images using suitable GIS tools, some custom made routines and unsupervised classification techniques.

In order to precise delineate river watershed, the first step was to create a DEM (Digital Elevation Model) of the area. So we used the draft boundary of river

watershed and extend it with a buffer of 5 km to cover enough area around the draft watershed. The occurred polygon will be used as the interpolation boundaries for DEM construction.

The next step was to use ArcGIS Topogrid command to create the DEM. After some tests we found that smaller possible analysis for DEM was about 20 meters and so we choose this pixel dimension for the final DEM. The smaller possible analysis for a DEM, using topogrid command, depends mainly on system memory (physical and virtual) and on software limitations. In our case, system's memory was overlapping software needs, so the 20 m resolution that we finally choose was a result of software limitations.

The first DEM was created using the above hypsographic and hydrographic data. In order to delineate river watershed the DEM should be a *depressionless DEM* or a DEM that can correctly simulate the water's flow on the surface it represents. In order to create a depressionless DEM we used the ArcHydro extension of ArcGIS. We also used this software to perform further hydrologic analysis. In more detail we also created the following spatial layers:

- A depressionless DEM of 20 meters pixel size
- The Flow Direction raster layer
- The Flow Accumulation raster layer
- The stream segmentation vector and raster layers
- The sub-watersheds per stream segment vector and raster layers
- The river main sub-watersheds.
- The river watershed vector and raster layer
- The slope and aspect raster layers

All the above layers can be combined with any other layers that can be inserted in the GIS for further analysis. For example we can combine a protected area polygon with the slope layer to calculate the mean slope of the protected area.

Spatial characteristics of the Aaos/Vjosa watershed

According to the layers produced in the previous step, the main characteristics of Aaos/Vjosa watershed are:

Total area: 723,968 hectares
Perimeter: 879,560 meters
Mean altitude: 857.682 meters
Maximum altitude: 2,663.6 meters
Minimum altitude: 0 meters
Mean slope: 43.17%

Using ArcHydro tools, 18 main sub-basins were delineated in the Aaos/Vjosa watershed. Table 1 lists them with some basic hypsography characteristics.

Table 1: The main sub-basins of Aaos/Vjosa River with some basic hypsography characteristics.

Sub-basin name	Area (ha)	Min. alt. (m)	Max. alt. (m)	Alt. range	Mean alt.	Pixel standard deviation
Aaos main	227174	0	2655,23	2655,23	793,51	588,05
Luftinges	17700,4	100	1839,71	1739,71	630,15	288,3
Deshnices	22412,1	162,5	1923,22	1760,72	740,43	363,28
Lemnices	12686,9	200	1574,16	1374,16	899,69	316,93
Lengarices	37438	231,79	2046,79	1815	1024,59	282,39
Sarantaporos	92473,9	335,95	2663,59	2327,65	1175,64	394,87
Voidomatis	40935,9	379,77	2481,75	2101,98	1154,1	435,04
Zagorise	17312,3	150,31	2154,68	2004,37	1102,55	420,94
Drinos	57755,4	128,56	2155,09	2026,52	681,67	448,49
Drinos_Kardhiqit	21361,7	169,77	1795	1625,23	911	424,94
Drinos_sulres	27819	192,58	2487,4	2294,82	961,65	478,52
Drinos_luma_mad_xerias	12199,5	240	1810	1570	703,36	346,94
Drinos_gyftopotamos	9489,92	240	1345,79	1105,79	533,27	185,25
Drinos_kavouras	10877,8	240	2014,31	1774,31	797,6	253,72
Shushices	84229,4	9,87	2043,31	2033,44	615,59	497,39
Bences	17673,8	128,56	2123,5	1994,94	951,31	366,36
Poveles	14427,1	34,75	984,94	950,2	433,57	190,09

Protected areas

A total of 29 protected areas are inside or very close (less than 4km) the river watershed. Four of them are in the Albanian territory and the rest 25 are in the Greek territory. A detailed list of these protected areas with some basic characteristics of them is in Table 2.

Table 2: List of protected areas in Aoos/Vjosa watershed with some basic characteristics.

Name	Protection	Area (ha)	Perimeter (m)	Establ.	IUCN characterization	Country
GR1320002 KORYFES OROUS GRAMMOS	Natura 2000 SPA & SCI	34470	96314	2003		GR
GR2130002 KORYFES OROUS SMOLIKAS	Natura 2000 SPA & SCI	19976	66581	2003		GR
GR2130008 OROS MITSIKELI	Natura 2000 SPA & SCI	8436	60689	2003		GR
GR2130010 OROS DOUSKON, ORAIOKASTRO, DASOS MEROPIS, KOILADA GORMOU, LIMNI DELVINAKIOU	Natura 2000 SPA	17383	86670	2003		GR
GR2130009 OROS TYMFI (GAMILA)	Natura 2000 SPA	27416	84672	2003		GR
GR1310002 ETHNIKOS DRYMOS PINDOU	Natura 2000 SPA	3294	26860	2003		GR
GR2120009 ORI TSAMANTA, FILIATRON, FARMAKOVOUNI, MEGALI RACHI	Natura 2000 SPA	19906	90032	2003		GR
GR1310001 VASILITSA	Natura 2000 SCI	8013	49831	2003		GR
GR2130001 ETHNIKOS DRYMOS VIKOU-AOOU	Natura 2000 SCI	12794	75081	2003		GR
GR2130004 KENTRIKO TMIMA ZAGORIOU	Natura 2000 SCI	33115	101535	2003		GR
GR1310003 ETHNIKOS DRYMOS PINDOU (VALIA KALDA) - EVRĒTERI PERIOCHI	Natura 2000 SCI	6838	33741	2003		GR
GR2130006 PERIOCHI METSOVOU (ANILIO-KATARA)	Natura 2000 SCI	7329	48330	2003		GR
Pindos National park	National park	19464 4	219070	2005		GR
Vikos Aoos National Forest core	National Forest core	3238	45455	1973	National park: protected area managed mainly for ecosystem protection and recreation	GR
Pindos National Forest core	National Forest core	3154	27565	1973	National park: protected area managed mainly for ecosystem protection and recreation	GR
Katafiki Megali Petra Skala Grammou	Game Refuge	1233	16217	1986		GR
Kastanofito Melanthio Zevgostasio Niki Lagka	Game Refuge	2686	24043	1997		GR
Arrenon	Game Refuge	2801	29499	1986		GR
Aetomilitsa	Game Refuge	1801	20498	1995		GR
Agia Sotira	Game Refuge	2131	22520	1989		GR
Tria Alonia Mantani Vounopika	Game Refuge	950	12988	1981		GR
Voukopotamos Ganadio Pirgos Pirsogiannis	Game Refuge	2202	29808	1981		GR
Valia Kirna	Game Refuge	1710	17043	1986		GR
Pades	Game Refuge	2076	18750	1989		GR
Haradra Aoou	Game Refuge	3523	33365	1986		GR
Papigko	Game Refuge	1059	14129	1993		GR

Table 2: continued

Name	Protection	Area (ha)	Perimeter (m)	Establ.	IUCN characterization	Country
------	------------	-----------	---------------	---------	-----------------------	---------

Palaiomonastiro Mpatefourlo	Game Refuge	1187	15911	1986		GR
Kira Kali Tripimeni	Game Refuge	2547	29439	1986		GR
Flampourario Vovoussa	Game Refuge	1324	20356	1986		GR
Metsovo Hrisovitsa Grevenitio	Game Refuge	3490	34045	1994		GR
Ag. Athanasios Siptoura	Game Refuge	333	10859	1985		GR
Iliohoriou - Vrisohoriou Dimou Timfis	Game Refuge	4479	38086	2004		GR
Ontria Zonis Dragasias Dimou Tsotiliou	Game Refuge	2244	27061	2001		GR
Zarkaniki Aygerinou Dimou Tsotiliou	Game Refuge	1698	24374	2001		GR
Vikos Aaos National Forest	National Forest	12833	74903	1973	National park: protected area managed mainly for ecosystem protection and recreation	GR
Pindos National Forest	National Forest	6668	33353	1973	National park: protected area managed mainly for ecosystem protection and recreation	GR
Pindos Biogenetic reserve	Biogenetic reserve	3154	27565	1973		GR
Bredhi i Hotoves	National park	14994	59704	1966	National park: protected area managed mainly for ecosystem protection and recreation	AL
Germenj - Shelegure - Laskovik	Habitat/Species Management Area	6425	57269	1996	Habitat/Species Management Area: protected area managed mainly for conservation through management intervention	AL
Piskal - Shqeri	Managed Resource Protected Area	13720	72009	1996	Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems	AL
Vjose - Narta	Natural Monument	19694	71385	2002	Natural Monument: protected area managed mainly for conservation of specific natural features	AL

Some of the above areas overlap with others so the total area covered by these protected areas is not the sum of the area column in Table 2 (516968 ha). This area was calculated to be 342299 ha.

