



Christian-Albrechts-Universität zu Kiel



Town Hall of Wągrowiec

HYDROLOGY & MANAGEMENT OF DUROWSKIE LAKE

INTERNATIONAL SUMMER SCHOOL
(Wągrowiec & Poznan – July 2014)

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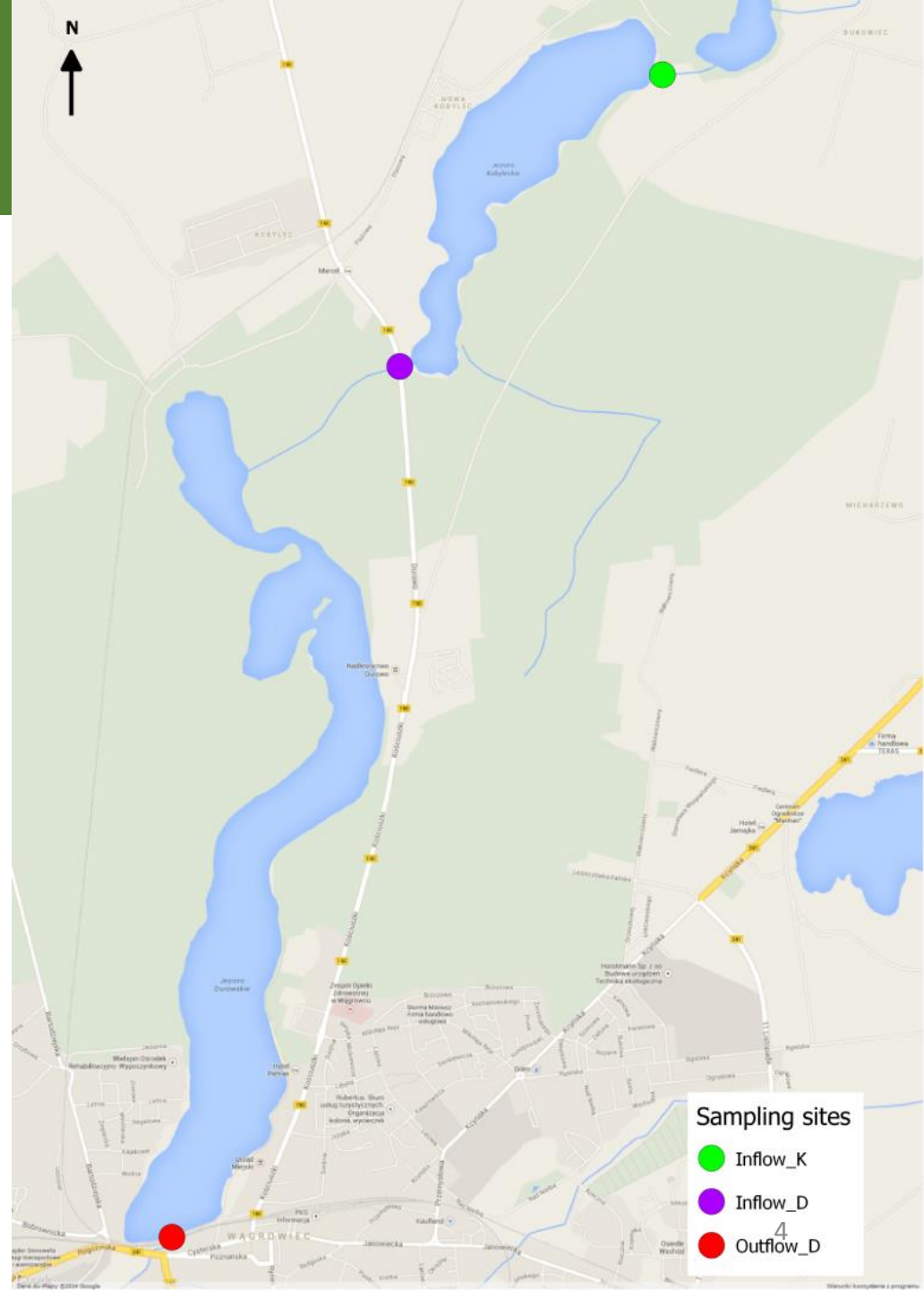
Aims of the study

- To find out some possible and practical solutions for the further management of Lake Durowskie
- To monitor water quality of the lake to assess effects of restoration initiative on its ecological state

Hydrological condition of Lake Durowskie

Sampling locations

- Inflow of Kobyleckie Lake
- Inflow of Durowskie Lake
- Outflow of Durowskie Lake

