

University of Warmia and Mazury in Olsztyn, Poland
Department of Environment Protection Engineering

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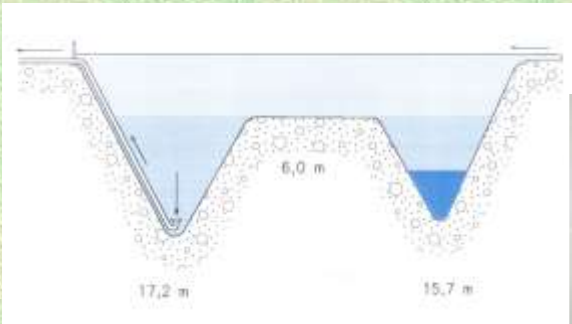
Research experience

- physical limnology
- hydrochemistry
- protection and restoration of lakes
- water management

Improvement of restoration methods

Hypolimnetic withdrawal

Professor Przemysław Olszewski,
Kortowskie Lake in Olsztyn, 1956

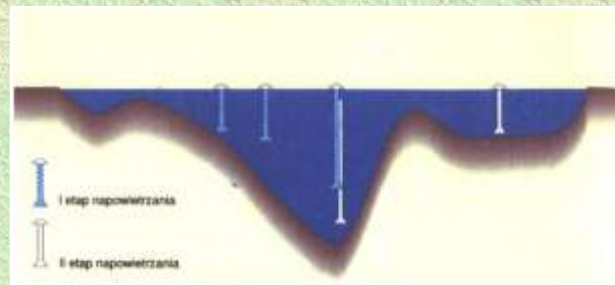


Phosphorus inactivation

- aluminium sulphate
- polyaluminium chloride (PAX 18)

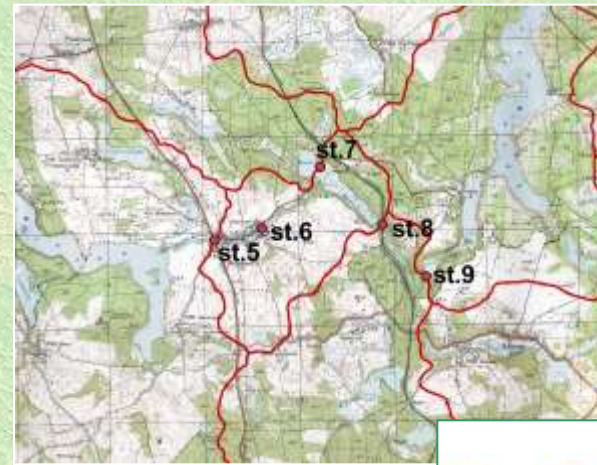


Artificial aeration



Impact of watershed development on the quality of water in lakes and rivers

- The seasonal changes of organic carbon concentration in lakes of different trophic state
- The dynamics of different forms of organic carbon in lakes during summer stagnation and the role of the metalimnion in transformation of organic carbon
- The relationship between quantity and quality of organic carbon and physical, chemical and biological parameters
- The relationship between quality and quantity organic carbon and morphometry and catchment parameters
- The role of lakes in the transport of organic carbon in river-lake systems in the context of a continuum river (Vannote et al. 1980)



Lakes under anthropopressure

The system of konińskie lakes in the Wielkopolsko-Kujawskie Lake District, comprising of various lenitic and lotic elements: lakes, channels, pre-cooling reservoirs, fish ponds, drainage ditches, streams).

The watershed of the system (418 km²) is fairly urbanized and transformed by power industry and surface mining.

The most important questions:

- How can the anthropogenic pressure in the watershed modify the cycle of organic carbon in lakes and thus impact lake metabolism?
- What is the rate of bacterial transformation and utilization of organic carbon in the heated lakes?



Impact of global warming on the transformation of organic carbon in lakes of different trophic state:

Field study - Mazurian Lakeland

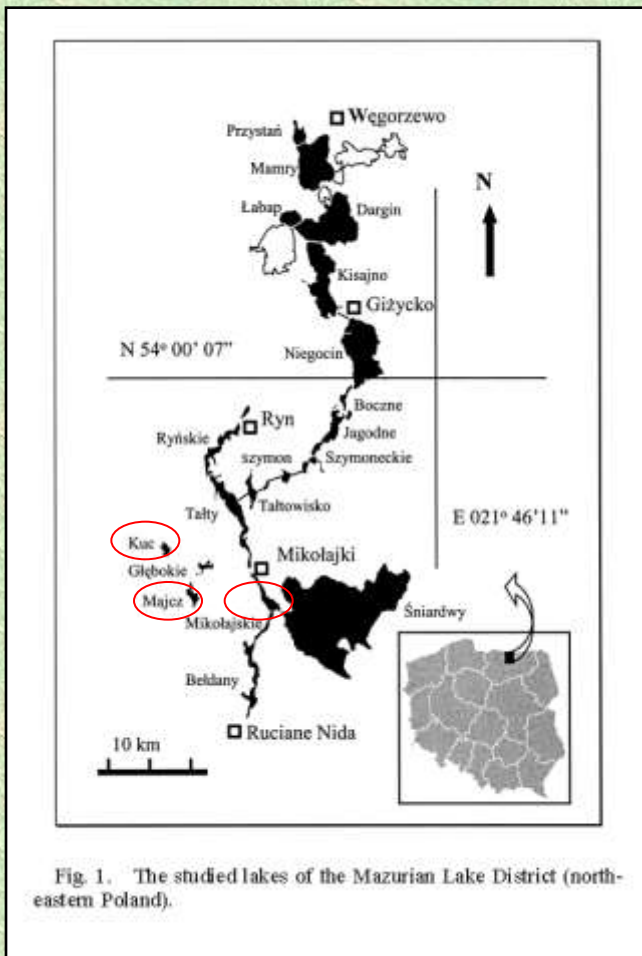
The recognition of the regulation mechanisms of production rate, degradation and utilization OM in lakes of different trophic state

Methods:

- Phytoplankton primary production and excreted organic carbon (EOC) during photosynthesis
- Bacterial secondary production
- Physical and chemical analysis
- Bacterioplankton
- Phytoplankton
- Zooplankton
- Bottom sediments

Experimental study

- Biodegradation experiments - The rate of bacterial degradation, refractory DOC (RDOC) and labile DOC (LDOC)
- Mesocosms experiments - Energy and nutrient transfer as a function of water temperature



Polar Projects:

- The influence of climate changes on the dynamics of organic carbon in the polar fjords of Spitsbergen
- The role of dissolved organic carbon in the forming of bacterial and virus communities in postglacier freshwater reservoirs of Spitsbergen
- The influence of glacial melting on marine organic carbon concentration on a gradient along the Western Antarctic Peninsula
- The impact of intensive deglaciation on origination and forming of polar ecosystems by microorganisms with respect to resources of organic carbon.

