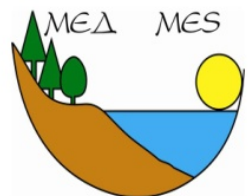
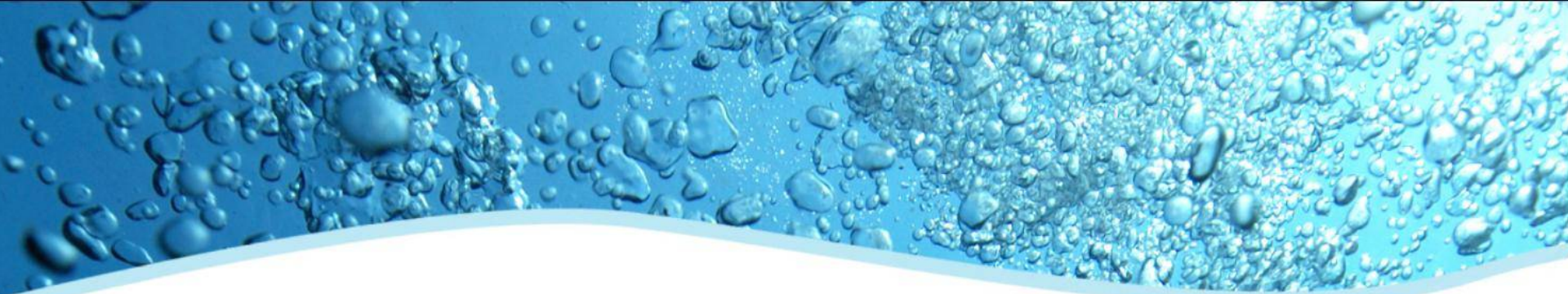


Ecological status assessment of the water ecosystems of the Jablanica Mountain

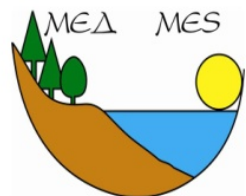
Valentina Slavevska Stamenković & Biljana Rimcheska





Ecological status assessment of the water ecosystems of the Jablanica Mountain

*Financed by Critical Ecosystem Partnership Fund (CEPF);
implemented by Macedonian Ecological Society (MES)*





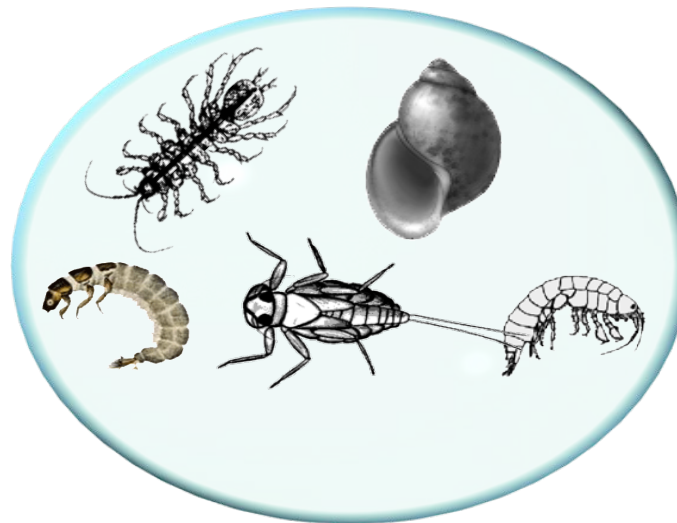
PROJECT DESCRIPTION

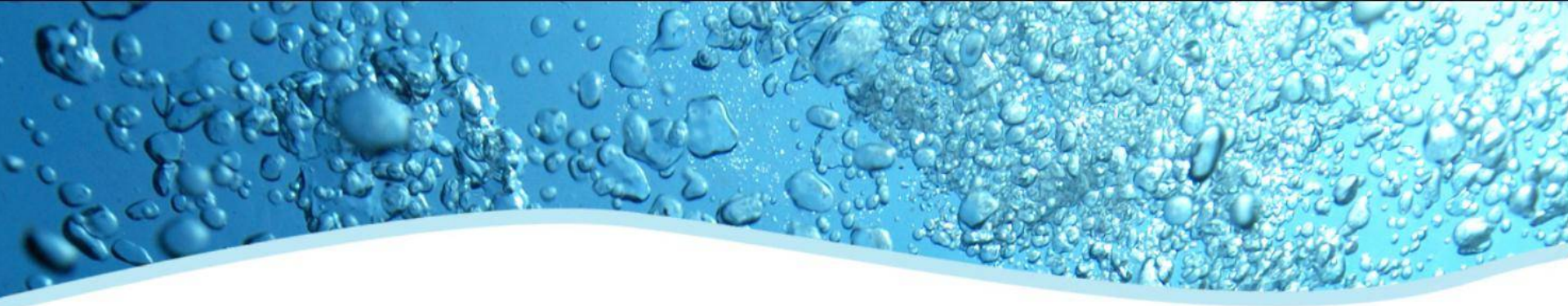
The aim of this project:

- to raise public awareness;
- education of local community;
- enabling NGOs to engage in protecting and preserving the Drim watershed

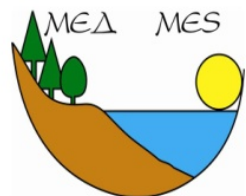
ECOLOGICAL STATUS ASSESSMENT OF THE WATER ECOSYSTEMS OF THE JABLANICA MOUNTAIN

- MACROINVERTEBRATE ANALYSE -





SUBLIMATE OF THE ESTABLISHED RECCOMENDATIONS FOR THE NECESSARY CONSERVATION ACTIONS OF AQUATIC ECOSYSTEMS



The background of the slide features a blue, cracked globe resting on a calm body of water. The globe is illuminated from above, with a bright light source visible in the sky, creating a reflection on the water's surface. The globe's surface is textured with numerous cracks and fissures, suggesting fragility or damage. The overall color palette is dominated by various shades of blue, from deep navy to lighter, hazy tones near the horizon.

