DRIN CORDA
COORDINATED ACTION FOR A SUSTAINABLE FUTURE

Enabling Transboundary Cooperation & Integrated Water Resources Management in the extended DRIN RIVER BASIN

5th Drin Stakeholders Conference

Thematic report on Biodiversity and Ecosystems for the Drin River Basin

Matjaž Harmel ZaVita d.o.o.

21 – 22 November 2017
Podgorica

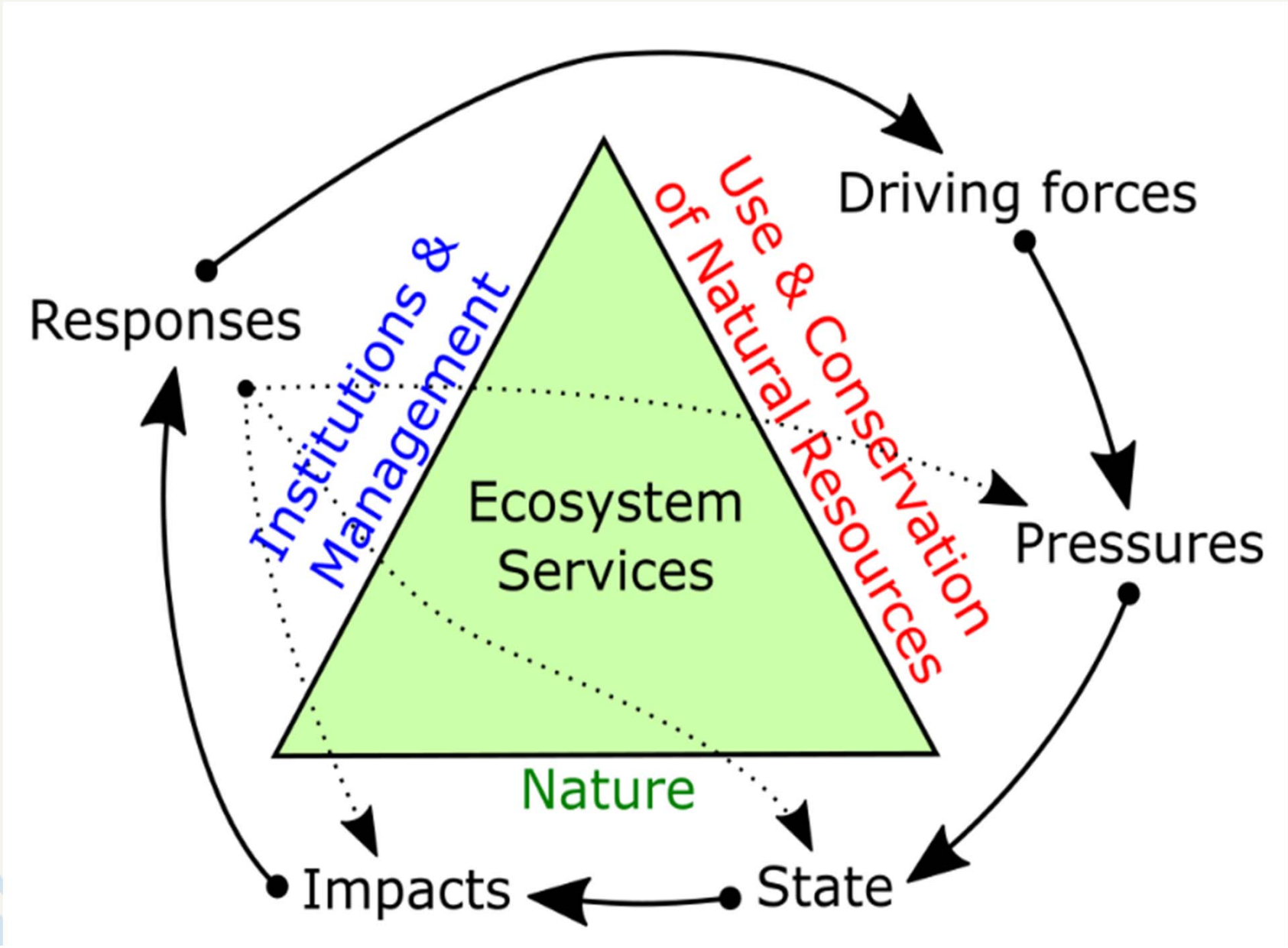
Main objectives

- To provide a comprehensive overview of the state of biodiversity and ecosystems in the Drin River Basin
- To identify data deficiency in species and ecosystem status
- To identify and assess the ecosystem services, as well as the relationships between the origins and consequences of environmental problems
- To provide recommendations for the future activities

Methodology

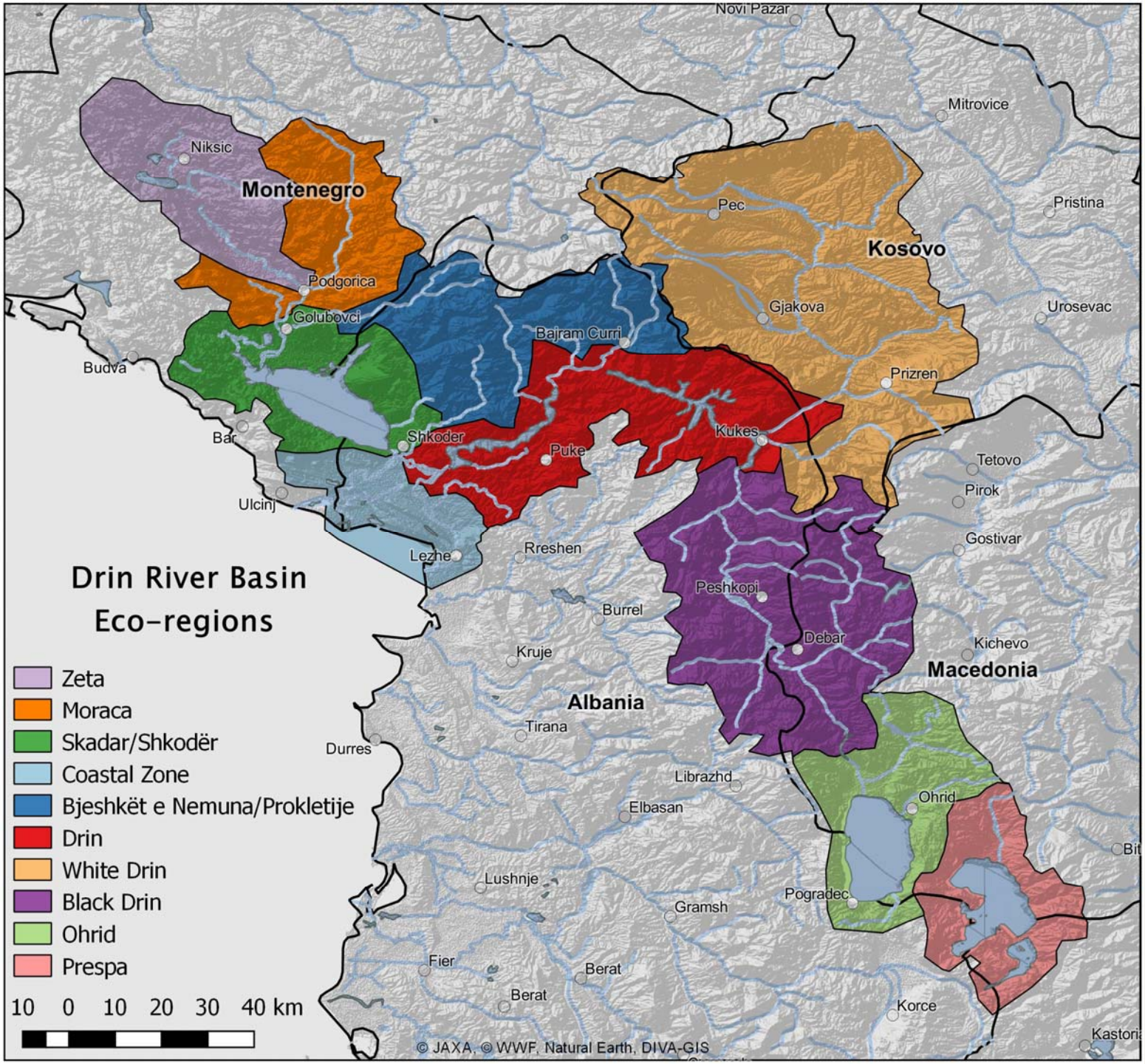
- Collecting data from the institutions
- Definition of Ecosystem services
- DPSIR Assessment
- Recommendations

