Introduction

- **Ohrid Lake** is shared by Albania and North North Macedonia.
- The largest in volume Lake in South Eastern Europe
- Four to ten million years old

Introduction

- Lake Ohrid is an ancient ecosystem, isolated by surrounding hills and mountains.
- Relict species, or ‘living fossils’, and many endemic species, found only in Lake Ohrid (*10 of the 17 fish*)
  - 10 of the 17 fish endemic
  - snails, worms, and sponges.

Introduction

The region of Ohrid basin has a long history and a significant cultural heritage, while evidence of human settlement dates back more than 9,000 years.

In 1980, North North Macedonian side of Lake Ohrid was designated as a "*site of cultural and natural values of the global patrimony*" under UNESCO.

The property was extended to include the rest of Lake Ohrid, located in Albania, in 2019

Ohrid lake basin

Name	Ohrid Lake
Location	Latitude 20°37' E - 20°48' E / Longitude 40°54' N - 41°10' N Altitude 690 masl
Origin	tectonic
Age	4-10 million years
Volume	50,9 km3
Surface	362,6 km2 (111,4 km2– AL / 251,2 km2- MK)
Length	30,4 km
Width	14,5 km
Shoreline	87,53 km (31,51 km – AL / 56,02 km – MK)
Max. depth	289 m
Mean depth	164 m
Catchment area	3,921 km² (1,402 km² Lake Ohrid / 2,519 km² Prespa Lakes

Ohrid lake basin

- Ohrid lake region is characterized by a hot summer continental climate
- closely bordering on a humid subtropical climate
- mean temperature of the warmest month is just below 22 °C
- The coldest month is January with the average temperature 2.5 °C
- The warmest month is August with average range of 27.7 °C
- The rainiest month is November, which sees on average 90.5 mm (3.6 in) of rain.
- The summer months of June, July and August receive the least amount of rain, around 30 mm
- The absolute minimum temperature is −17.8 °C and the maximum 38.5 °C

Ohrid lake basin

Inflow

Surface waters:

- Rivers (Sateska, Cherava, Kaleska)

Groundwater:

- St. Naum, Tushemisht, Drilon, Kriftolake springs

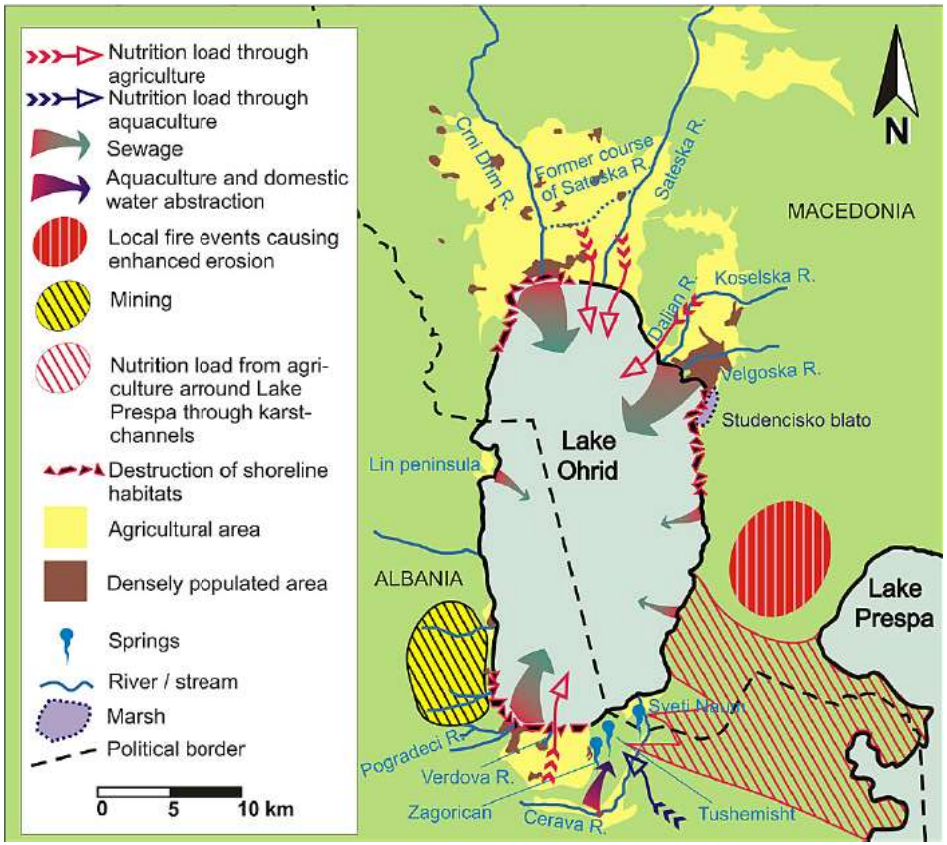
(50% of the waters of Prespa Lake flow into the Ohrid Lake through Ground springs)

