



The analysis of changes in oxbow lakes characteristics using remote sensing data. A case study from Biebrza River in Poland.

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Biebrza River Valley is located in North-Eastern part of Poland. Biebrza is a river of intermediate size with almost natural character. River has numerous of oxbow lakes. Biebrza River Valley consists of three Basins: Upper, Middle and Lower, which are characterized by different geomorphological structure. Biebrza River Valley is an area of significant ecological importance, especially because it is one of the biggest wetlands in Europe. It consists of almost undisturbed floodplain marshes and fens. Biebrza river is also characterised by low contamination level and small human influence. Because of those characteristics Biebrza River can be treated as a reference area for other floodplains and fen ecosystems in Europe. Since oxbow lakes are the least known part of the river valleys there is a need for more research on them.

The objective of this study is the characterisation of the oxbow lake water quality and indirectly oxbow lake state using remote sensing method. For achieving the objective two remote sensing datasets has been analysed: IKONOS and hyperspectral camera AISA. The utility of both data sources was compared and time variability of oxbow lakes was defined.

The first part of the remote sensing analysis of oxbow lakes was held with the usage of the satellite images from IKONOS satellite from 20.07.2008 (images were taken from Biebrza National Park resources). All analysis were made in ArcGIS 10.0 and ENVI 5.0. The second part of the image analysis was conducted with the data gained from airborne hyperspectral camera AISA Eagle in August 2013.

The oxbow lakes have been described on: state of the habitat, transparency, state of overgrowing, connectivity with the river, maximum area and maximum length. The general method of describing oxbow lakes is visual habitat state, related with natural succession. Three main habitat states of oxbow lakes were designated: privileged (described as 'good'), eutrophic and disappearing.

The results confirm the fact that most of the oxbow lakes are habitats which are disappearing or proceeding to disappearance. It also shows the potential of remote sensing data for monitoring this type of water bodies. The fact that first data was collected in 2008 and second in 2013 enabled detection of changes in oxbow lakes during these 5 years.