DPSIR Model


Driving forces
Pressures
State
Impacts
Responses
Institutions & Management
Use & Conservation of Natural Resources
Ecosystem Services
Nature

Definition of Ecoregions

Ecoregion	Brief description
Prespa	Prespa lake basin
Ohrid	Ohrid lake basin without the Prespa lake basin
Black Drin	Black Drin River Basin without Ohrid and Prespa basins
White Drin	White Drin River Basin above the main HP reservoirs
Drin	Central Drin valley dominated by HP reservoirs
Bjeshkët e Nemuna/Prokletije	High mountains drained by several rivers into Drin and Skadar/Shkodra lake
Morača	Morača river basin above Golubovci
Zeta	Zeta river basin, including Karstic field of Nikšić with accumulations
Skadar/ Shkodra	Skadar/Shkodra lake with immediate surroundings affected by the water regime of the lake
Coastal Zone	Buna/Bojana river and old Drin river with their deltas and the adjacent Adriatic shore


Drin River Basin
Eco-regions
Zeta
Moraca
Skadar/Shkodër
Coastal Zone
Bjeshkët e Nemuna/Prokletije
Drin
White Drin
Black Drin
Ohrid
Prespa
10 0 10 20 30 40 km
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Montenegro
Kosovo
Albania
Macedonia
Novi Pazar
Mitrovice
Niksic
Pec
Pristina
Podgorica
Gjakova
Urosevac
Golubovci
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Tetovo
Pirok
Ulcinj
Gostivar
Lezhe
Rreshen
Peshkopi
Burrel
Debar
Kruje
Kichevo
Tirana
Durres
Librazhd
Ohrid
Elbasan
Lushnje
Pogradec
Gramsh
Fier
Berat
Berat
Korce

Available Biodiversity Data

Data on biodiversity suffers from large deficiencies

- Very little comprehensive data on the ecology of species, community interactions, ecosystem dynamics and functions
- Birds, fishes and plants are the best researched, other taxonomic groups like invertebrates, are far less covered
- Data on species composition, status, trends etc. of some taxonomic groups is largely lacking
- Generally protected areas have better data on biodiversity as a result of protected area designation and management

Available Biodiversity Data

- Some parts of the region are better researched than the others
- Generally protected areas have better data on biodiversity as a result of protected area designation and management.
- In some locations outside protected areas information on biodiversity is extremely scarce (e.g. Zeta river ecoregion).
- Some of the available data is a result of old researches and as such has become outdated, giving a misleading picture of the species and community status and trends

Available Biodiversity Data

The available data is found in the following forms:

- as research papers published in specialist journals, which are usually of limited value in terms of inferring species and community trends
- as technical reports from various projects, which are more recently produced, but can suffer from the lack of scientific rigour, are of short time-frames and limited in scope
- as raw data from monitoring programs, but which in some cases lack consistency over time and applied different methodology, for which it is hard to infer wider regional and temporal trends
- as state reports on biodiversity, which basically connect mentioned forms of data

Current State

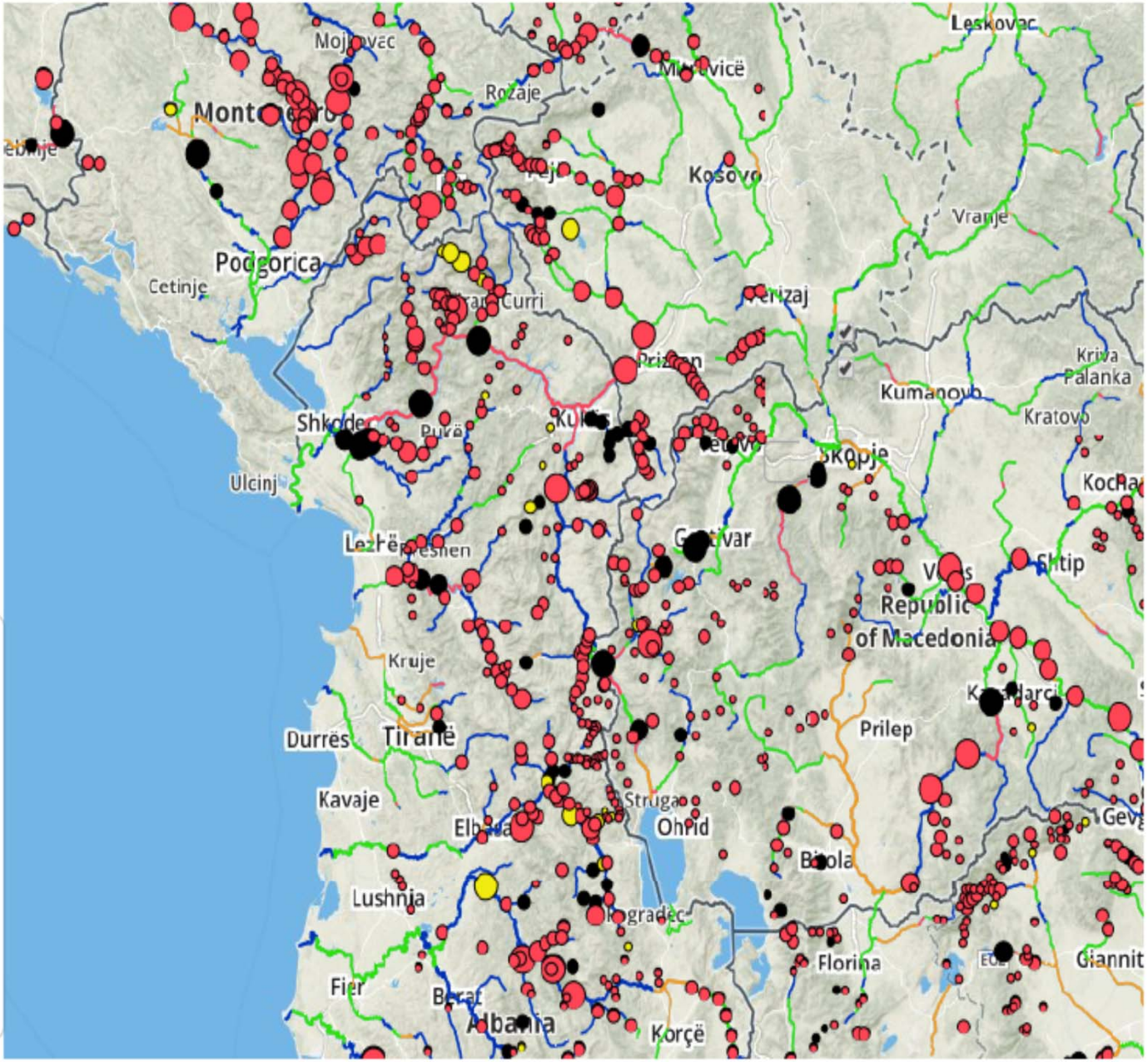
Terrestrial Habitats

- 41 habitat types (Natura 2000 HT) from the Annex 1 of the Habitats directive (*Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora*) are identified in the area
- Lack of data on the spatial distribution of the HT (for many of them there is no data available, but were identified during the field visits)
- The most endangered are grasslands HT due to overuse or abandonment
- The most protected are rocky and mountain habitats
- Big pressures of urbanization
- In some areas forests are endangered due to unsustainable forest management

Freshwater, wetland and brackish HT

- 23 Natura 2000 HT Identified
- Lack of data on the spatial distribution of the HT
- Main pressures are:
  - intensification of agriculture
  - hydro power plant construction
  - regulation of rivers
  - urbanization
  - pollution caused by waste
  - pollution from agriculture
  - pollution from waste water
  - gravel extraction


