



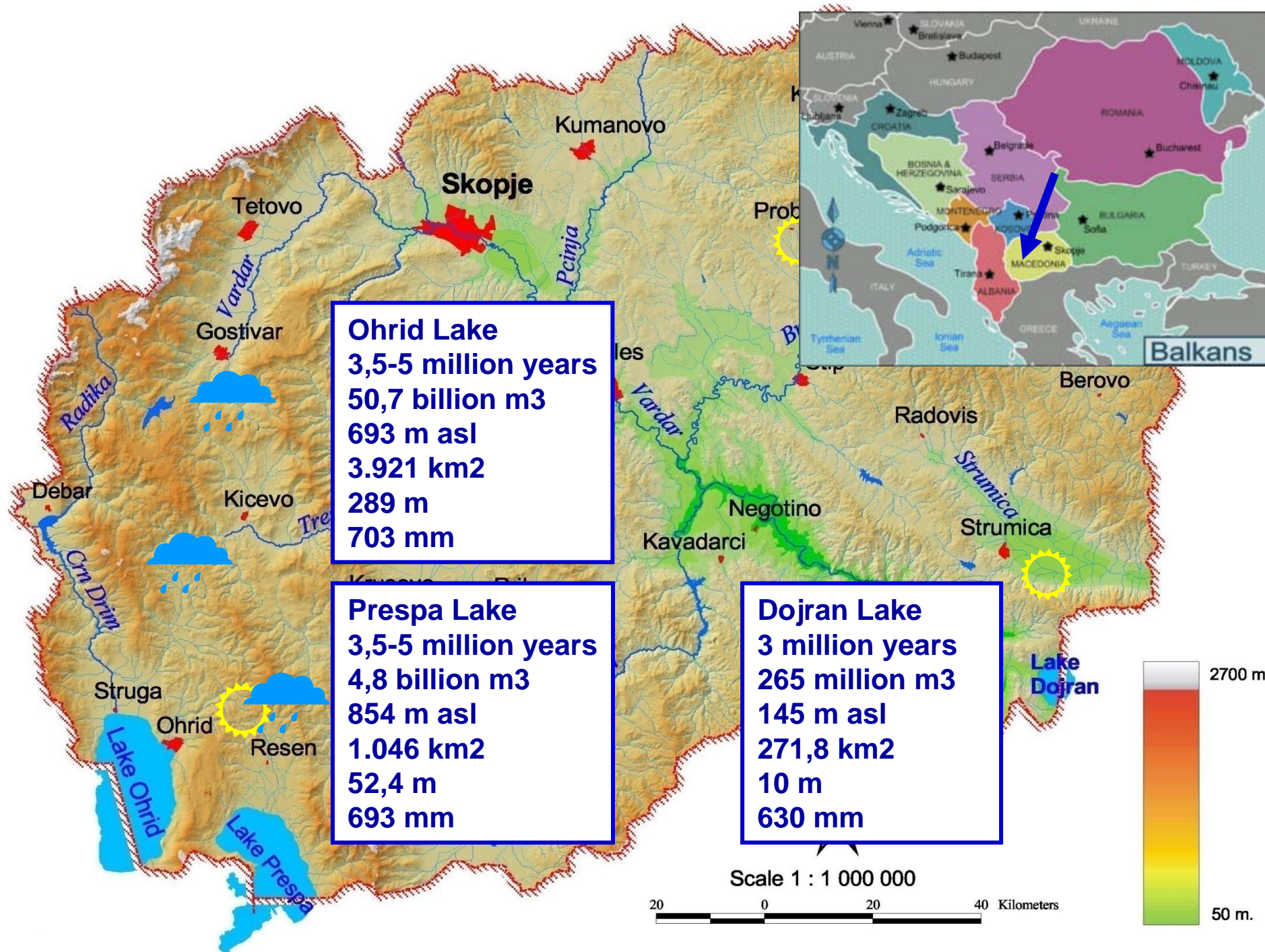
European Geosciences Union
General Assembly 2011 Vienna Austria 03-08 April 2011
Session: Lakes and Inland Seas

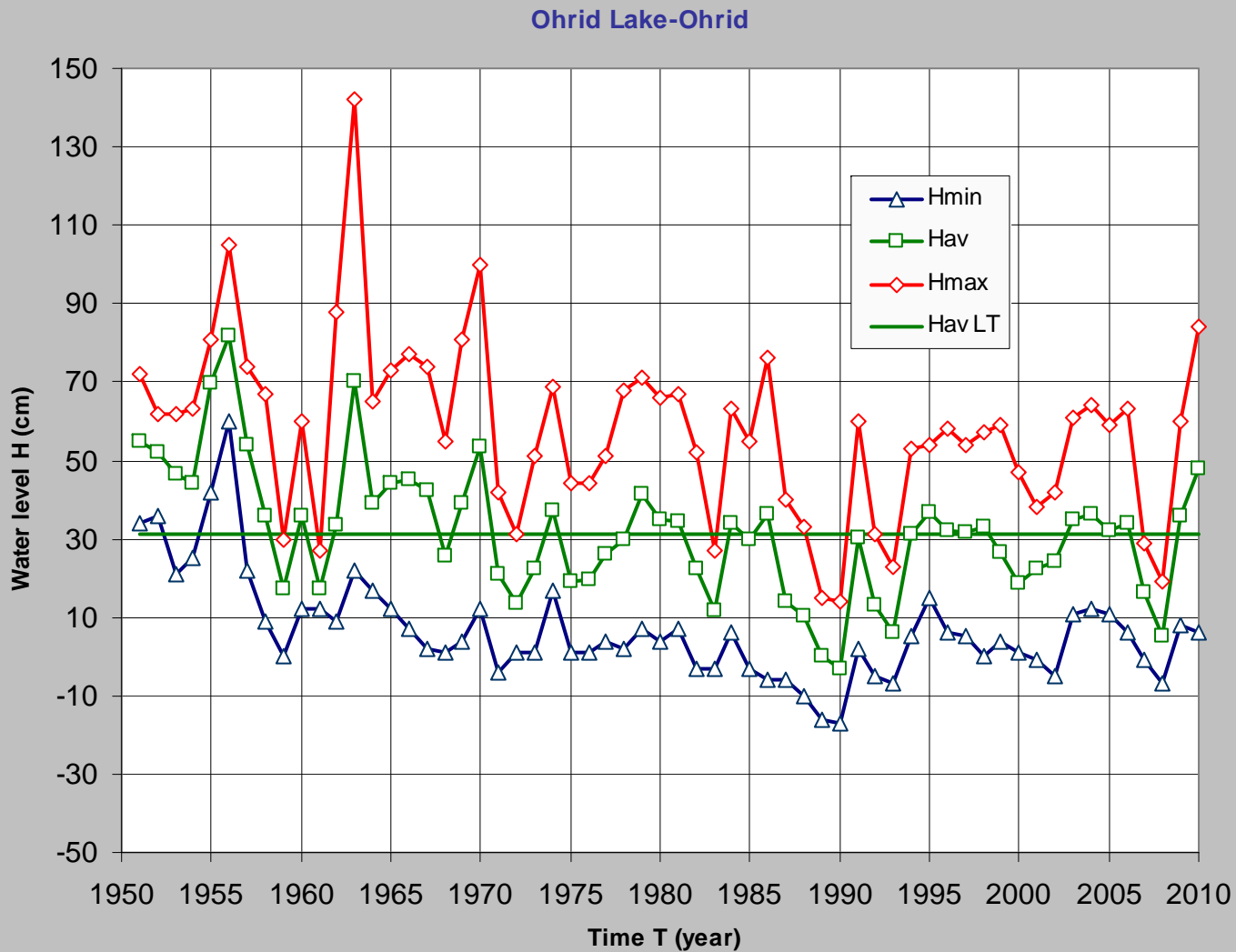
Tectonic Lakes-Climatic and Anthropogenic Impacts