...SERVIVLE OF THE LIFE ON EARTH

**... COSES DISRUPTION OR LOSS OF SPECIES
HABITATS...**

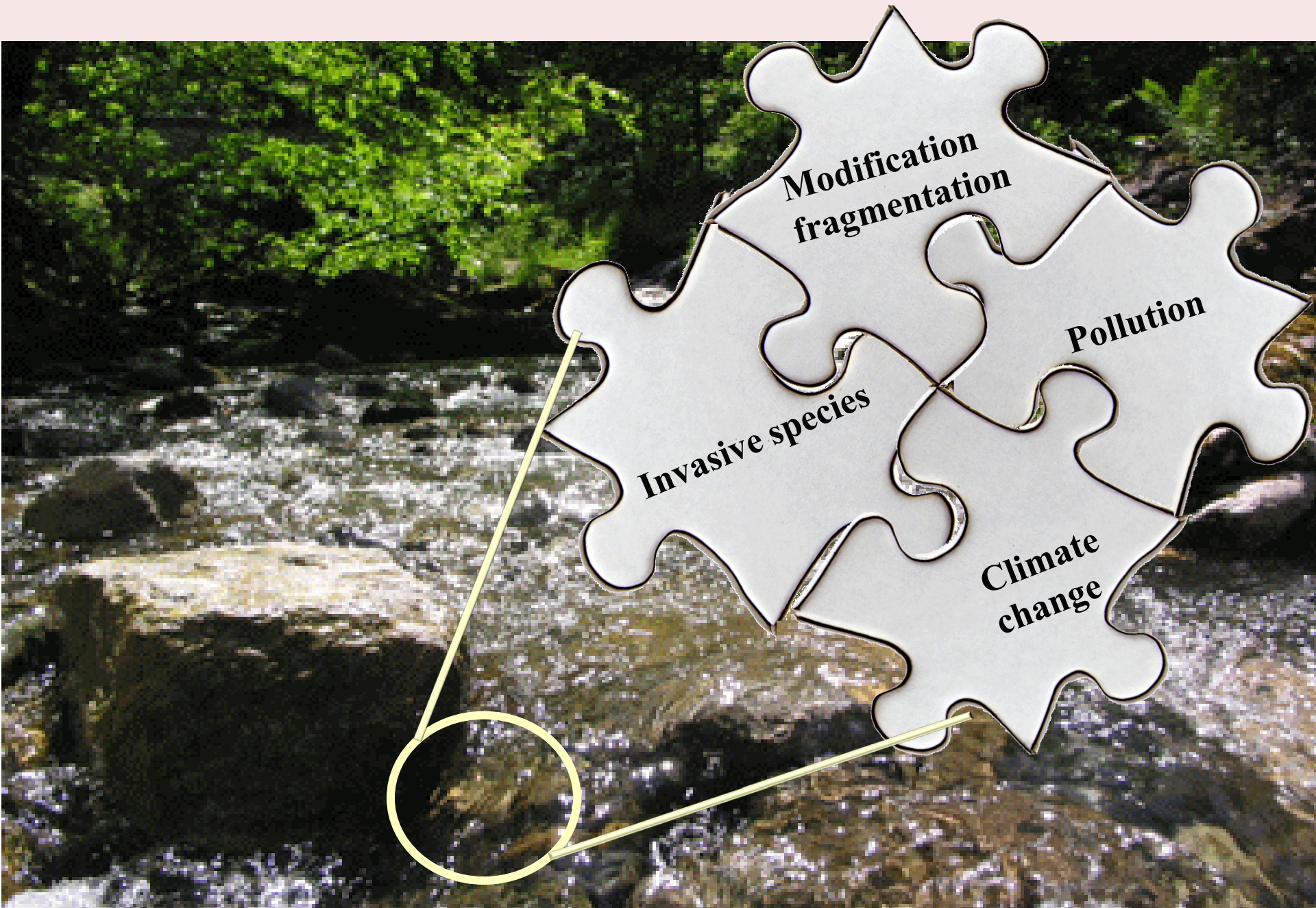
Aquatic ecosystems



The image features a stylized representation of the Earth as a globe. The globe is depicted with a dark, cracked upper hemisphere and a lighter, melting lower hemisphere, suggesting a loss of ice or structural integrity. It is positioned in the center, with a bright, circular light source (representing the sun or moon) in the upper right corner. The background is a deep blue sky with wispy clouds. A prominent yellow banner with a black border is centered across the middle of the image, containing the text "...AQUATIC ECOSYSTEMS ARE ONE OF THE MOST ENDANGERED ECOSYSTEMS...". The globe is reflected in a body of water at the bottom of the frame.

**...AQUATIC ECOSYSTEMS ARE ONE OF THE MOST
ENDANGERED ECOSYSTEMS...**

What are the major threats for survival of freshwater biodiversity?

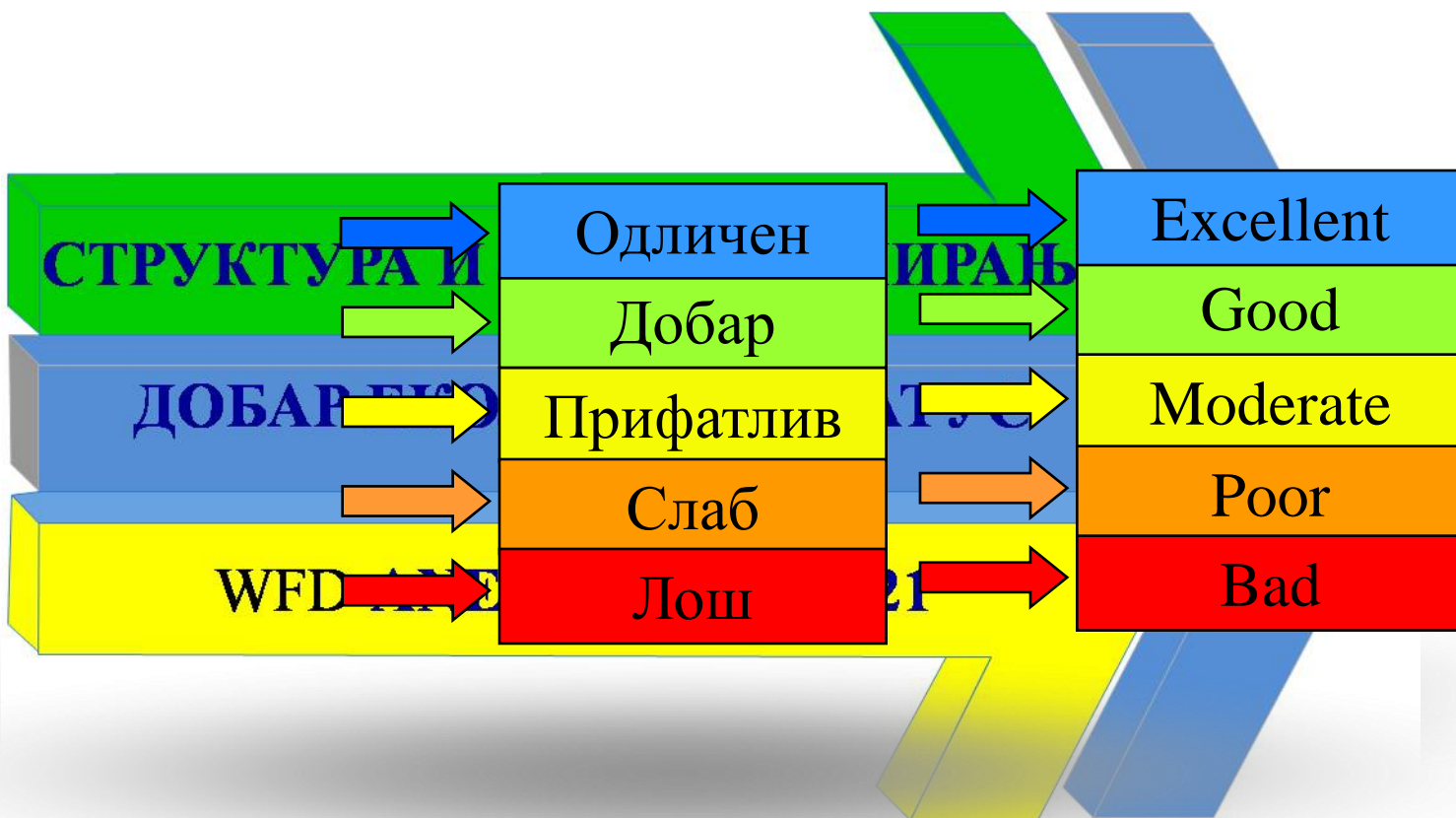


...for protection of surface water and groundwater in
associate and member states of EU...



WFD - Water Framework Directive

Good
Status
2015



INTRODUCTION



Biological elements

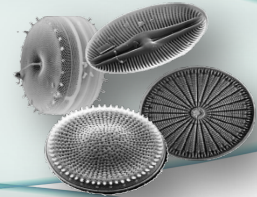
**Hydro-morphological
elements**

**Physical-chemical
elements**

BIOLOGICAL ELEMENTS

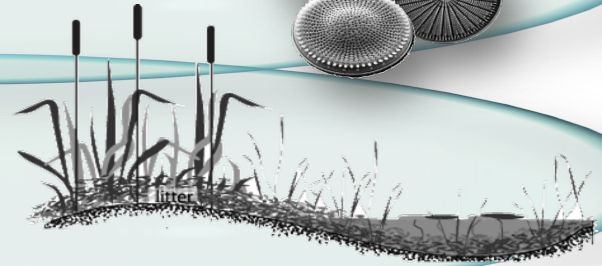
1

Phytobentos



2

Macrophytes



3

Macroinvertebrates



4

Fish fauna



MACROINVERTEBRATES





Macroinvertebrates

- Artificially established terminology refers to the part of the groups of invertebrate animals that inhabit the water ecosystem -

“Macro”

- ♣ large enough ($> 500 \mu\text{m}$) visible with naked eye and to be captured in the net with mesh of the size $\geq 200-500 \mu\text{m}$

“Invertebrates”

- ♣ animals without vertebra

- 
- # Macroinvertebrates
- Artificially established terminology refers to the part of the groups of invertebrate animals that inhabit the water ecosystem -
- “Macro”
- ♣ large enough ($> 500 \mu\text{m}$) visible with naked eye and to be captured in the net with mesh of the size $\geq 200-500 \mu\text{m}$
- “Invertebrates”
- ♣ animals without vertebra



Macroinvertebrates

- Artificially established terminology refers to the part of the groups of invertebrate animals that inhabit the water ecosystem -

“Macro”

- ♣ large enough ($> 500 \mu\text{m}$) visible with naked eye and to be captured in the net with mesh of the size $\geq 200-500 \mu\text{m}$

“Invertebrates”

- ♣ animals without vertebra



Macroinvertebrates

- Artificially established terminology refers to the part of the groups of invertebrate animals that inhabit the water ecosystem -

“Macro”

- ♣ large enough ($> 500 \mu\text{m}$) visible with naked eye and to be captured in the net with mesh of the size $\geq 200-500 \mu\text{m}$

“Invertebrates”

- ♣ animals without vertebra



Macroinvertebrates

- Artificially established terminology refers to the part of the groups of invertebrate animals that inhabit the water ecosystem -

“Macro”

- ♣ large enough ($> 500 \mu\text{m}$) visible with naked eye and to be captured in the net with mesh of the size $\geq 200-500 \mu\text{m}$

“Invertebrates”

- ♣ animals without vertebra



Macroinvertebrates

- Artificially established terminology refers to the part of the groups of invertebrate animals that inhabit the water ecosystem -

“Macro”

