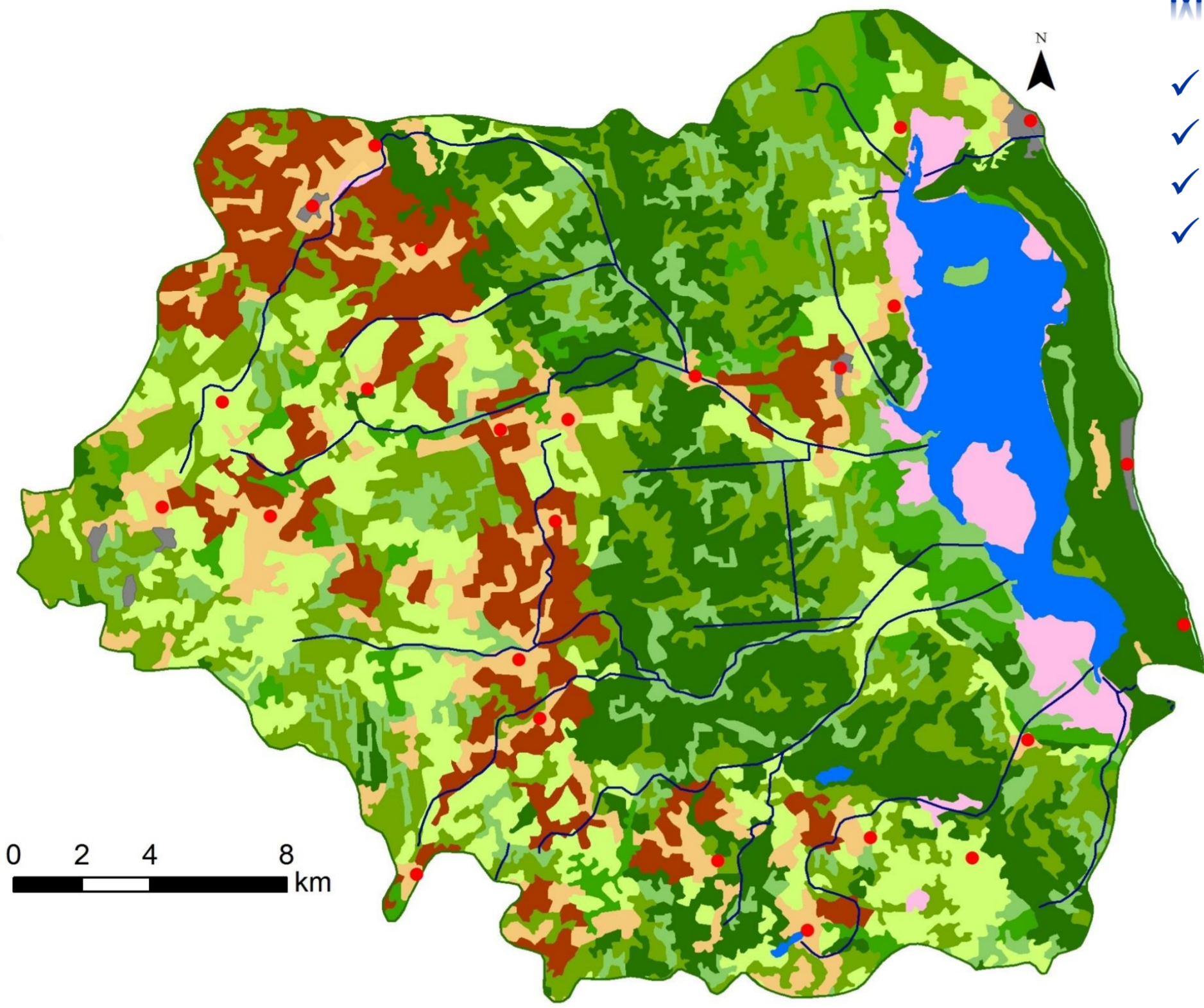


LIMNOLOGICAL RESEARCH AT THE LAKE ENGURE

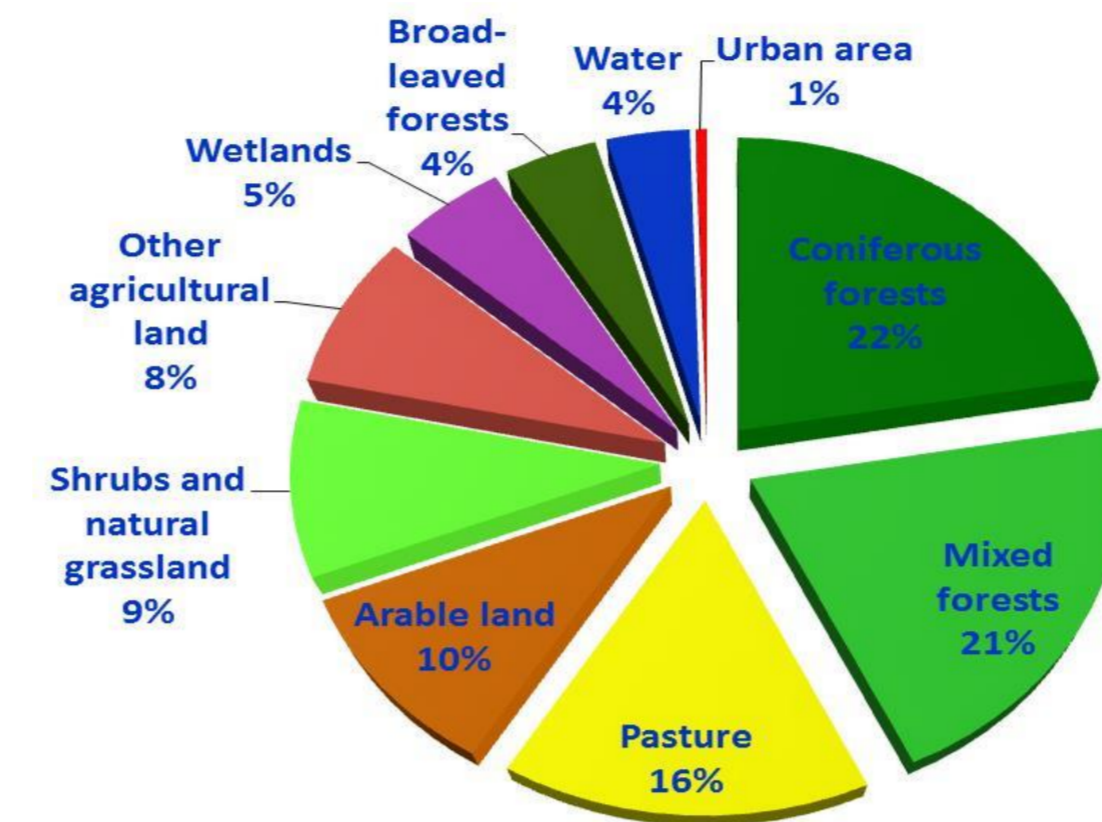
Ilga Kokorīte¹, Linda Dobkeviča¹, Ivars Druvietis¹, Laura Grīnberga¹, Jolanta Jēkabsons¹, Dāvis Ozoliņš¹, Elga Parele¹, Valery Rodinov¹, Agnija Skuja¹, Roberts Šiliņš², Gunta Sprinģe¹

¹University of Latvia, Institute of Biology; ²Lake Engure Nature Park Fund



MORPHOMETRIC FEATURES:

- ✓ catchment area: 644 km²
- ✓ lake are: 40.5 km²
- ✓ volume: 0.168 km³
- ✓ mean depth: 0.4 m
- ✓ max depth: 2.1 m
- ✓ water exchange time: 7.2 times/year
- ✓ shallow lagoon-lake



Annual ornithological observations in L.Engure are since 1958. Regular hydrobiological and hydrochemical observations are carried out since 1995.

Land cover types in the L.Engure catchment.