Cvetanka Popovska

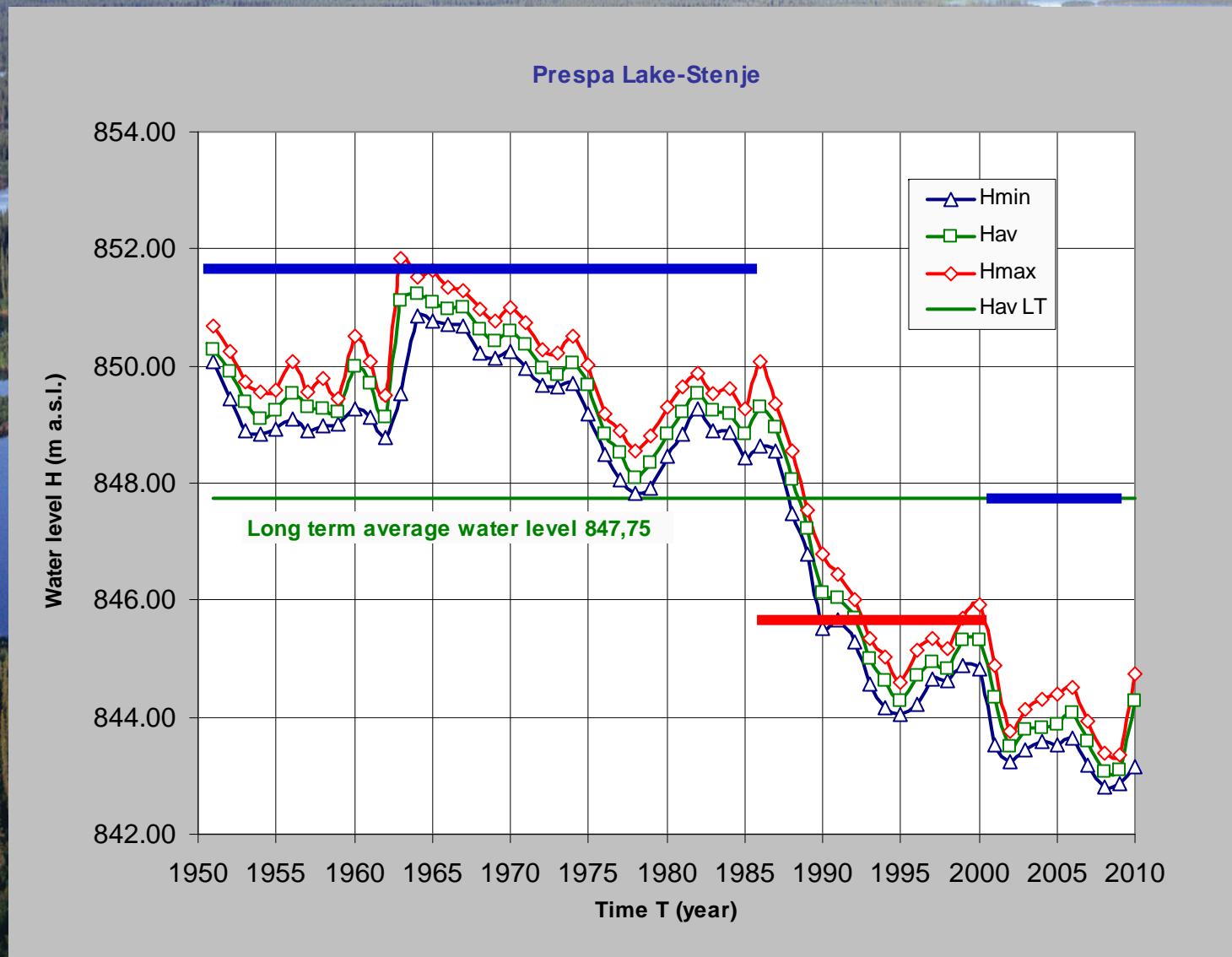
University of Ss Cyril & Methodius
Faculty of Civil Engineering
Skopje, Republic of Macedonia