AK-RAPID



Hydropower Legend

- Existing
- Under construction
- Planned

Hydromorpohological Assessment

- Pristine or near natural
- Slightly to moderately modified
- Extensively modified
- Severely modified/impoundments

http://www.balkanrivers.net/en/map?base=B2&overlays=4,1,2,3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Flora

- No comprehensive floristic information is available for the entire Drin River Basin
- Very high level of biodiversity and endemism
- Some species are endangered due to:
  - intensification of agricultural activities
  - abandoning of agricultural activities
  - unsustainable forest management
  - excessive collection
  - wild fires

Flora - Very high level of biodiversity and endemism

Ecoregion	Number of species
Prespa	1.130 plant + 120 funghi + 102 lichenes
Ohrid	Over 1.000 plant, more than 200 endemits
Black Drin	1.435 plant - NP Mavrovo
White Drin	Over 1.000 plant species, 33 endemic
Drin	Over 1.000 plant species16 endemic
Bjeshkët e Nemuna/Prokletije	Over 1.500 plant species
Morača	122 lichenes
Zeta	?
Skadar/ Shkodra	726 plant species
Coastal Zone	450 plant species, 17 endemic

Fauna

- No comprehensive information is available for the entire Drin River Basin
- Main pressures are:
  - Introduction of alien species
  - Illegal hunting
  - Illegal fishing
  - Overfishing
  - Gravel extraction
  - Damming the rivers
  - Changing of habitats
  - Urbanization

Fauna - Very high level of biodiversity and endemism

Ecoregion	Number of species
Prespa	23 fish (6 endemic), 270 bird (132 breeding), 7 amphibian, 7 reptile, 60 mammals
Ohrid	21 fish (7 endemic), 137 bird, 13 reptiles 10 amphibians, 39 mammals
Black Drin	135 bird, 11 amphibian, 24 reptile, 49 mammals
White Drin	200 bird, 200 butterflies, 250 verterbrates
Drin	13 fish
Bjeshkët e Nemuna/Prokletije	8 fish, 13 amphibian, 10 reptile, 148 bird, 36 mammal, 129 butterflies
Morača	28 fish, 130 bird
Zeta	?
Skadar/ Shkodra	50 fish, 30 reptile, 15 amphibian, 281 bird, 57 mammal
Coastal Zone	50 fish, 11 amphibian

Invasive species

Lack of data on invasive species distribution

- Plants – 9 species
- Fish – 14 species
- Insecta – 1 species
- Decapods-Crustaceans – 1 species

Phytoplankton

High biodiversity in the phytoplankton communities

Ecoregion	Number of species
Prespa	phytoplankton of the pelagic zone - 46 species, 244 diatom algae, 138 taxa of phytoplankton organisms, 270 species of diatoms
Ohrid	789 species of benthic diatoms, 117 endemic, 14 diatom algae
Black Drin	79 species of phytoplankton algae,
Skadar/ Shkodra	1.092 species

Zooplankton

The zooplankton communities have been extensively investigated in the extended Drin River basin

	Number of species
Rotatoria	79
Cladocera	27
Copepoda	12

Benthic invertebrates

Higher biodiversity in comparison to other biolgocial communiuties

Ecoregion	Number of species
Prespa	> 500 macroinvertebrates
Ohrid	586 benthic macroinvertebrates 72 endemic
Black Drin	1.172 macroinvertebrates, 86 endemic


Assessment
21-22 November 2017

Assessment and Synthesis of management and institutional setting

- Ineffective Spatial planning
  - Triggering new erosion processes
  - Uncontrolled disposal of waste waters
  - Uncontrolled disposal of solid waste
  - Uncontrolled water abstraction
- Ineffective Impact assessment
  - Transposition of SEA and EIA Directive is done
  - Poor implementation of Directives
  - Poor control

Assessment and Synthesis of management and institutional setting

- Water management
  - Interests of energy, agriculture and fisheries sector prevail nature protection sector
- Forest management
  - All countries have public service that prepare FMP
  - In some areas control of implementation od FMP is poor
  - High demand for fuelwood
  - Currently state institutions are not in the position to control illegal cutting

Assessment and Synthesis of management and institutional setting

- Protected areas management
  - PA managers only/mainly focused on restrictions, control, entrance fees and similar mechanisms of protection
  - PA managers rarely implement active management measures/activities neither they suggest them to the land owners. In some cases they only manage sanitary cuttings
  - generally the cooperation between PA institutions and local communities is weak
  - staffing and budgeting problems of PA managers
  - PA staff need to have adequate education, training and skills

Protected areas

Overall around 500.000 ha under different categories of protection in the Drin River basin

Category	Number	Area (ha)
I	21	15.914
II	10	325.383
III	15	49.566
IV	3	82.115
V	9	85.813

Ecosystem services

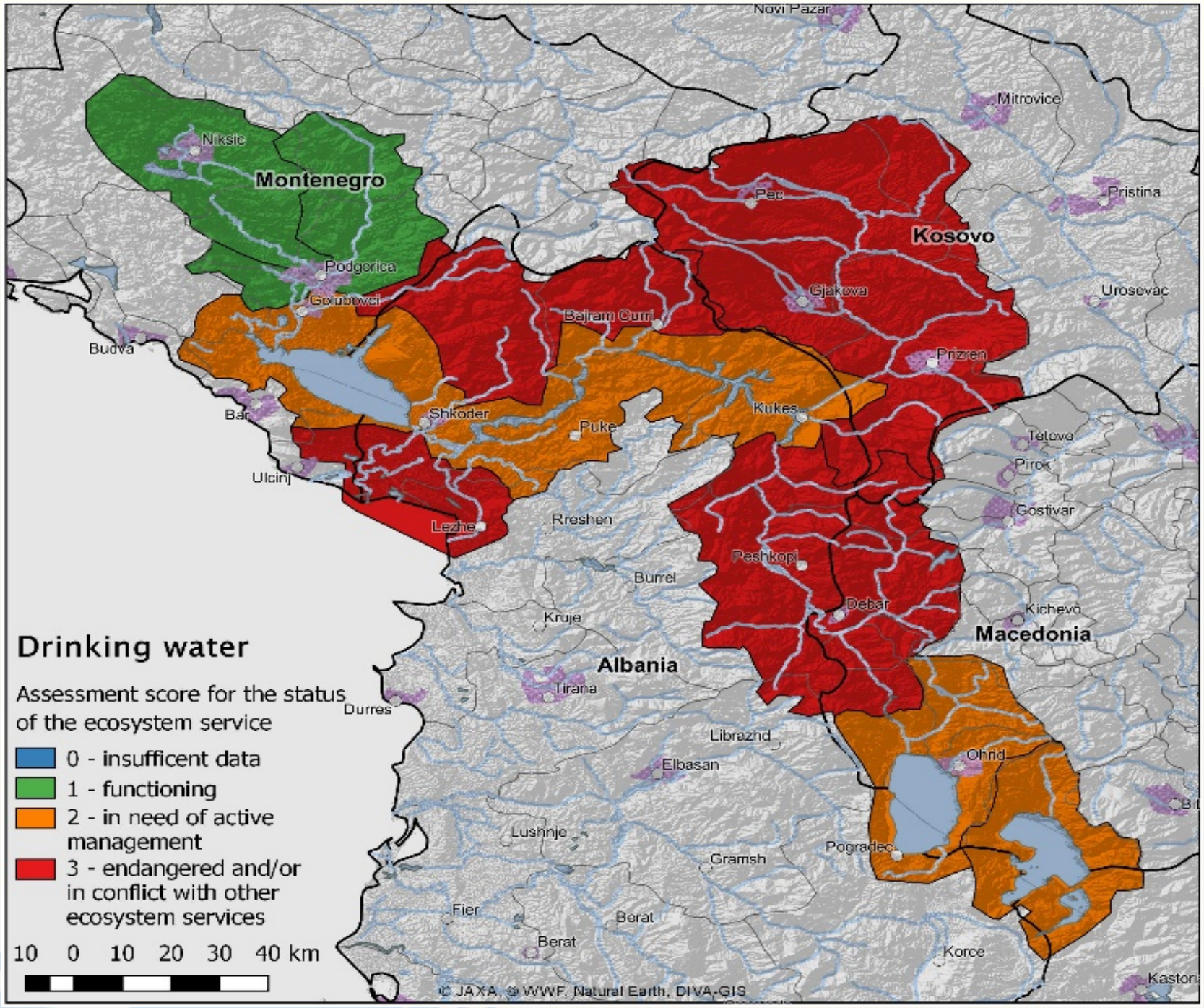
- Ecosystem services is the collective term describing the different benefits that are provided by the natural landscape when it is functioning properly
- First step is identification of ecosystem services
- Assessment by the ecoregion