Outflow

- Black Drin river (controlled)

Water Balance	Inflow in m3 / year	Outflow in m3 / year
Surface waters:		
• **Rivers**	380.6 x 10^6	693.8 x 10^6
• **The rest of the catchment area**	75.7 x 10^6	Black Drin (controlled)
Groundwater:		
• **Known springs**	323.6 x 10^6	
Precipitation	276.6 x 10^6	
Evaporation		408 x 10^6
TOTAL	1056.5	1101.8

Ohrid lake basin



Part of the basin	FYR North Macedonian	Albanian
Population	106,000	61,000
Land use	**Arable land: 2,500 ha (1,500 are irrigated)** **Pasture: 1,367 ha** **Forests: 10,248 ha** **Economic enterprises: 1,396 ha** **Built land (building, roads): 672 ha**	**Arable land: 53,303 ha (50% is irrigated)** **Pasture: 27,319 ha** **Forests: 61,225 ha** **Water: 41,000 ha**

Ohrid lake water status

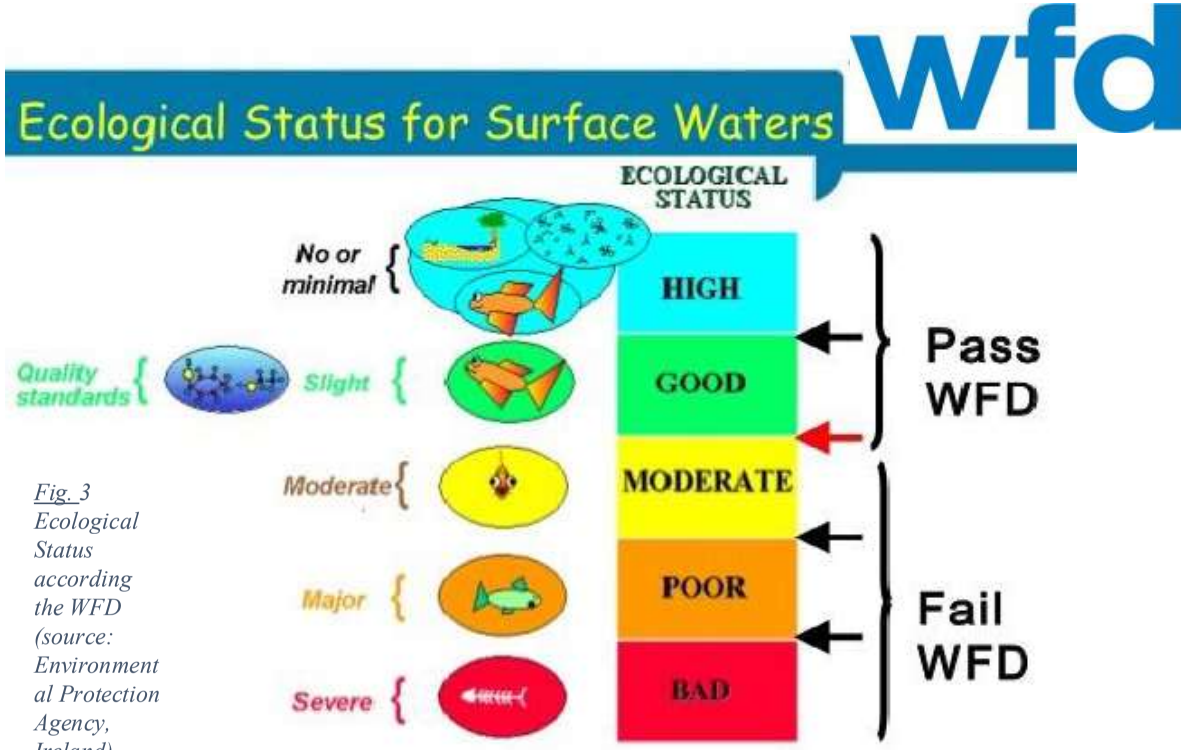


Fig. 3 Ecological Status according the WFD (source: Environmental Protection Agency, Ireland)

- Groundwater
- groundwater - dependent terrestrial ecosystems (wetlands, peatlands)

Water bodies types:

- Lakes;
- Rivers;
- Transitional;
- Coastal waters;

Each WB Considered:

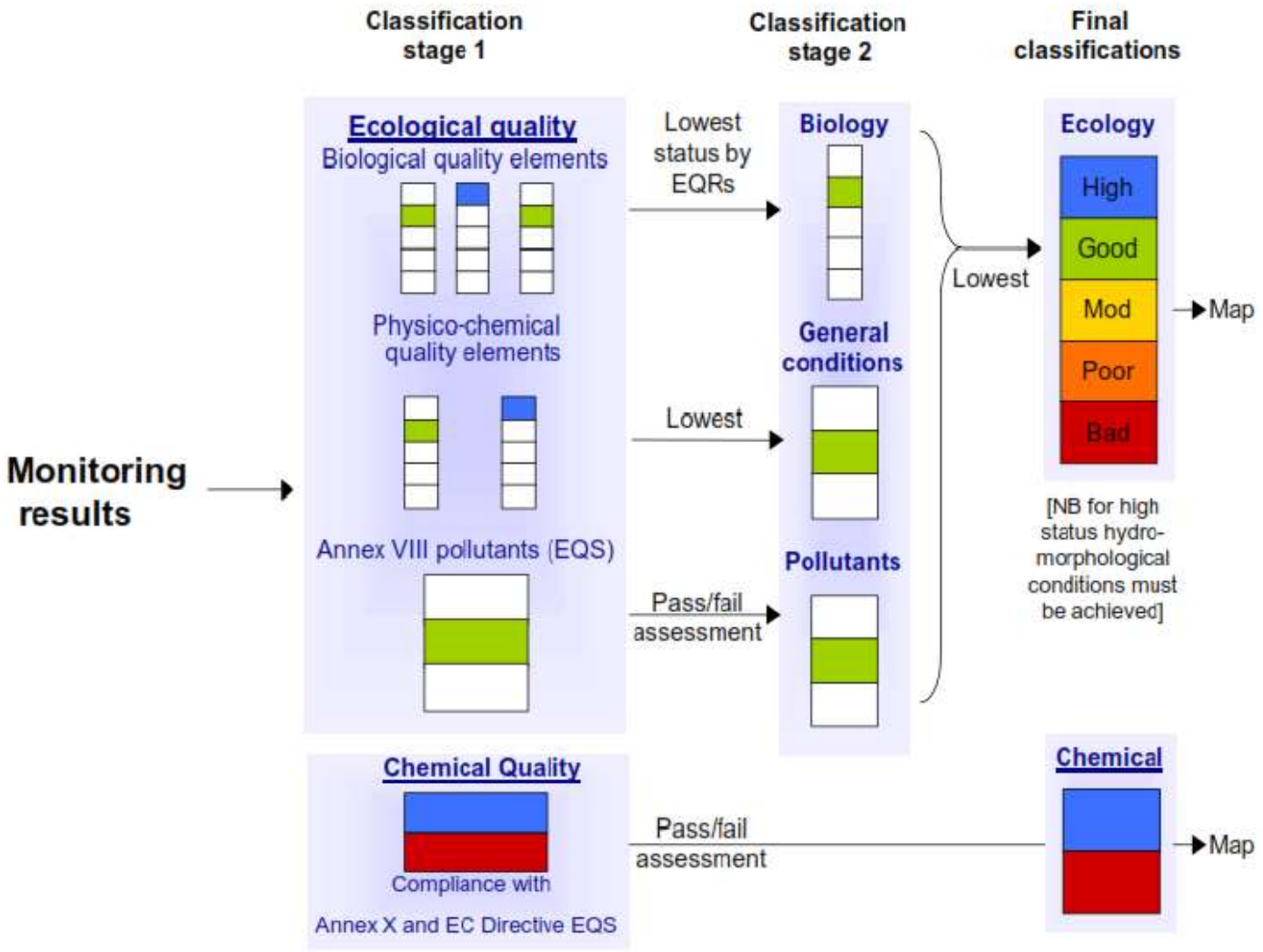
- Pristine
- lightly modified;
- heavily modified
- artificial