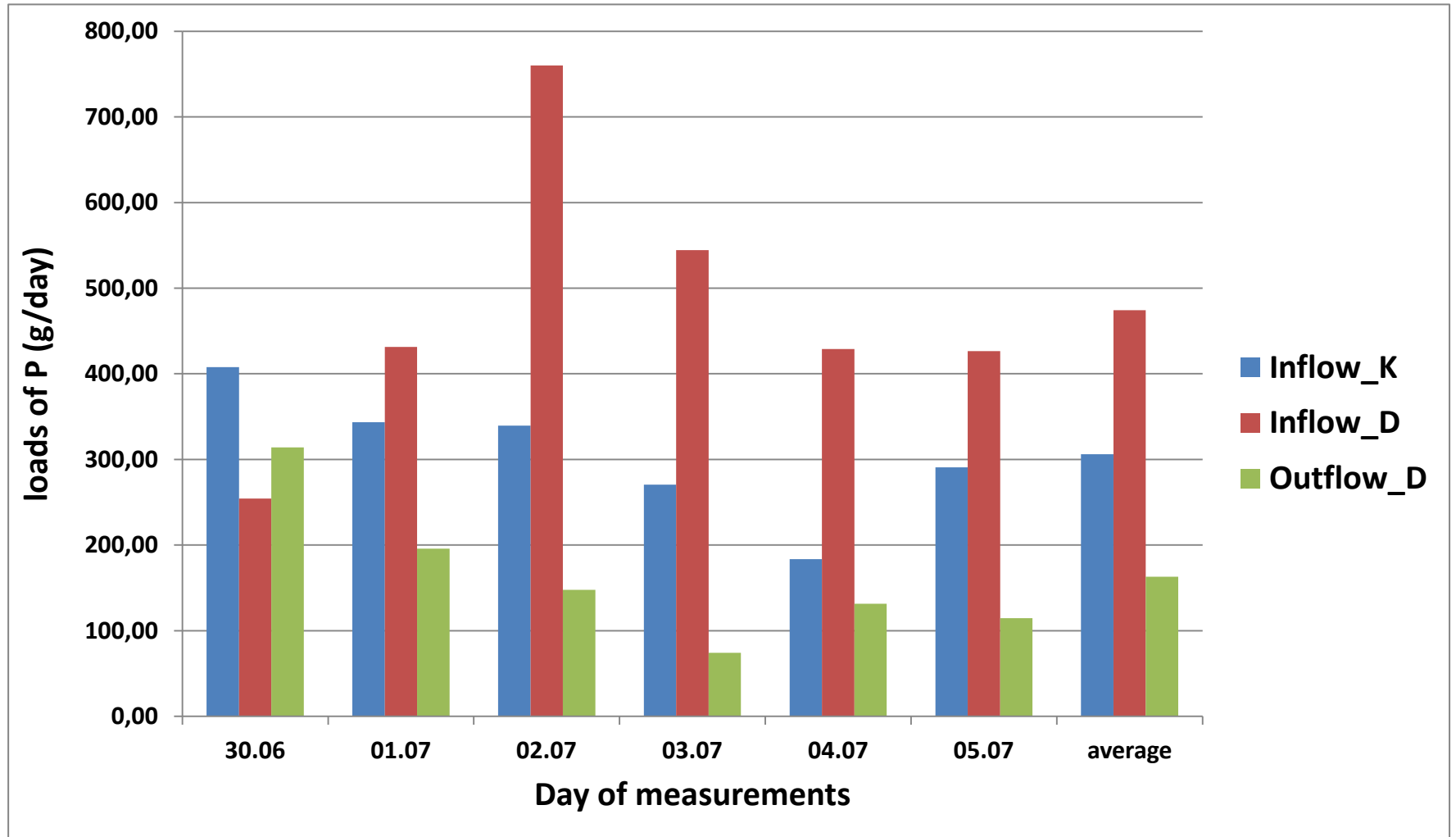


Methods: water quality assessment

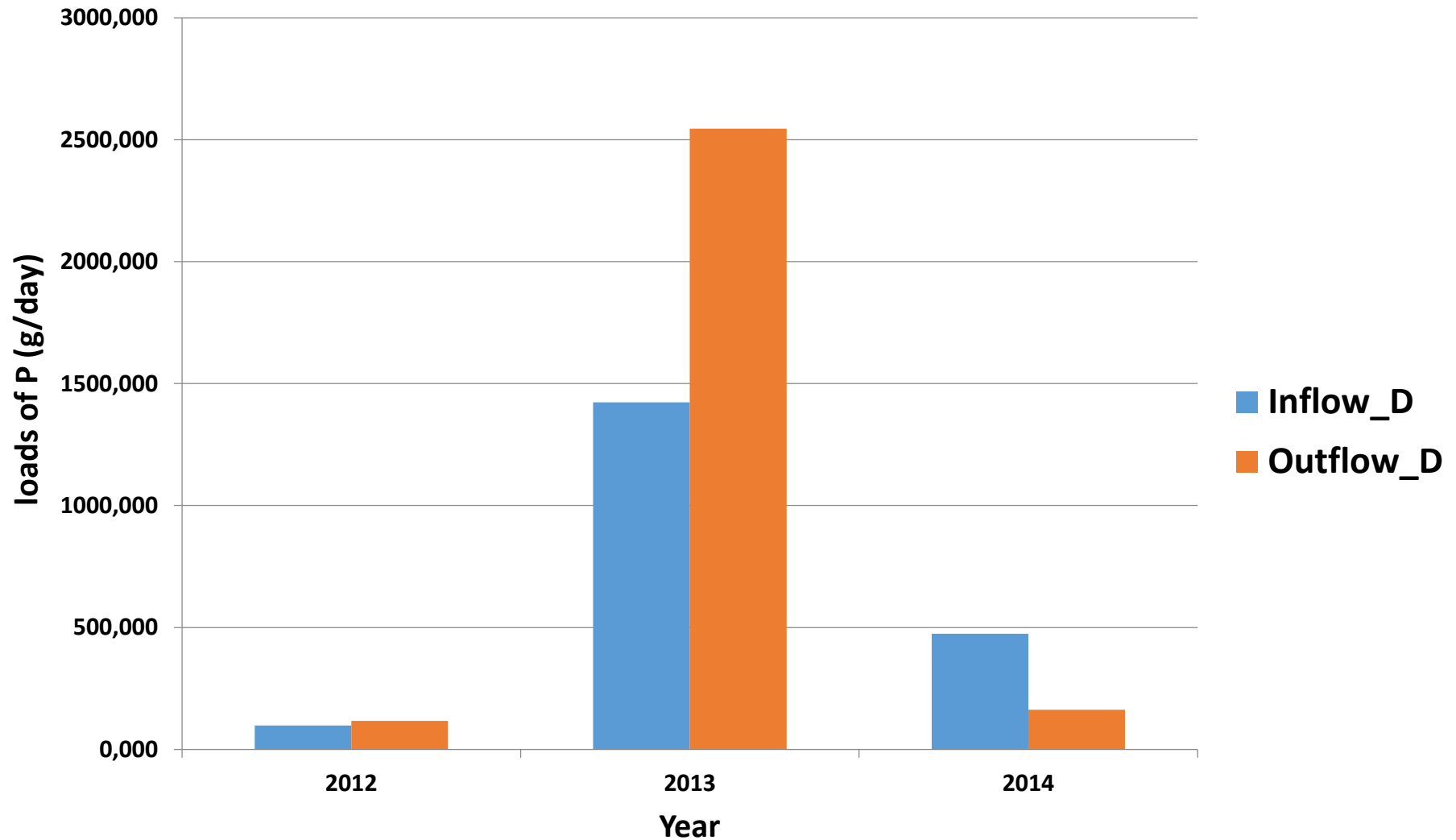
- Handheld multiparameter meter
- Pocket pH meter
- Electromagnetic velocity meter
- Spectrophotometer