- ✓ Due to eutrophication areas covered by charophytes are decreasing.
- ✓ Lowed water level has also facilitated overgrowing of the lake
- ✓ Area covered by emergent macrophyte stands has increased by 15 ha/year during 1956-2007 (Brīzs, 2011)

EXCAVATION OF MĒRSRAGS CANAL IN 1842

- ✓ Water level lowered by 1.5 meters
- ✓ Water volume decreased by more than 2x
- ✓ Frequent intrusions of saline waters from the Gulf of Riga when W-NW winds prevail

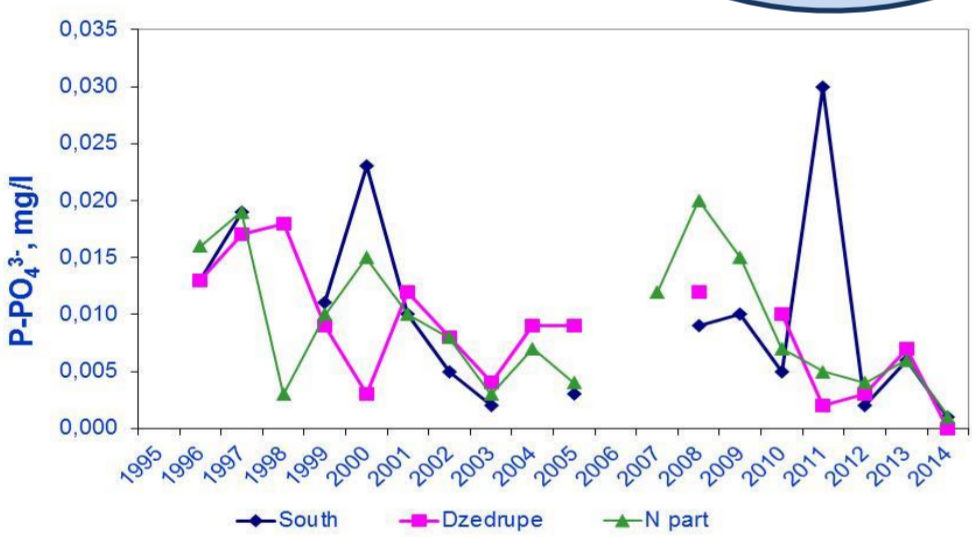
EUTROPHICATION

Nutrient inputs from tributaries and cormorant's colony

- ✓ Overgrowing by emergent macrophytes
- ✓ Decrease of areas covered by Chara beds