- ♣ large enough ($> 500 \mu\text{m}$) visible with naked eye and to be captured in the net with mesh of the size $\geq 200\text{-}500 \mu\text{m}$

“Invertebrates”

- ♣ animals without vertebra

AIMS

**... ESTABLISHING OF BIODIVERSITY OF
MACROINVERTEBRATES ...**

**... IDENTIFICATION OF MAIN TREATS FOR THE
AQUATIC ECOSYSTEMS ...**

AIMS

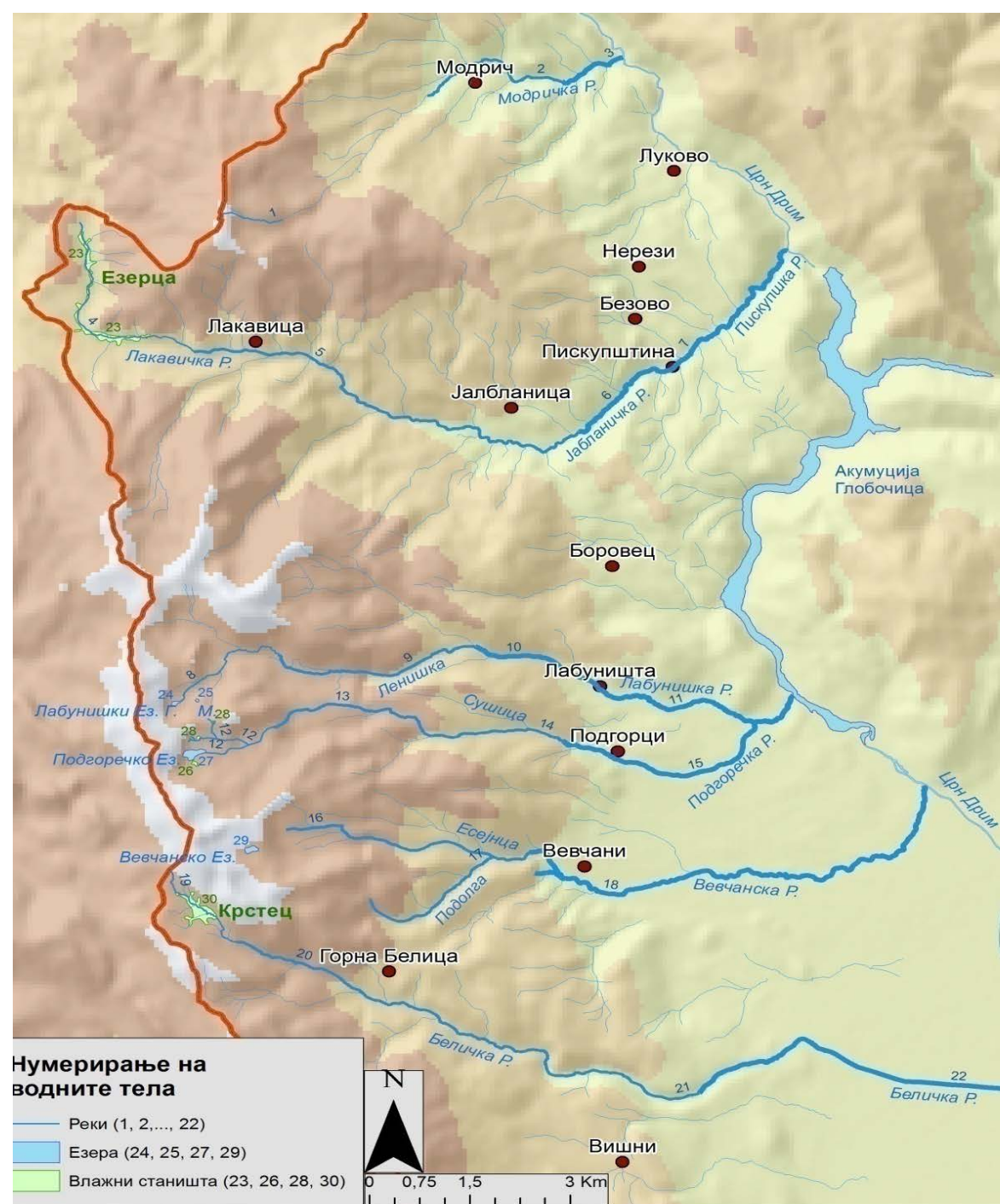
...ASSESSMENT OF THE ECOLOGICAL STATUS OF
THE RIVERS AND LAKES FROM JABLANICA
MOUNTAIN...

ЦБЦ

... MEASURES FOR IMPROVEMENT OF THE
PRESENT CONDITION...

STUDED SITE

Monitored 30
water bodies from
Jablanica
mountain





MATERIALS AND METHODS

5667-14:1998, EN 28265:1994,
EN 27828:1994, EN ISO
9391:1995, ISO 5667-3:1995

Water framework
directive (WFD)