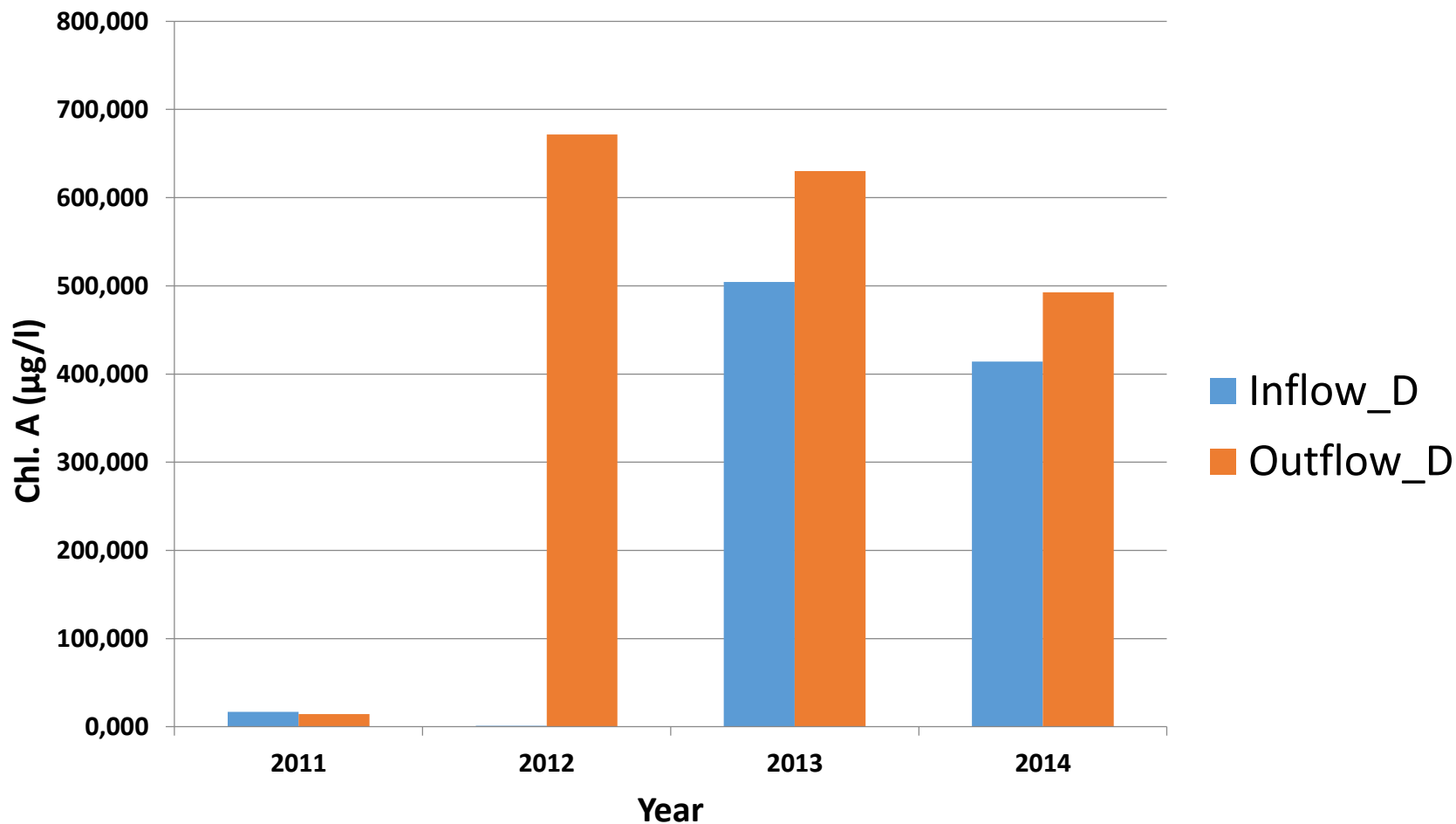
Result: Phosphorus loads



Results: Comparison of phosphorus loads with previous years

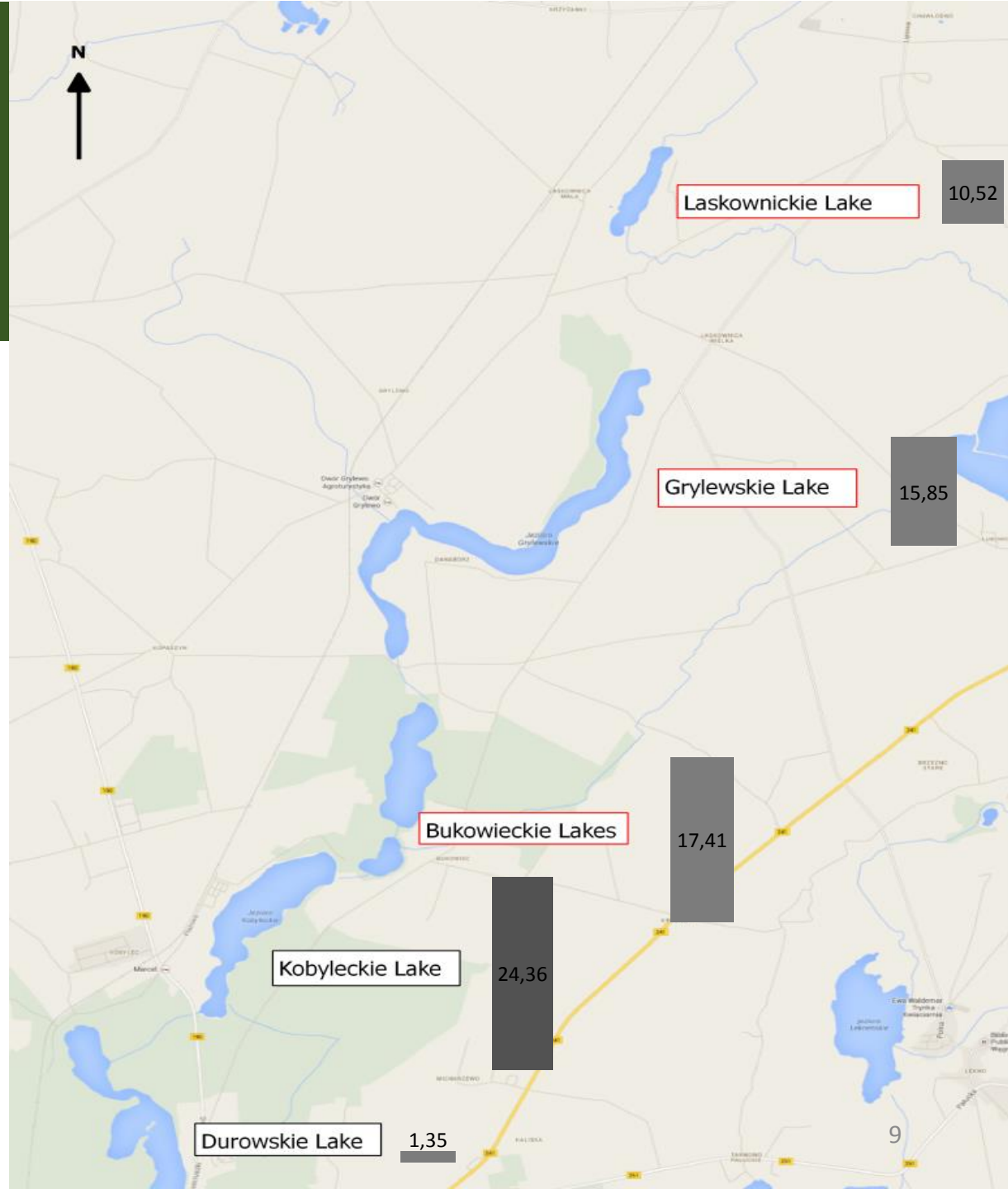