www.gf.ukim.edu.mk



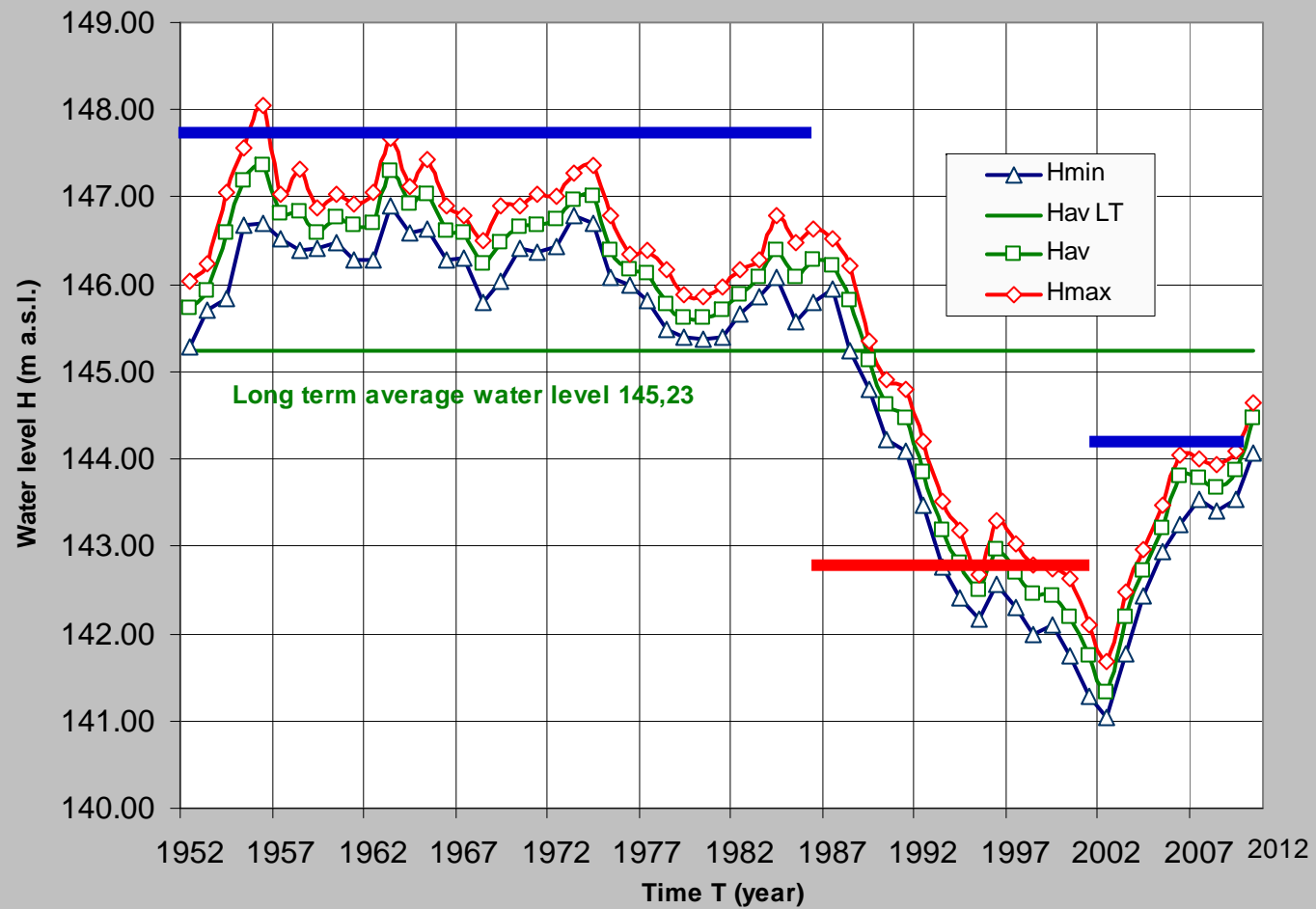


UNESCO Cultural and Natural Heritage Site in 1980
Resident time of about 75 years explains high endemism of lake's biology



Rescaled Adjusted Partial Sums-RAPS (Garbrecht&Fernandez, 1994)

Dojran Lake-Nov Dojran





Questions:

- Do we understand the hydrological cycle completely?
- Shall we reconsider hydro-logical cycle as hydro-illogical cycle?