VII, IX, X 2014

Processing the collected

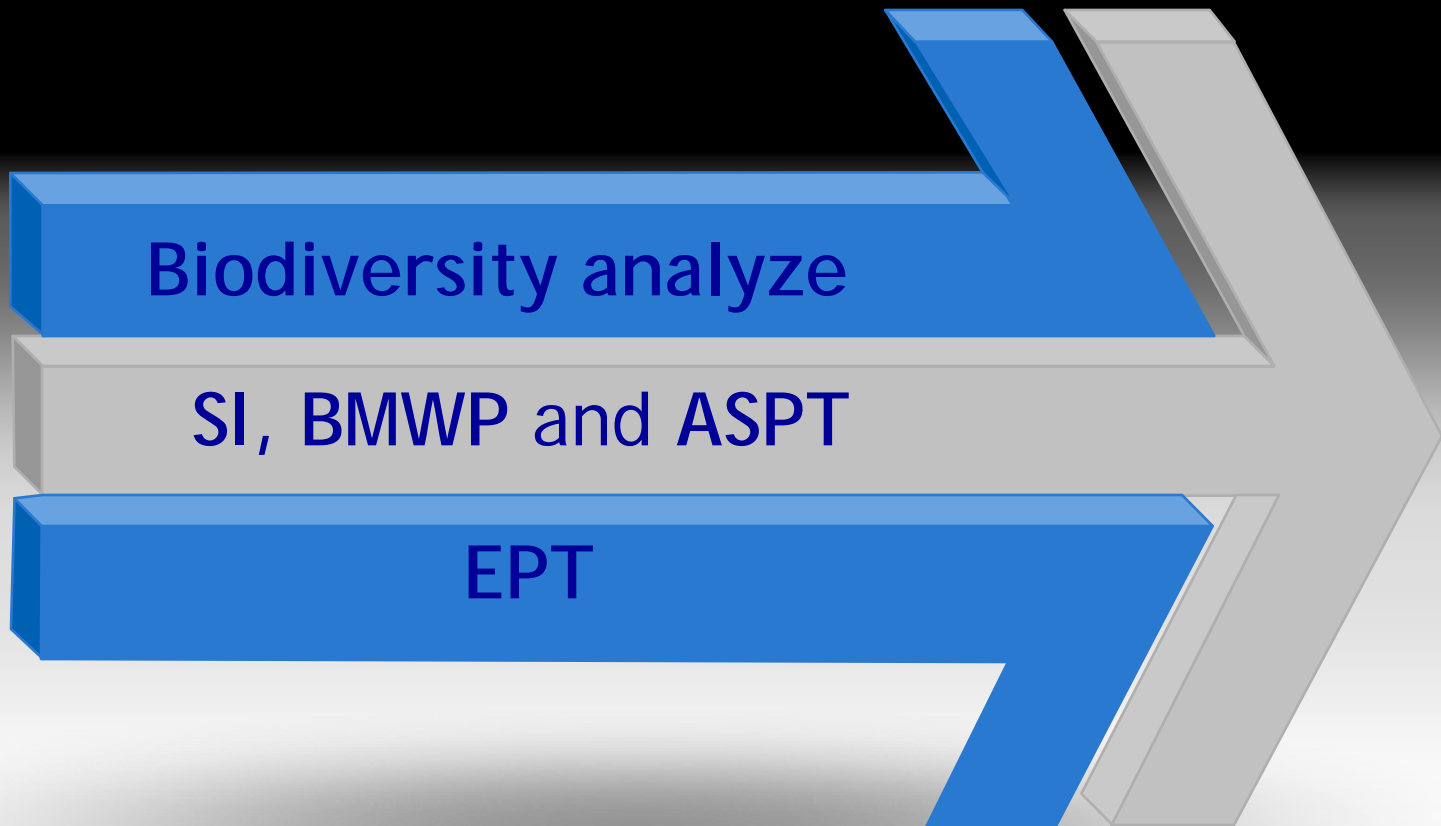
Separation by
grupes

Preparation of
microscope
slides

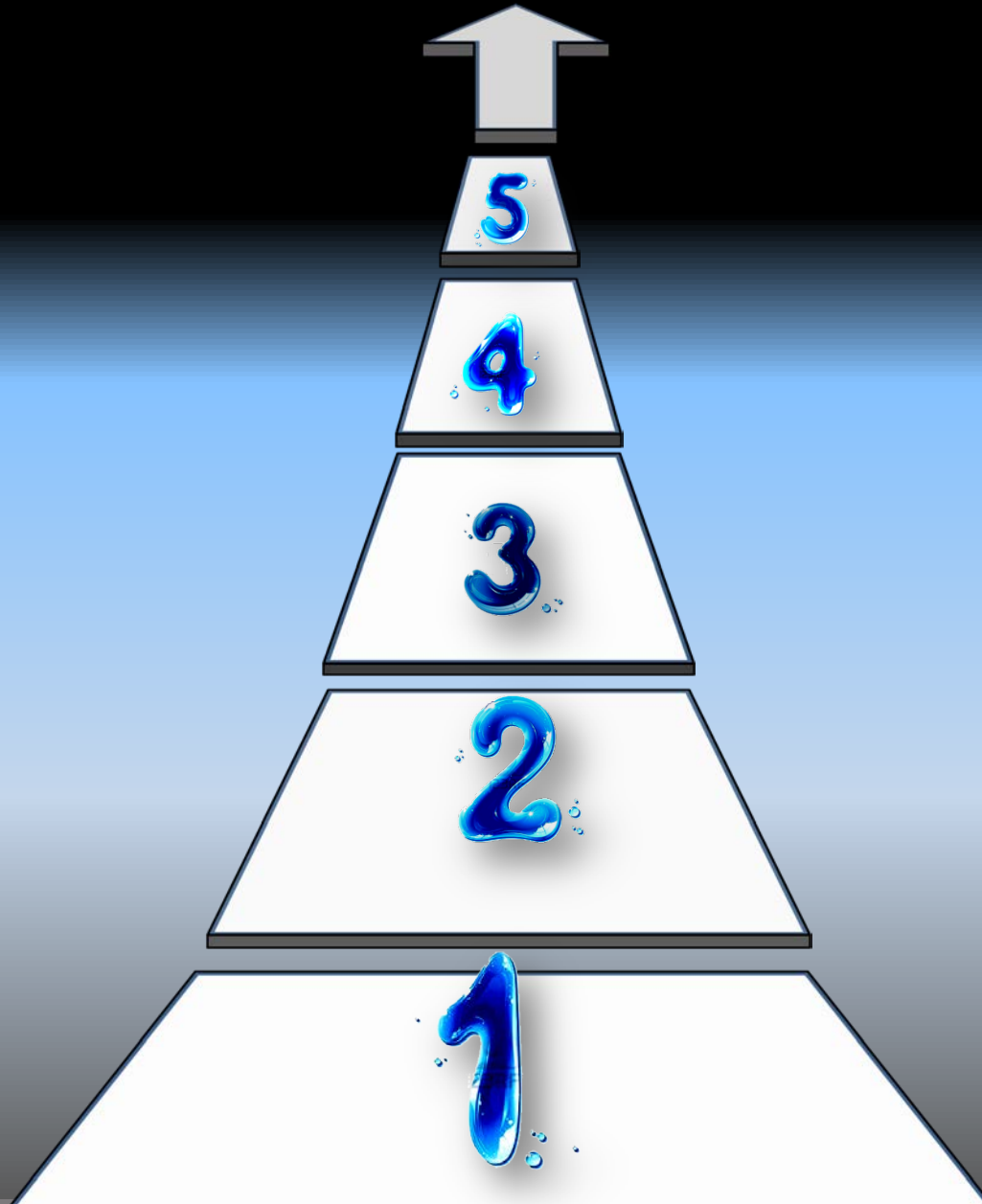
Determination



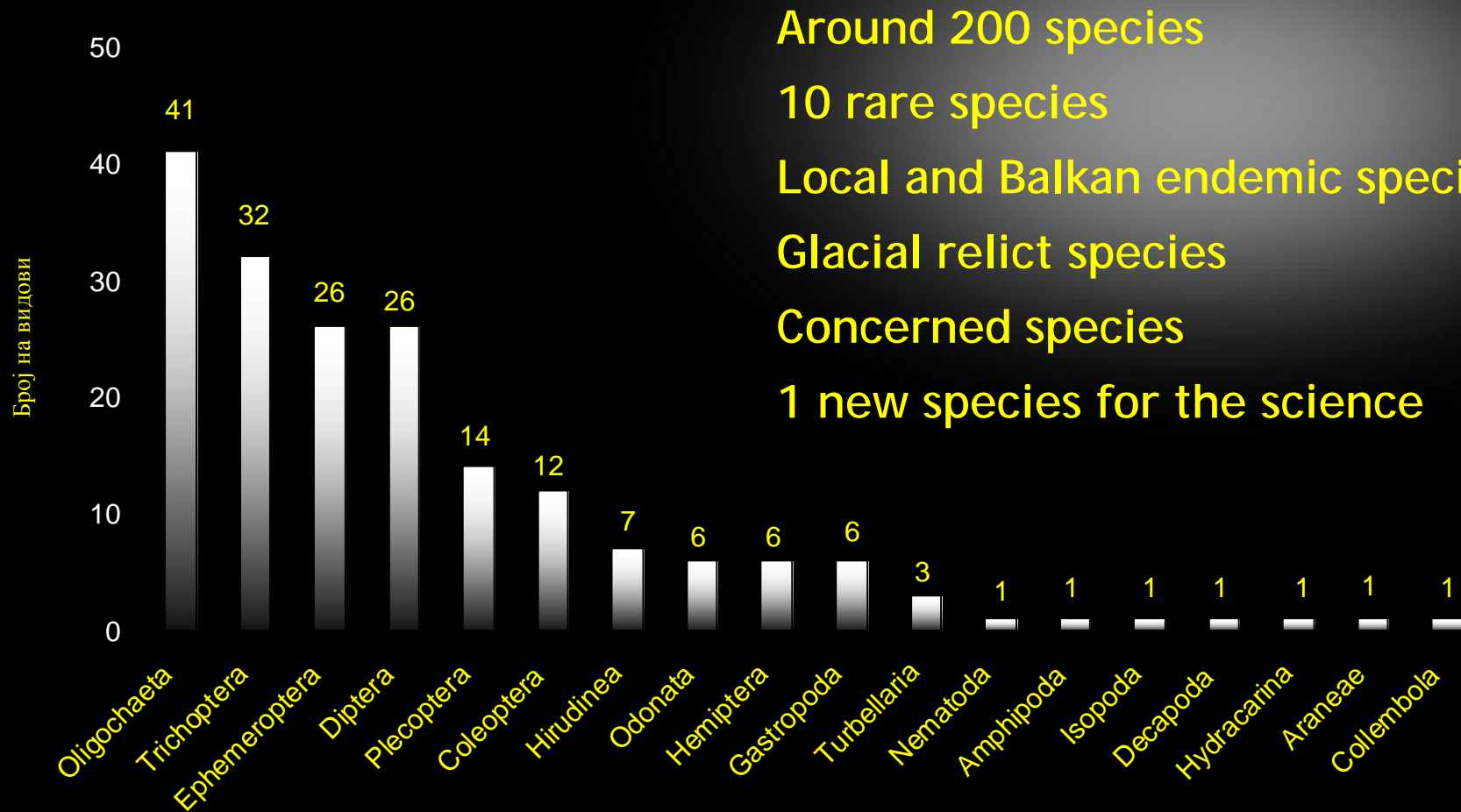
Analyze of the biological component



RESULTS



Macroinvertebrates diversity



Around 200 species

10 rare species

Local and Balkan endemic species

Glacial relict species

Concerned species

1 new species for the science



Location	Species	Importance
Vevchani springs, Lakavica River, Belichka reka, Springs of Podgorechka lake	<i>Isoperla vevčianensis</i>	Macedonian endemic species, only at Jablanica Mt.
Vevchani River	<i>Protonemura miačense</i>	Macedonian endemic species, found only in rivers in the West part of Macedonia
Lakavica Reka River	<i>Bythinella drimica drimica</i>	Balkan endemic species
Jablanichka Reka River	<i>Epeorus yougoslavicus</i>	Endemic species for Balkan and Apennine Peninsula
Lenishka Reka River	<i>Thremma anomalum</i>	Balkan and Carpathian endemic species
Vevchani Lake	<i>Chirocephalus diaphanus</i>	Relict species (for glacial lakes)
Rivers: Modrichka Reka, Lenishka Reka, Lakavichka Reka, Jablanichka Reka, Podgorechka Reka, Vevchanska Reka	<i>Gammarus balcanicus</i>	Balkan endemic species



<http://zoobank.org/urn:lsid:zoobank.org:pub:7F2257AD-83AB-4BE4-A9C1-FD2ED3F30582>