Result: Comparison of Chlorophyll *a* content with previous years



Water quality parameters of upstream lakes 05.07.2014

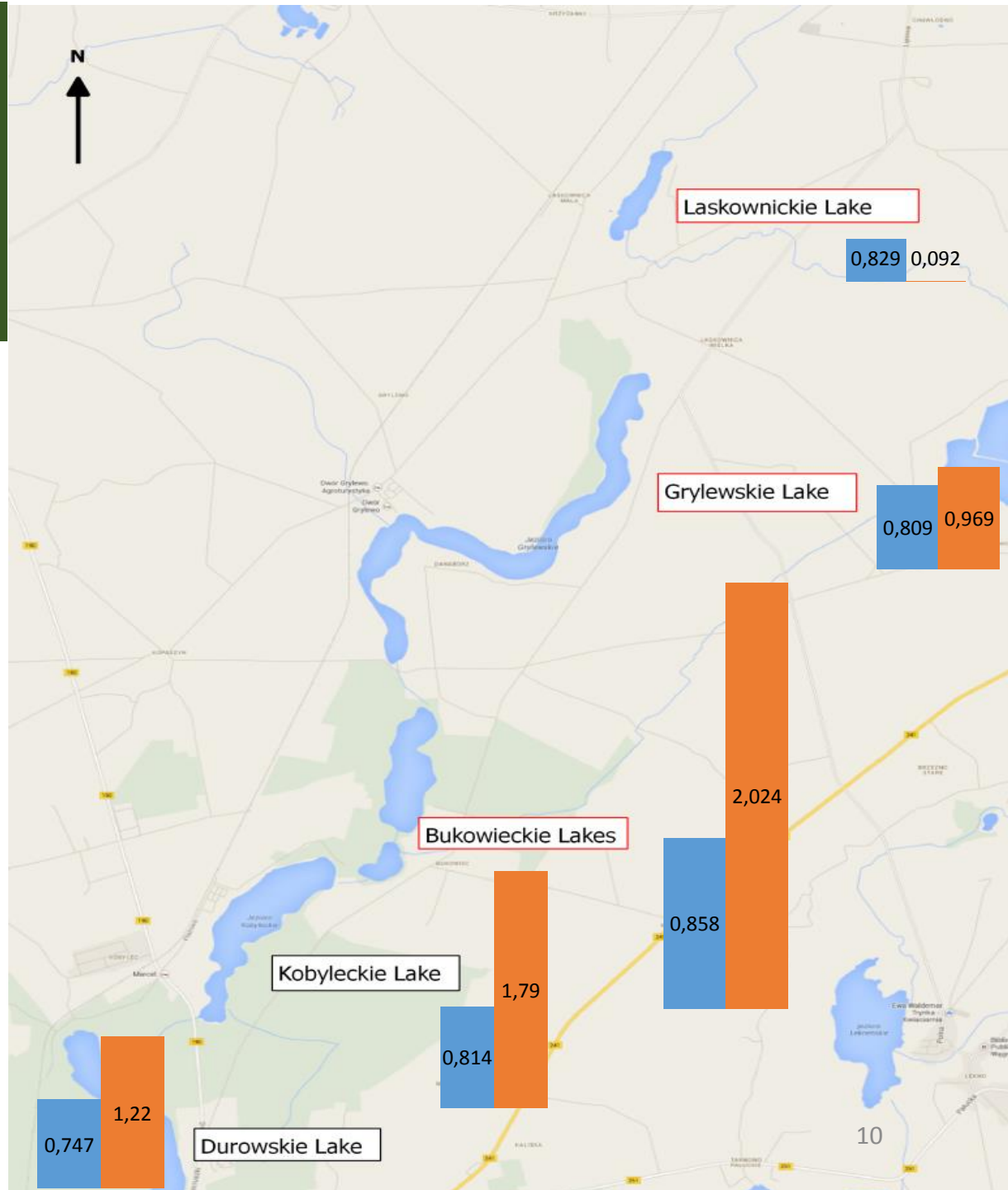
