

ECOLOGICAL VALORIZATION OF SMALL WATER RESERVOIRS IN POLAND THE WYSKOĆ CATCHMENT AREA CASE STUDY

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The method of ecological evaluation of small water reservoirs in an agricultural landscape was the main result of our study. It was worked out experimentally with cooperation of many scientists of natural field of study. Although the method was used only to evaluate the ecological value of ponds in Wyskoć catchment area, there is not any restriction to use it to estimate the value of ponds in the whole central Poland.

INTRODUCTION

Small water reservoirs are essential elements of an agricultural landscape, typical for post-glacial areas. From natural, hydrological and economic point of view they play many important functions. On the other hand, considerable decrease both numbers and surface of the water bodies can be observed in a few last dozen. Therefore, we ought to undertake activities that could be conducive to protection and natural reconstruction of ponds in our environment. Inventory control and ecological valorization of ponds in an agricultural landscape are one step to reach that goals.

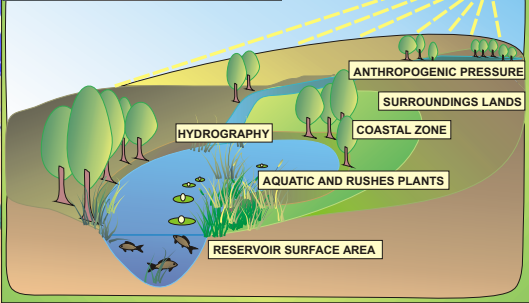
AIM AND RANGE OF WORK

- Work out the inventory and valorization methods of small water bodies in an agricultural landscape.
- Ecological valorization of small ponds in the Wyskoć catchment area.
- Define the possible ways of protection and reconstruction of small water bodies in an agricultural landscape.

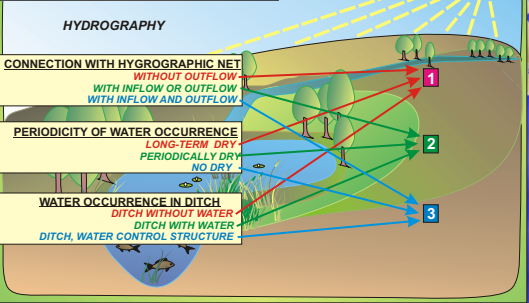
HYPOTHESES

- Firstly, we assume that in spite of a strong anthropogenic pressure put on ponds in an agricultural landscape many water reservoirs have still high ecological and landscape values. The water bodies should be protected e.g. as ecological sites.
- Secondly, there is an assumption that the number and ecological value of water reservoirs depends on the structure of the use of an agricultural grounds. That is, the more arable lands and urban areas the fewer ponds and the lower ecological value.

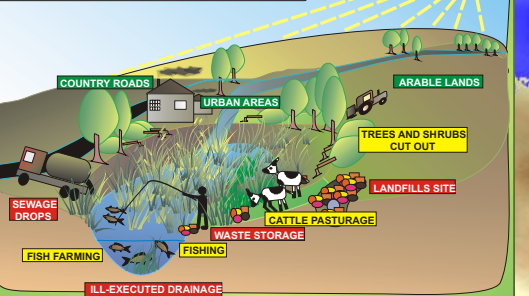
CRITERIA OF ECOLOGICAL VALORIZATION OF SMALL WATER RESERVOIRS IN AN AGRICULTURAL LANDSCAPE



