

# Natural (Small) Water Retention in Poland

*Waldemar Mioduszewski, Małgorzata Przychodzka*

*Institute of Technology and Life Sciences*

*[www.itp.edu.pl](http://www.itp.edu.pl)*



# HISTORY OF SMALL WATER RETENTION

1. 70s` of XX century: small water retention = small water reservoirs for agricultural purposes
2. 80`s of XX century: support for small water energy production (Kościel Foundation as support for farmers)
3. 1992: agreement between Ministry of Agriculture and Ministry of Environment on support for small water retention
4. 2008: Natural Small Water Retention Program in Forests
5. 2000 – 2010: Initiatives of ecological organizations

# Systems and methods for water retention in rural areas

Water resources	Systems and methods
Landscape (habitats) retention	<p>Systems shaping the proper structure of land use through:</p> <ul style="list-style-type: none"> <li>• Structure of arable lands, grasslands, forests, „ecological lands”, constructed wetlands</li> <li>• Afforestation, development of buffer zones, clusters of bushes, woodlands, development of bruises and terraces</li> <li>• Increase of the area of wetlands, peat bogs and restoration of the area</li> </ul>
Soil retention	<p>Cultivation systems shaping water retention in soil profile:</p> <ul style="list-style-type: none"> <li>• Improvement of soil structure, limiting of drainage, liming, proper agro technology, increase of content of organic matter in soil</li> </ul>
Groundwater aquifers	<p>Drainage – cultivation systems limiting surface runoff:</p> <ul style="list-style-type: none"> <li>• Increase of soil permeability</li> <li>• Anti-erosion measures, phyto drainage, agro drainage</li> <li>• Regulated outflow from the drainage system</li> <li>• Ponds and infiltration wells (also for outflow of rainwater from sealed surfaces)</li> </ul>
Surface water	<p>Hydro technical systems of water distribution and storage:</p> <ul style="list-style-type: none"> <li>• Small water reservoirs</li> <li>• Regulated outflow from ponds and small water reservoirs</li> <li>• Water storage in drainage ditches, channels etc.</li> <li>• Retention of outflow from drainage systems</li> <li>• Increase of river valley retention</li> </ul>

# The Program of Small Scale Retention

In 1995 the Ministry of Agriculture and the Ministry of Environment set priority trends for a Program of Small Water Retention. Actions outlined in this document include: reconstruction, modernization and construction of water storage facilities as well as a number of other relevant measures for increasing water resources.

The problems of a small scale retention have been reflected in the second agreement signed on 11th April 2010 by:

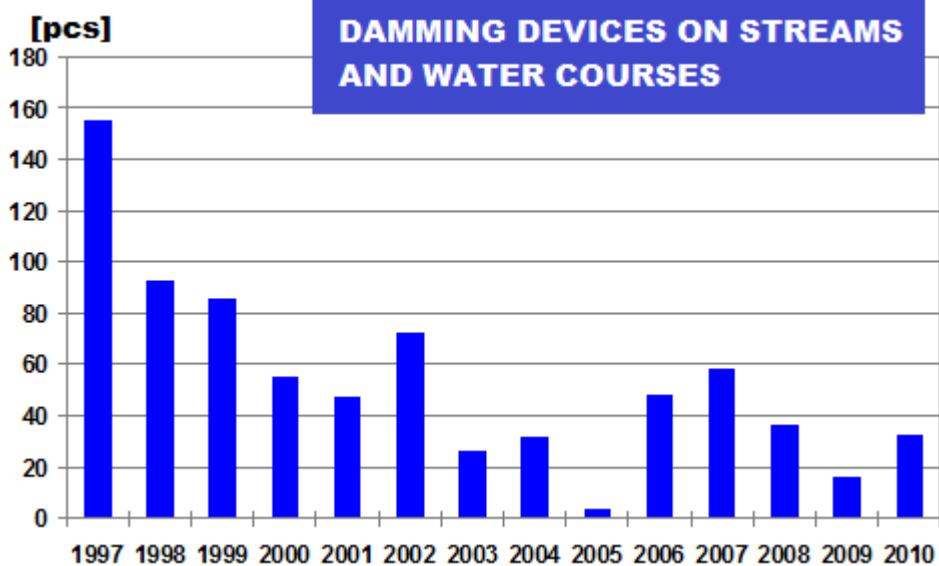
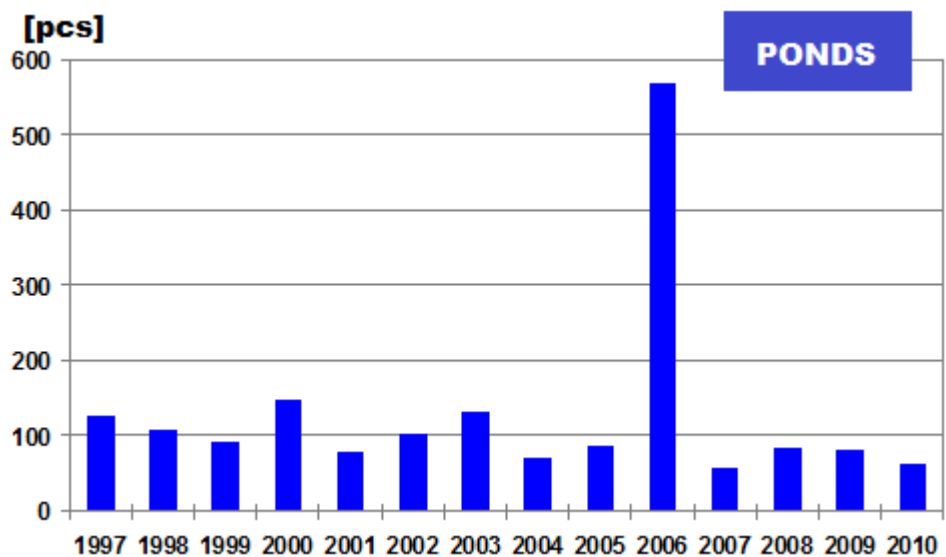
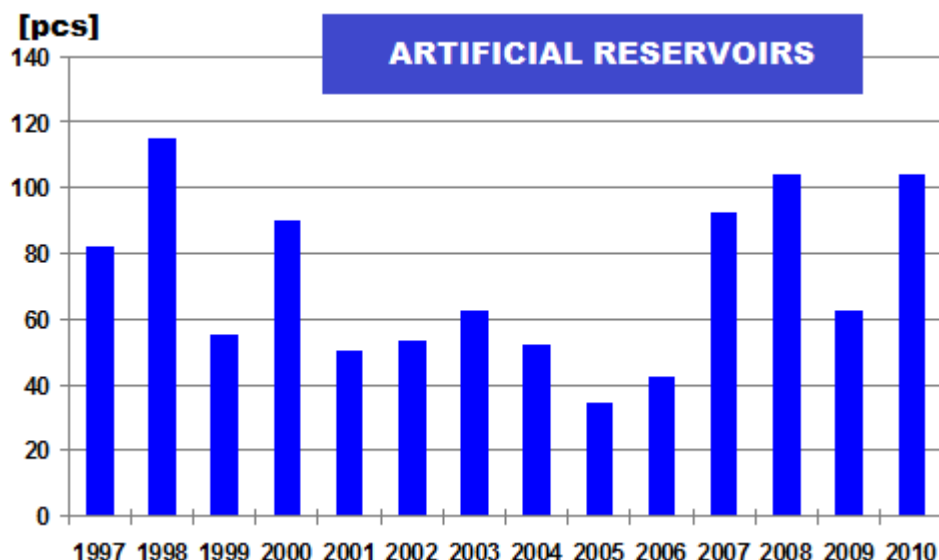
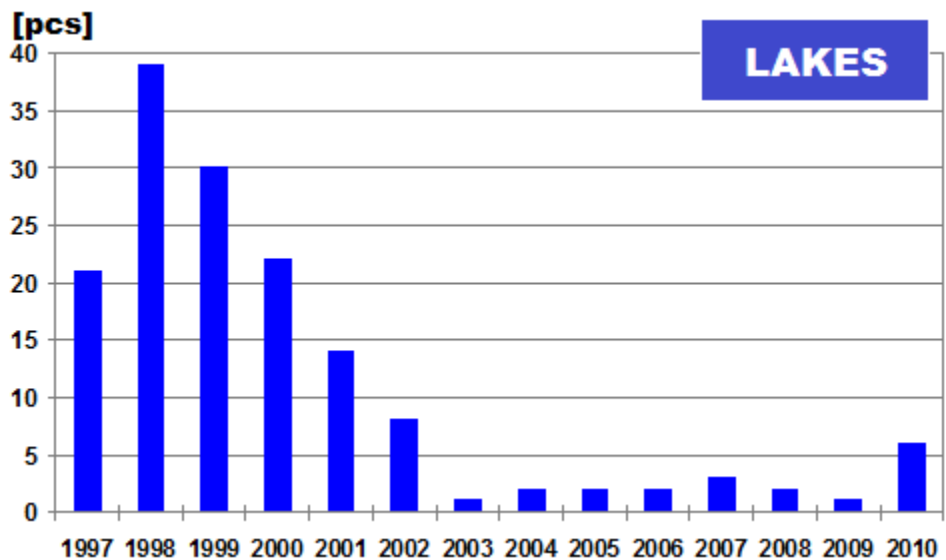
- Minister of Environment,
- Minister of Agriculture and Rural Development,
- President of the Agency for Restructuring and Modernization of Agriculture,
- President of the National Fund for Environmental Protection and Water Management.