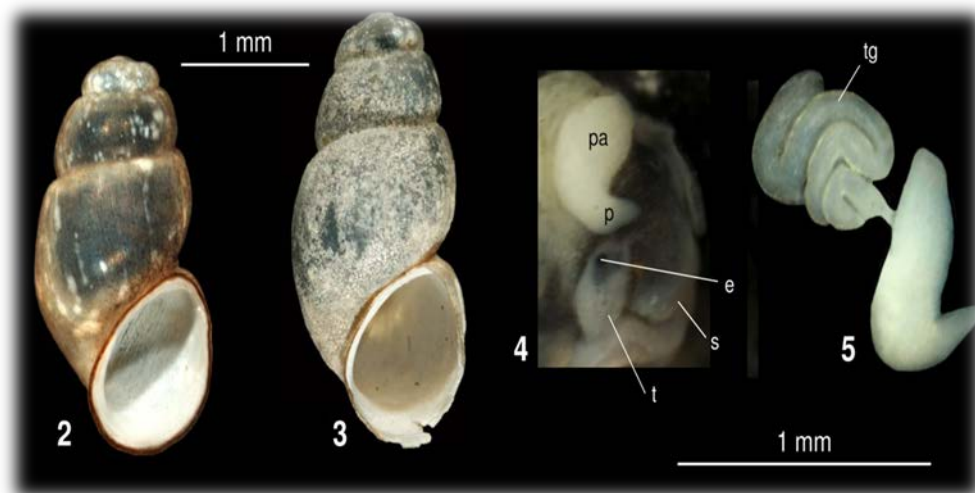
***Bythinella melovskii* n.sp., a new species from R. Macedonia
(Gastropoda: Hydrobiidae)**

PETER GLÖER¹* and VALENTINA SLAVEVSKA-STAMENKOVIĆ²

¹ Biodiversity Research Laboratory, Schulstr. 3, D-25491 Hetlingen, Germany. E-mail: gloeer@malaco.de

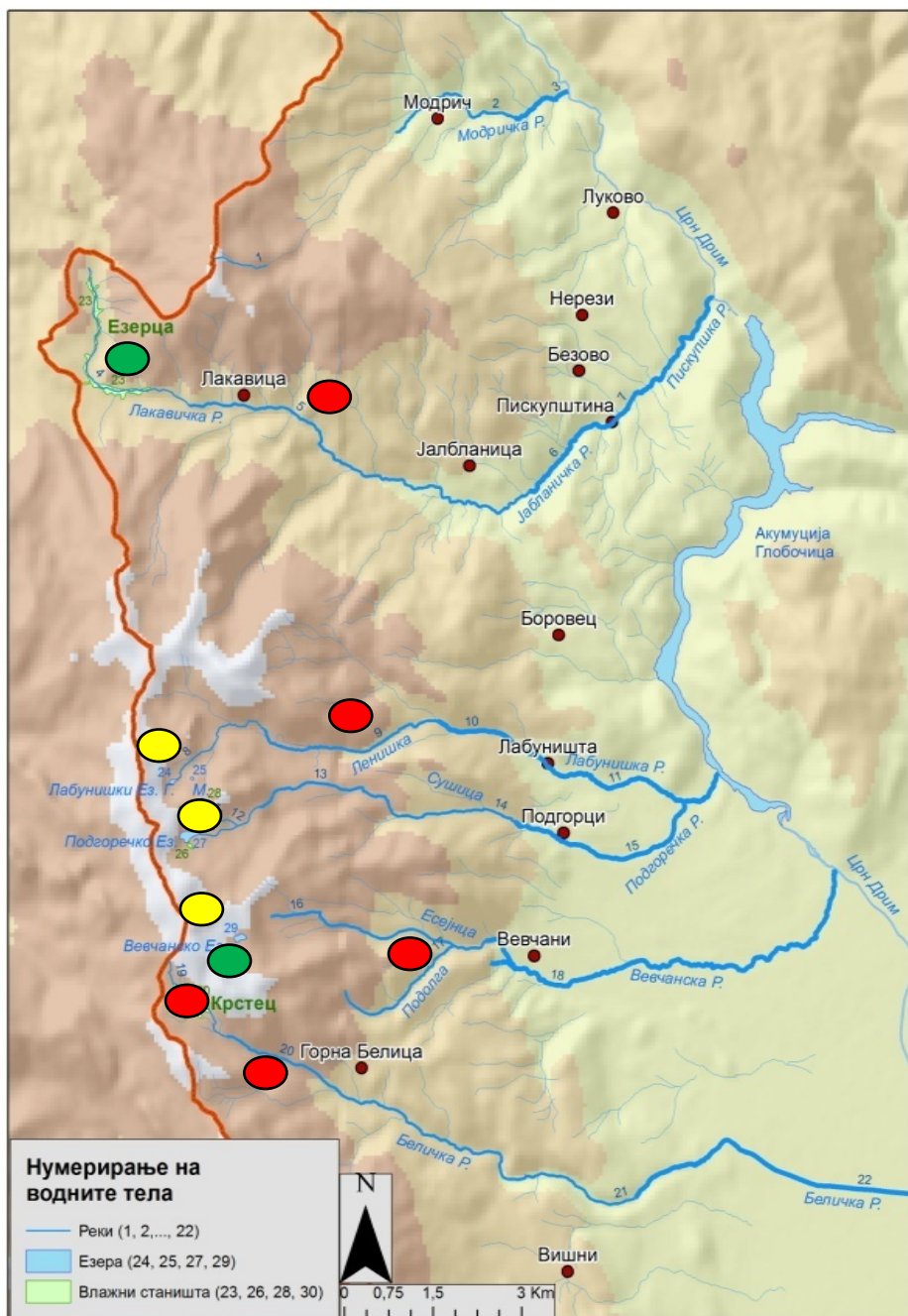
² Institute of Biology, Faculty of Natural Science and Mathematics, Ss. Cyril and Methodius University, P.O. Box 162,
1000 Skopje, Republic Of Macedonia; E-mail: vstamen@yahoo.com

* Corresponding author



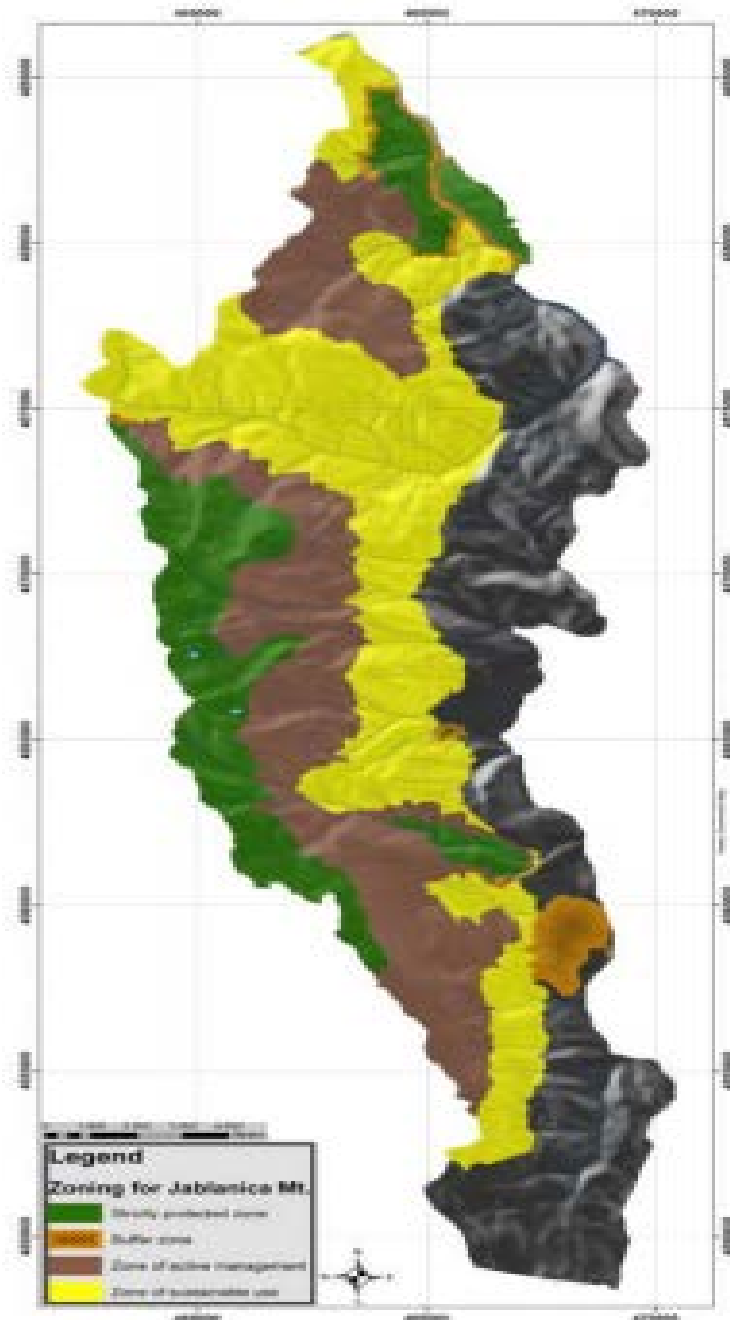
WATER BODIES SEPARATED BY THE RICHNESS OF RARE, ENDEMIC AND CONCERNED SPECIES

- Lakes: Podgorechko, Vevchansko and Golemo Labunishko;
- Wetlands: Krstec bogs and swamps Ezerca;
- Rivers: Belichka Reka, Podloga (Crveno Kladenche), Lenishka Reka and Jablanichka Reka .