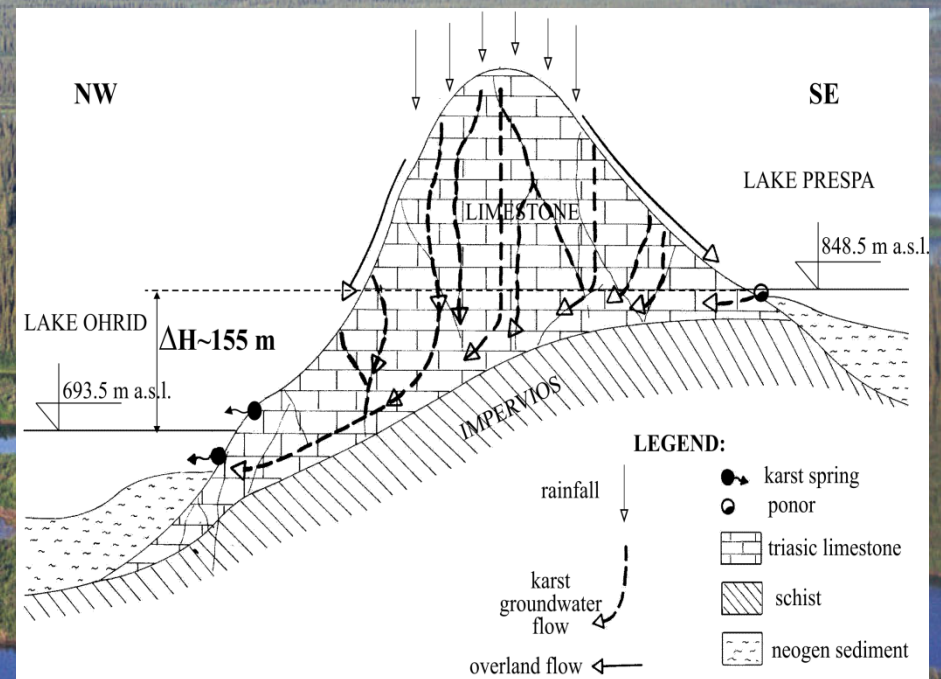
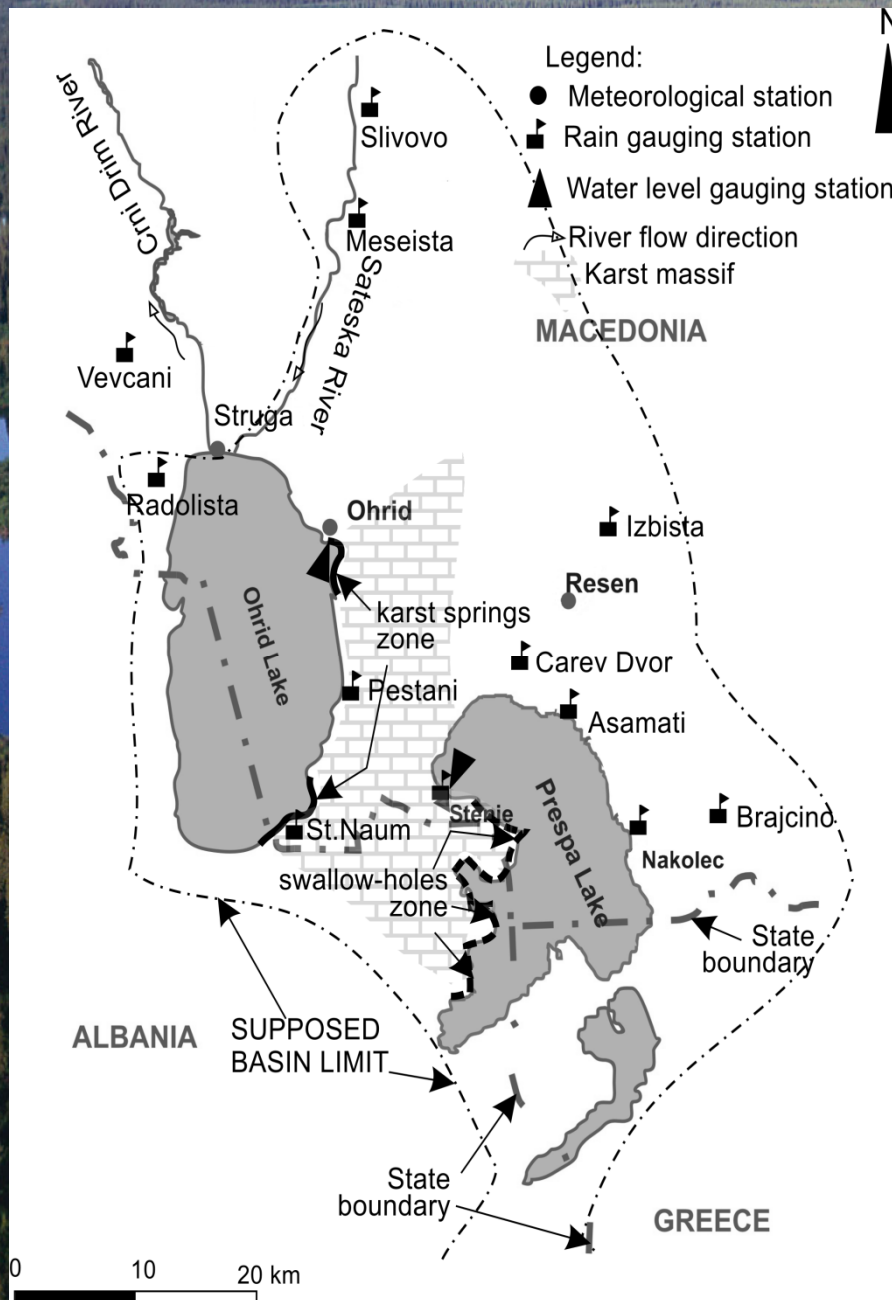
The four Laws (Commoner B., 1970):

- Everything is connected to everything else
- Everything must go somewhere
- Nature knows best
- There is no such a thing as free lunch