Undersigned parties took the responsibility to support any action associated with the improvement of the catchment retention capacity. Moreover, two institutions namely Agency for Restructuring and Modernization of Agriculture and National Fund for Environmental Protection and Water Management obliged themselves to support some of these actions financially.

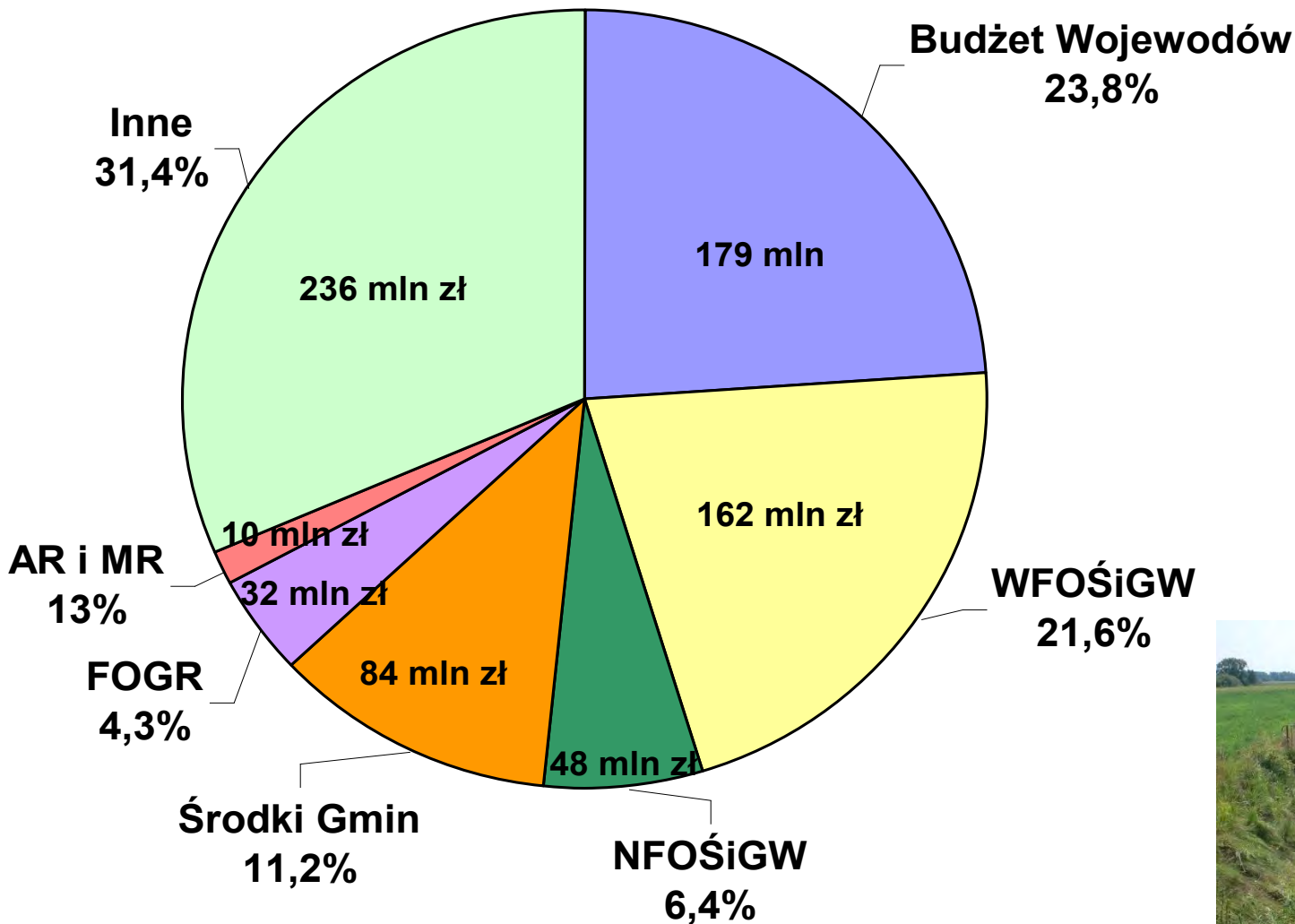
# The Program of Small Scale Retention

- Reconstruction and modernization of existing and construction of new hydraulic structures such as wires, gates, outlet boxes and stages of fall, on waterways and streams managed by state and farmers in grassland and arable areas drained for agriculture.
- Modernization of drainage projects with a view to sustaining ecological balance of biotopes, installation of structures for regulation of water outflow from drainage projects.
- Reconstruction and modernization of existing and construction of new hydraulic structures for raising the surface water table and measures for erosion control on streams and to raise groundwater levels.
- Retention of spring melt water and precipitation in ponds and smaller lakes, disused peat mines, gravel and aggregate extraction workings, tracts of lower-lying ground.
- Reconstruction and modernization of existing and construction of new ponds and small water reservoirs with capacity of up to 5 million cubic meters.
- Reconstruction and modernization of existing and construction of new fish ponds.

# Number of objects constructed in years 1997 - 2010



# Funding sources of the Small Retention Program 1997 - 2010





# Farmer's initiative – Farmer of the year 2011



Buffer zone along the crop. Photo: U. Bogusiewicz



One of the numerous ponds on the farm. Photo: U. Bogusiewicz



# **Small Water Retention Program in Forests (lowlands) 2010-2014 (European Programme)**

## **1. Retention in the river valleys**

- Wetlands reconstruction, liquidation of drainage ditches, construction of small water reservoirs, damming on rivers
- Participation of 190 of forest superintendents
- Number of objects – over 4000
- Water retention capacity – ca. 45 million cubic meters, cost – 1 EUR per 1m<sup>3</sup>