■ Chlorophyll a ($\mu\text{g/l}$)



Water quality parameters of upstream lakes 05.07.2014


 NH4 (mgN-NH4/l)

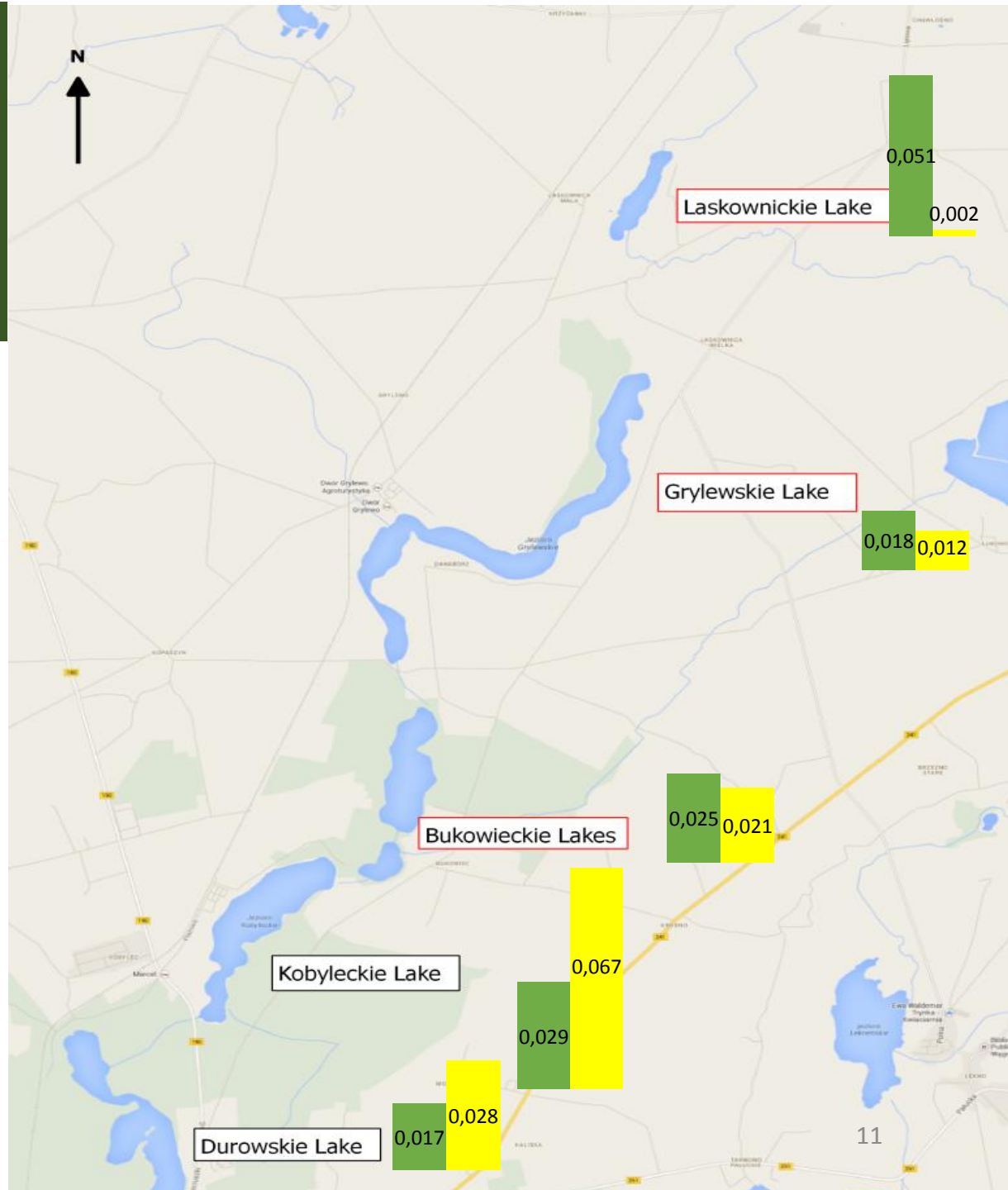
 NO3 (mgN-NO3/l)