Not all of the area of each protected area belongs entirely inside the Aoos/Vjosa watershed. Table 3 shows the area inside and outside the watershed for each protected area. Some areas are entirely outside the watershed but very close to it's boundaries and are mentioned in this table for reference.

Table 3: Areas inside and outside watershed for each protected area.

Name	Protection	Inside or outside watershed	Area (ha)
Aetomilitsa	Game Refuge	inside watershed	1801
Aetomilitsa	Game Refuge	outside watershed	1801
Ag. Athanasios Siptoura	Game Refuge	inside watershed	333
Ag. Athanasios Siptoura	Game Refuge	outside watershed	333
Agia Sotira	Game Refuge	outside watershed	2131
Arrenon	Game Refuge	inside watershed	2801
Arrenon	Game Refuge	outside watershed	2801
Bredhi i Hotoves	National park	inside watershed	14994
Flampourario Vovoussa	Game Refuge	inside watershed	1324
	Habitat/Species		
Germenj - Shelegure - Laskovik	Management Area	inside watershed	6425
GR1310001 VASILITSA	Natura 2000 SCI	inside watershed	8013
GR1310001 VASILITSA	Natura 2000 SCI	outside watershed	8013
GR1310002 ETHNIKOS DRYMOS PINDOU	Natura 2000 SPA	inside watershed	3294
GR1310002 ETHNIKOS DRYMOS PINDOU	Natura 2000 SPA	outside watershed	3294
GR1310003 ETHNIKOS DRYMOS PINDOU (VALIA KALDA) - EVR€TERI PERIOCHI	Natura 2000 SCI	inside watershed	6838
GR1310003 ETHNIKOS DRYMOS PINDOU (VALIA KALDA) - EVR€TERI PERIOCHI	Natura 2000 SCI	outside watershed	6838
GR1320002 KORYFES OROUS GRAMMOS	Natura 2000 SPA & SCI	inside watershed	34470
GR1320002 KORYFES OROUS GRAMMOS	Natura 2000 SPA & SCI	outside watershed	34470
GR2120009 ORI TSAMANTA, FILIATRON, FARMAKOVOUNI, MEGALI RACHI	Natura 2000 SPA	inside watershed	19906
GR2120009 ORI TSAMANTA, FILIATRON, FARMAKOVOUNI, MEGALI RACHI	Natura 2000 SPA	outside watershed	19906
GR2130001 ETHNIKOS DRYMOS VIKOU-AOOU	Natura 2000 SCI	inside watershed	12794
GR2130002 KORYFES OROUS SMOLIKAS	Natura 2000 SPA & SCI	inside watershed	19976
GR2130004 KENTRIKO TMIMA ZAGORIOU	Natura 2000 SCI	inside watershed	33115
GR2130004 KENTRIKO TMIMA ZAGORIOU	Natura 2000 SCI	outside watershed	33115
GR2130006 PERIOCHI METSOVOU (ANILIO-KATARA)	Natura 2000 SCI	inside watershed	7329

Table 3: continued

Name	Protection	Inside or outside watershed	Area (ha)
GR2130006 PERIOCHI METSOVOU (ANILIO-KATARA)	Natura 2000 SCI	outside watershed	7329

GR2130008 OROS MITSIKELI	Natura 2000 SPA & SCI	inside watershed	8436
GR2130008 OROS MITSIKELI	Natura 2000 SPA & SCI	outside watershed	8436
GR2130009 OROS TYMFI (GAMILA)	Natura 2000 SPA	inside watershed	27416
GR2130010 OROS DOUSKON, ORAIOKASTRO, DASOS MEROPIS, KOILADA GORMOU, LIMNI DELVINAKIOU	Natura 2000 SPA	outside watershed	17383
Haradra Aouu	Game Refuge	inside watershed	3523
Iliohoriou - Vrisohoriou Dimou Timfis	Game Refuge	inside watershed	4479
Kastanofito Melanthio Zevgostasio Niki Lagka	Game Refuge	outside watershed	2686
Katafiki Megali Petra Skala Grammou	Game Refuge	inside watershed	1233
Katafiki Megali Petra Skala Grammou	Game Refuge	outside watershed	1233
Kira Kali Tripimeni	Game Refuge	inside watershed	2547
Kira Kali Tripimeni	Game Refuge	outside watershed	2547
Metsovo Hrisovitsa Grevenitio	Game Refuge	inside watershed	3490
Metsovo Hrisovitsa Grevenitio	Game Refuge	outside watershed	3490
Ontria Zonis Dragasias Dimou Tsotiliou	Game Refuge	outside watershed	2244
Pades	Game Refuge	inside watershed	2076
Palaiomonastiro Mpatfourlo	Game Refuge	inside watershed	1187
Palaiomonastiro Mpatfourlo	Game Refuge	outside watershed	1187
Papigko	Game Refuge	inside watershed	1059
Pindos Biogenetic reserve	Biogenetic reserve	inside watershed	3154
Pindos Biogenetic reserve	Biogenetic reserve	outside watershed	3154
Pindos National Forest	National Forest	inside watershed	6668
Pindos National Forest	National Forest	outside watershed	6668
Pindos National Forest core	National Forest core	inside watershed	3154
Pindos National Forest core	National Forest core	outside watershed	3154
Pindos National park	National park	inside watershed	194644
Pindos National park	National park	outside watershed	194644
Piskal - Shqeri	Managed Resource Protected Area	inside watershed	13720
Piskal - Shqeri	Managed Resource Protected Area	outside watershed	13720
Tria Alonia Mantani Vounopika	Game Refuge	inside watershed	950
Tria Alonia Mantani Vounopika	Game Refuge	outside watershed	950
Valia Kirna	Game Refuge	inside watershed	1710
Vikos Aaos National Forest	National Forest	inside watershed	12833
Vikos Aaos National Forest core	National Forest core	inside watershed	3238
Vjose - Narta	Natural Monument	inside watershed	19694
Vjose - Narta	Natural Monument	outside watershed	19694
Voukopotamos Ganadio Pirgos Pirsogiannis	Game Refuge	inside watershed	2202
Zarkaniki Aygerinou Dimou Tsotiliou	Game Refuge	outside watershed	1698

Using the Subbasins layer in combination with the protected areas layer, we calculated the distribution of each protected area per sub-basin. This distribution is in Table 4.

Table 4: Distribution of protected areas per sub-basin.

Name	Protection	Subbasin	Area (ha)
Aetomilitsa	Game Refuge	Outside watershed	0,55
Aetomilitsa	Game Refuge	Main Aaos	1800,22
Aetomilitsa	Game Refuge	Sarantaporos	1800,22
Ag. Athanasios Sipitoura	Game Refuge	Outside watershed	76,27
Ag. Athanasios Sipitoura	Game Refuge	Main Aaos	257,04
Ag. Athanasios Sipitoura	Game Refuge	Voidomatis	257,04
Agia Sotira	Game Refuge	Outside watershed	2130,84
Arrenon	Game Refuge	Outside watershed	22,57
Arrenon	Game Refuge	Main Aaos	2778,18
Arrenon	Game Refuge	Sarantaporos	2778,18
Bredhi i Hotoves	National park	Lemnices	10082,95
Bredhi i Hotoves	National park	Lengarices	3149,8
Bredhi i Hotoves	National park	Main Aaos	14994,38
Flampourario Vovoussa	Game Refuge	Main Aaos	1323,88
Germenj - Shelegure - Laskovik	Habitat/Species Management Area	Lengarices	3052,19
Germenj - Shelegure - Laskovik	Habitat/Species Management Area	Main Aaos	6424,77
Germenj - Shelegure - Laskovik	Habitat/Species Management Area	Sarantaporos	1758,63
GR1310001 VASILITSA	Natura 2000 SCI	Outside watershed	3715,24
GR1310001 VASILITSA	Natura 2000 SCI	Main Aaos	4297,53
GR1310002 ETHNIKOS DRYMOS PINDOU	Natura 2000 SPA	Outside watershed	336,96
GR1310002 ETHNIKOS DRYMOS PINDOU	Natura 2000 SPA	Main Aaos	2956,86
GR1310003 ETHNIKOS DRYMOS PINDOU (VALIA KALDA) - EVR€TERI PERIOCHI	Natura 2000 SCI	Outside watershed	1179,84
GR1310003 ETHNIKOS DRYMOS PINDOU (VALIA KALDA) - EVR€TERI PERIOCHI	Natura 2000 SCI	Main Aaos	5658,41
GR1320002 KORYFES OROUS GRAMMOS	Natura 2000 SPA & SCI	Outside watershed	9791,55
GR1320002 KORYFES OROUS GRAMMOS	Natura 2000 SPA & SCI	Lengarices	1,65
GR1320002 KORYFES OROUS GRAMMOS	Natura 2000 SPA & SCI	Main Aaos	24678,42
GR1320002 KORYFES OROUS GRAMMOS	Natura 2000 SPA & SCI	Sarantaporos	24676,77
GR2120009 ORI TSAMANTA, FILIATRON, FARMAKOVOUNI, MEGALI RACHI	Natura 2000 SPA	Outside watershed	19878,3