## **2. Retention in reservoirs in mountains**

- Limitation of surface runoff, anti erosion measures

# Natural (Small) Water Retention in Pisa Forest





# Białowieża Forest (National Park)

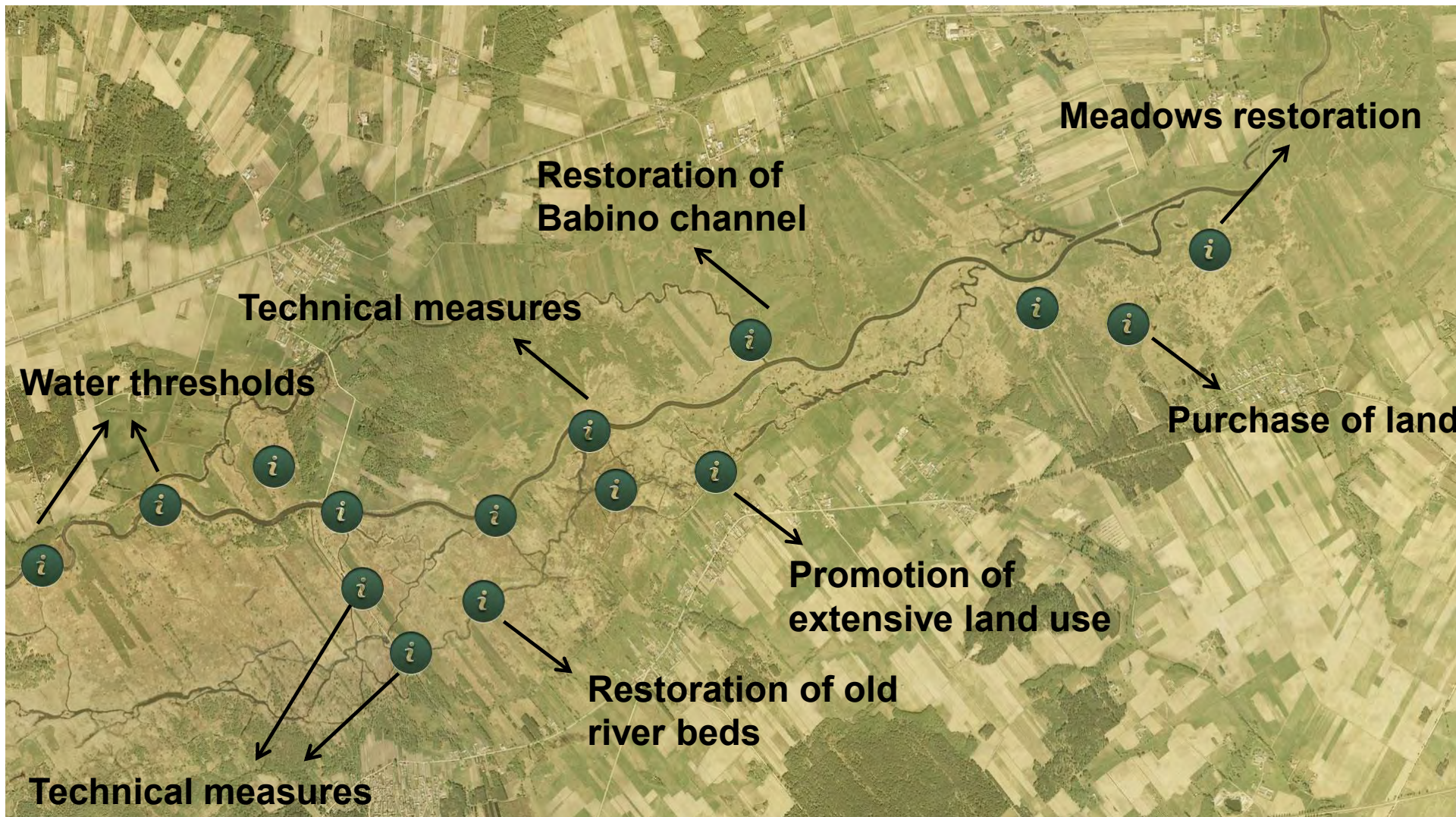
Implementing authority: Polish Society for Birds Protection

Implemented measures: construction of ca. 50 damming devices on small ditches





# Narew valley



# CONCLUSIONS

- The Small (Natural) Retention brings a visible improvement in the water regime and has helped to satisfy the water demand of various users, mostly, agriculture and the natural environment.
- The impact of small retention on the water regime may be observed only in smaller river catchments. It also concerns flood protection. Increasing groundwater level and higher evapotranspiration.
- In planning and building reservoirs and other hydraulic structures more focus should be placed on creating conditions for increasing biological diversity of aquatic fauna and flora.
- It seems that the Small Retention is close to the idea of Natural Retention. It will allow to protect the water quality (constructed wetlands) and the ecosystems which are dependent on water.
- **Small Retention = Natural Water Retention + small hydraulic structures**





**INSTITUTE OF TECHNOLOGY  
AND LIFE SCIENCES**

Thank you for your attention