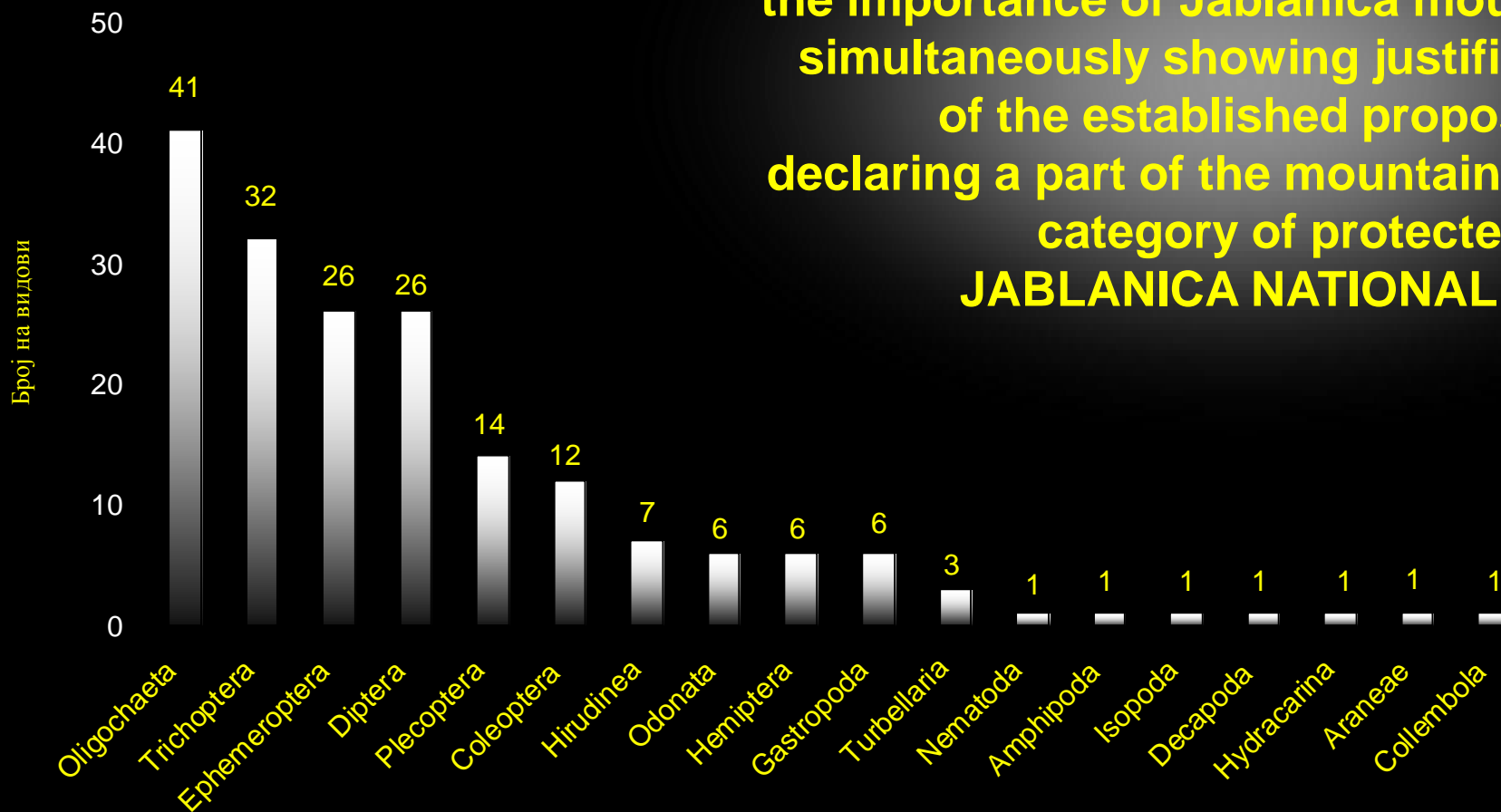
PROPOSALS FOR ZONATION OF THE PROPOSED NATIONAL PARK JABLANICA

- Strictly protected area
- Area of active management in the frame of the proposed National Park Jablanica





... in terms of biodiversity, reaffirms the importance of Jablanica mountain, simultaneously showing justification of the established proposal for declaring a part of the mountain in the category of protected area **JABLANICA NATIONAL PARK**



ANTHROPOGENIC PRESSURE OF THE WATER ECOSYSTEMS



PRESSURES ANALYZE AND IMPACT ON WATER QUALITY

- ✓ Stronger influence at lower sections of the rivers;
- ✓ Intense flow of unpurified communal wastewater, eg. Rivers Pskupshtinska, Labunishka and Podgorechka.
- ✓ Presence of solid waste



PRESSURES ANALYZE AND IMPACT ON WATER QUALITY

- ✓ Pollution of organic and non organic origin in Modrichka Reka river
(As a result of the separation of two active fishponds)



PRESSURES ANALYZE AND IMPACT ON WATER QUALITY

- ✓ Deterioration of the water quality condition of the river Jablanicka Reka;
- ✓ Shoddy building practices in the construction of hydropower above the village Piskupstina.





PRESSURES ANALYZE AND IMPACT ON WATER QUALITY

- ✓ Vevchansko lake - anthropogenic eutrophication
 - ✓ Intensive livestock farming
- ✓ Presence of organic sediment on the lake bottom



PRESSURES ANALYZE AND IMPACT ON WATER QUALITY

- ✓ High anthropogenic influence: Podgorechko, Malo Labunishko and Golemo Labunishko Lake;
- ✓ Highly disturbed of the hydrological and ecological condition of the glacial lakes;
- ✓ Unplanned and uncontrolled use of the lakes water.



CURRENT SITUATION WITH PODGORECHKO LAKE



**With Ecological
catastrophic consequences**

CURRENT SITUATION WITH GOLEMO AND MALO LABUNISHKO LAKE



1



2

**With Ecological catastrophic
consequences**

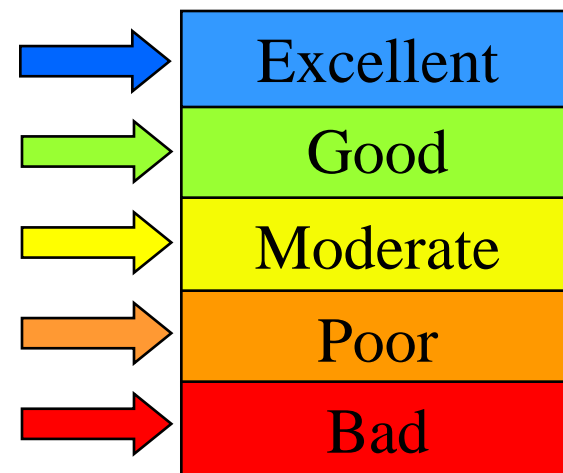
**Golemo Labunishko (1) and Malo
Labunishko Lake (2)**

PRESSURES ANALYZE AND IMPACT ON WATER QUANTITY

- ✓ Over exploitation of freshwater resources (capturing of the water for agricultural and sanitarian uses);
- ✓ Situation with the rivers: Sushica, Podgorechka Reka, Belichka Reka;
- ✓ Belichka Reka in the village Dolna Belica is canalized with concrete river bed and completely dried up.