Table 4 continued

Name	Protection	Subbasin	Area (ha)
GR2120009 ORI TSAMANTA, FILIATRON, FARMAKOVOUNI, MEGALI RACHI	Natura 2000 SPA	Drinos	27,88
GR2120009 ORI TSAMANTA, FILIATRON, FARMAKOVOUNI, MEGALI RACHI	Natura 2000 SPA	Drinos_luma_mad_xerias	27,88
GR2120009 ORI TSAMANTA, FILIATRON, FARMAKOVOUNI, MEGALI RACHI	Natura 2000 SPA	Main Aaos	27,88

GR2130001 ETHNIKOS DRYMOS VIKOU-AOOU	Natura 2000 SCI	Main Aoos	12794,25
GR2130001 ETHNIKOS DRYMOS VIKOU-AOOU	Natura 2000 SCI	Voidomatis	7754,92
GR2130002 KORYFES OROUS SMOLIKAS	Natura 2000 SPA & SCI	Main Aoos	19975,72
GR2130002 KORYFES OROUS SMOLIKAS	Natura 2000 SPA & SCI	Sarantaporos	5719,7
GR2130004 KENTRIKO TMIMA ZAGORIOU	Natura 2000 SCI	Outside watershed	10409,76
GR2130004 KENTRIKO TMIMA ZAGORIOU	Natura 2000 SCI	Main Aoos	22705,2
GR2130004 KENTRIKO TMIMA ZAGORIOU	Natura 2000 SCI	Voidomatis	15845,39
GR2130006 PERIOCHI METSOVOU (ANILIO-KATARA)	Natura 2000 SCI	Outside watershed	5202,62
GR2130006 PERIOCHI METSOVOU (ANILIO-KATARA)	Natura 2000 SCI	Main Aoos	2126,2
GR2130008 OROS MITSIKELI	Natura 2000 SPA & SCI	Outside watershed	8014,35
GR2130008 OROS MITSIKELI	Natura 2000 SPA & SCI	Main Aoos	421,64
GR2130008 OROS MITSIKELI	Natura 2000 SPA & SCI	Voidomatis	421,64
GR2130009 OROS TYMFI (GAMILA)	Natura 2000 SPA	Main Aoos	27416,44
GR2130009 OROS TYMFI (GAMILA)	Natura 2000 SPA	Voidomatis	18430,69
GR2130010 OROS DOUSKON, ORAIOKASTRO, DASOS MEROPIS, KOILADA GORMOU, LIMNI DELVINAKIOU	Natura 2000 SPA	Outside watershed	9795,47
GR2130010 OROS DOUSKON, ORAIOKASTRO, DASOS MEROPIS, KOILADA GORMOU, LIMNI DELVINAKIOU	Natura 2000 SPA	Drinos	5229,13
GR2130010 OROS DOUSKON, ORAIOKASTRO, DASOS MEROPIS, KOILADA GORMOU, LIMNI DELVINAKIOU	Natura 2000 SPA	Drinos_gyftopotamos	159,39
GR2130010 OROS DOUSKON, ORAIOKASTRO, DASOS MEROPIS, KOILADA GORMOU, LIMNI DELVINAKIOU	Natura 2000 SPA	Drinos_kavouras	4682,32
GR2130010 OROS DOUSKON, ORAIOKASTRO, DASOS MEROPIS, KOILADA GORMOU, LIMNI DELVINAKIOU	Natura 2000 SPA	Drinos_sulres	387,42

Table 4: Continued

Name	Protection	Subbasin	Area (ha)
GR2130010 OROS DOUSKON, ORAIOKASTRO, DASOS MEROPIS, KOILADA GORMOU, LIMNI DELVINAKIOU	Natura 2000 SPA	Main Aoos	7587,94
Haradra Aoou	Game Refuge	Main Aoos	3523,15
Haradra Aoou	Game Refuge	Voidomatis	4,78
Iliohoriou - Vrisohoriou Dimou Timfis	Game Refuge	Main Aoos	4478,55
Iliohoriou - Vrisohoriou Dimou Timfis	Game Refuge	Voidomatis	81,61
Kastanofito Melanthio Zevgostasio Niki Lagka	Game Refuge	Outside watershed	2686,22
Katafiki Megali Petra Skala Grammou	Game Refuge	Outside watershed	1153,86
Katafiki Megali Petra Skala Grammou	Game Refuge	Main Aoos	78,99
Katafiki Megali Petra Skala Grammou	Game Refuge	Sarantaporos	78,99

Kira Kali Tripimeni	Game Refuge	Outside watershed	2130,47
Kira Kali Tripimeni	Game Refuge	Main Aaos	416,43
Metsovo Hrisovitsa Grevenitio	Game Refuge	Outside watershed	19,28
Metsovo Hrisovitsa Grevenitio	Game Refuge	Main Aaos	3470,86
Ontria Zonis Dragasias Dimou Tsotiliou	Game Refuge	Outside watershed	2244,14
Pades	Game Refuge	Main Aaos	2075,68
Palaiomonastiro Mpatefourlo	Game Refuge	Outside watershed	7,67
Palaiomonastiro Mpatefourlo	Game Refuge	Main Aaos	1178,91
Papigko	Game Refuge	Main Aaos	1059,08
Papigko	Game Refuge	Voidomatis	965,51
Pindos Biogenetic reserve	Biogenetic reserve	Outside watershed	367,54
Pindos Biogenetic reserve	Biogenetic reserve	Main Aaos	2786,33
Pindos National Forest	National Forest	Outside watershed	1437,24
Pindos National Forest core	National Forest core	Outside watershed	367,54
Pindos National Forest core	National Forest core	Main Aaos	2786,33
Pindos National Forest	National Forest	Main Aaos	5231,17
Pindos National park	National park	Outside watershed	79584,52
Pindos National park	National park	Main Aaos	115059,3
Pindos National park	National park	Sarantaporos	10744,54
Pindos National park	National park	Voidomatis	35617,32
Piskal - Shqeri	Managed Resource Protected Area	Outside watershed	5,34
Piskal - Shqeri	Managed Resource Protected Area	Lengarices	13459,74
Piskal - Shqeri	Managed Resource Protected Area	Main Aaos	13714,28

Table 4: continued

Name	Protection	Subbasin	Area (ha)
Tria Alonia Mantani Vounopika	Game Refuge	Outside watershed	2,3
Tria Alonia Mantani Vounopika	Game Refuge	Main Aaos	947,26
Tria Alonia Mantani Vounopika	Game Refuge	Sarantaporos	947,26
Valia Kirna	Game Refuge	Main Aaos	1709,81
Vikos Aaos National Forest core	National Forest core	Main Aaos	3237,99
Vikos Aaos National Forest core	National Forest core	Voidomatis	3237,99
Vikos Aaos National Forest	National Forest	Main Aaos	12832,72
Vikos Aaos National Forest	National Forest	Voidomatis	7828,51
Vjose - Narta	Natural Monument	Outside watershed	9293,62
Vjose - Narta	Natural Monument	Main Aaos	10400,51

Vjose - Narta	Natural Monument	Shushices	1672,57
Voukopotamos Ganadio Pirog Pirsogiannis	Game Refuge	Main Aaos	2202,4
Voukopotamos Ganadio Pirog Pirsogiannis	Game Refuge	Sarantaporos	2202,4
Zarkaniki Aygerinou Dimou Tsotiliou	Game Refuge	Outside watershed	1697,65

Using the depressionless DEM in combination with the protected areas layer, we performed some statistic calculations regarding altitude per protected area. These calculations are summarized in Table 5. These values are for the part of the protected area that is inside the river watershed.

Table 5: Statistical data for each protected area.