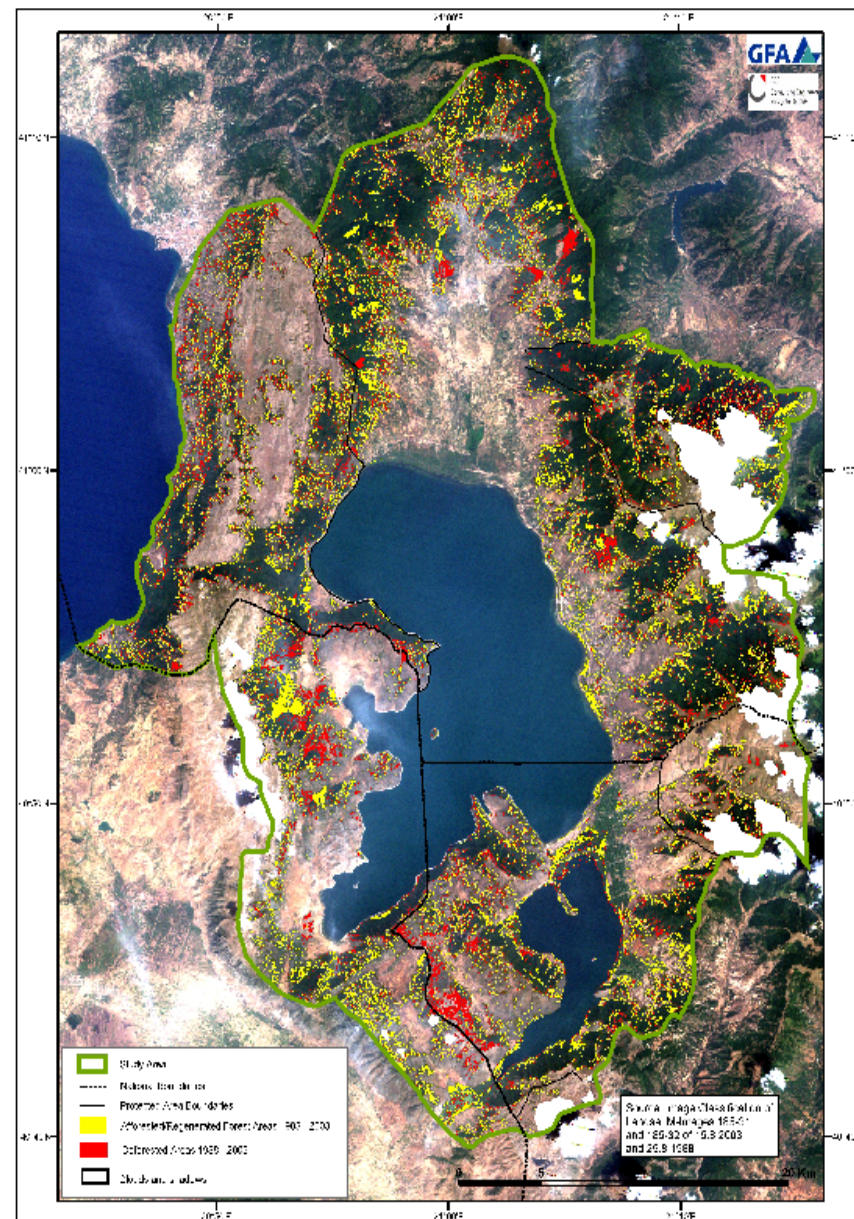
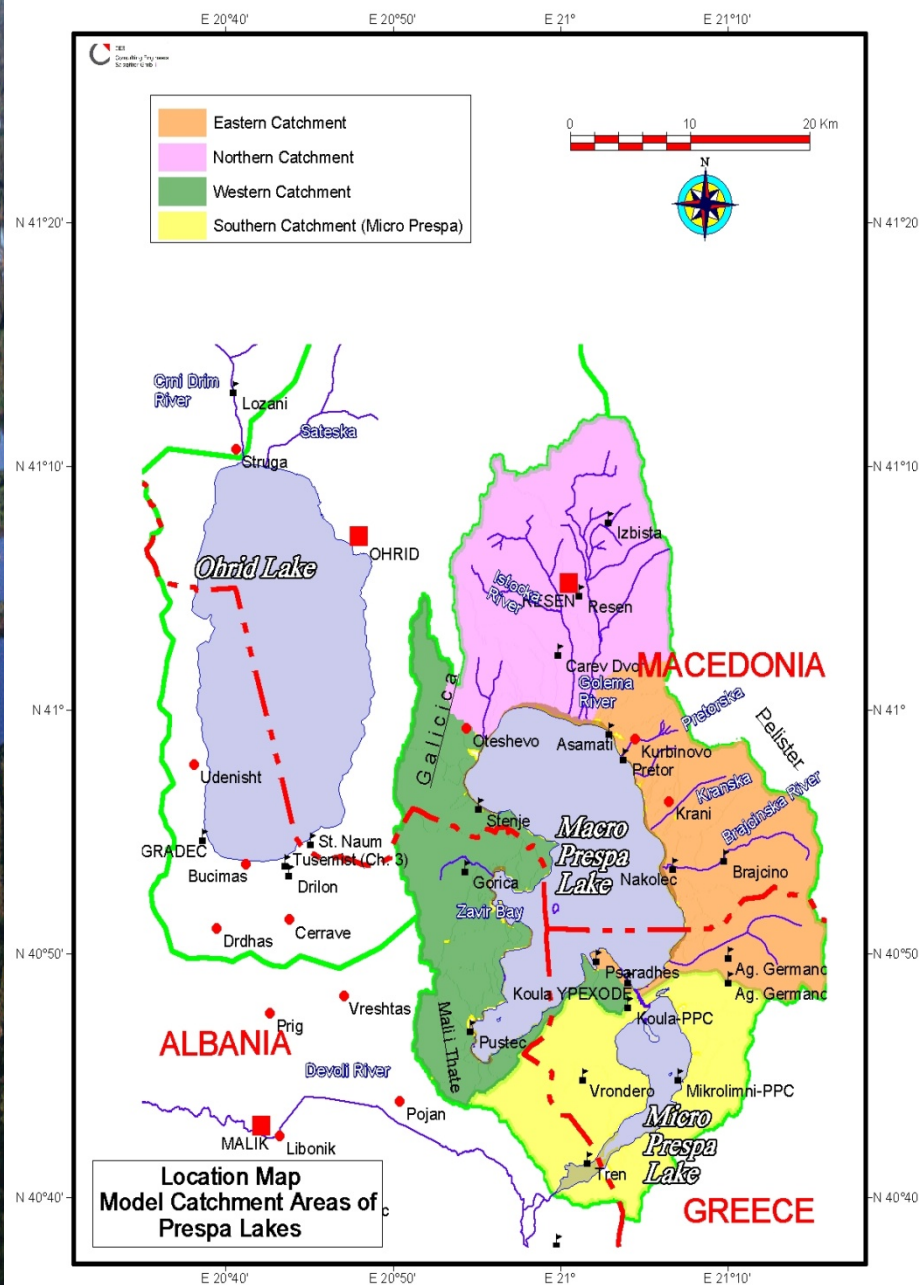
An aerial photograph of a large, dark blue lake surrounded by a dense, green forest. The lake's surface is calm, reflecting the surrounding trees. The forest appears to be a coniferous woodland. The image is used as a background for a presentation slide.

Projects:

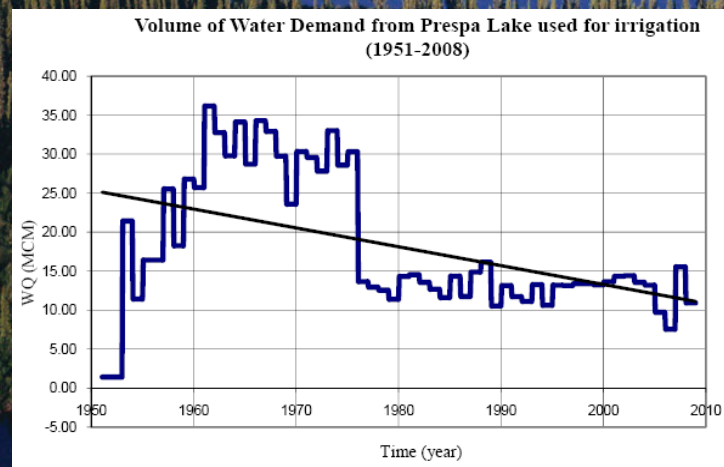
- **Feasibility Study-Transboundary Prespa Park Project, 2005 (KfW)**
- **Development of Prespa Lake Watershed Management Plan, 2010 (UNDP&GEF) (on-going)**
- **Improvement of Management of Transboundary Water Resources in the Vardar River Basin, Package 5: Lake Dojran, 2007 (CARDS)**
- **Lake Ohrid Conservation Project, 2002 (GEF&World Bank)**