AMBU

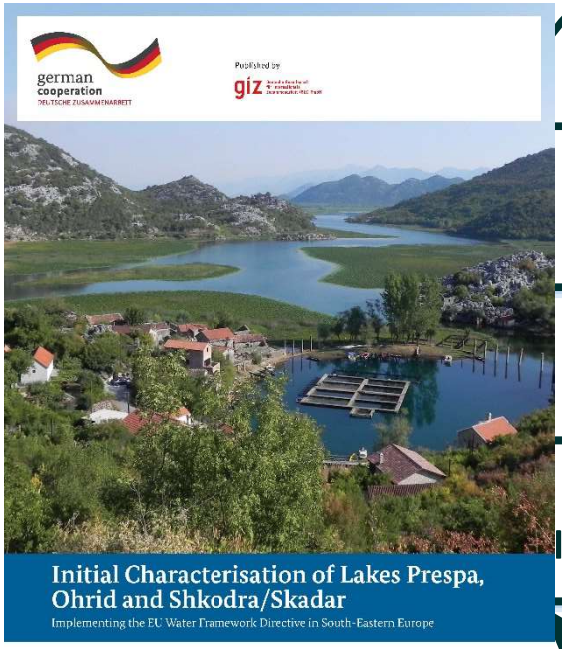
ILEC

JICA

Ohrid lake water status

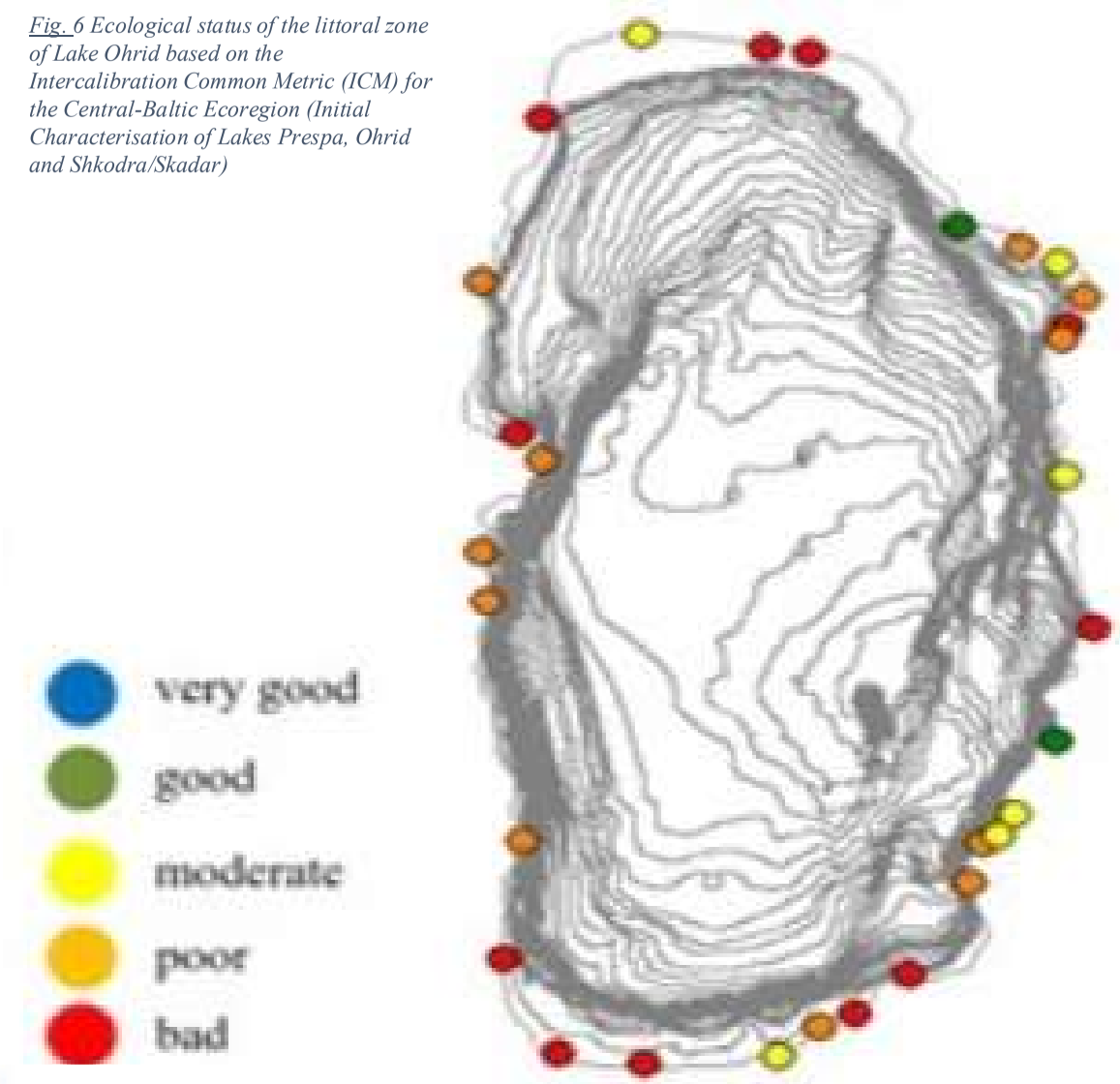


Ohrid lake water status



Ohrid lake water status

Fig. 6 Ecological status of the littoral zone of Lake Ohrid based on the Intercalibration Common Metric (ICM) for the Central-Baltic Ecoregion (Initial Characterisation of Lakes Prespa, Ohrid and Shkodra/Skadar)



Ecological status

Conservation and Sustainable Use of Biodiversity at Lakes Prespa, Ohrid and Shkodra