CLIMATE CHANGE

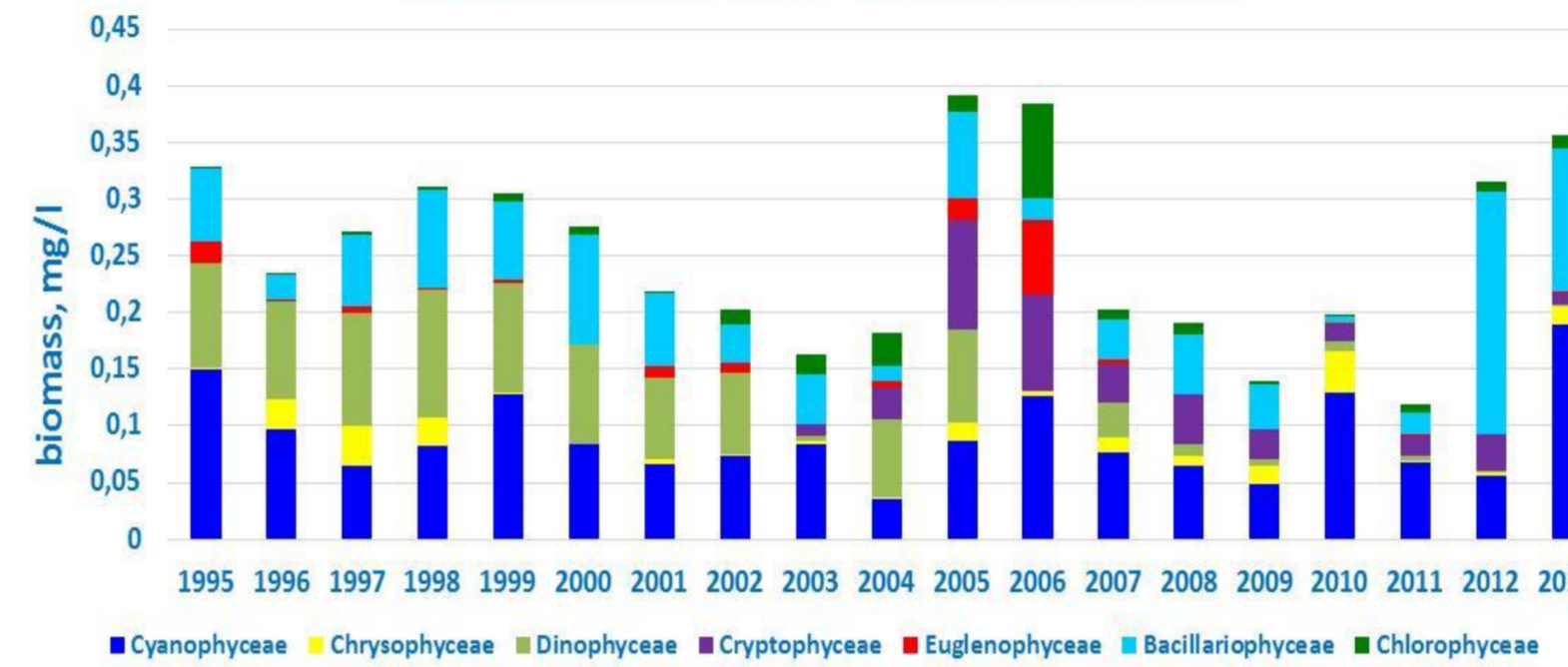
- ✓ Mean air temperature has increased by 1.04°C during 1928-2007
- ✓ Impact on the lake water level
- ✓ Changes in river discharge



