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Integrated Land and Water Management Illustrated with an Example of the Recreational Function of the City

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Lakes are an essential part of many world's most popular tourist places

Tourism based on inland water resources is a strong impulse for social and economic development:

- increase of income from economic tourism activities,
- increase in the inhabitants' standard of living,
- increase in the possibilities of recreational activities for residents and visitors,
- an increase in environmental care in society.

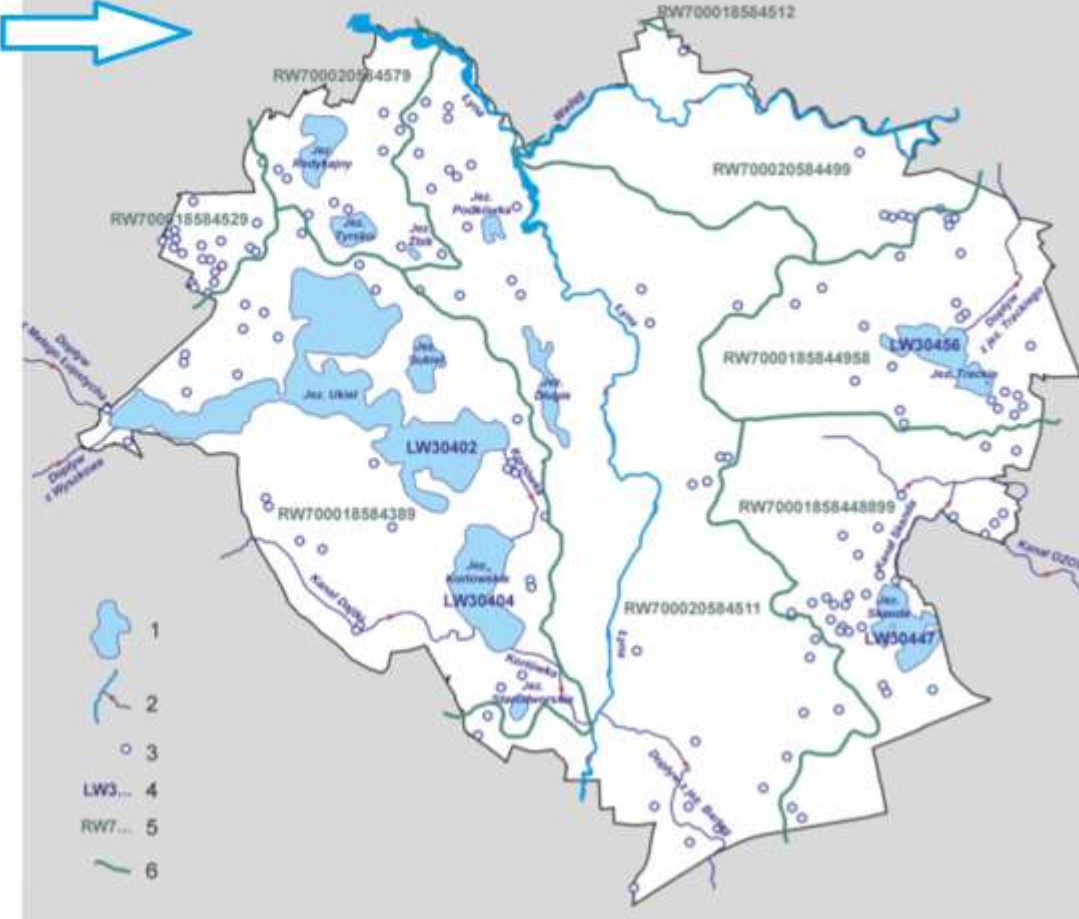
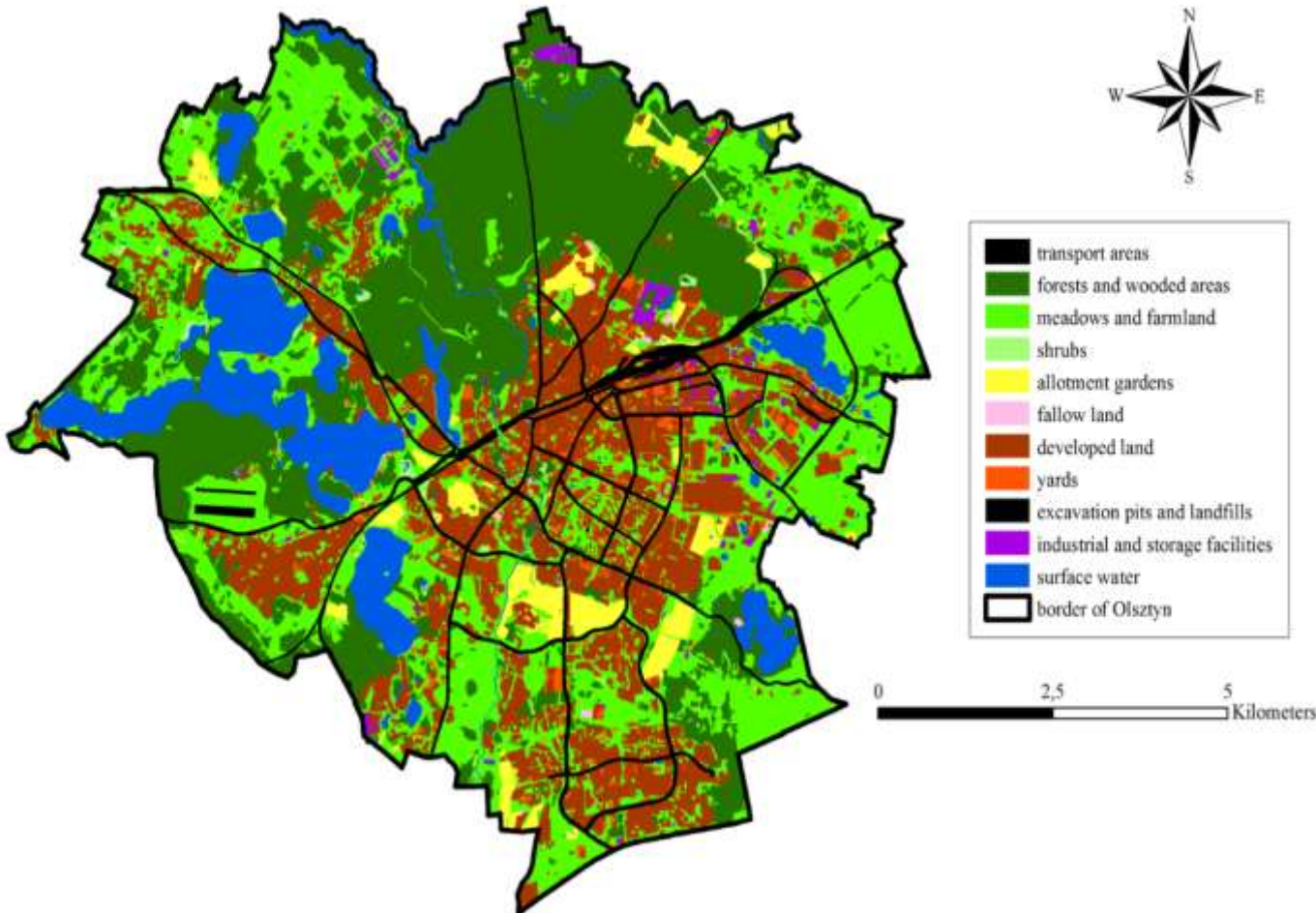