Ecosystem services

- The ecosystem service that are most at risk and need attention are:
  - Fishing and aquaculture, especialy in Coastal zone, Drin and Black Drin
  - Hydropower, especialy in Coastal zone, Drin, Black Drin, White Drin and Bjeshket e Nemuna/Prokletije
  - Wood, in the same ecoregion as hydropower
  - Drinking water, especialy in Coastal zone, Black Drin, White Drin and Bjeshket e Nemuna/Prokletije
  - Farming, especially in Prespa and Ohrid
  - Gravel, especially in Skadar/Shkodra and Morača
  - Tourism, especially in Coastal zone

Ecosystem service	Provided by terrestrial habitats	Provided by aquatic habitats
Farming	+	
Fishing and aquaculture		+
Animal husbandry	+	
Wild food and herb collection	+	
Wood	+	
Gravel		+
Drinking water		+
Irrigation		+
Hydropower		+
Climate change mitigation	+	+
Moderation of extreme weather effects		+
Erosion prevention and maintenance of soil fertility	+	+
Biological control	+	

Ecosystem service	Provided by terrestrial habitats	Provided by aquatic habitats
Wastewater treatment	+	+
Local climate and air quality	+	+
Habitats for species	+	+
Maintenance of genetic diversity	+	+
Recreation and health	+	+
Tourism	+	+
Aesthetic appreciation and inspiration	+	+
Spiritual experience	+	+


Drinking water
Assessment score for the status of the ecosystem service
0 - insufficent data
1 - functioning
2 - in need of active management
3 - endangered and/or in conflict with other ecosystem services
10 0 10 20 30 40 km
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Montenegro
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Mitrovice
Pristina
Niksic
Podgorica
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Burrel
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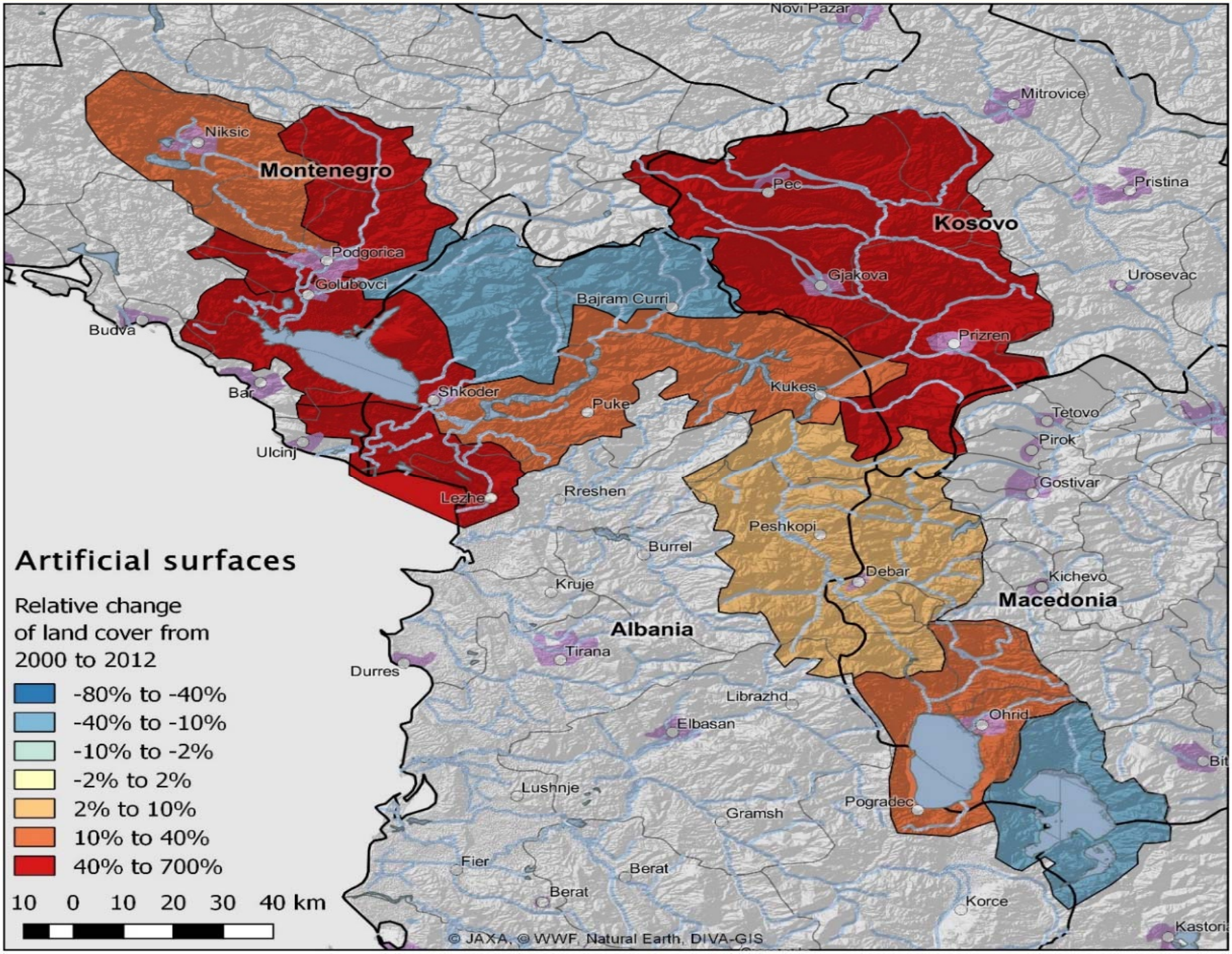
Kruje
Kichevo
Tirana
Durres
Librazhd
Ohrid
Elbasan
Lushnje
Pogradec
Gramsh
Fier
Berat
Korce

Land use

Comparison of CORINE Land Cover 2000 – 2012

Land-use type	2000	2012	Comparison (in ha)
Artificial surfaces	27.703,28	40.656,45	12.953,17
Agricultural areas	444.248,32	438.489,48	-5.758,85
Pastures	36.456,31	35.328,60	-1.127,72
Forest and semi natural areas	1.101.653,22	1.086.312,33	-15.340,88
Natural grasslands	224.510,44	208.397,45	-16.113,00
Open spaces with little or no vegetation	101.771,10	124.302,64	22.531,54
Inland wetlands	15.745,91	16.154,70	408,79
Maritime wetlands	922,15	958,24	36,09
Inland waters	118.828,52	121.115,28	2.286,76
Marine waters	18.776,02	18.900,12	124,10


Artificial surfaces
Relative change
of land cover from
2000 to 2012
-80% to -40%
-40% to -10%
-10% to -2%
-2% to 2%
2% to 10%
10% to 40%
40% to 700%
10 0 10 20 30 40 km
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Montenegro
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Lushnje
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Berat
Korce

DPSIR Model Assessment – Driving forces

- rapid economic development and transformation
- demographic shift from rural to urban areas
- increased demand for natural resources and ecosystem services
- increasing the demand for energy
- climate change
- globalisation