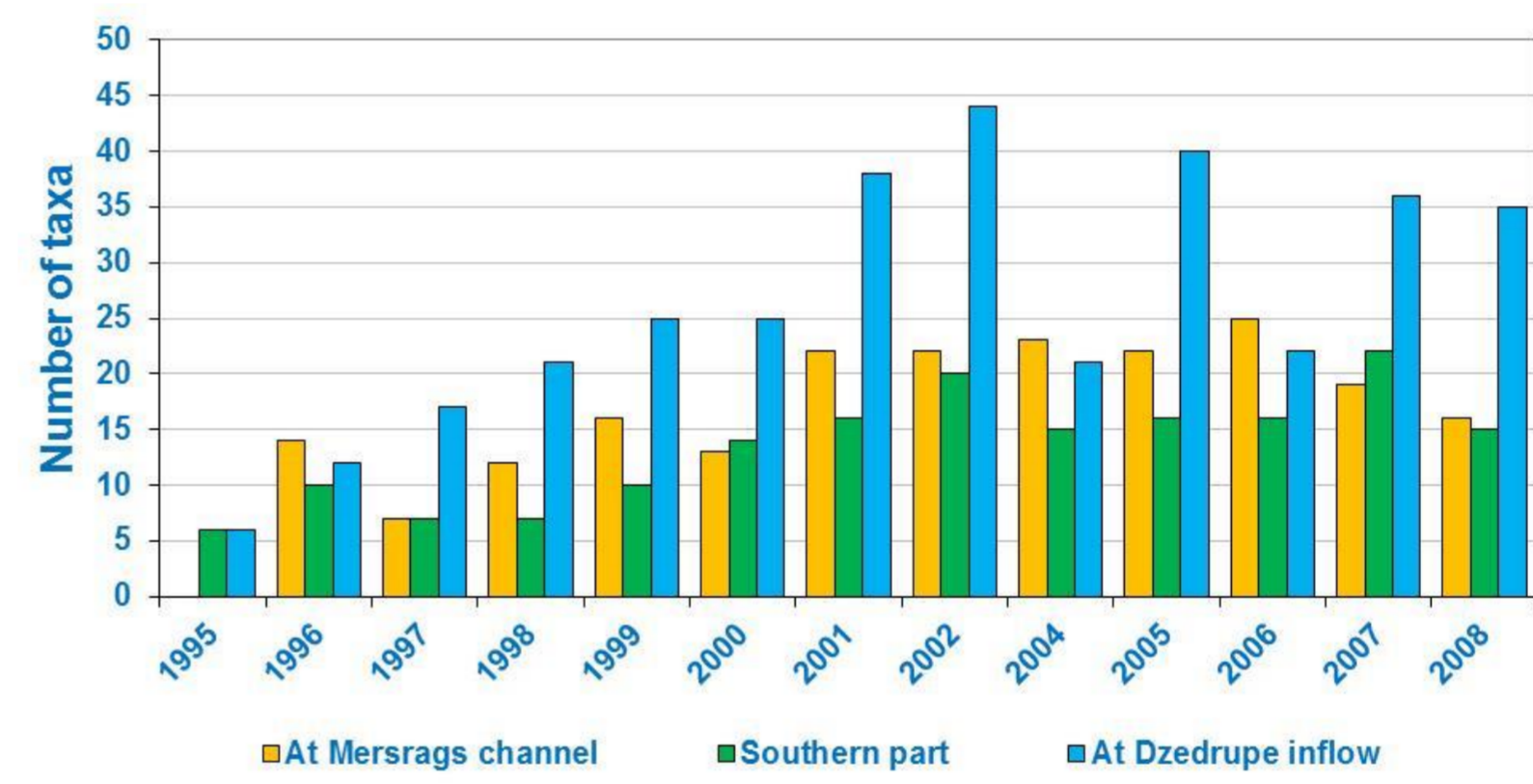