Ohrid lake water status

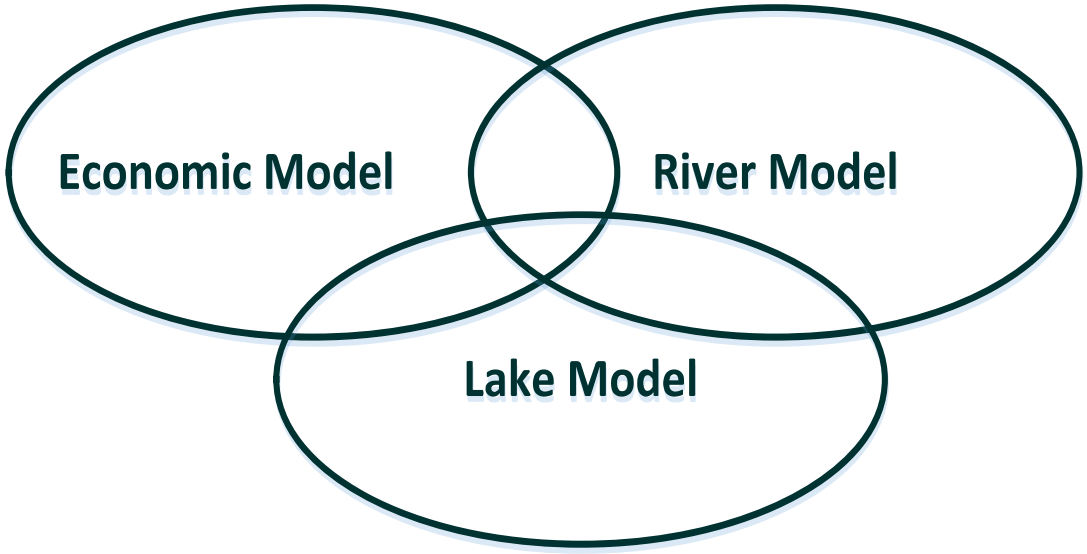
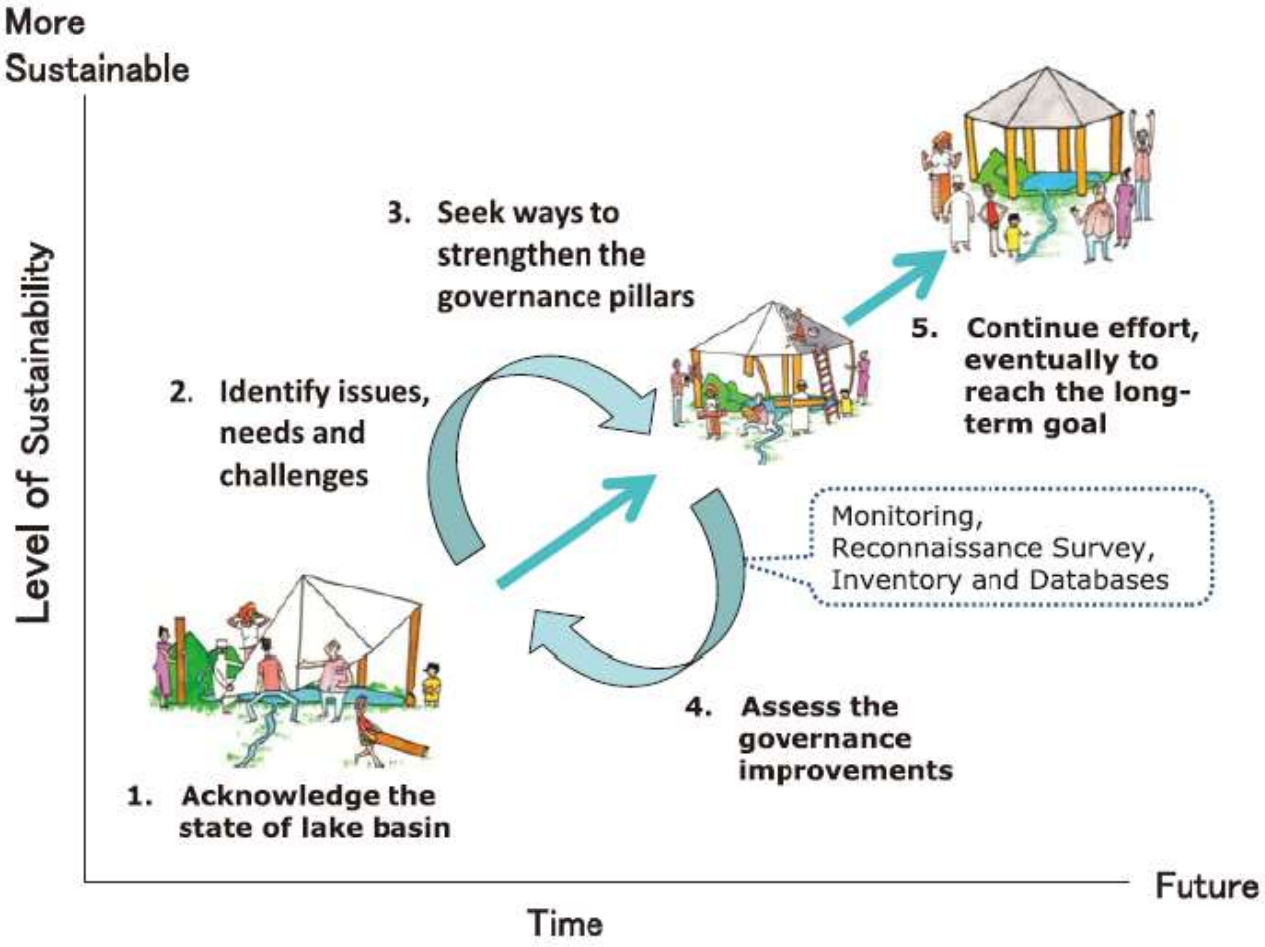


Fig. 7 Schematic Presentation of a Model

Which is the best policy to adapt in a Basin in order to reach our objective?