Water quality parameters of upstream lakes 05.07.2014

 NO₂ (mgN-NO₂/l)

 TP (mg P/l)



Lake Durowskie: Management aspects

Methods – Lake management aspect

- Lake survey by kayak
- Forest exploration walks
- Erosion potential measurement
- Interview with Professors
- Information collection from the local government
- Brain storming sessions



What we observed ...

Tourism

Shortcuts created by people



≈ 20 channels of 30 m^3 each
Total = $640 \text{ m}^3 = 36$ lorries



What we observed...

THE GREAT COLORADO CANYON OF WAGROWIEC !!!



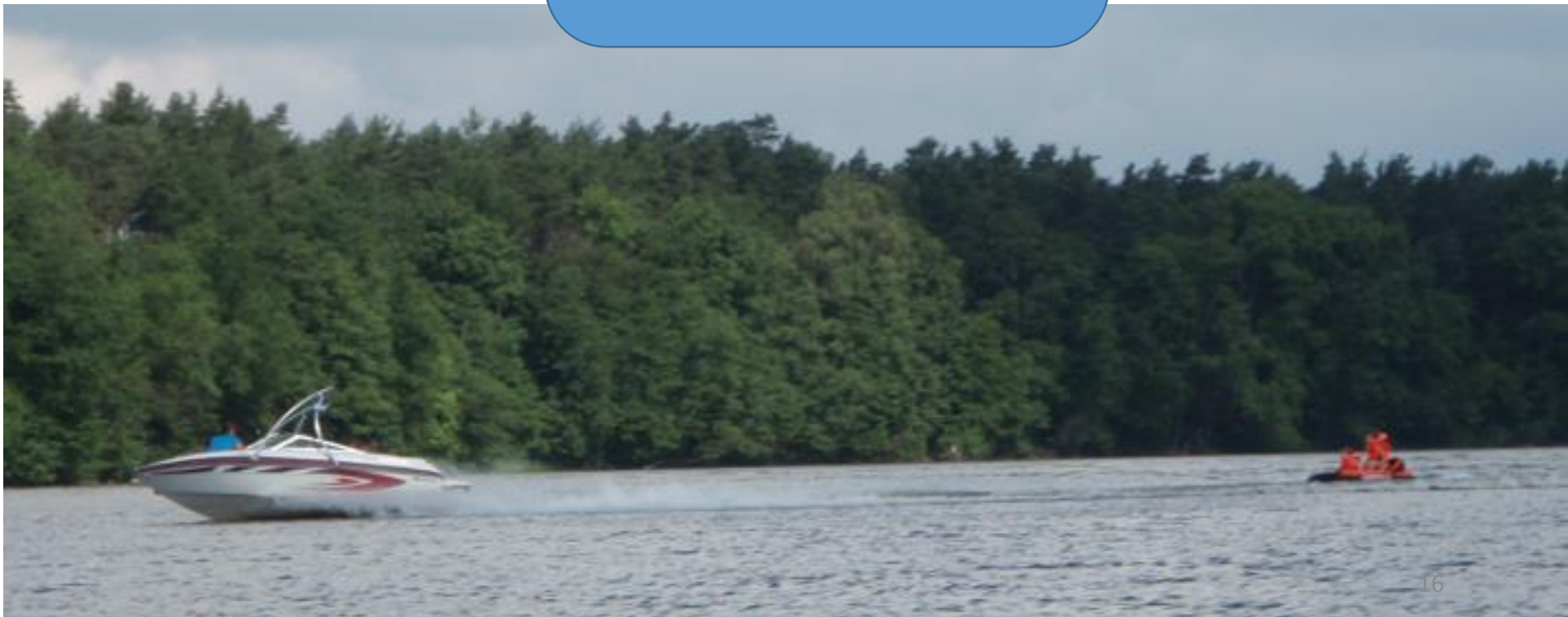
360 m³ = 20 lorries



What we observed...

Tourism

Motorboats wave erosion of
the littoral zone
Swimming



What we observed ...

Fishing activities

Bait

Bank erosion

Macrophytes gaps $\approx 1 \text{ km} - 920 \text{ m}^2$



Some recommendations for further management

Erosion control measures

- Management of the eroded areas along the shore line;
 - Retention walls
 - Sealed the area for restoration
 - Plantation
- Trail management
 - Regulation of Hiking trails
 - Mountain biking activities



Erosion control measures: fishing docks

- Use of abandoned fishing platform instead of building new ones
- Improved design of fishing platforms
- Selected area around the lake to be used for fishing



Lake water quality improvement: Withdrawal of water from hypolimnion

- Hypolimnetic withdrawal from the upper lakes for irrigation purposes



Education and awareness: Fishermen

- Regulate use of bait through monitoring and regulation
- Awareness raising meetings with the fishermen
- Development of small booklets carrying information about the environmental friendly fishing methods.



dos
&
don'ts

Education and awareness: Participation of local community

- Awareness raising events such as plantation campaigns with high erosion rate
- Local government could make arrangement to share with people the results of restoration initiatives
- A new page on the website of the Wagrowiec town
- Pictures of important events related to the restoration work can be uploaded on this page