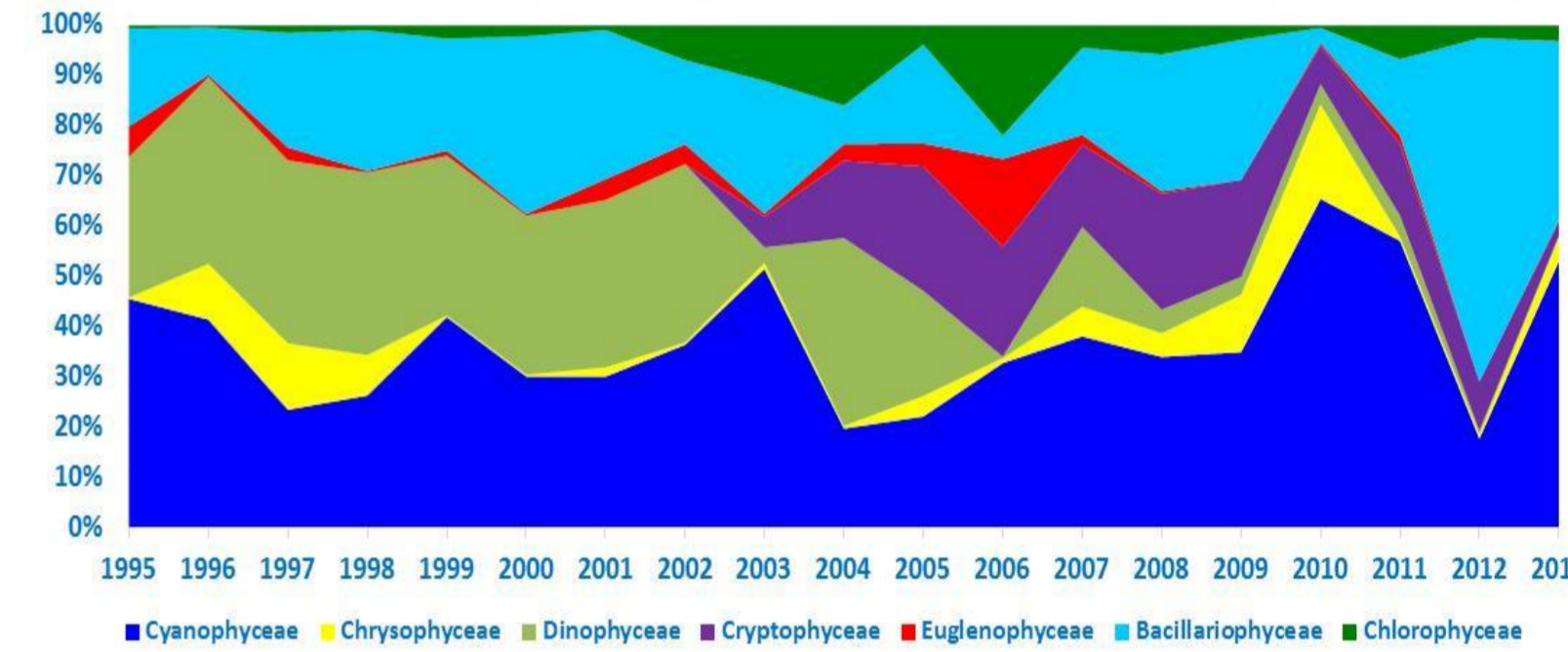
Pressures to the ecosystem of L.Engure