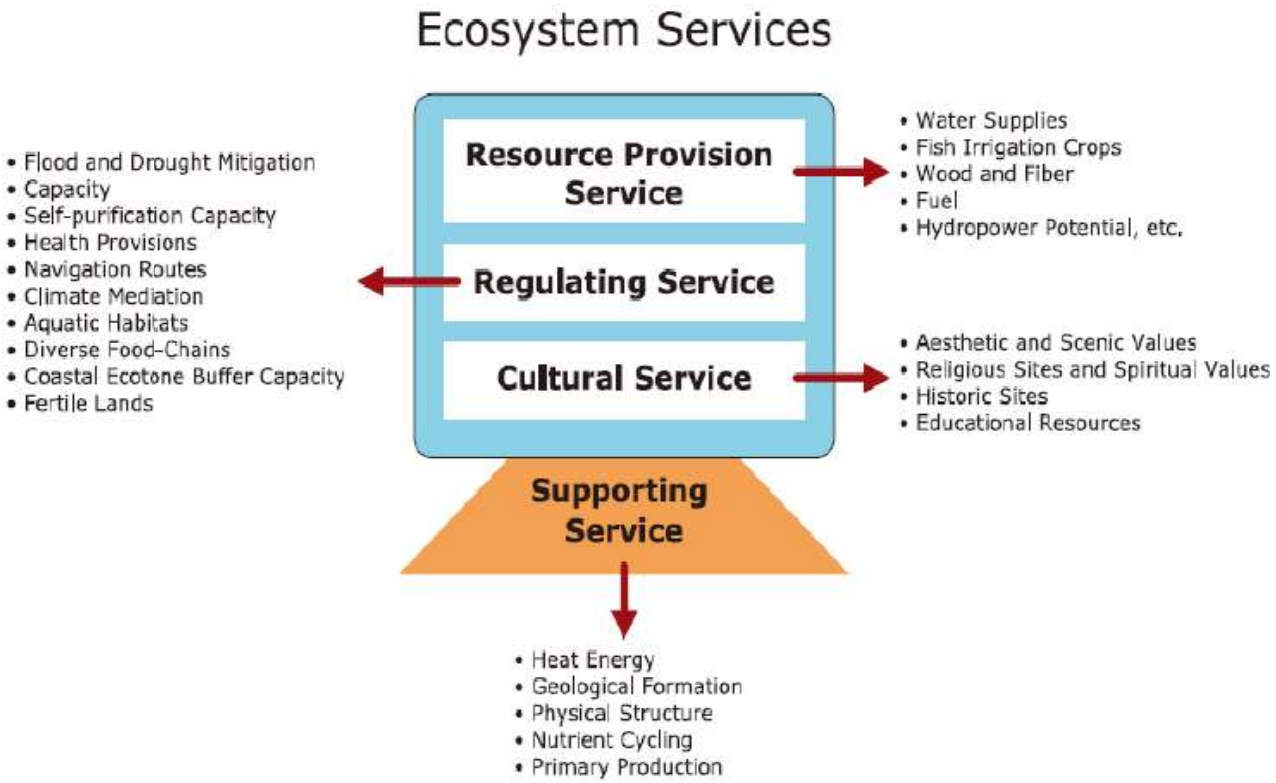
- SWAT (Soil and Water Assessment Tool)
- the Enhanced Stream Quality Model (QUAL2E)
- MIKE21 produced by the DHI – Danish Hydraulic Institute
- *Etc.*

ILBM concept



Continuing governance improvements over time

ILBM concept



Degradation of one component → Degradation of all component

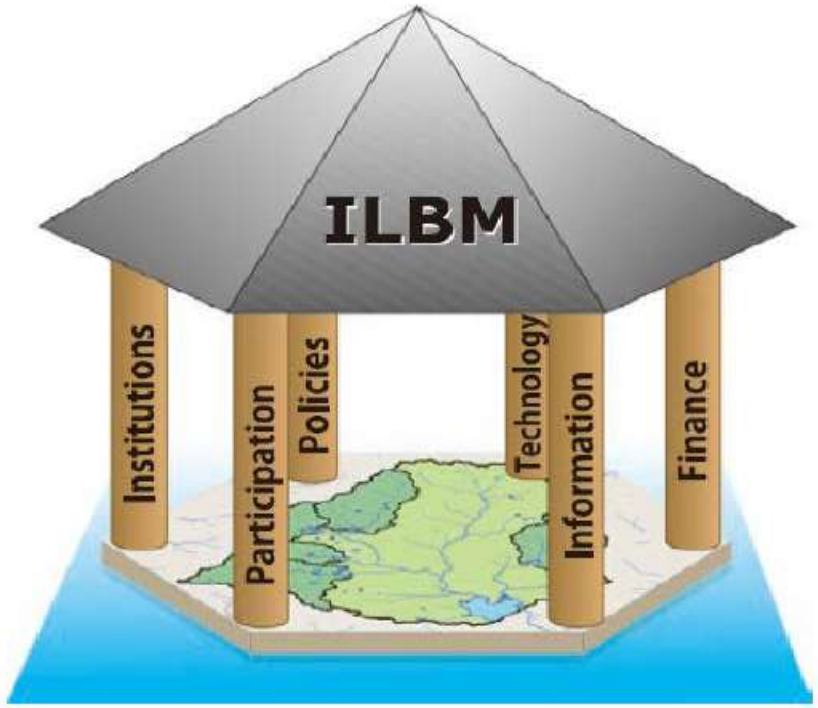
Resources Provision Services – These represent the products people obtain from ecosystems;

