

Capturing changes in riparian wetlands. Biebrza Wetlands case study.

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Human activities have led to the loss of a large proportion of diversity in vegetation types in riverine wetlands in Europe. Many floodplains, fens, and riparian woodlands have been cultivated for agricultural purposes and the remaining riverine wetlands, often embedded in agricultural land, have lost species due to the impact of human activities. Moreover wetlands are exposed to climate changes. The main question is – can we observe any changes in the wetlands characteristics, which can be associated with climate and which cannot be attributed to other human interferences?

Biebrza is an almost natural lowland river of intermediate size (mean annual discharge c. 30 m³/sec) running through a valley of about 1000 km² in N.E. Poland. The valley contains non-drained floodplains, marshes and fens and surrounded by a post-glacial landscape with ice-pushed hills, moraines and outwash plains. The almost natural character of the Biebrza peatlands is reflected in a regular pattern of peat-forming plant communities which run the length and breadth of the valley. Observation of changes in hydrological characteristics, plant communities and soils in such a relatively undisturbed area helps in sorting out different cause-effect relationships including effects of climate change.

We have analyzed the data of last fifty years available for Biebrza Wetlands – data on precipitation and temperature in the middle of the valley, water gauge reading in different locations, vegetation maps done in 70ties and in 1998 as well as peat soil maps done in two different periods. In an analysis of meteorological data we paid special attention to the winter half of the year looking at the snow pack length. Hydrological data were calculated with the focus on extreme flooding events (size and duration) as well as on low flow studies. Analyzing vegetation maps was focused on trying to capture areas and direction of the major changes. Soil maps studies were focused on identifying areas where peat physics changed from peat accumulation towards decomposition processes. Comparing results of the analysis with human activities both in the river valley and in the catchment we are trying to capture the changes which can not be directly explained by local or regional human activities.