Aim of this paper:

- present of the **quantitative and qualitative effects** of the measures taken by the **Olsztyn city authorities** as part of the **integrated management of water resources**, whose main goal is to **ensure the sustainable use of lakes.**

STUDY AREA – POLAND (OLSZTYN)

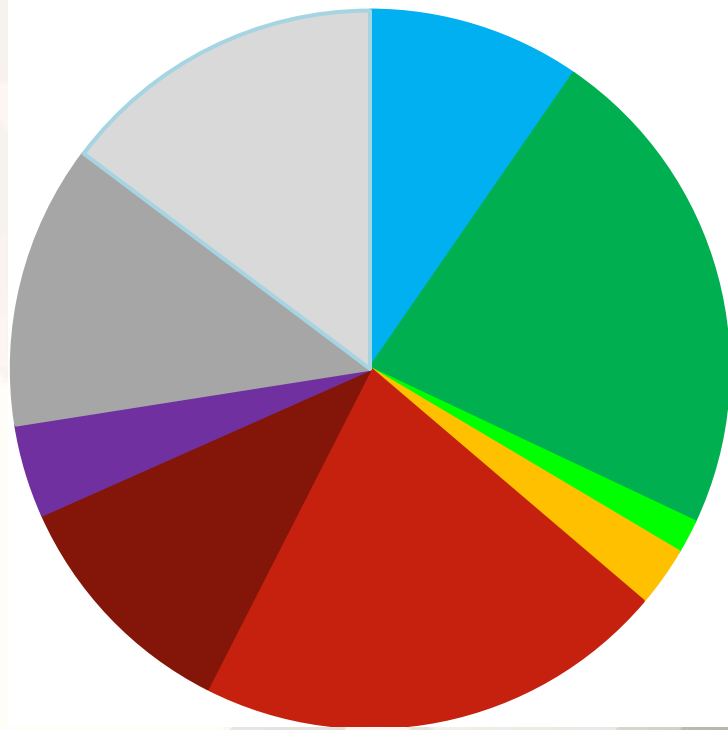
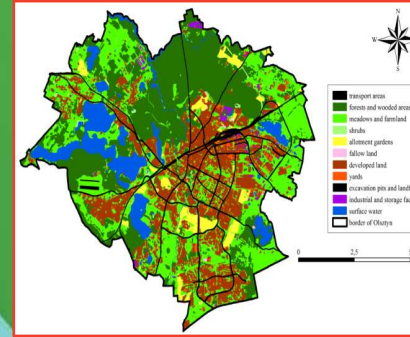
Olsztyn is an urban settlement situated in north-eastern Poland and the capital city of the Warmia and Mazury region. The area of the city 8,833 ha.



Olsztyn - 11 lakes (area of 725 ha) and 3 rivers and 200 of small-sized water bodies, forest resources (1283 ha), recreational parks (103 ha), 66 green squares (33.13 ha), street greenery with an area of 177 ha and housing estate green areas (214 ha).

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Olsztyn is characterised by a **specific** (for a city) **structure of use**, in which the **blue-and-green resources** accounts for more than 30% of the city area, including water bodies accounting for approx. 10%, and forests as well as wooded land and bushland accounting for over 20% of the city area.



- lands under water
- forests
- woody and bushy land
- recreational and rest areas
- arable land
- residential areas
- industrial areas
- transport areas
- others

This provides incredible potential for the development of recreational and tourism functions to be used by both the inhabitants and visiting tourists.

RESEARCH 1

Analysis of municipal tourism and recreation investments related to water management



- **Development Strategy for the City of Olsztyn, 2020**
- **Environmental Protection Programme for the City of Olsztyn up to 2020**
- **Environmental Protection Programme for the Olsztyn Poviast up to 2020**
- **Report on the condition of the city of Olsztyn, 2019**
- **A study on determinants and directions of the spatial development of Olsztyn**
- **Local Area Development Plan for Lake Długie in Olsztyn**
- **Local Area Development Plan for Lake Ukiel in Olsztyn**

Analysis of municipal tourism and recreation investments related to water management

The Development Strategy for the City of Olsztyn 2020 indicates the natural assets: *the Lake Krzywe shores, the Łyna River valley, the Municipal Forest complex, and 11 lakes within the city limits.*

The Study on Determinants and Directions of the Spatial Development of Olsztyn indicates the following directions for the development of the urban space in the context of the existing water resources:

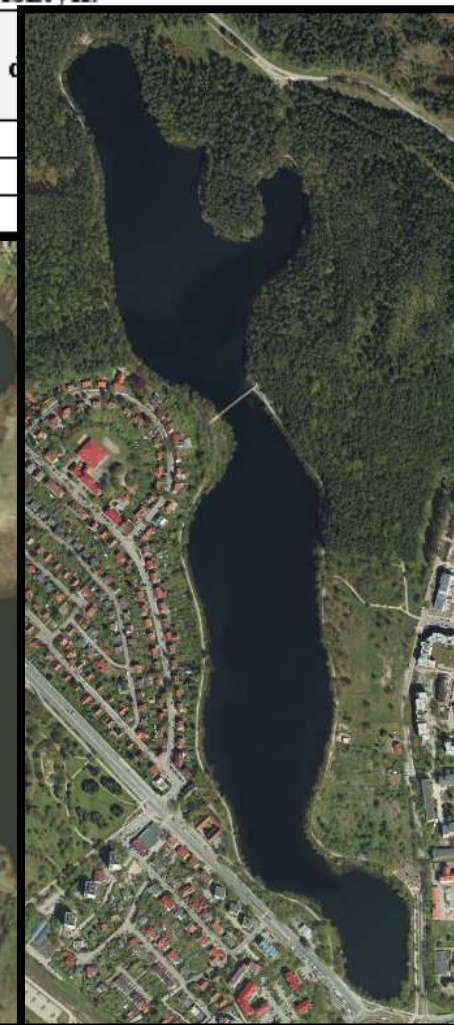
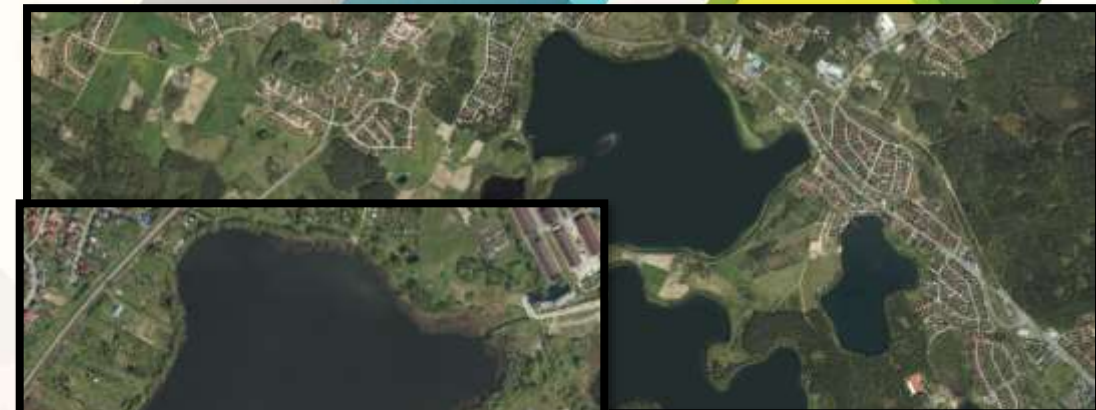
- *striving to establish greenery belts and walking & cycling links between the **Łyna River** corridor and the external greenery enclaves*
- *recreational and tourism development of lakeshores (kayak and sailing marinas, beaches, and sports grounds)*
- *recreational and tourism development of the **Łyna River**. It is only possible if no adverse effects on the following goals and objects of protection of the Central Łyna River Valley Protected Landscape Area are demonstrated:*
- *extension of the network of bicycle lanes and pedestrian pathways at lakes, in forests and in the uncontrolled greenery (landscape) areas.*

RESEARCH 2

Characteristics of lakes in Olsztyn

The characteristics of selected lakes in Olsztyn.

Lake name	Water table area [ha]	Maximum depth [m]	Shoreline length [km]	
Ukiel	412.0	43.0	22.5	
Kortowskie	89.7	17.2	4.80	
Track	52.8	3.8	4.65	
Skanda	51.1			
Długie	26.8			
Redykainy	29.9			



RESEARCH 3

Analysis of the recreational potential of Ukiel lake



The deepest and the largest lake with the longest shoreline in Olsztyn, situated near the city centre



On 27 January 2010, the City Council adopted a resolution on setting about implementing the investment project:

- Recreational facilities (beach volleyball courts, playgrounds, walking promenades and cycling lanes, a pier, a volleyball hall, squash courts and a gym, a sports equipment rental facility),
- Kayaking centre,
- Viewing and mooring platforms, and leisure platforms and terraces,
- Marina with a sports equipment rental facility,
- Catering facilities,
- Captain's Office,
- City Guard and Police stations, rooms for lifeguards serving the bathing areas and car parks.

