

Ecosystem services of inland waters in the Slovak Republic – results to date

Radoslav Bujnovský

Water Research Institute, Bratislava

bujnovsky@vuvh.sk

Definition of inland water ecosystem services

Inland waters (IW), i.e. rivers and lakes, belong to the main categories of ecosystems defined by Maes et al. (2013). In the evaluation ES enter both surface and ground waters.

There are two aspects of the evaluation of ecosystem services namely the supply and demand. **The attention is primarily focused on demand, which indicates the extent the use of ES at present.**

The selection of significant ES in Slovak conditions and subsequent evaluation is focused on **utility values** (Table).

At the economic assessment of inland waters in the Slovak Republic there are used primarily non-preferential methods as the survey of human preferences and their willingness to pay for ecosystem services is in many cases burdened with insufficient awareness the real meaning of functions/services provided by ecosystem.

Significant ES of inland waters and related benefits from their provision in Slovak conditions

Ecosystem services		Benefits from ES
Surface water		
Provisional	Biomass	water animals – namely fishes
	Raw water	water for drinking purposes water for crop irrigation water as raw material in industry water as cooling medium in industry
	Materials (the consequence of substances accumulation)	gravel, sands (riverbed sediments)
	Renewable energy	electricity production
Regulation and maintenance	Regulation of water quality	degradation of pollutants
	Transport medium	waterway transport
	Habitat preservation, gene reserve	creation of conditions for aquatic (and water influenced) biotopes
Cultural	Physical or experiential use of ecosystems	recreational activities (recreational fishing, bathing, water tourisms)
Groundwater		
Provisional	Raw water	water for drinking purposes water for crop irrigation water as raw material in industry water as cooling medium in industry
Regulation and maintenance	Habitat preservation, gene reserve	creation of conditions for water influenced (especially terrestrial) biotopes
Cultural	Physical or experiential use of ecosystems	recreational activities on exposed groundwater

Evaluation of selected ES - results to date

Water for crop irrigation

Principle of evaluation consists in conversion of water consumption for this purpose to dry matter/harvested product yield. Non-productive losses of water via evaporation are excluded from amount of consumed water.

Early potatoes was selected as the general commodity with average market prices in period 2011-2013. Rental costs for irrigation systems are deducted.

The average annual benefit from the use of ES in given period is 25,7 million €, of which 86% is related to surface water. Subsequent deducting of costs for water pumping reduces this benefit.

Recreational fishing

The benefit from recreational fishing is most often expressed by appreciation of amount/weight of individual fish species.

The information on catch of individual fish species and the price list of fish from National Council of Fishermen's Associations is used for valuation of ES.

The value of such benefit, calculated for 2012, is nearly 7,9 million €, of which 76% belongs to surface water. Similar benefit is (preliminarily) expected for previous and subsequent year.

As fish stocks are in fishing grounds in Slovakia usually purposefully influenced (stocking and feeding of fish), information regarding the benefits from the use of ES in term of catch is considerably distorted and do not give in this respect realistic picture about the potential of the natural environment.

Natural water areas for swimming and recreation

Bathing waters specified by national legislation (Act No. 355/2007 Coll.) represent the most significant waters that use large numbers of bathers and for which has not been issued a permanent bathing prohibition or permanent advice against bathing.

Benefit from the use of this type of ES is typically assessed through travel costs method or derived from visitor incomes to recreational sites (factor income of recreation area).

In the absence of natural waters for swimming, one alternative for recreationists is the use of artificial pools where bathing water (except for the thermal pools) is usually taken from the public water supply systems. **In principle saved cost for water and sewerage represents the immediate benefit from the use of natural waters.**

The annual benefit value related to period 2011-2013 is almost 1.2 million €, of which the 58% is related to surface water.

Concluding remarks

The extent of the ES assessment of IW is primarily influenced by the availability and quality of bio-physical data that enter the subsequent economic valuation. So, till now selected ES are evaluated on sub-basin level.

Ecological status is often considered as an expression of the quality of the structure and functions (and consequently services) of aquatic ecosystems that are linked to surface water...

...but some services of IW ecosystems are not tied to the achievement of good ecological (and chemical) state and some types of water use have designed a specific qualitative objectives.

So, suitability water use for a specific purpose - which represents the concrete ecosystem service - is assessed with the assumption that water quality is in harmony with particular set of water quality parameters and corresponding limit values.

Thank you for attention!