DPSIR Model Assessment – Pressures

- Urbanisation
- Construction of new hydropower plants
- Agriculture
- Land Abandonment
- Overuse/underuse of pastures and grasslands
- Overuse of forests
- Hunting
- Collection of edible and medicinal plants and berries
- Unregulated fishing
- Pollution of Water and Solid Waste
- Mineral extraction
- Wildfires
- Visitors to nature


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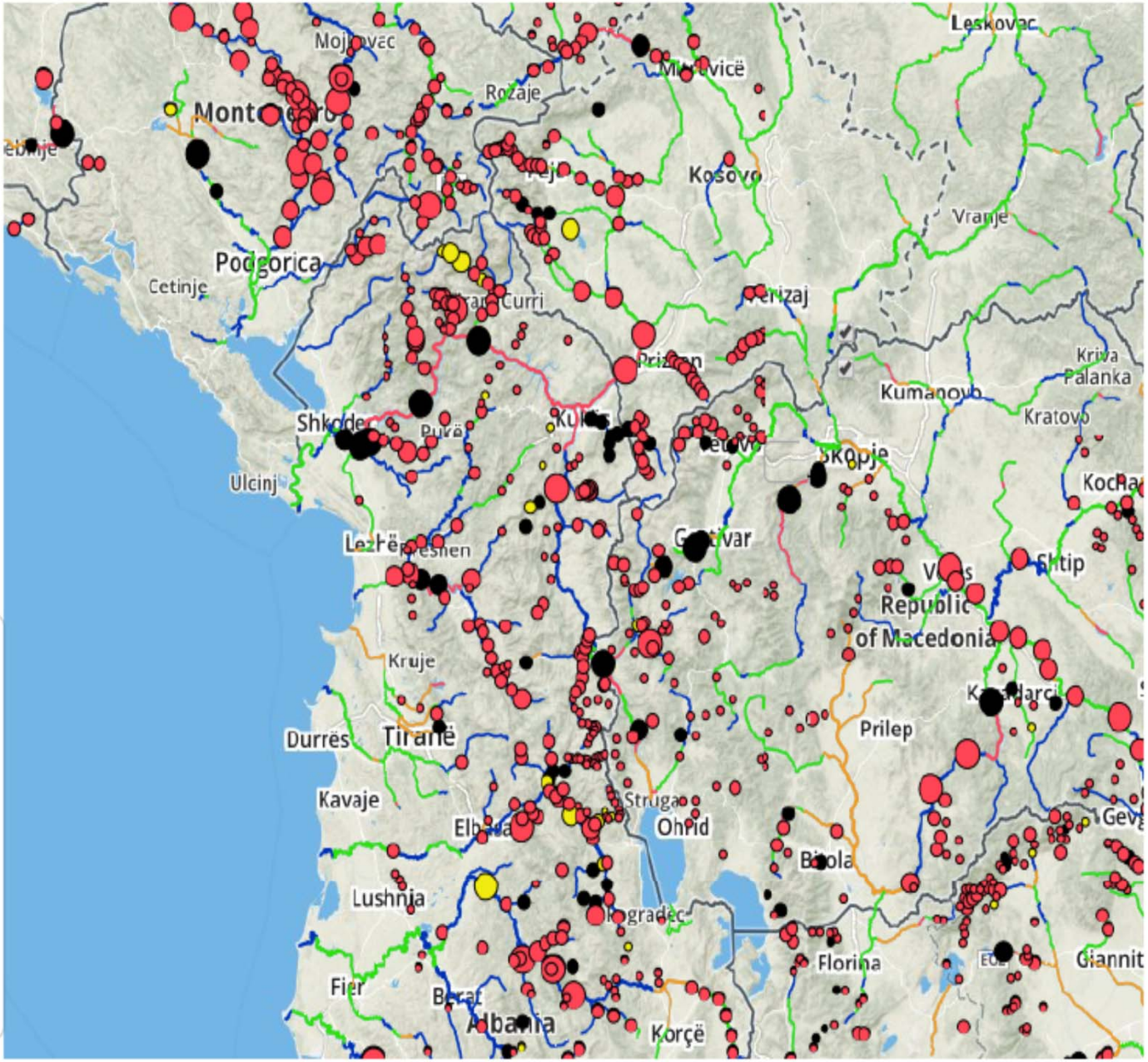

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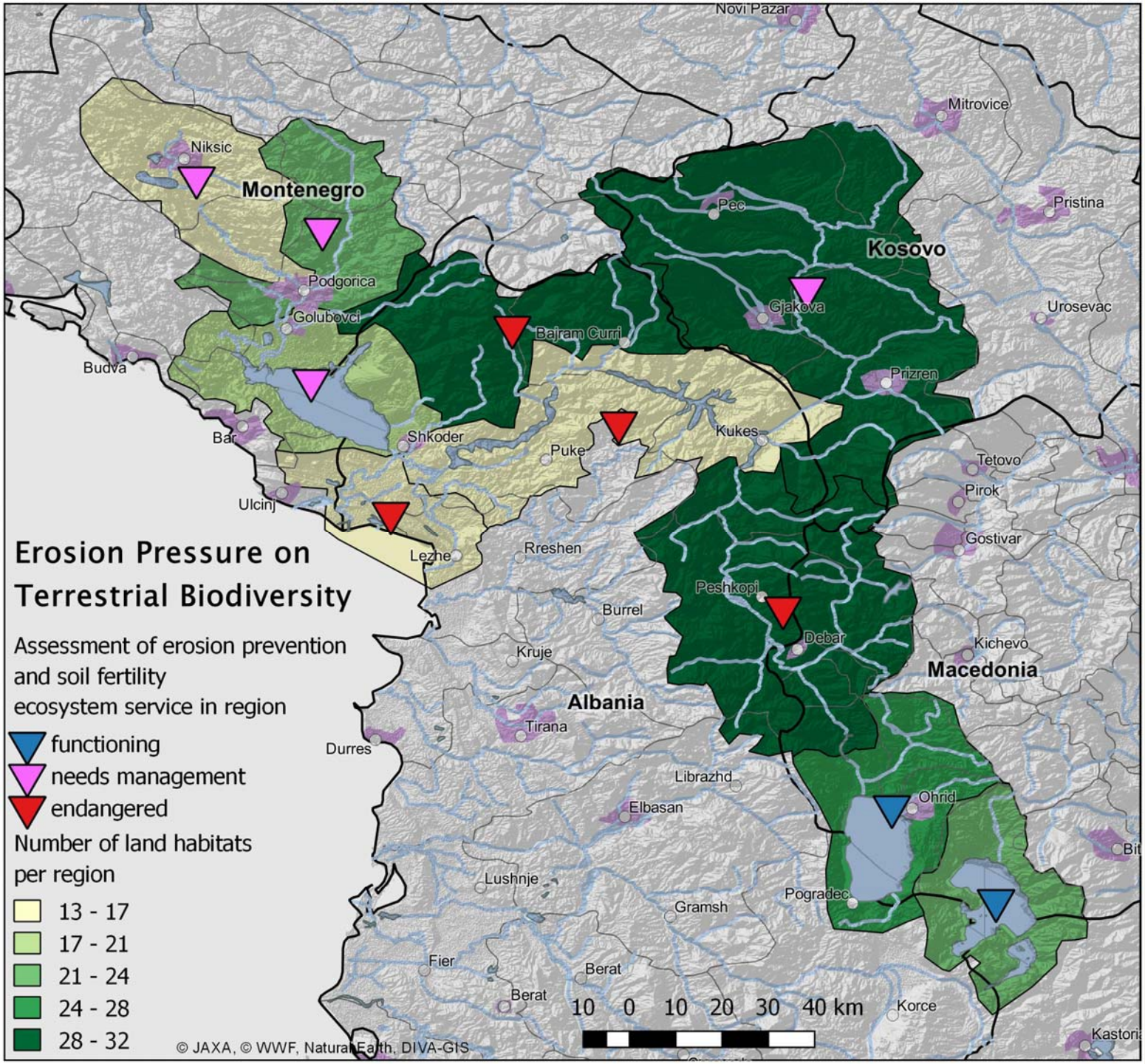
DPSIR Model Assessment – State