Source: Popovska & Bonacci, 2007

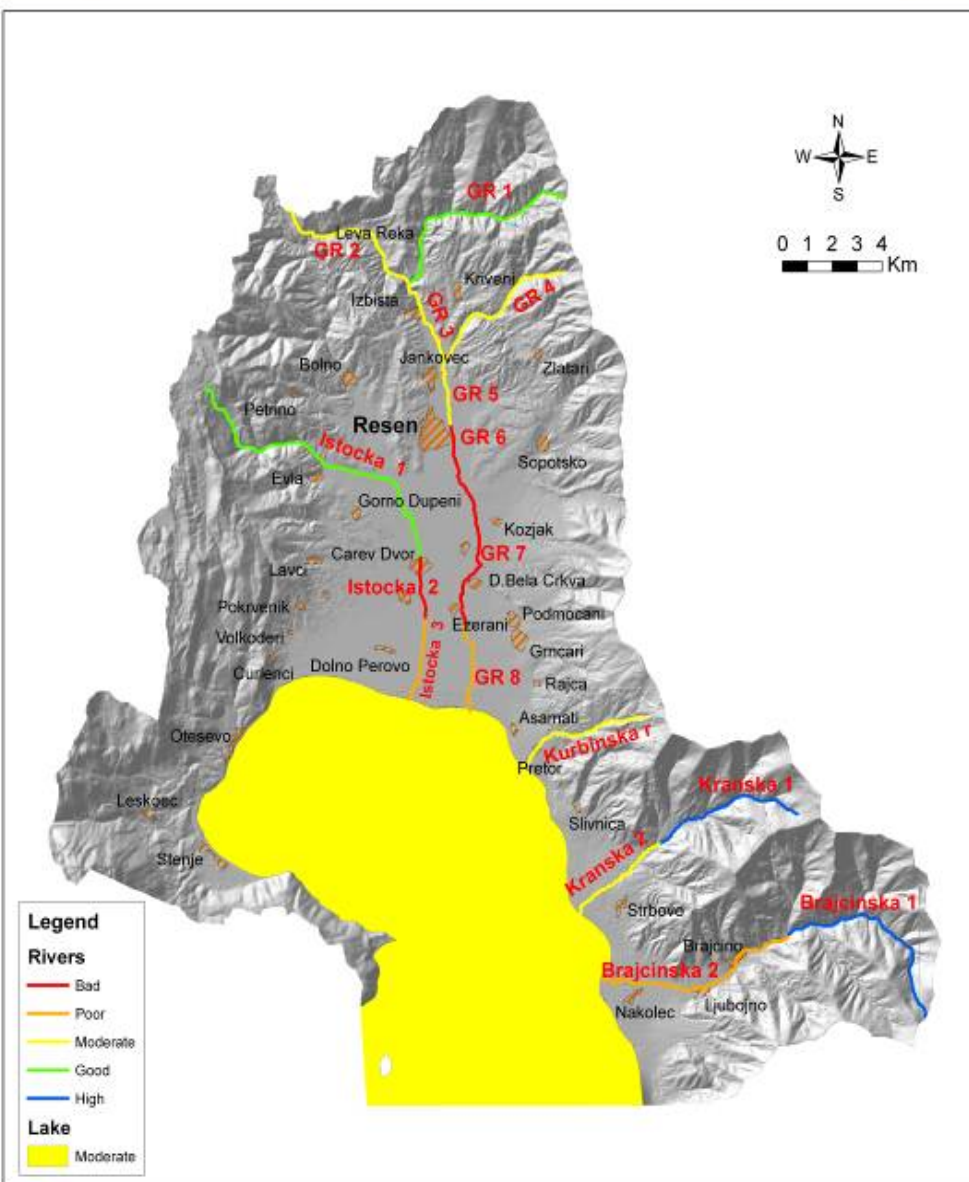


Inflow-outflow (1967-2008)	MCM
Total inflow into the lake	10.942
Inflow from Micro Prespa Lake (spill and seepage)	1.728
Total water abstraction (irrigation and water supply)	380,2
Losses due to karstic outflow	11.300
Losses due to evaporation	803,2
Lake volume losses	1.528
Computational balance (inflows-outflows)	-1.542



Source:
Development of Prespa Park
Management Plan, 2010 (UNDP&GEF)

Classification of the ecological status of the water bodies



Water quality

High

Good

Moderate

Poor

Bad

Source:
Development of Prespa Park
Management Plan, 2010 (UNDP&GEF)

An aerial photograph of a vast, forested landscape. A dark blue river winds through the scene, reflecting the surrounding greenery. A large, elongated island with a dense forest of tall, thin trees sits in the middle of the river. The background shows more forest and distant hills under a clear sky.

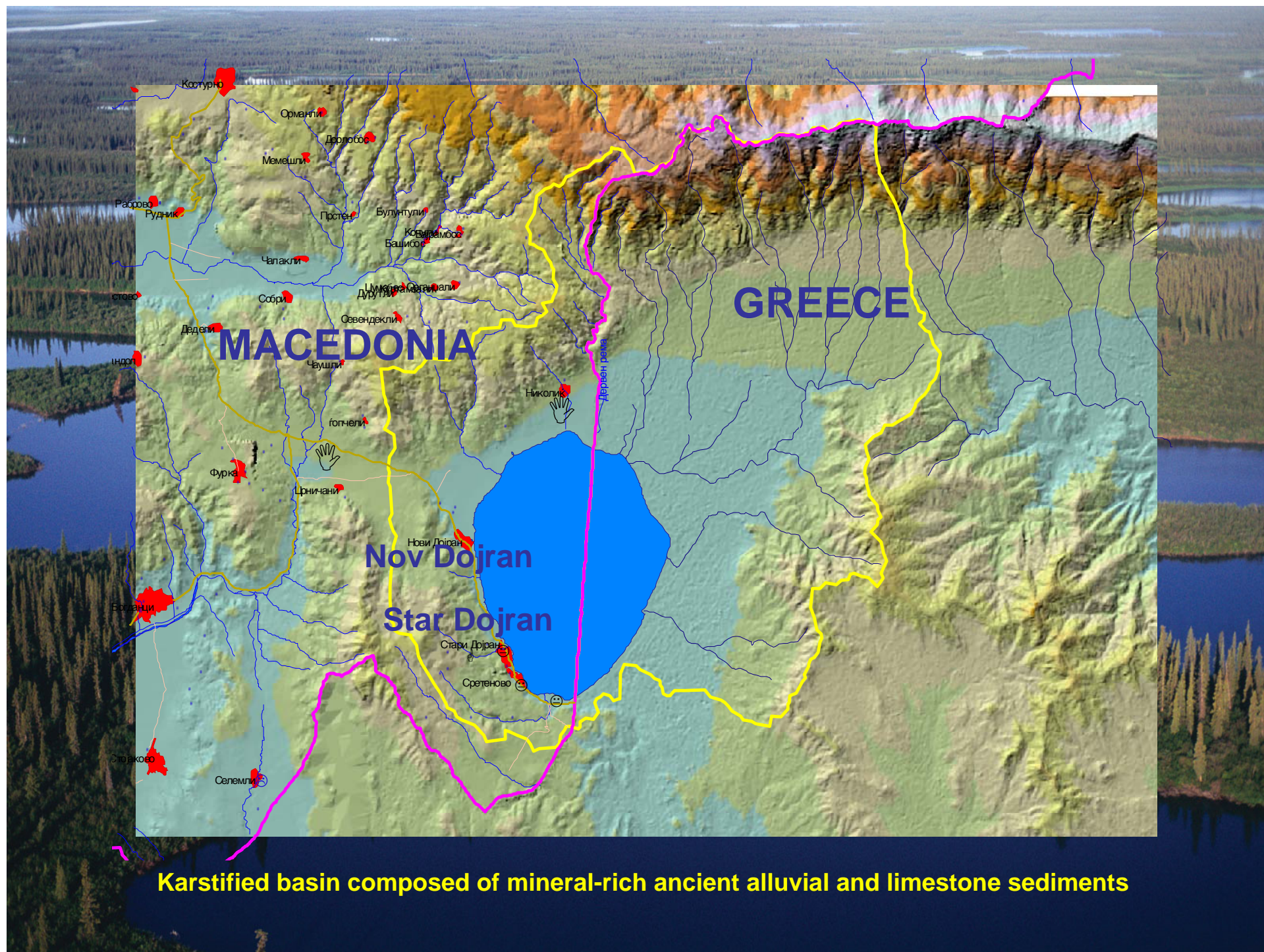
Delineation is carried out following EU documents:

Guidance document No.2

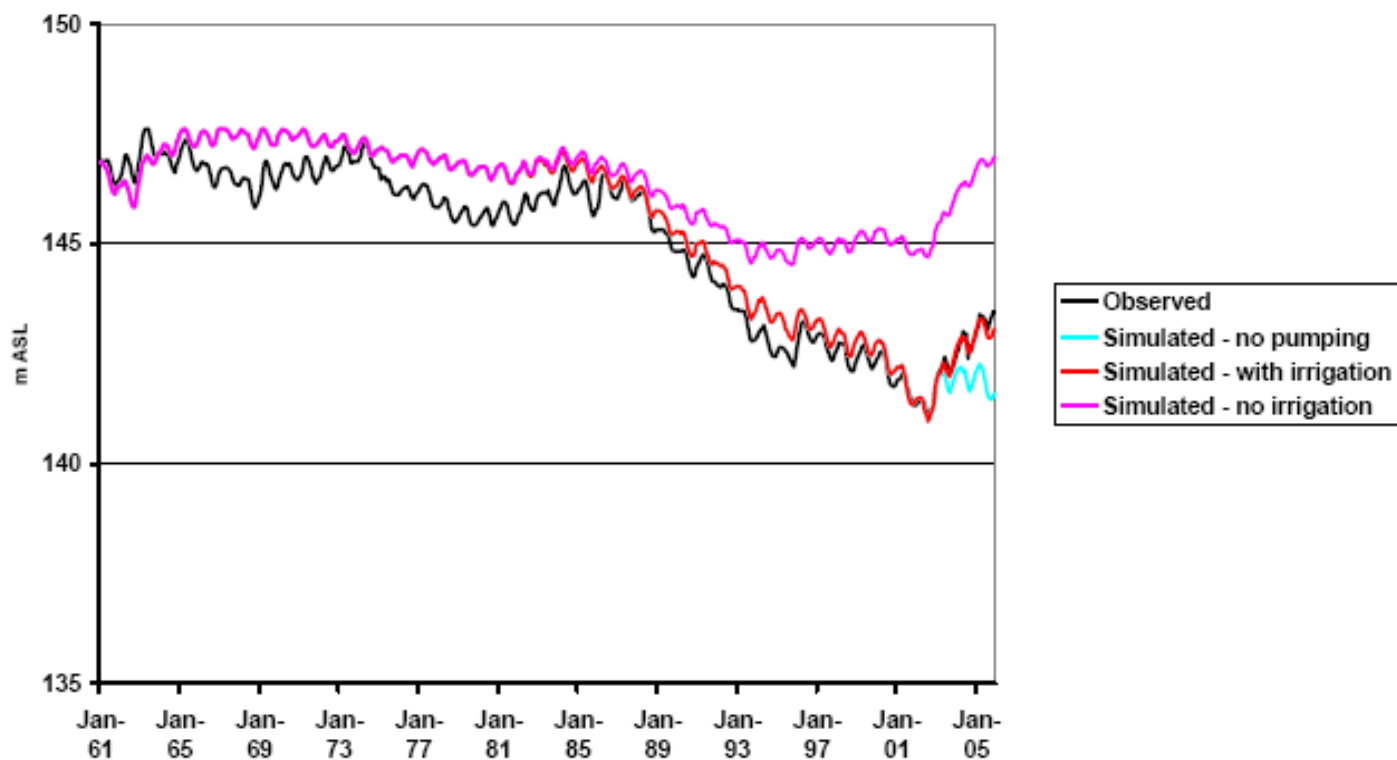
Identification of Water Bodies

Guidance document No.4

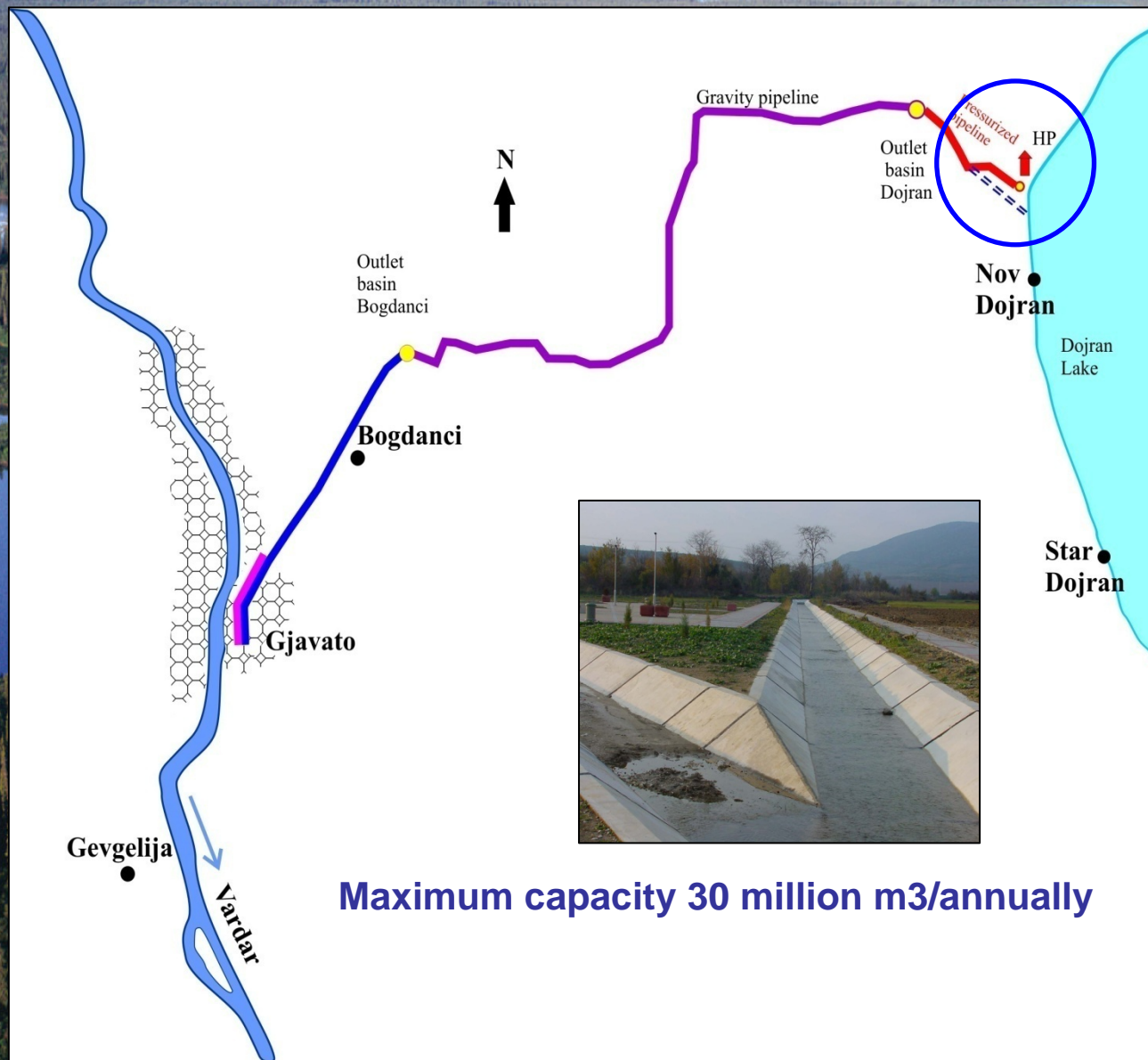
Identification of Heavily Modified and Artificial Water Bodies



Simulated and observed water levels (Rainfall-runoff model HYSIM)



Source:
Manley, Spirovska, Andovska, BALWOIS 2008
(Improvement of Management of Transboundary
Water Resources, Package 5: Dojran Lake, 2007)



Maximum capacity 30 million m³/annually

Source:
NATO ARW: Popovska & Bonacci, Lednice, 2007



CONCLUSIONS/DISSION

Like it or not

Climate, Water, Weather and Society are integrally linked

Scientists separate them for research purposes

Societies separate them for administrative purposes

We forget that Water Cycle and Life Cycle are one