Name	Minimum altitude	Maximum altitude	Range	Mean altitude	Standard deviation
GR1320002 KORYFES OROUS GRAMMOS	668,2	2506,88	1838,69	1325,71	378,66
GR2130002 KORYFES OROUS SMOLIKAS	769,67	1699	929,33	1541,47	126,8
GR2130010 OROS DOUSKON, ORAIOKASTRO, DASOS MEROPIS, KOILADA GORMOU, LIMNI DELVINAIOU	475,73	2200	1724,27	992,86	314,32
GR2130009 OROS TYMFI (GAMILA)	400	1487,32	1087,32	796,39	231,81
GR2120009 ORI TSAMANTA, FILIATRON, FARMAKOVOUNI, MEGALI RACHI	690	1810	1120	1366,24	363,94
GR2130001 ETHNIKOS DRYMOS VIKOU-AOOU	472,57	563,1	90,53	490,01	30,15
GR2130006 PERIOCHI METSOVOU (ANILIO-KATARA)	1360	1820	460	1547,76	114,41
Pindos National park	379,77	2663,59	2283,82	1316,76	369,96

Katafiki Megali Petra Skala Grammou	1511,11	2108,24	597,13	1734	143,56
Arrenon	1094	2192	1098	1644,91	271,08
Aetomilitsa	848,2	2409,27	1561,06	1554,45	336,64
Tria Alonia Mantani Vounopika	800	1775,18	975,19	1212,4	140,15
Voukopotamos Ganadio Pirgos Pirsogiannis	512,68	1731,89	1219,21	927,38	226,84
Valia Kirna	1000	2253	1253	1604,72	266,77
Pades	700	2520	1820	1637,08	450,88
Haradra Aoou	581	1985,04	1404,03	1189,86	227,24
Papigko	1493,37	2124,39	631,03	1802,27	109,31
Palaiomonastiro Mpatfourlo	800	1854,39	1054,39	1299,52	202,81
Kira Kali Tripimeni	1945,02	1964,89	19,88	1958,2	5,43
Flampourario Vovousa	1100	1880,23	780,23	1454,44	249,72
Metsovo Hrisovitsa Grevenitio	1167,51	1940	772,49	1399,4	96,98
Ag. Athanasios Sipitoura	840	1514,91	674,91	1219,89	122,76
Iliohoriou - Vrisohoriou Dimou Timfis	600	2478	1878	1394,66	433,6
Vikos Aaos National Forest	379,77	2485,71	2105,94	1267,17	467,45
Pindos National Forest	1000	2288,67	1288,67	1689,81	239,97
Pindos Biogenetic reserve	1100	2177	1077	1616,91	224,73
Bredhi i Hotoves	245,83	1574,74	1328,92	803,9	299,87
Germenj - Shelegure - Laskovik	495,5	2046,83	1551,33	1246,38	269,5
Piskal - Shqeri	446,73	1550	1103,27	985,83	220,52
Vjosa - Narta	0	246,37	246,37	28,89	54,01

In the following section a brief description of the Albanian protected areas is presented.

Protected areas in Vjosa catchment

Site name: Bredhi i Hotoves (Hotova Fir)

Location

The Hotova Fir is located on the southeast side of Albania, in the district of Permet, lat. 40° 19' 05"- 40 22' 17" long. 20° 22' 05"- 10-30. The primary forms of the Hotova Fir are the hillsides with a slope of 10°-30°, facing northwest, east and southwest, starting from 900 to 1500 meters altitude above sea level. The lands are wooden and the mountainous valleys are placed on top of clayey rocks.

Ecological information

The forest of Hotova is part of the mountainous Mediterranean area, under the southeastern zone.

Under the climate conditions, Mediterranean annual temperature varies between 10-14 °C, the lowest values during January varies between 0-2 °C, while the highest temperature goes up to 24-28 °C in July. The average annual precipitation varies from

1000 mm up to 1350 mm. Snow starts in November and covers the mountains to the Frasher and Pagri villages March, with the exception of some places where it stops falling around the end of April, with a thickness of 0.5-1.2m.

The wind blows northern and southeastern directions and on the upper side of the area it causes some woods to fall.

Site designation

There is no designation yet for the whole protected area called National Park “Bredhi i Hotoves-Dangelli” (14973 ha).

National Park “Bredhi i Hotoves” (1200 ha) (IUCN Category II) established by Decision of Council of Minister No. 102 on 15/01/1996.

Quality and Importance

The site “Bredhi i Hotoves-Dangelli” is considered as an important relict site of Mediterranean vegetation. It includes amazing fir forests with Macedonian fir (*Abies borisi-regis*), pure or mixed with other broadleaved species (oaks, maple, hornbeam), as well as a unique mixture of Mediterranean shrubs, especially *Arbutus unedo* and *Arbutus andrachne* (this last one is growing at its north-western border of its distribution area). The area is rich in endemic species and there are several important wildlife species breeding there.

The Hotova Fir lay on a surface of 2000 hectares, made of the Macedonian fir, Sessile Oak and Maple, even though this is unusual considering the climate conditions of Albania. The development of the forest is generally pretty good.

The Macedonian fir being well adapted under the climate and land conditions of the Hotova, it is the prevailing tree species in the whole Hotova Forest. The Macedonian fir is common and in valleys and hillsides in combination with Sessile Oak and Maple that are generally not damaged.

In the spaces between the trees in the forest, next to the small valleys above the roads, there are saplings with black pine sowed, which have a good development. On small surfaces, especially surfaces with the combination of Sessile Oak and Turkey Oak, we can find hornbeams, Hop Hornbeam, and wild-cherries, all in very good condition. The under forest under this economy is scarce and it is made of hornbeam, hazelnut, black and red juniper, wild rose, blackberry and hawthorn. The hawthorn is found the most in the woods with a small circle-density, the ones facing SE, especially in the

economic streams. Under the ecologic conditions of the Hotova, the Macedonian fir has an average diameter of 30-40 cm; height of 17 m and has an average life of 120 years.

Vulnerability

The site has been under some pressure from human activities occurring within the area as illegal logging, hunting, grazing, and visitor management. Recently there is less pressure regarding illegal logging, but hunting and grazing are still damaging the natural values of the site causing habitat loss and fragmentation, and disturbances to wildlife species.

Body responsible for the site management

The responsible 5-members body for the management of the area is The Administration Unit for National Park "Bredhi i Hotoves". This managing agency reports directly to the Ministry of Environment, Forests and Water Administration.

Ownership

9230 ha (62%) State

5760 ha (38%) Private

Site management plans

There is no management plan for the area.

Site Name: Germenj – Shelegure - Leskovik

Location

The Germenj – Shelegure - Leskovik is located on the southeast of Albania in Kolonje district of region Korce (lat. 40°10'00"- 40 22' 17" long. 20°39'00"). The site is a mountain area between 900 m to 1800 m absolute altitude.

Ecological information

Shelegura; surface (hectares) 430; status with roads and it represents a valuable landscape characterized by its floristic importance.

Shelegura is located on the central mountainous region, on the south side of it, next to the border that divides Albania with Greece, in between the geographic latitude 40 06' 45'' - 40 09' 55'' and the geographic longitude of 20 41'42''. Shelegura is under the territorial jurisdiction of the Kolonja district and it is under the administration of the Directorate of the Forest Service. 430 ha of this area, in between 1100-1639 m

altitude above sea level, is included in the Nature's Monuments category due to its significance in terms of floristic and value of landscape.

The landscape is of continuous hillsides of Shelegura, with an average steepness of 16-30°. Their general exposition is north, northeast. The forest is placed on limy rocky formation. Shelegura is on the Mediterranean mountainous climate area, southeast under district (IVC)

Shelegura, besides the wooden nature, represents landscape values whose natural combination has created a beautiful flourishing where the plots of wood are distinguish for their beauty. The wooden floor is made of the black wood and the white tree followed by Sessile oak.

Based on the results from the biometric measurements, the forest of Shelegura has an average life of 120 years, while the dendrometric elements of the woods are: average diameter of the woods 32 cm, average altitudes 20 m, circle density 0.9-1. The 'phyto-sanitary' situation is quite well.

The principal part of the site is occupied by *Pinus nigra* forests, mixed often with *Abies borisii-regis* and *Fagus sylvatica* (Pineto-Abietum borisii-regis, Fageto-Borisii regis). There are also other communities of black pine (Pineto-Corylletum avellanae, Pinetum - Staehelina uniflosculosa, Erico-Pinetum, Pinetum-Seslerietum coerulantis. CORINE forest types: 41.6217, 42.6619, 42.1652, 42.6211, 42.6212, 44.514.

Site designation

The site is designated as national park by Decision of Council of Minister No. 102, date 15.01.1996.