- a very high level of biodiversity compared to the rest of Europe but very limited certainty of information about the actual biodiversity
- Several parts of the basin are considered Important Plant and Important Bird Areas
- At the same time some habitats and species have been destroyed
- Overfishing and introduction of alien species
- Urbanization and infrastructure construction
- Lack of probiodiversity management

DPSIR Model Assessment - Impacts

- Loss of biodiversity and ecosystem services
  - Fishing
  - Wood
  - Availability of water for irrigation and drinking water
  - Hydropower
  - Agriculture
  - Collection of wild herbs and berries
  - Regulation of weather events
  - Gravel
  - Climate change mitigation
  - Tourism and Recreation


Erosion Pressure on Terrestrial Biodiversity
Assessment of erosion prevention and soil fertility ecosystem service in region
functioning
needs management
endangered
Number of land habitats per region
13 - 17
17 - 21
21 - 24
24 - 28
28 - 32
Montenegro
Kosovo
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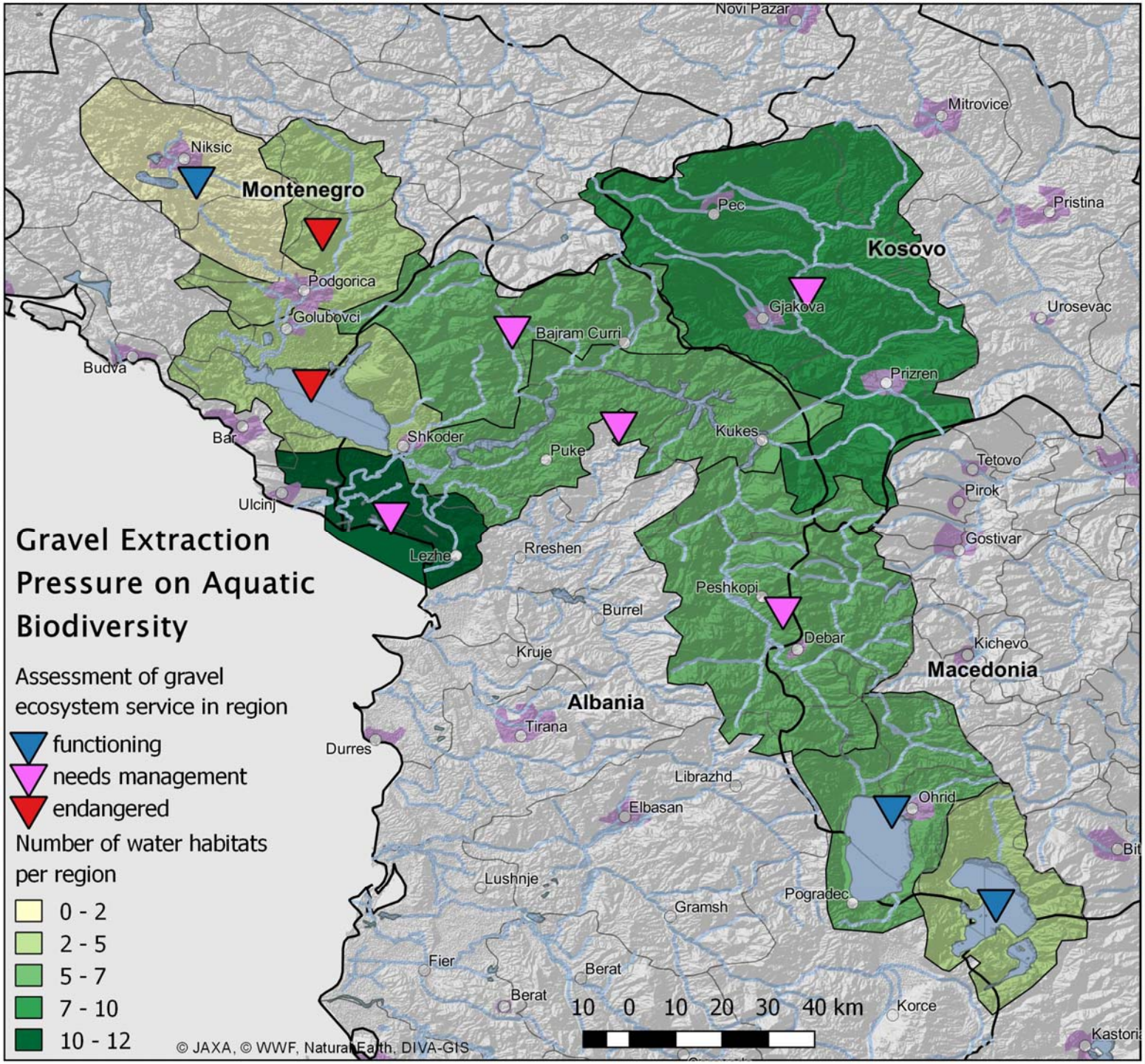
Gravel Extraction Pressure on Aquatic Biodiversity
Assessment of gravel ecosystem service in region
functioning
needs management
endangered
Number of water habitats per region
0 - 2
2 - 5
5 - 7
7 - 10
10 - 12
Montenegro