(Jacques Cousteau)

An aerial photograph of a vast, forested landscape. A dark, winding river flows through the center of the image, surrounded by numerous small, interconnected lakes and ponds. The surrounding area is densely covered with green coniferous trees. The sky is a pale blue, and the overall scene depicts a natural, undisturbed environment.

Instead action by words we need action on the field

Lakes' watersheds needs rain-gauges at higher altitudes

Snowfall and snow density data are missing

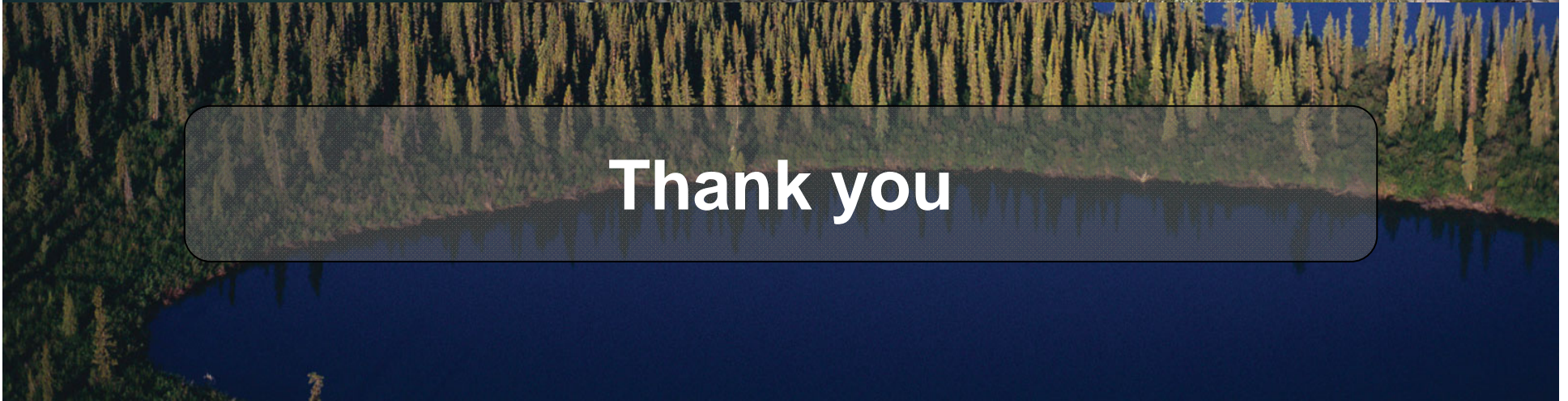
Evapotranspiration and evaporation data are missing

Hydrogeological investigations are not sufficient

Water quality monitoring is not sufficient

Integrated Management Plans should be developed

Lakes' watersheds needs restoration



Thank you