PHYTOPLANKTON biomasses are low 0.13-0.39 mg/l. No substantial change in species composition or biomasses has occurred since the beginning of monitoring in 1995.

Phytoplankton biomass (mg/l) in the central part of L. Engure



Percentage (%) of algal groups forming phytoplankton in the central part of L. Engure



Dominating groups of **BENTHIC INVERTEBRATES** are chironomids, oligochaetes, crustaceans, mayflies, caddisflies and molluscs. Near the inflow of Mērsrags Chanel oligohaline and mesohaline species are common.

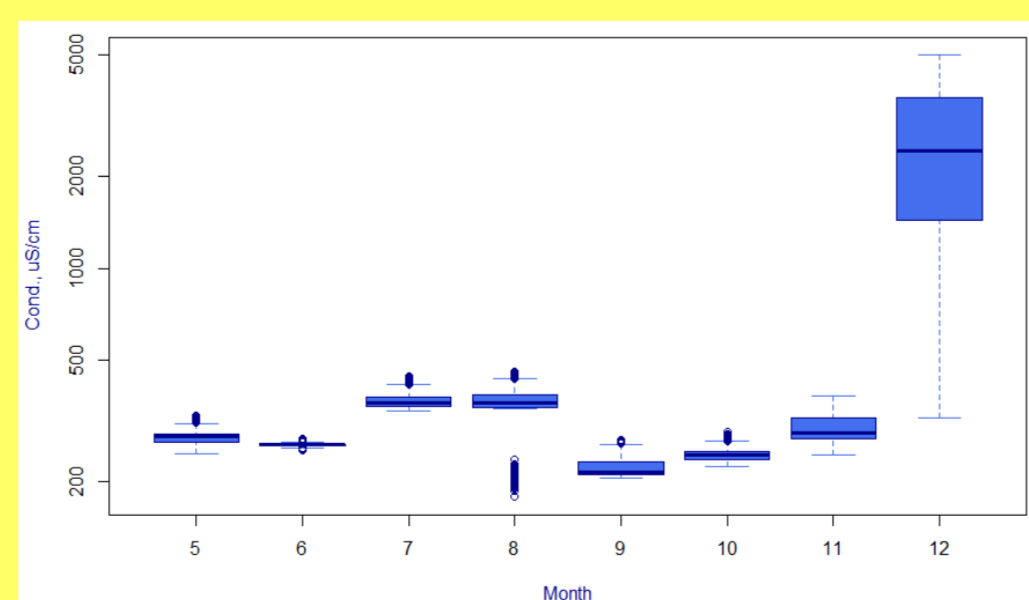
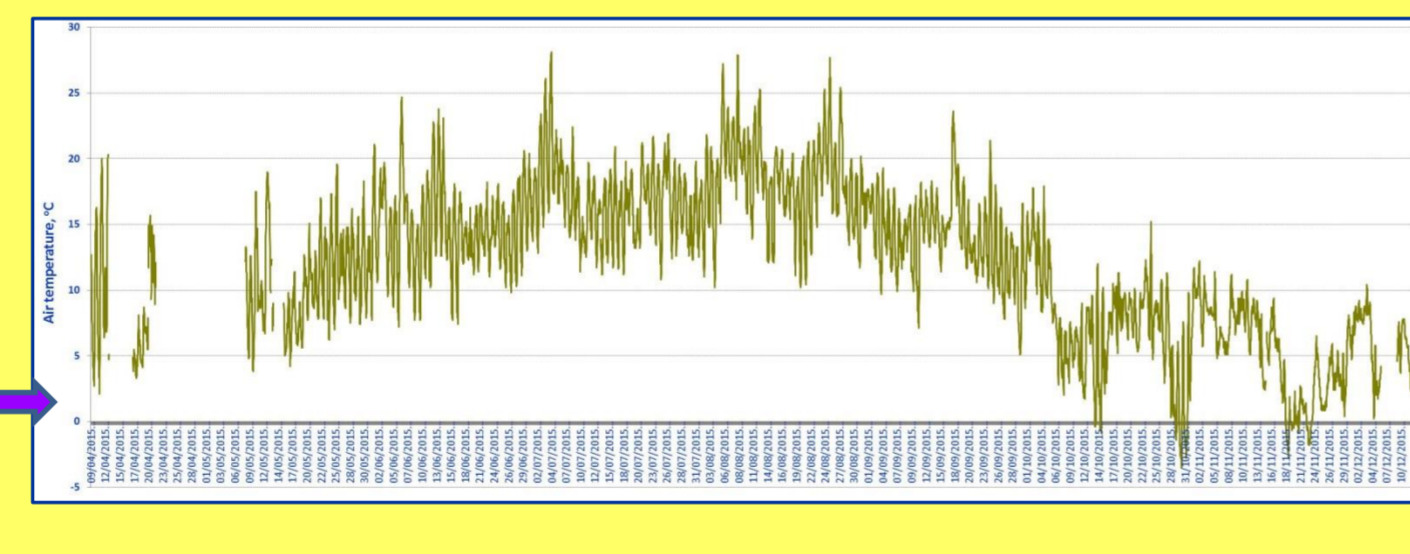