- Use of social media such as facebook to develop a page about the restoration of the lake could be another practical and doable option.



About

We are group of concerned activists committed to restoring a treasured community resource back to its natural state.

Mission

WBLRA commits to work toward the following:

1. Raising community awareness of rapidly declining water levels in White Bear Lake
2. Returning White Bear Lake to normal and average historic water levels
3. Restoring a community resource for future generations of Minnesotans

Description

Basic Info

Founded 2012
Location PO Box 10682, White Bear Lake, Minnesota 55110

Contact Info

Phone +1 651-407-3347
Email info@wblra.org
Website <http://www.wblra.org> 23

Typha management: Engagement of community

Areas with high percentage of *Typha* with potential contribution to organic matter in the lake during winter

Harvesting of *Typha* during winter season from the selected areas (avoiding habitat destruction)

Promotion of community based *Typha* products



Education and awareness- tourists

- Solid waste generation
- Signboards and displays carrying messages about not throwing waste in open spaces in and around the lake



**Please Don't
Litter**

Education and awareness: Participation of youth

- Summer schools around the lake
- Engage the children in activities which can make up their minds to become nature loving citizens in the future such as
 - bird watching
 - solid waste collection



Restoration continuation

- Restoration of the lake should be continued in the coming years.



Reference

- Zaccara, S., Canziani, A., Roella, V., & Crosa, G. 2007. A northern Italian shallow lake as a case study for eutrophication control. *Limnology*, 8(2), 155-160.
- Millennium ecosystem assessment synthesis report. Millennium Ecosystem Assessment, 2005.
- Bajkiewicz-Grabowska E., Mikulski Z. 2010. Hydrologia ogolna, PWN Warszawa
- Lake Jordan cleanup initiative.2010. accessed online <http://cleanjordanlake.org/>
- All photo were taken during the field work, exceptional credits are mentioned individually

Thank you for the attention (Dziękujemy za uwagę)

Lets discuss on how to improve Lake Durowskie further