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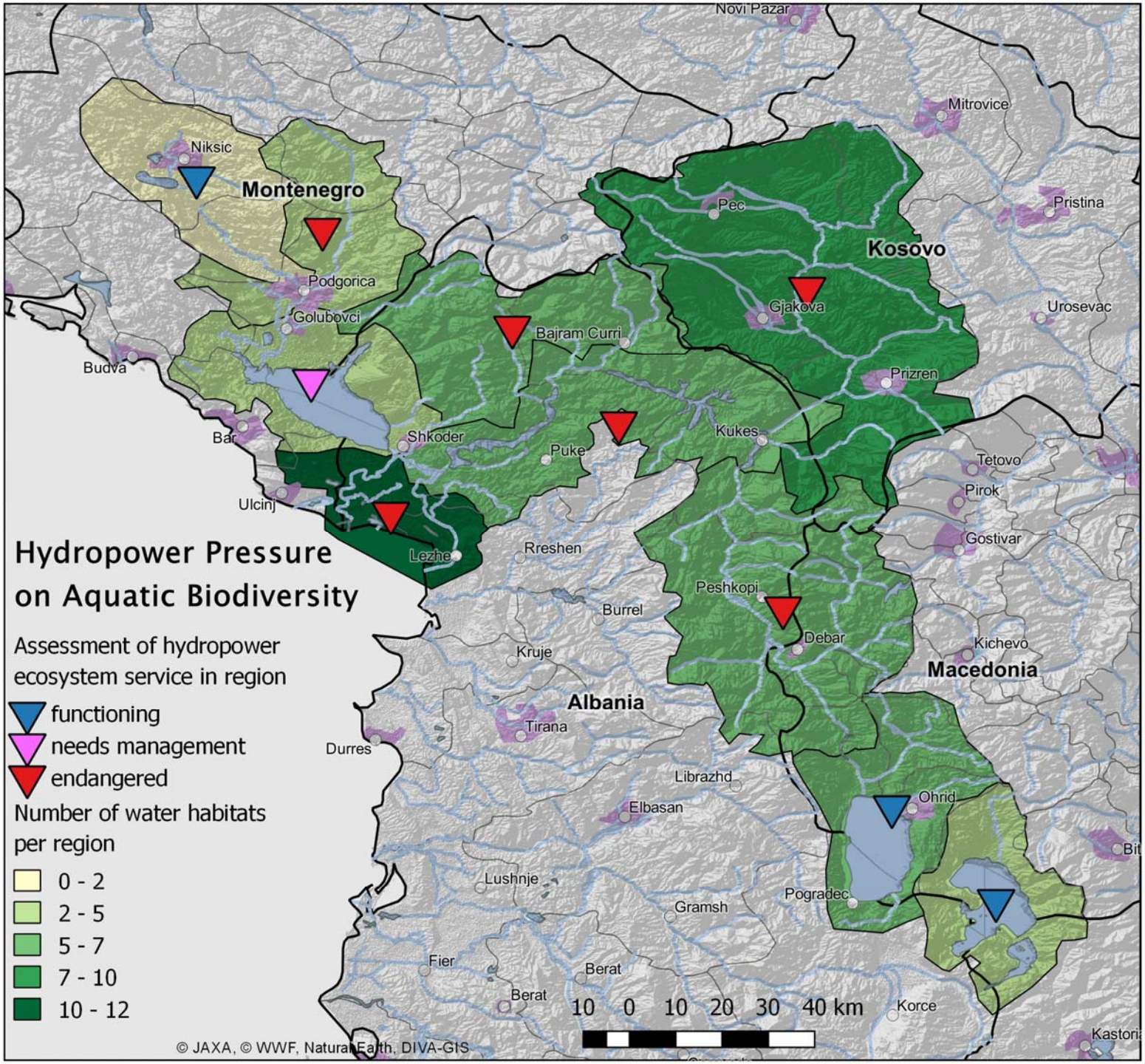
Hydropower Pressure on Aquatic Biodiversity
Assessment of hydropower ecosystem service in region
functioning
needs management
endangered
Number of water habitats per region
0 - 2
2 - 5
5 - 7
7 - 10
10 - 12
Montenegro
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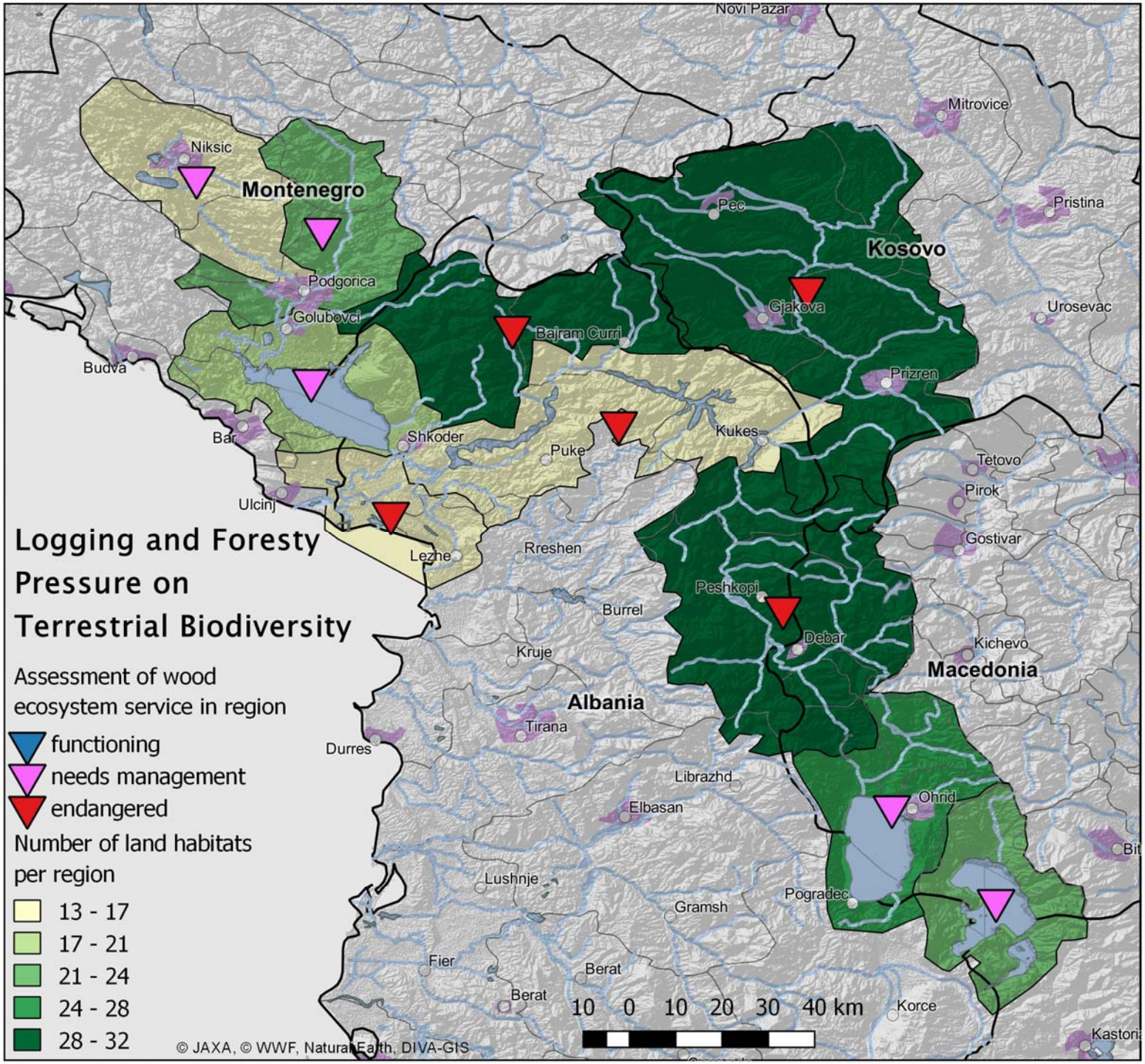
Logging and Foresty Pressure on Terrestrial Biodiversity
Assessment of wood ecosystem service in region
functioning
needs management
endangered
Number of land habitats per region
13 - 17
17 - 21
21 - 24
24 - 28
28 - 32
Montenegro
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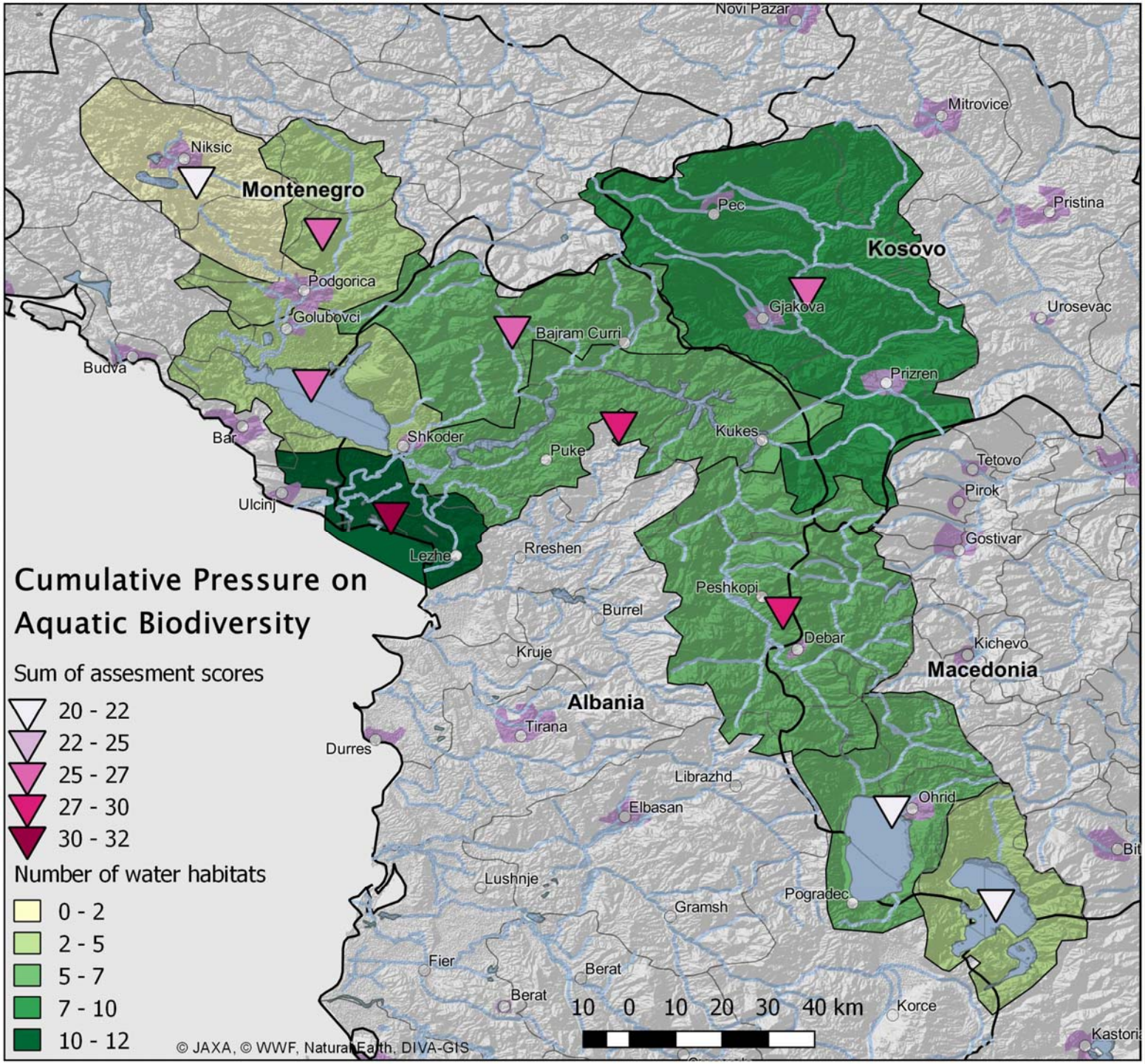
Cumulative Pressure on Aquatic Biodiversity
Sum of assesment scores
20 - 22
22 - 25
25 - 27
27 - 30
30 - 32
Number of water habitats
0 - 2
2 - 5
5 - 7
7 - 10
10 - 12
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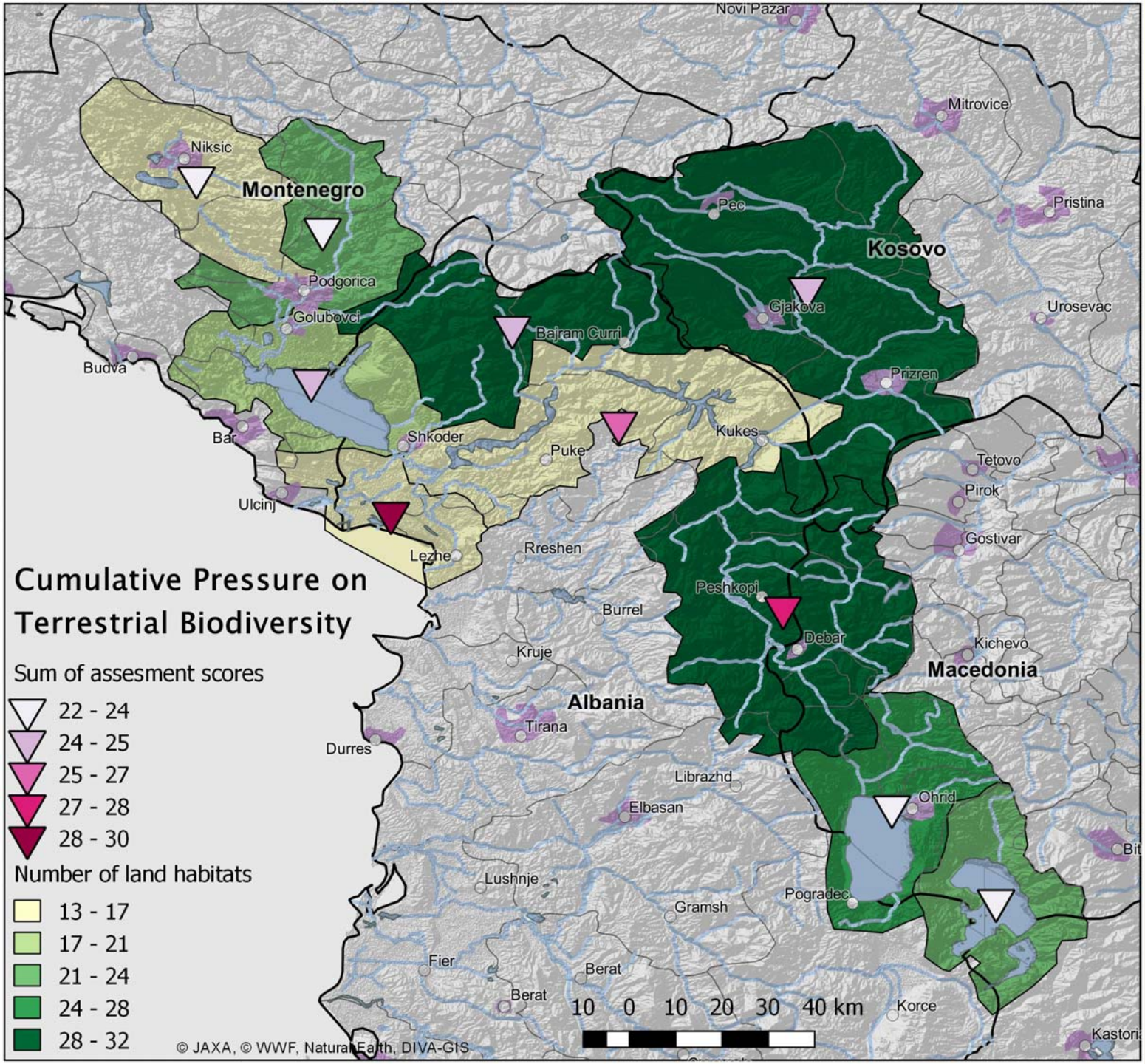
Cumulative Pressure on Terrestrial Biodiversity
Sum of assesment scores
22 - 24
24 - 25
25 - 27
27 - 28
28 - 30
Number of land habitats
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Ohrid
Elbasan
Lushnje
Pogradec
Gramsh
Fier
Berat
Berat
Korce
10 0 10 20 30 40 km
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DPSIR Model Assessment - Responses