Quality and Importance

Important transboundary area for ensuring the continuity of habitats between Albania and Greece, with high biodiversity, where black pine (*Pinus nigra*), mixed with macedonian fir (*Abies borissi-regis*) and beech (*Fagus sylvatica*) are in almost climax stage. Important site for large carnivores and large mammals such as *Ursus arctos*, *Canis lupus*, *Capreolus capreolus*, *Rupicapra rupicapra*. The area shelters more than 120 species of birds. An important site for several species of raptors, such as *Aquila chrysaetos*, *Circaetus gallicus*, *Accipiter gentilis*, *Falco tinnunculus* etc., whose presence gives to the area a high national and international importance. Very well high-developed forest with mammal and bird communities, linked with old growing mixed forests. The very particular scientific, tourist and recreation values of the area

are offering great and real potentials for the development of the ecological tourism and other recreational activities that could bring some incomes and prosperity to the local community itself.

Vulnerability

Forest harvesting, illegal cuttings, uncontrolled grazing, hunting, shooting. Access to the site through an asphalted national road is bringing up tourism and leisure activities to the site, particularly to Germenji.

Body responsible for the site management

There is no relevant information

Designation

Only a part of Shelegura (430 ha) is a Managed Nature Reserve (Cat. IV by the IUCN). Under Biodiversity Strategy and Action Plan of Albania, the area entire area (Germenj-Shelegure-Leskovic) is proposed as National Park.

Ownership

Mostly State ownership, but there are also private lands included inside the proposed enlarged borders of the Germenji-Shelegura National Park.

Species

Mammals

Ursus arctos, *Canis lupus*, *Capreolus capreolus*, *Rupicapra rupicapra*, *Vulpes vulpes*, *Meles meles*, *Martes foina*, *Lutra lutra*, *Mustela nivalis*, *Glis glis*, *Rhinolophus ferrumequinum*, *Rhinolophus blasii*, *Myotis myotis*, *Myotis blythi*, *Myotis capaccinii*, *Pipistrellus savii*, *Pipistrellus kuhli*, *Sciurus vulgaris*, *Lepus europaeus*:

Birds

Accipiter gentilis, *Accipiter nisus*, *Alectoris graeca*, *Aquila chrysaetos*, *Dendrocopos leucotos*, *Dendrocopos major*, *Dendrocopos medius*, *Dendrocopos minor*, *Dryocopus martius*, *Emberiza cia*, *Emberiza citrinella*, *Falco peregrinus*, *Falco subbuteo*, *Falco tinnunculus*, *Fringilla coelebs*, *Hieraaetus fasciatus*, *Lanius collurio*, *Loxia curvirostra*, *Lullula arborea*, *Miliaria calandra*, *Neophron percnopterus*, *Oenanthe hispanica*, *Oenanthe oenanthe*, *Perdix perdix*, *Phylloscopus collybita*, *Picus canus*, *Picus viridis*, *Pyrrhocorax graculus*, *Pyrrhula pyrrhula*, *Regulus regulus*, *Sitta europaea*, *Sylvia cantillans*

Amphibians/Reptiles

Triturus cristatus, *Bombina variegata*, *Bufo viridis*, *Hyla arborea*, *Rana dalmatina*, *Testudo hermanni hermanni*, *Lacerta viridis*, *Podarcis muralis*, *Coronella austriaca austriaca*, *Elaphe longissima*, *Natrix tessellata*, *Natrix natrix*, *Vipera ammodytes*

Invertebrates

Coenagrion ornatum, *Lestes dryas*, *Mantis religiosa*, *Libelloides macaronius*, *Pieris ergane*, *Colias australis*, *Scolitantides orion*, *Apatura ilia*, *Euphydryas aurinia*, *Nymphalis xanthomelas*, *Nymphalis polychloros*, *Argynnis paphia*, *Hipparchia statilinus*, *Hipparchia fagi*, *Phyllodesma ilicifolia*, *Proserpinus proserpina*, *Arctia villica*

Plants

Pinus nigra, *Abies borisii-regis*, *Fagus sylvatica*, *Fraxinus ornus*, *Carpinus orientalis*, *Ostrya carpinifolia*, *Corylus avellana*, *Quercus petraea*, *Salix caprea*, *Acer pseudoplatanus*, *Quercus cerris*, *Euphorbia spinosa*, *Juniperus oxycedrus*, *Daphne oleoides*, *Crataegus laciniata*, *Coronilla emerus*, *Cotinus coggygria*, *Daphne blagayana*, *Chamaecytisus hirsutus*, *Rubus ulmifolius*, *Stachelina uniflosculosa*, *Cornus sanguinea*, *Sorbus torminalis*, *Juniperus foetidissima*, *Erica herbacea*, *Stachys scardica*, *Teucrium montanum*, *Satureja montana*, *Thymus longicaulis*,

Galium verum, Sesleria coerulans, Brachypodium sylvaticum, Prunella laciniata, Helleborus odoratus, Knautia drymea, Sideritis raeseri, Onosma arenaria, Dorycnium pentaphyllum, Brachypodium pinnatum, Fragaria vesca, Scabiosa columbaria, Luzula sylvatica, Geranium robertianum, Gentiana cruciata, Dianthus ferrugineus, Melampyrum fimbriatum, Tanacetum macrophyllum, Euphorbia amygdaloides, Asplenium trichomanes, Sanguisorba minor, Myosotis sylvatica, Poa nemoralis, Valerianella coronata, Asyneuma limonifolium, Cistus albanicus, Deschampsia flexuosa, Verbascum glabratum, Sanicula europaea, Cephalanthera rubra, Alnus glutinosa, Orchis quadripunctata

Site management plans

No management plan.

Site name: Vjose-Narta Landscape Protected Area

Location

Vjosa-Narta is a wetland complex located in Vlora District (lat. 40°35' and long 19°23').

Site description

Narta is one of the most important lagoons in the southeastern coast of the Adriatic sea. Maximum depth reaches at 1.5 m. The lagoon is bordered by the picturesque hills of Zverneci. On this side of the lagoon are situated two small islands. In the big island, there is the Zverneci Monastery

The Site covers an area of 19,412 hectares. The altitude of the wetland site varies between 0 - 246 m. The highest elevation is reached between Hoshtima and Llakatundi villages.

The Protected Area comprises land from two communes: Qendra Commune in the south and Novosela Commune in the north. The main habitats of Narta include wetlands, agricultural land, forests and urban areas (Table 1).

Main Habitats	Surface (<i>in ha</i>)
Wetlands	10,210
Forests	1,167
Agricultural land	7,798
Urban areas	277
Airport	286
Total	19738 ha

Ecological information

Natural habitats wetland complex includes different types of ecological units classified according descriptive and functional criteria such as water presence/absence, salinity and vegetation physiognomy.

Aquatic habitats Aquatic habitats are themselves composed by numerous sub-habitats such as semi-permanent aquatic habitats, drainage and irrigation channels, marshes (salt marshes and lagoons), fresh water reservoirs and riverbeds covered by alluvial forests.

Wetland habitats occupy 37 % of the total surface. The other main habitat (circa 33%) is agricultural land. Forests compose the third main habitat covering only 6% of the territory. The core wetland is Narta lagoon, a shallow marshland of 2,900 hectares surrounded by hills in the southern and western part, salinas and agriculture land in the north, and two shallow wetlands in the northwest.

Pishe-Poro: a former Nature Managed Reserve represents very well developed sand dunes (up to 6-8 m high) as well as psamophyte, hygrophyte and halophyte vegetation. The bulk of the reserve is covered by Mediterranean pine forest.

A part of sand dunes is destroyed due to sand extraction for construction purposes.

Despite the upper-mentioned damages the Nature Managed Reserve is still in good shape. Its degraded parts could well recover if management interventions are undertaken.

Site designation

Vjosa-Narta Landscape Protected Area (IV IUCN Category)

Body responsible for the site management

Different institutions are directly implicated in the territory of the wetland site. They belong to Central Government, Local Government, Regional authorities, NGOs, Development Agencies, Local users etc.

The Ministry of Environment, Forest and Water Administration is main authority in the site, through Directorate General for Forests and Pastures (DGFP) and its District Forest Service (DFS), Fishery Directorate (FD). DGFP and DFS is the administrator of Forest and Pasture resources, including Nature Managed Reserve. They issue licenses for forest harvesting and pasture use. FD is responsible for administration of fishery activities, and issues licenses for fishery and aquaculture activities. WD is responsible for administration of water resources used for irrigation and issues licenses to water user associations to use those resources for irrigation purposes.