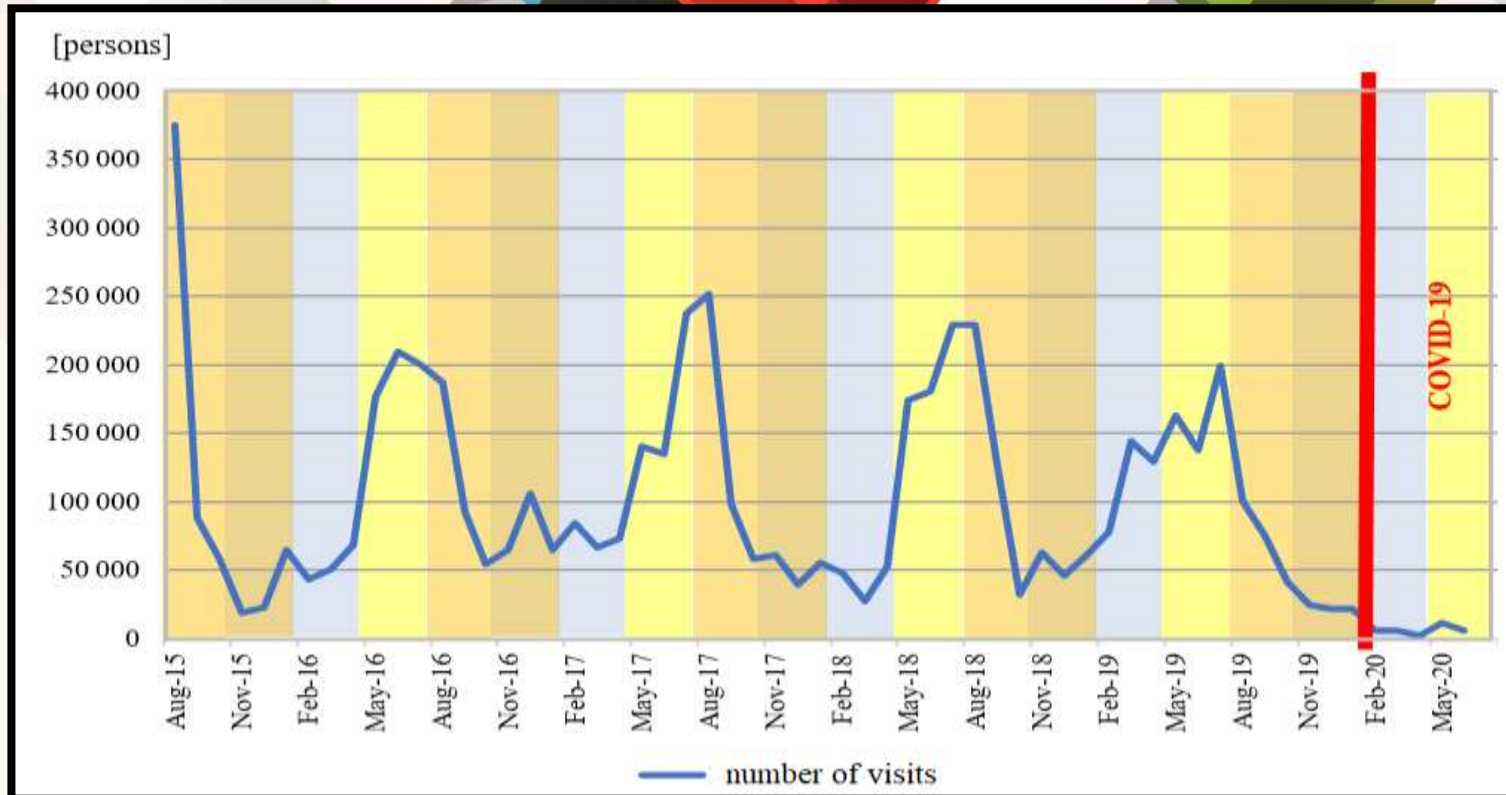


RESEARCH 3

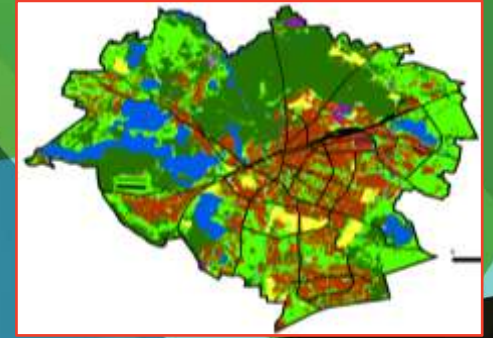
Analysis of the recreational potential of Ukiel lake



Ukiel Leisure and Sports Centre - a continuous monitoring system - Covid-19



Olsztyn, as a blue-and-green city with a minimum of industry, is unique compared to the rest of Poland.



Local authorities have invested in tourism infrastructure (lakes and rivers), in the last decade.

These investments gave the opportunity to use of the recreational potential of Olsztyn's lakes, rivers and forests, create jobs and improve the quality of life.

Over the past years, tourism has been the fastest-growing branch of the Olsztyn economy and the estimated increase in tourism traffic has been approx. 40%

Excessive development of tourist infrastructure influences the growth of tourist traffic and may adversely affect the environment. It therefore requires constant monitoring of any changes that have a potential impact on the environment.



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