Regulating Services – These refer to the benefits people obtain from the regulation of ecosystem processes;

Cultural Services – These refer to the nonmaterial benefits people obtain from ecosystems;

Supporting Services – These refer to the services necessary for the production of all other ecosystem services;

ILBM concept



Policies: Broad Directions and Specific Rules
Institutions: Developing Effective Organizations
Participation: Expanding the Circle of Involvement
Technology: Possibilities and Limitations
Information: Pursuing the Sources of Knowledge and Wisdom
Finance: Seeking for Sustainable Sources at Appropriate Level

Fig. 10 ILBM Governance Pillars, Founded on a Lake Basin Ecosystem Service Base Supporting the Integration Goal (Source: ILEC)

Management of the Ohrid lake

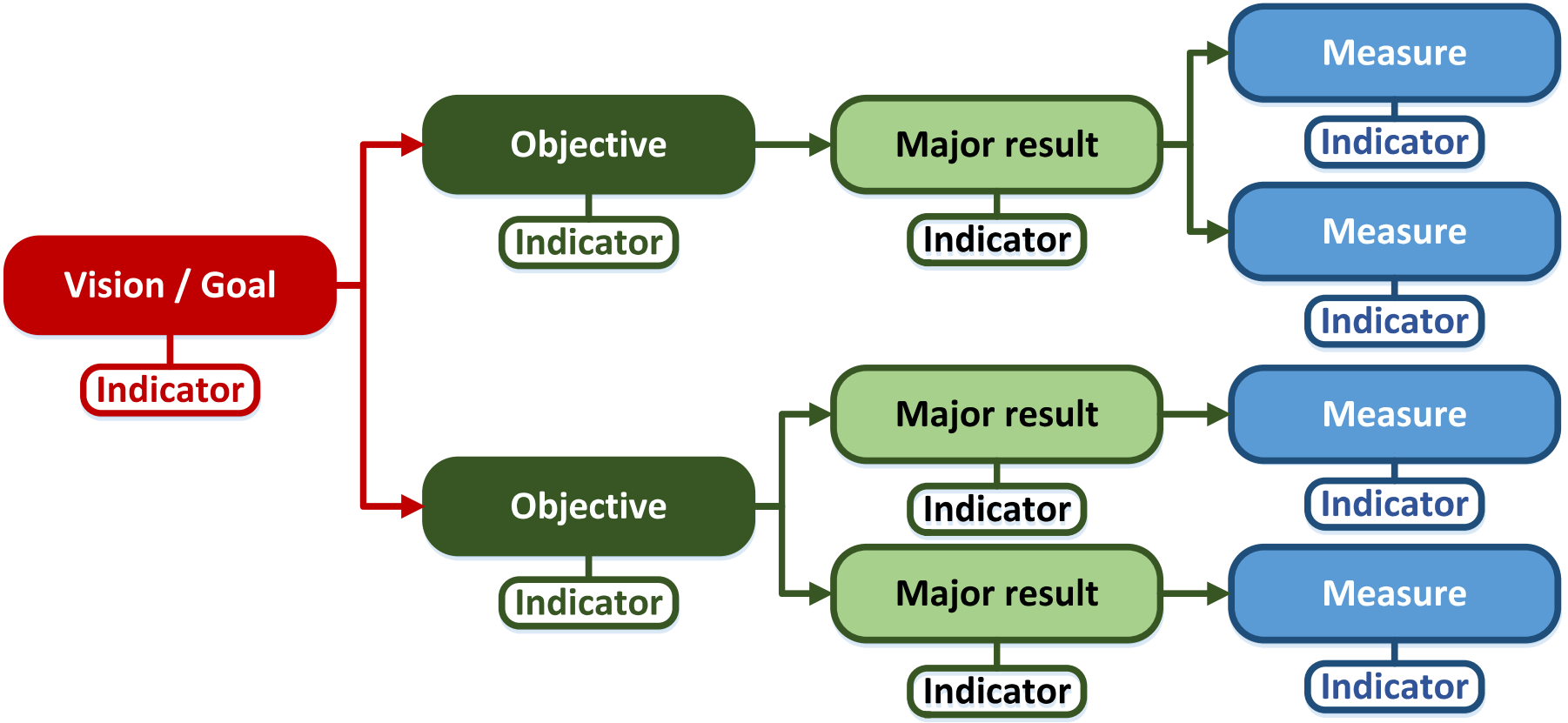
ILBM Pillar	Access governance aspect
Policy	- Existence of relevant legislation - Direction of policy - Distribution of roles and responsibilities - Role in transboundary issues
Institutional	- Existence of relevant institutions - Coordination - Capacity
Participation	- Public education & awareness raising - Involvement & roles of stakeholders
Technology	- Pleasure and Impact in the lake water status - Pollution control - Fisheries control
Information	- Data & information collection - Access to information
Finance	- Available sources of funds - Adequacy of funds