Th MEFWA issues and supervises environmental permissions or licenses to various economical activities (including mining, tourism, transport) that do have their impacts on environment.

Ministry of Territory Adjustment and Tourism (MoTA&T) is responsible for preparing Master Plans for any physical or territorial planning, including Urban and Tourism development. These Plans are approved by the Council of Territorial Adjustment of Albanian Republic (CTAAR). MoTA&T issues licenses to Tourism operators in case they want to build up tourism infrastructure and facilities in areas identified for tourism development. The newly approved National Strategy has identified the coastal area from Vjosa to Zverrneci as priority zone for tourism development for Tourism Development.

Ministry of Defense exerts its rights over a small territory (considered as a future military airport). For the moment the area is fenced and guarded by military forces.

Flora

Vjose-Narta wetland complex is an important area well known for its special flora and the diversity of habitats. All these plant species make up a great national asset with economic and scientific values. Some plants are extremely rare, some others have scientific values and a good number of them compose widely used economic groups such as the medicinal, aromatic, industrial alimentary and decorative plants.

The region of Vlora shelters some 1400 vascular plant species, representing 42% of the total flora of Albania. Detailed data on the project area are still not available.

Fauna

The wetland complex of Vjosa-Narta is an important distribution area for a high number of animals including insects, fish, amphibians, reptiles, and mammals and especially birds. The wetland complex shelter at least 747 species of animals of vertebrates. Group of species are Molluscs, Insects (Lepid & Coleopt), Crustaceans, Echinoderms, Fish, Amphibians, Reptiles, Birds, Mammals

Invertebrates

The area of Narta holds at least 390 species of invertebrates comprising Molluscs, Butterflies, Beetles, Crustaceans and Echinoderms.

The most common butterflies include Swallow-tail, Cleopatra, Hairstreaks and Blues. In addition some large and small Orthopterans, Longhorn Beetles and Ant-lions occurred in abundance in the drier habitats.

Studies on mollusks have shown that Narta holds 32 species of aquatic molluscs belonging to Families of Gastropoda and Bivalvia.

Fish

Narta area is an important site for fish species. Former studies including all types of habitats (sea, brackish and fresh waters) concluded that the site is inhabited by at least 102 species of fish. The main species of Narta lagoon are: Eel (*Anguilla anguilla*), Sea bream (*Sparus aurata*), Sea bass (*Dicentrarchus labrax*), European eel (*Anguilla anguilla*), Grey mullet (*Mugil cephalus*) and sand smelt (*Aterina* sp.).

Amphibians and Reptiles

Narta shelters 9 species of amphibians and 26 species of reptiles. The most common amphibians include *Rana balcanica*, *Hyla arborea*, *Triturus vulgaris* etc

Among reptiles is worth mentioning *Natrix natrix*, *Elaphe quatuorlineata*, *Malpolon monspensulanum*, *Testudo hermanni* etc.

Birds

The wetland complex is an important wintering and breeding site for 192 species of birds and more particularly for water birds.

Winter censuses undertaken during 1995-2004 registered 12,600-81,200 individuals of water birds with an annual average of 34,800 individuals. The majority of wintering birds (circa 91% of them) is located in lagoon waters. The most common birds are Ducks and Coots.

Mammals

The wetland complex registers 32 species of mammals from 71 species observed in Albania. The mammal community is dominated by rodents followed by bats and carnivorous species.

Ownership

The majority of land, circa 68%, is under state ownership. The remaining part is private. The state ownership includes sandy beaches, forest and pastures, wetlands (lagoons, small reservoirs, rivers, etc), salt pans, major part of arable land, airport etc. Private land includes arable land comprising olive yards, vineyards, fruit trees as well as residences.

Site management plans

There is management plan.

Site name: Piskal - Shqeri

The Forest Unit “Piskal” is made of the watershed of the Langurica and Piskal lakes and of the Postenan, Radimisth and Pode rocks, as well as the Radum mountain surrounded by the Dermal, Rajan, Kamnik, Mbreshtan, Piskal, Vitish and Shijan villages. In the previous inventory, the economy was named: “The wooden Piskal Economy” name that will stay unchanged for this inventory. The reason behind this name is based on the fact that on the V-L side of the economy, the Piskal village is the biggest in the area and because the agricultural economy keeps the name of Piskal.

This economy is located on the central mountainous region of Albania, (lat. of 40° 12’ 00” – 40° 21’ 55” and long. of 20° 28’ 00” – 20° 38’ 53”). It covers an area of 5400 ha. Piskal is under the jurisdiction of the Kolonja district and the respective Directorate of the Forest Service administers it.

The area is made of valleys that fall down by the streams creating a ‘micro relief’ of a wide ‘basin’.

They face south and southwest. The hillside slopes are about (16-30°), while the minimum and maximum altitude above the sea level are respectively 500 and 1550 meters. The land is brownish and mountainous, ‘mbi formacione shistesh ranore-above sandy formations. The Piskal lay in the climate area (IV.C) that is noted for the rough weather during winter.

The woods of this forest unit belong to three different formations with combinations between conifers and oak forest, and between oak forest and shrub formations. Obviously being part of this category there is debate about the preservation of this ecosystem specifically in order to preserve the *Arbutus andrachne* and *Arbutus unedo* communities. The forest is composed by Sessile oak, Macedonian Oak, Black pine and Maple, while the shrub formation is represented by *Arbutus unedo*.

There is not management plan

GIS Description

All the spatial data collected was organized in a GIS. A complete list and description of these layers is below:

1. Contour lines

File name: Contours

Folder: GIS\topo\contours

File type: Shapefile

Topology: Lines

Fields:

Alt: The altitude in meters

Length: The length in meters

2. Hypsographic points

File name: Hpoints

Folder: GIS\topo\

File type: Shapefile

Topology: Points

Fields:

Alt: The altitude in meters

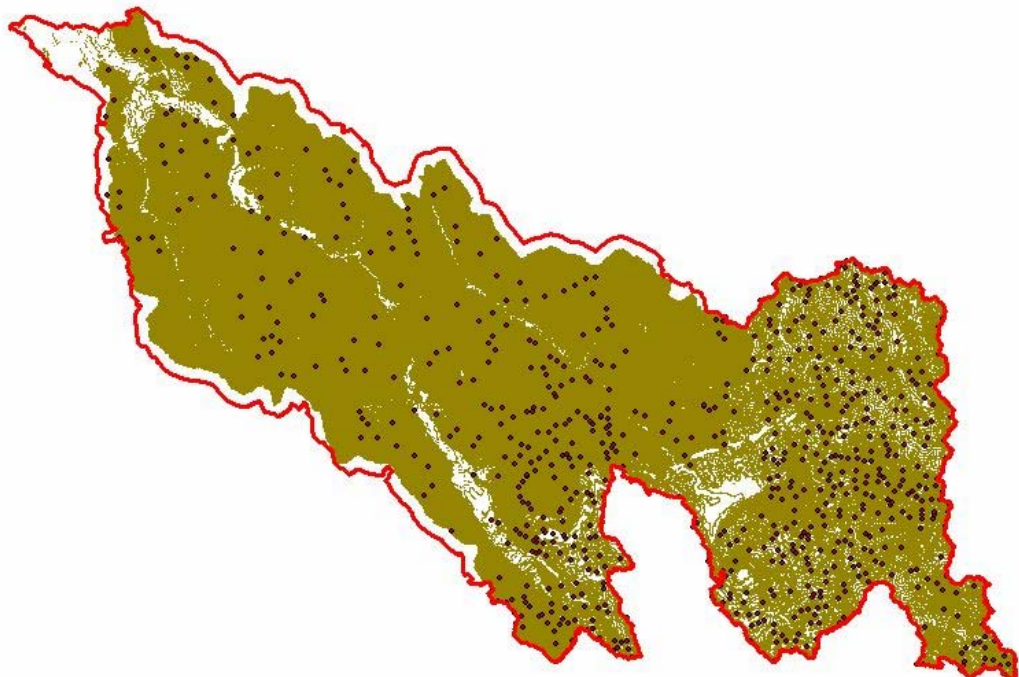


Fig. 1: Contours and hypsographic points in Aaos/Vjosa watershed

3. Stream network

File name: Streams

Folder: GIS\hydro

File type: Shapefile

Topology: Lines

Fields:

Length: The length of stream segment in meters

4. Water surfaces

File name: Wsurface

Folder: GIS\hydro

File type: Shapefile

Topology: polygons

Fields:

Type: Characterization of water surface

Area: Area in m²

Perimeter: Perimeter in m

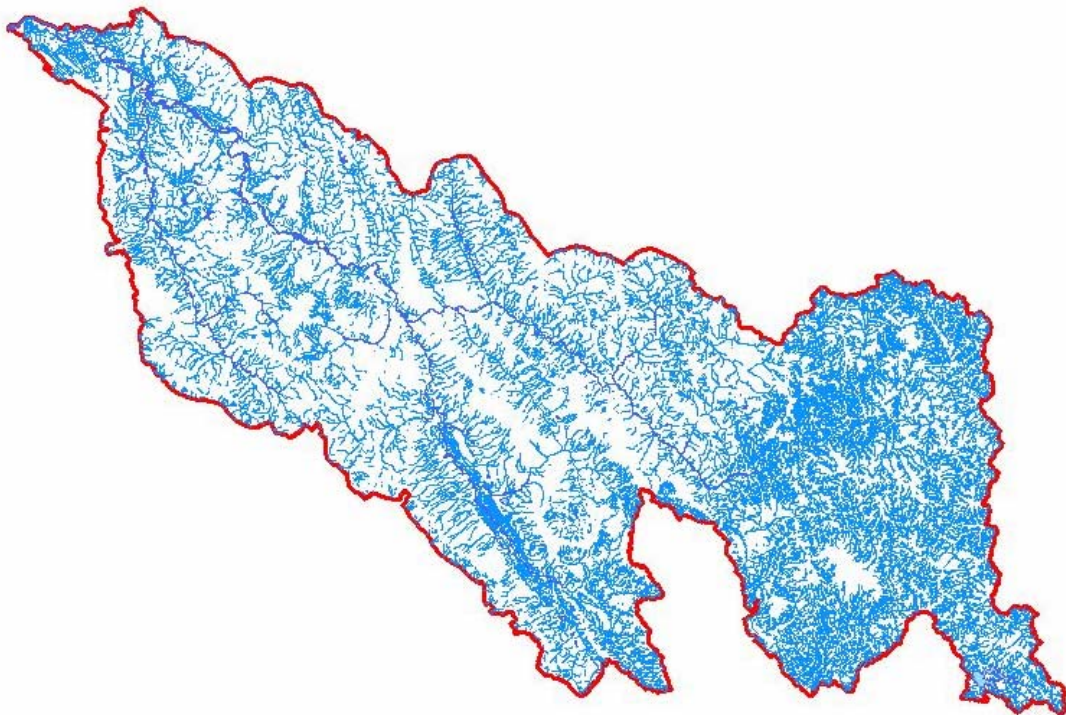


Fig 2: The hydrographic network

5. Protected areas

File name: PAreas

Folder: GIS\ProtectedAreas

File type: Shapefile

Topology: Polygons

Fields:

Area: Area in m²

Perimeter: Perimeter in m
Type: Type of protection area
Year: Year of establishment of protected area
IUCN: IUCN characterization (where available)
Country: The country where the protected area belongs
Nam: Name of protected area

6. Country boundaries and shoreline in Aaos/Vjosa area

File name: Bnds
Folder: GIS\admin
File type: Shapefile
Topology: Line
Fields:
Length: The length of the line segment
Type: The type of line (country boundary or shoreline)

7. Digital Elevation Model

File name: FIL_DEM
Folder: GIS\dempro
File type: Grid
Topology: Raster
Fields:

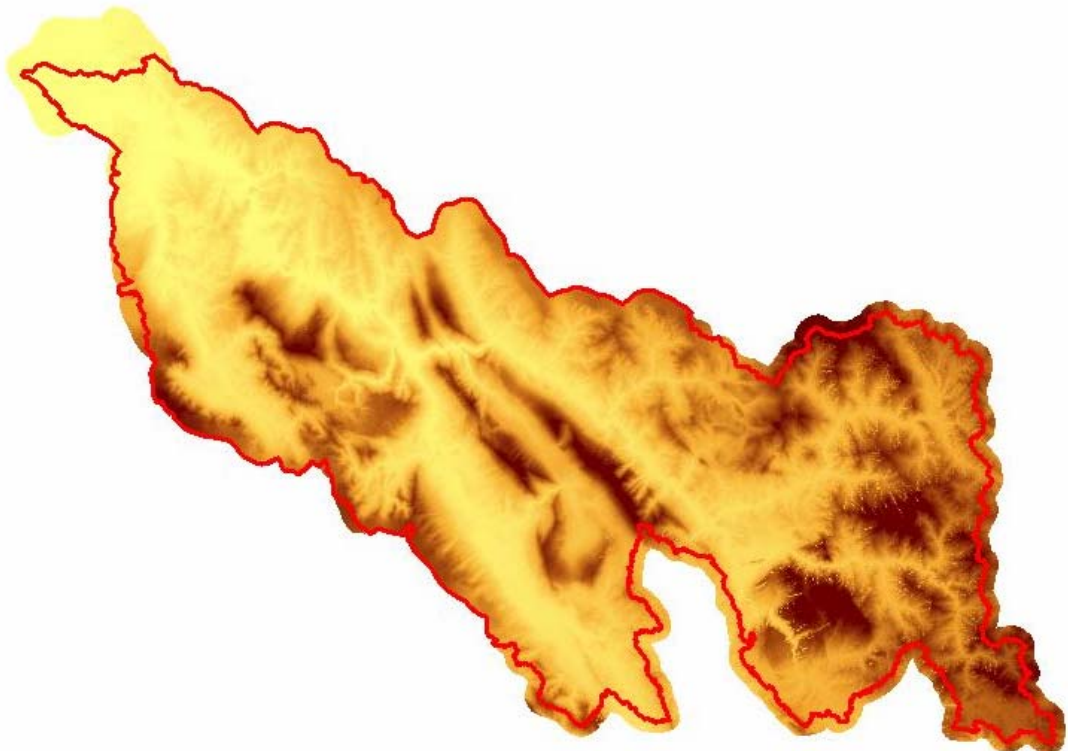


Fig 3: Digital Elevation Model of Aaos/Vjosa Watershed

8. Flow Accumulation

File name: fac
Folder: GIS\dempro
File type: Grid

Topology: Raster
Fields:

9. Flow Direction
File name: fdr
Folder: GIS\dempro
File type: Grid
Topology: Raster
Fields:

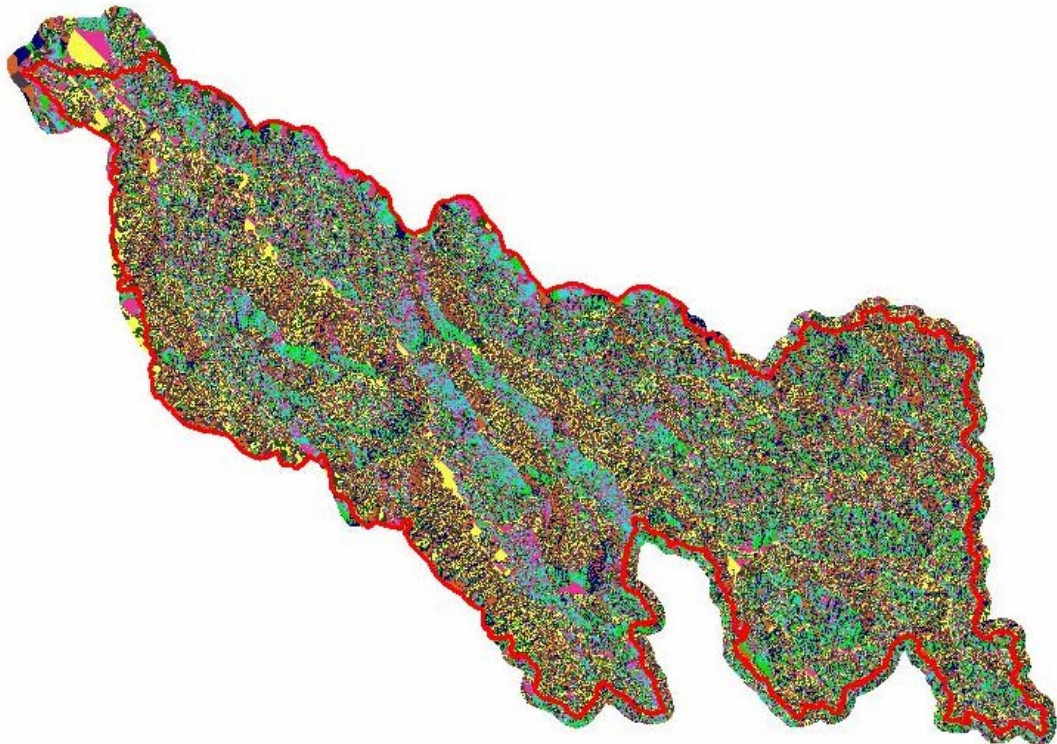


Fig 4. Flow Direction Grid

10. Aspect
File name: demaspect
Folder: GIS\dempro
File type: Grid
Topology: Raster
Fields:

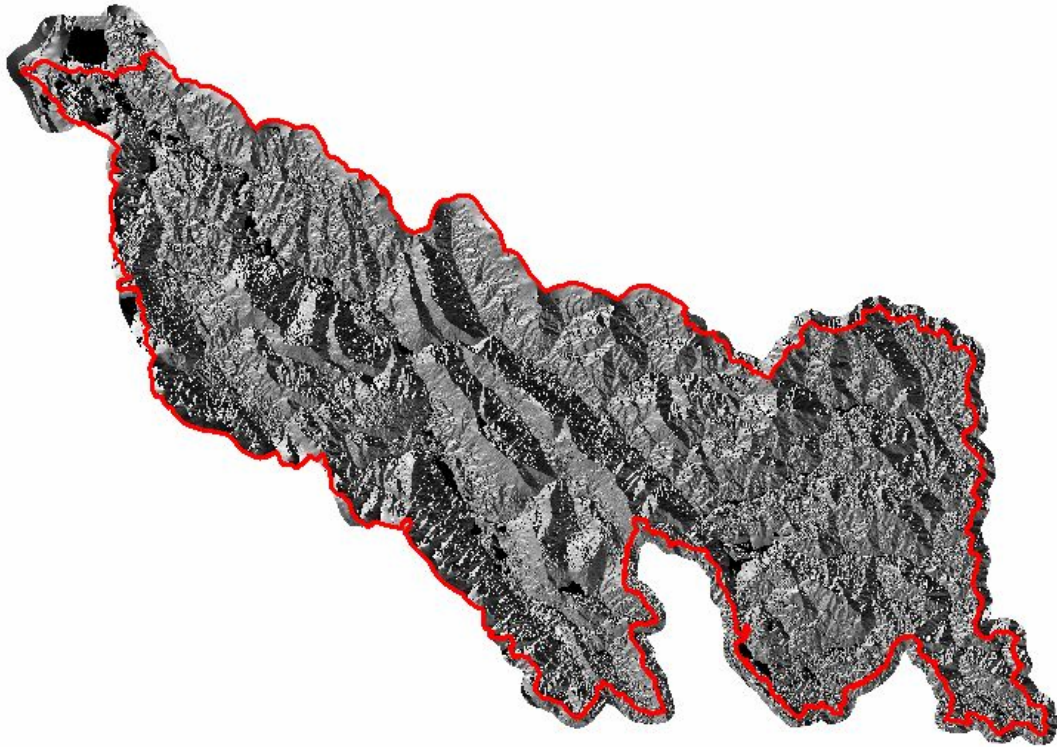


Fig 5: Aspect Grid

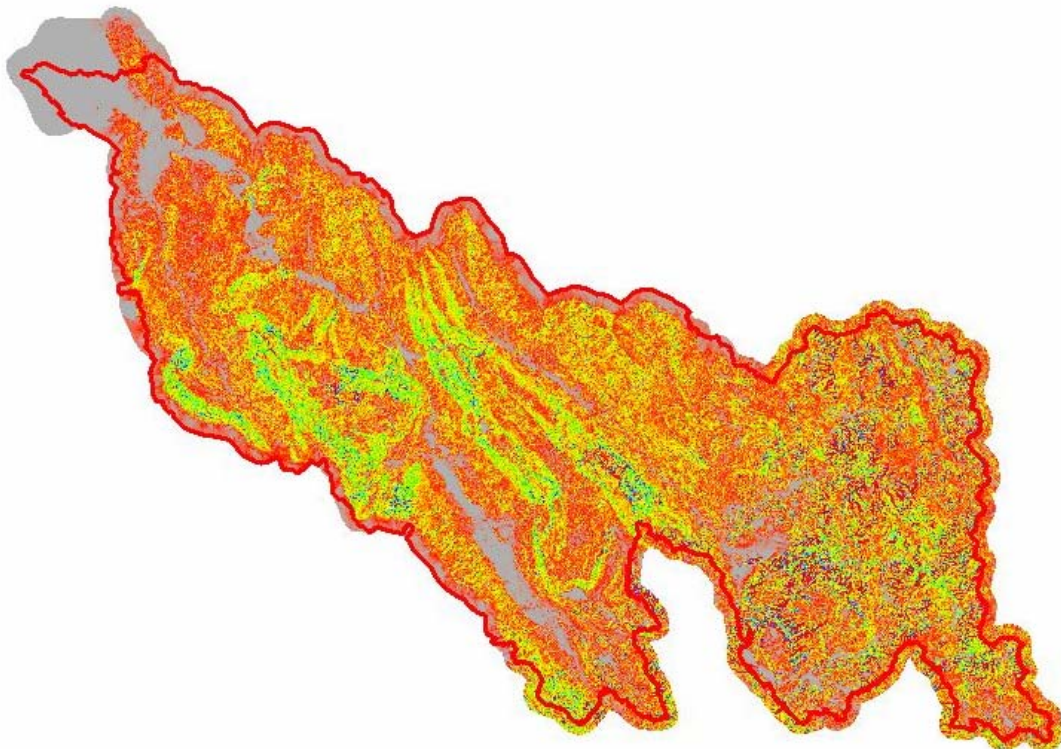


Fig 6: Slope grid

11. Slope
File name: demslope
Folder: GIS\dempro

File type: Grid
Topology: Raster
Fields:

12. Main watershed

File name: Watershed

Folder: GIS\dempro

File type: Shapefile

Topology: Polygon

Fields:

Area: The area of watershed in m²

Perimeter: The perimeter of watershed in m.

13. Subbasins

File name: Subbasins

Folder: GIS\dempro

File type: Shapefile

Topology: Polygons

Fields:

Area: The area of sub basin in m²

Perimeter: The perimeter of sub basin in m.

Name: The name of sub basin

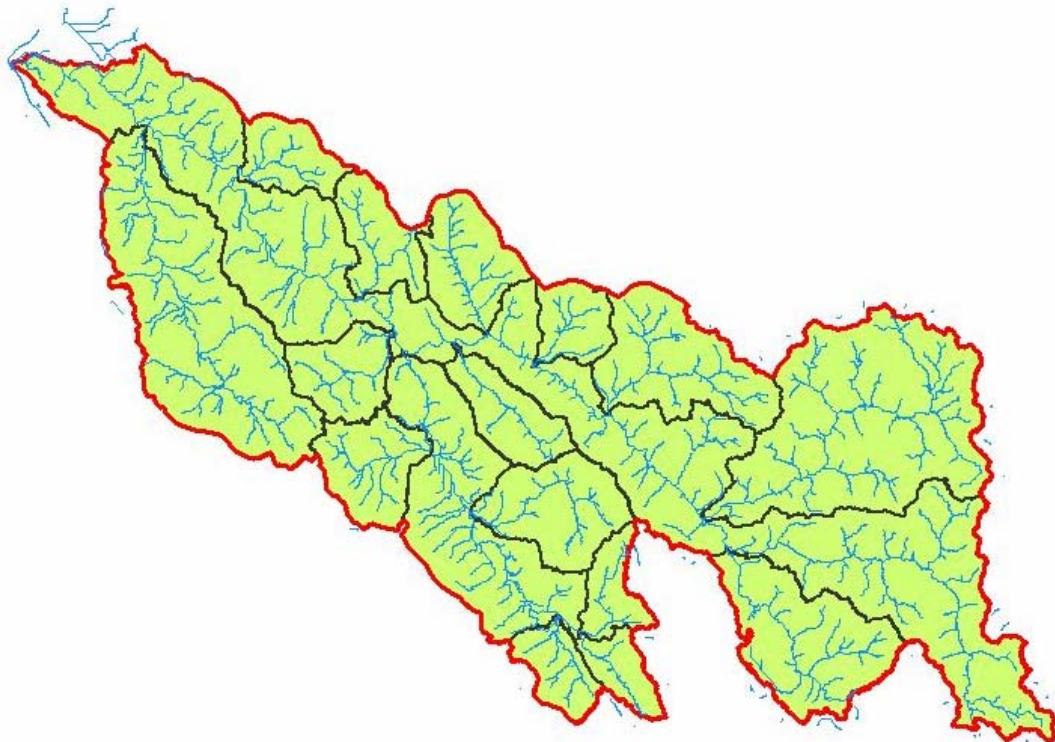


Fig 7: Watershed, Sub basins and main hydrographic network for Aaos/Vjosa River.