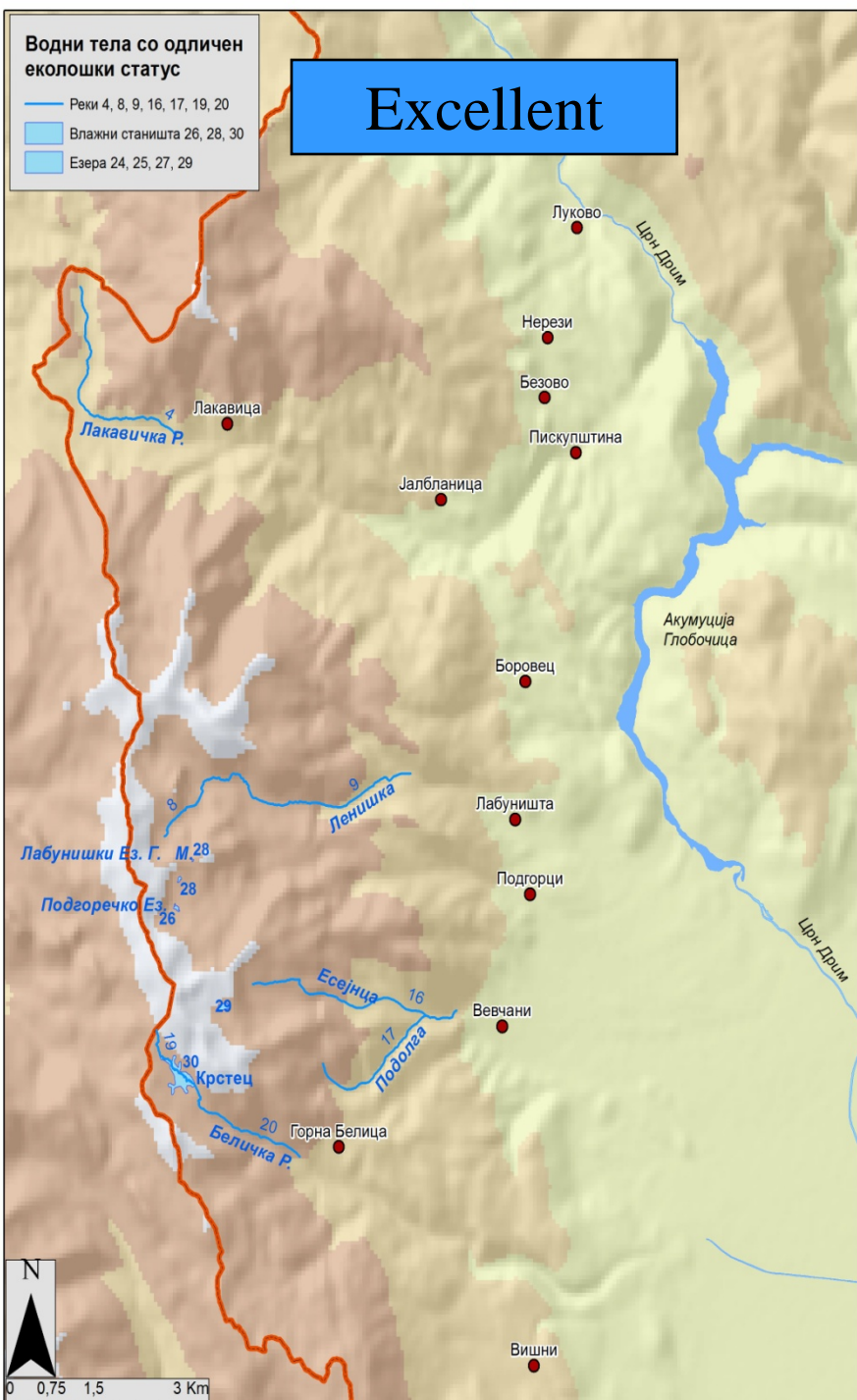
ECOLOGICAL STATUS OF THE WATER BODIES



Водни тела со одличен
еколошки статус

Excellent

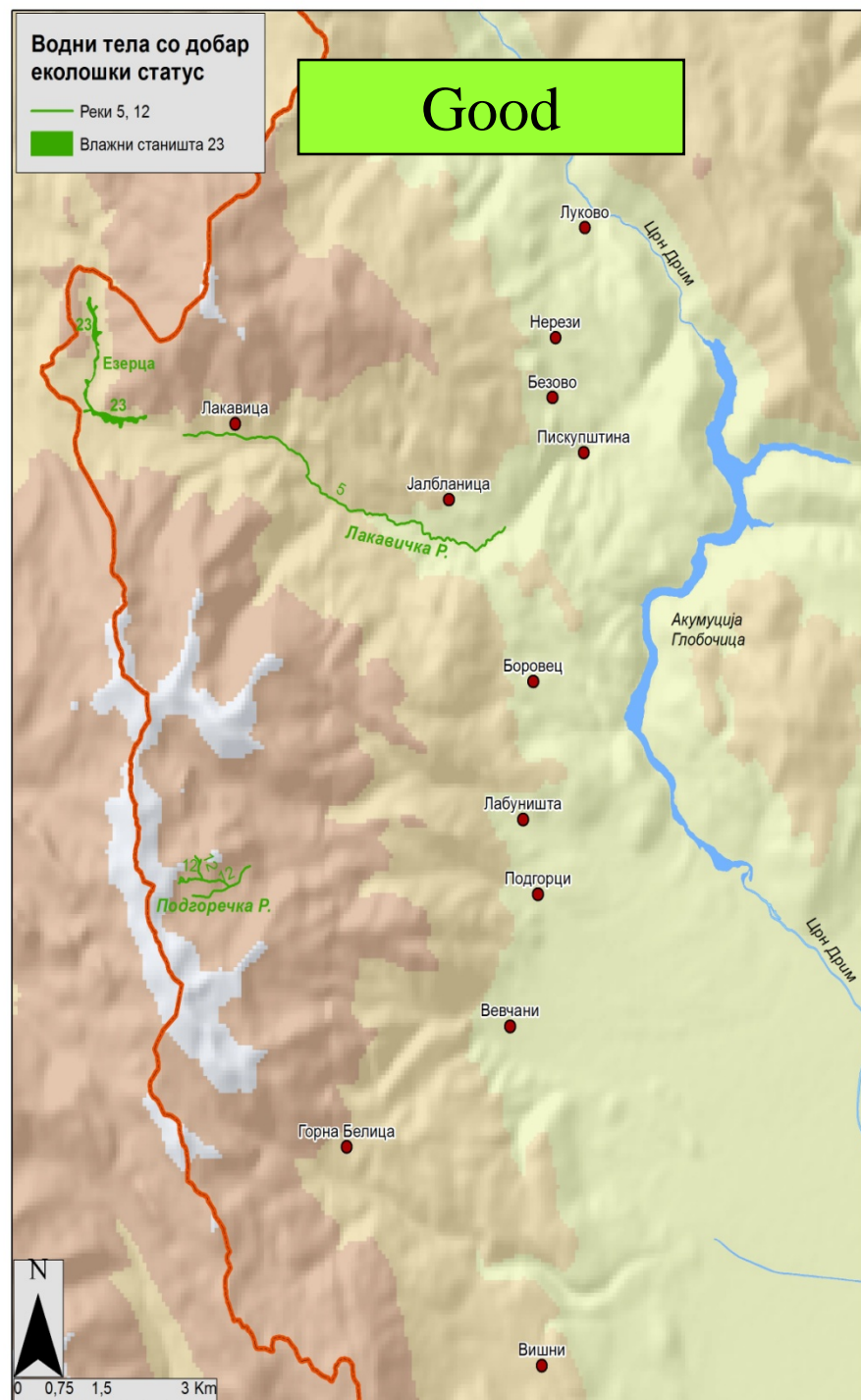
- Реки 4, 8, 9, 16, 17, 19, 20
- Влажни станишта 26, 28, 30
- Езера 24, 25, 27, 29