- Management and institutional setting
  - Water management
  - Spatial planning
  - Agriculture
  - Forestry
  - Protected areas

OPPORTUNITIES	CHALLENGES
Sustainable use of forests, pastures, agricultural land, waters, wild plants and animals provides an economic opportunity for the rural populations and countries as a whole	Collapse of aquatic biodiversity if all the planned hydropowerplants are constructed and fish stocks are not adequately protected and recovered;
	Breakdown of the three high value lakes (Skadar/Shkodra, Ohrid, Prespa) due to urbanisation, pollution and overfishing;
	Reduction of productivity of mountain forests and grasslands due to poor management and effects of climate change including wild fires;
The nature of the basin is a basis for the development of nature based sustainable tourism,	Loss of valuable natural areas including wetlands to urbanisation in the valleys and plains;
Increased resilience to weather events and effects of climate change	Reduced resilience to severe weather events, increase erosion;
Climate change mitigation (carbon sequestration in forests, grasslands and wetlands) provides a new source of revenues for the countries	

Reccommendations

21-22 November 2017

ACTOR	RECOMMENDATION
DrinCorda	Develop a common vision of conservation
	Develop a joint River Basin Management Plan
	Setup flagship biodiversity projects
	Interdisciplinary transboundary capacity building programme
	Explore opportunities for large scale climate change mitigation and adaptation related funding

ACTOR	RECOMMENDATION
DrinCorda together with National Governments	Strategic assessment of cumulative effects of the planned hydropower projects and setting clear environmental and conservation requirements for the projects that will go ahead
	Set up and facilitate a Drin River Basin wide network for cooperation and coordination between the responsible national sectoral institutions and other relevant stakeholders (scientists, local authorities, NGOs, businesses…)

ACTOR	RECOMMENDATION
National Governments/authorities	Clarification of responsibilities and improvement of coordination between all institutions involved in conservation and natural resource management
	Strengthen the natural resource management institutions. Provide them with adequate long-term budgets, staffing and training.
	Increase the area of protected areas of rivers, streams and wetlands, as part of future Natura 2000 network.
	Introduction of community based management of natural resources,
	Start systematic research and monitoring of biodiversity and its management in the Drin River Basin focusing on the information gaps and conservation priorities.

Thanks for your attention ☺

Additional information:

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21-22 November 2017