Key challenges

ILBM Pillar	Key challenge
Policy	- Strengthen the legislation regarding the Lake Basin Management
Institutional	- Increase the cooperation between institutions - Strengthen the institutional capacities - Strengthen of the cooperation in the transboundary level
Participation	- Raise the public awareness and environmental education - Increase the involvement of the stakeholders
Technology	- Controlled construction - Control of the industrial effluents (Chromium mining, iron ect) - Control of the agricultural pollution - Controlled extraction of sand and gravel - Reduce the untreated waste water discharge - Reduce the sediment in the lake - Control of the fisheries exploitation
Information	- Increase the level of the monitoring of the basin - Strengthen the data sharing and the access on information
Finance	- sustainable financial mechanism
Heart-ware	- a comprehensive framework for conservation of the natural values, - rules for sustainable tourism development

Draft action plan

Schematic presentation



Draft action plan

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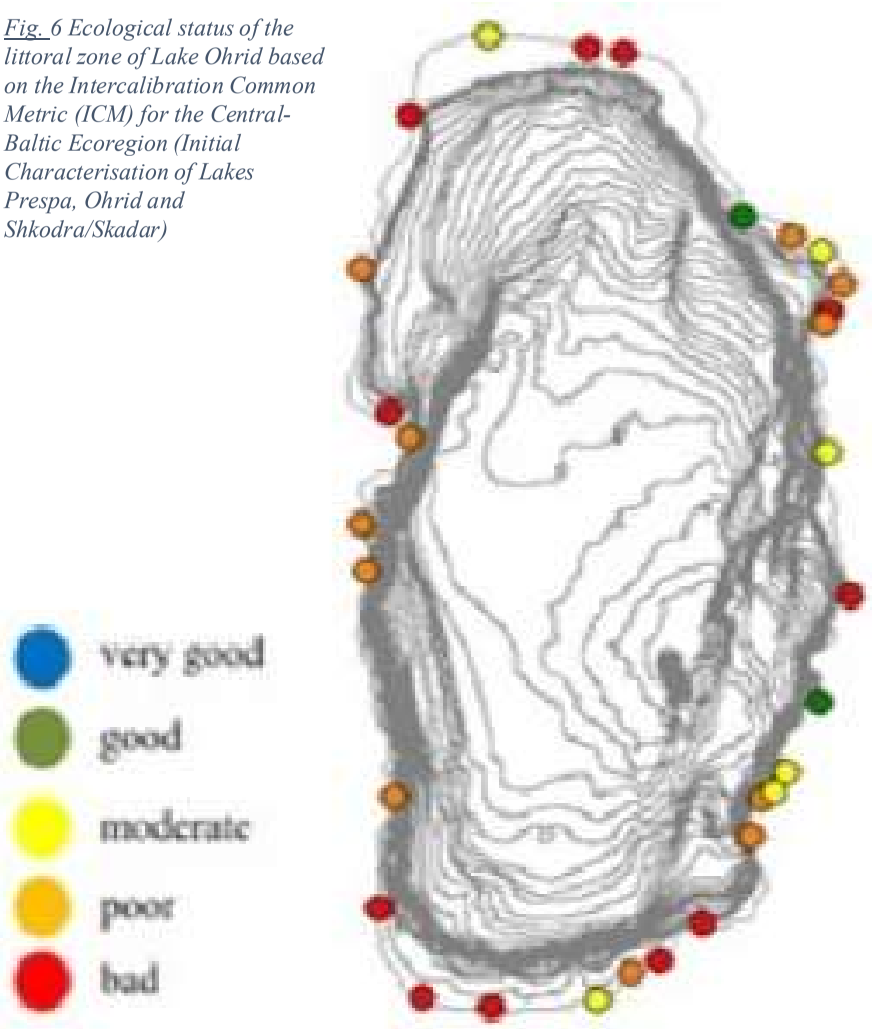

Vision/Goal:

Conservation and sustainable use of water resources of the Ohrid Lake Basin

Overall indicator:

Lake Water status according the WFD