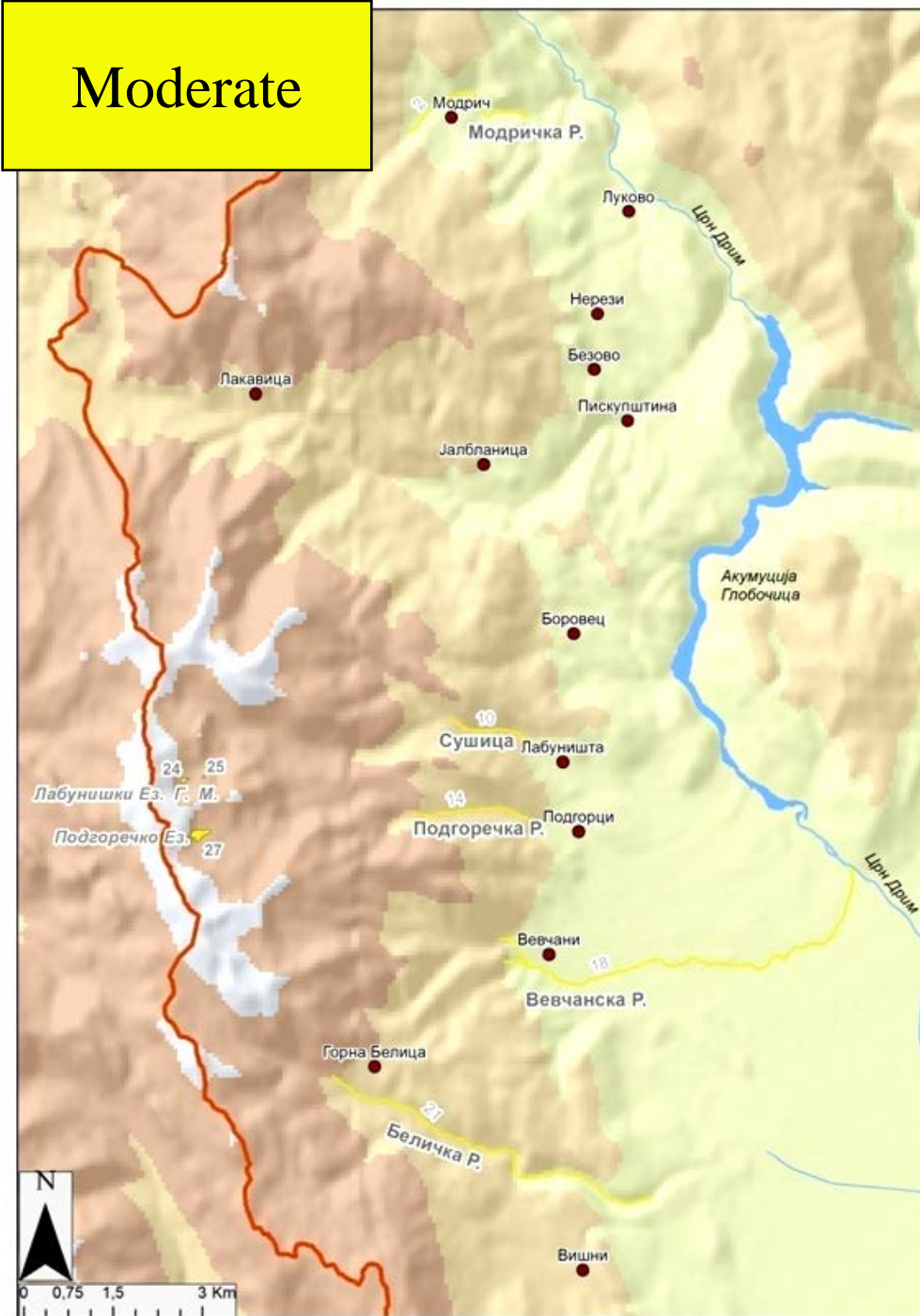
Водни тела со добар
еколошки статус

Good

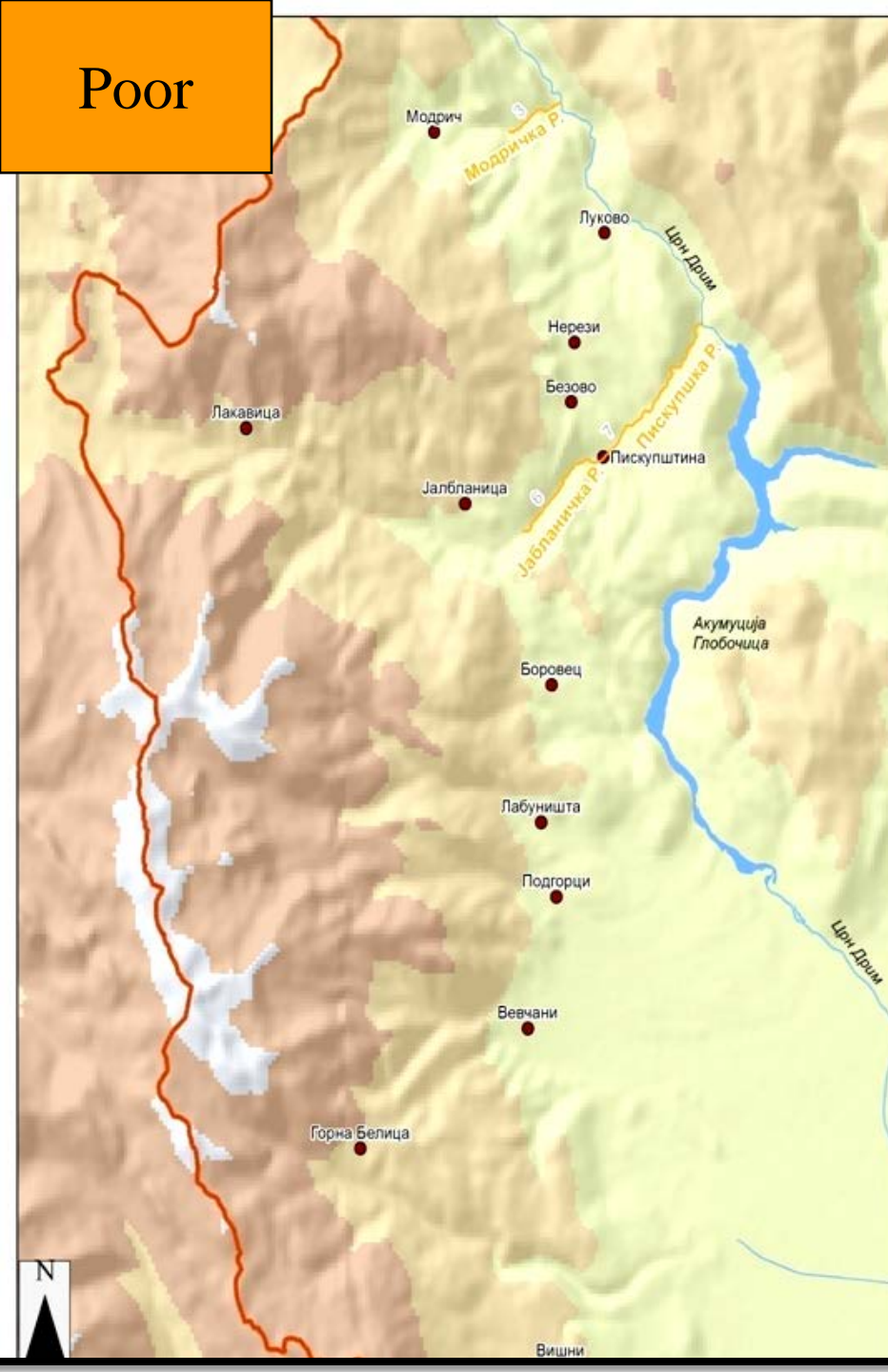
- Реки 5, 12
- Влажни станишта 23



Moderate



Poor



Bad



OBJECTIVES FOR THE ENVIRONMENT

Environmental objectives are basic concept for providing sustainable water management and high level for environmental protection

- ✓ Objective 1: To prevent future disturbance of the surface waters and to achieve good ecological status of the water bodies;
- ✓ Objective 2: To control the water level in the rivers and lakes ecosystems (to prevent loss of water) on Jablanica mountain and to promote the concept for sustainable use of the water;
- ✓ Objective 3: To prevent future losses of hydrobiont diversity of Jablanica mountain try the adequate protection of its habitats.

MEASURES TO IMPRUE THE CURRENT ECOLOGICAL STATUS

1. **Project proposal for restoration** of Podgorechko Lake and its watershed;
 - ✓ main objectives: **establishment** of the natural hydrological water condition of the lake and **protection** of the biodiversity.
2. **Project proposal for rehabilitation** of the current dam on the Podgorechko Lake;
 - ✓ This measures are necessary for permanent solution with water supply of the region. The proposed proposals should be guided by the positive examples and experiences.
3. **Project proposal for rehabilitation** of the current system of tanks and pipelines under Golemo Labunishko lake.

MEASURES TO IMPRUE THE CURRENT ECOLOGICAL STATUS

4. **Project proposal for** closing the discharged canal build on Malo Labunishko Lake and restoring the natural charging of the lake;
 - ✓The lake can be rehabilitate as aquatic sustainable system.
5. **Project proposal** with alternative solutions for long-term solutions of water supply;
 - ✓ Possibility to use ground waters whose available capacities are significantly used;
 - ✓Possibility to connect the community to the water supply systems of Ohrid-Struga water system;
 - ✓ Even these proposed project are with higher cost , on long-term level they are cost effective and with long-term benefits to the local community and lakes ecosystems.

MEASURES TO IMPRUE THE CURRENT ECOLOGICAL STATUS

6. **Project proposal for** sewage systems in the villages Labunishta and Podgorci with treatment plants for wastewater treatment;
 - ✓Treated wastewater can be used as potable water or released into riverbeds.
7. Construction of sewage systems;
 - ✓To implement recommended practices for the design and performance of septic tanks and control pollution of the underground.
8. Future monitoring activities;
 - ✓Assessment and monitoring of ecological status of surface water bodies, based on physic-chemical and biological parameters.
9. Introducing **practices for solid waste management** in the region.



High species diversity and rare water habitats on mountain Jablanica



Serious threat to water habitats and the important need for establishment of measures for its protection



Proposals for alternative water supplies for the local community



Result: lower environmental impact and improving of the ecological status of the water ecosystems





RECCOMENDATION

„The application of the proposed measures will enable to achieve the environmental goals, that will contribute to improve the quantitative and qualitative status of water resources and consequently will ensure the preservation of high species diversify, where in, is recognizable Jablanica mountain”



THANK YOU FOR YOUR
ATTENTION