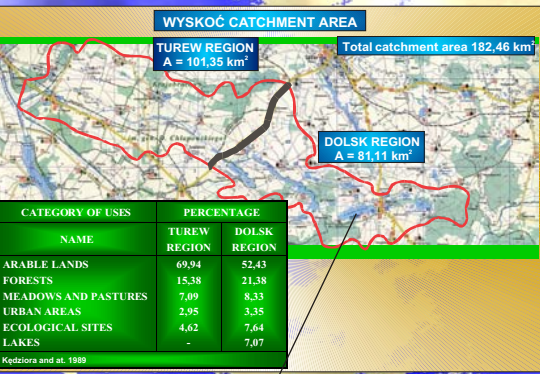
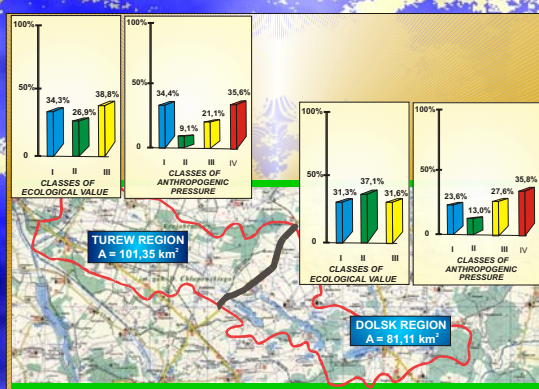
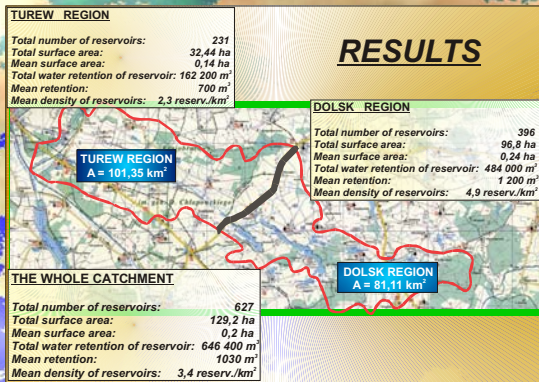
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ANTHROPOGENIC THREATS AND DETERIORATION OF SMALL WATER RESERVOIR IN AN AGRICULTURAL LANDSCAPE



CRITERIA OF ECOLOGICAL VALORIZATION	SUBCLASSES OF VALORIZATION	EVALUATION
1	Surface of water reservoir (ha) < 0.02 0.02 - 0.11 > 0.11	1 2 3
2	Hydrography	
A	Periodicity of water occurrence Long-term dry (lack of water in summer) Periodically dry (depth of water in ponds < 0.2 m in summer) No dry (depth of water in ponds > 0.2 m in summer)	1 2 3
B	Connection with hydrographic net Without outflow With inflow or outflow With inflow and outflow	1 2 3
C	Water occurrence in ditch Ditch without water Ditch with water Ditch, water control structures occur	1 2 3
3	Vegetation in reservoir	
A	Vegetation zones Lack Occur	0 2
B	Indicatoric assemblages Lemnaceae Ceratophyllum Potamogeton Chara	1 2 3 4
C	Species of water reservoir vegetation Poor (< 3 species) Semi-poor (3-5 species) Rich (> 5 species)	1 2 3
D	Species of herbaceous vegetation of water reservoir Rich (> 10 species) Semi-rich (5-10 species) Poor (< 5 species)	1 2 3
4	Ecotone	
A	Occurrence and mean width of ecotone Lack < 10 > 10	0 1 2
B	Ecotone length in % of reservoir circumference < 30 30 - 60 > 60	1 2 3
C	Types of ecotone Plane of no-use areas Trees and shrubs Swamps	1 2 3
5	Adjoining uses Buildings, roads, landfill site Arable lands and pasturage Meadows and forests Ecological sites*	1 2 3 4
6	Class of anthropogenic pressure I class (lack of negative influence) II class (border on country roads, arable lands, or farm buildings), III class (border on pasturage, trees and shrubs cut out, drainage, fish farming), IV class (ill-executed drainage, sewage drops, waste storage, border on landfill sites).	$\frac{1}{4} [(P_1 \times U_1) + \dots + (P_4 \times U_4)] / 100$ $\frac{1}{4} [(P_1 \times U_1) + \dots + (P_4 \times U_4)] / 100$ $\frac{1}{4} [(P_1 \times U_1) + \dots + (P_4 \times U_4)] / 100$ $\frac{1}{4} [(P_1 \times U_1) + \dots + (P_4 \times U_4)] / 100$



CONCLUSIONS

- In spite of the fact that small water reservoirs located on the Wyskoć catchment are under strong anthropogenic pressure (about 60% of ponds was rated among the third and fourth class of anthropopressure), the large quantity of ponds have still a high ecological value.
- The number of water reservoirs depends on the structure of a land use. The more arable lands and fewer forests as well as urban areas the fewer ponds in an agricultural landscape. There is not any connection with structure of a land use and ecological value of water bodies as well as anthropogenic pressure.
- Protection of small water reservoirs in an agricultural landscape should be achieved: firstly, by legal protection as ecological sites, secondly, by extension and protection of coastal zones that play biogeochemical barriers function, thirdly, by direct reclamation of degraded reservoirs, lastly, by an ecological education of catchment inhabitants.