HIGH FREQUENCY MEASUREMENTS OF PHYSICO-CHEMICAL AND WEATHER PARAMETERS STARTED IN SPRING 2015



Photo by L. Grīnberga

New floating house in L.Engure equipped with Hanna Instruments sensors for in-situ measurements of water temperature, dissolved oxygen, conductivity, pH, turbidity as well as meteorological station Davis Vantage Pro2 Plus (data holder: Lake Engure Nature Park)



MACROPHYTES of the L.Engure are typical for very shallow hard-water lakes.

- ✓ Most dominant submerged macrophytes are charophytes.
- ✓ *Phragmites australis*, *Scirpus lacustris* and *Typha angustifolia* are dominating in emergent flora.
- ✓ Near the inflow of R. Dzedrupe species indicating on eutrophication are found.
- ✓ Chara beds are disappearing in the vicinity of cormorant colonies.



Photo by I. Druvietis

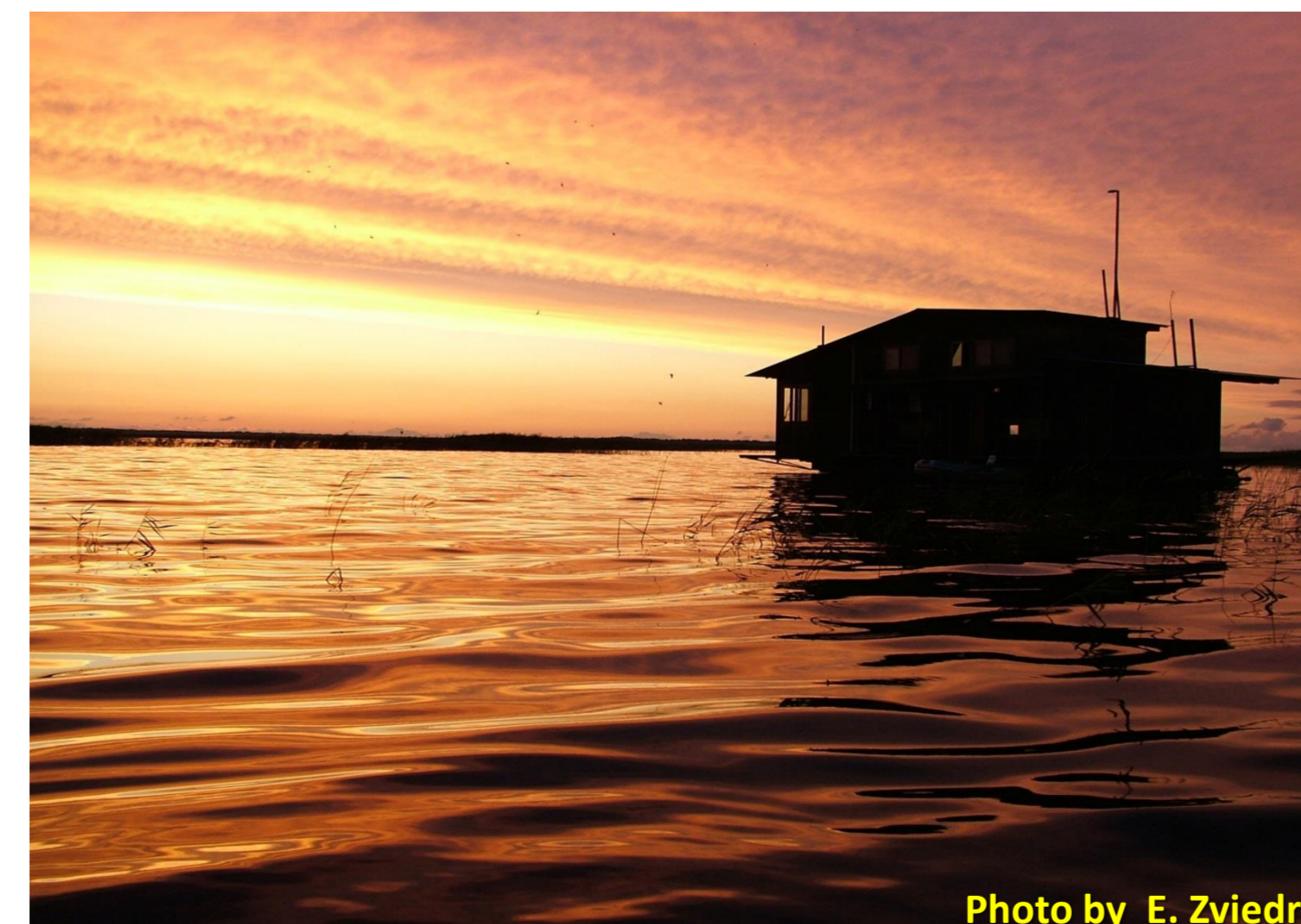


Photo by E. Ziedere

HYDROBIOLOGICAL RESEARCH AT THE LAKE ENGURE IS SUPPORTED BY:

- ✓ Grant of Latvian Council of Science «Changes in stability of the climate system and their impact on the biogeochemical flows limiting surface water quality in Latvia» (No. 526/2012)
- ✓ eLTER H2020 project «Integrated European Long-Term Ecosystem & Socio-Ecological Research Infrastructure
- ✓ EU Life+ project «Restoration of Bittern habitats in two coastal lakes in Latvia»



Photo by I. Druvietis



Photo by I. Druvietis



Photo by I. Druvietis



Photo by A. Jarmuts

Expansion of dense emergent macrophyte stands is one of the reasons for decreased nesting of waterfowl. Semi-wild cows and horses are introduced in the Nature Park of the L.Engure to create open landscapes. Read-cutting is done during winter season.

The «flower» in the Northern part of the Lake has been created in 2014-2015 in order to provide good habitats for population of Bittern *Botaurus stellaris*