Large wetlands of the Biebrza Valley, Poland

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An example of near to nature
The Biebrza river valley is one of the largest European high value wetlands that remain in relatively good ecological condition. The dominating wetland type is fen with a great variety of types including groundwater-fed mire. Other important high value habitats include meadows and pastures on wet and mesic sites, many of them located in the floodplains.

The main features of the current relief of this area were established in the Pleistocene period (Würm glaciation or Vistulian) during the last phases of glaciation. The front of the Vistulian ice sheet had formed a large marginal valley in which melt water collected. After the fluvio-glacial processes, the eolic, biogenic and fluvial processes were active in the morphogenesis of the valley.

The Biebrza valley is a circa 1000 km$^2$ large flat peat-covered depression composed of three, clearly distinguished basins. The valley runs from the outwash plains in the north in a south-westerly direction and is surrounded by morainic plateaus. Most of the valley is filled with peat deposits of diverse thickness, ranging from 1 to 6 metres, locally underlain by calcareous gyttja, clay layers and deep gravel-sand-silt series. The quaternary deposits extend from circa 130 to 210 m in depth (Pajnowska et al., 1984).

The main sources of wetness are the groundwater flows from the moraine plateau towards the Biebrza river and the yearly natural flooding up to kilometres width in the lower and middle basin and tens of meters width in the upper basin.

Wetlands cover circa 60% of the Biebrza Valley, of which peatlands occupy 46% and organic-mineral and muddy soils about 14%. The remaining 40% of the area is comprised of mineral soils on sandy islands in the peat landscape (Churski and Szuniiewicz, 1999). The hydrological regime of most of the mires is near-natural. Nevertheless the area bears signs of human interference - from shallow, already overgrown drainage ditches to deep, active artificial channels. The most intensive drainage has occurred in the middle basin, where peat has been partly mineralized and transformed into mucky soils due to several canals dug in the 19th century and agricultural reclamation in the 20th century.

The area has a moderate climate with a marked continental influence. It has an average annual temperature of 6.5°C, average annual precipitation of 573 mm and a relatively short growing season of 192 days (Górniak, 2000).

The 16th century was important for the human population
Until the 14th century primeval forests (Łowmiański, 1932), natural fens and swamps were still present in the Biebrza Valley and its surroundings. The landscape was extensively used by hunters, fishermen, keepers of wild forest bees, haymakers and herdsmen with cattle. Permanent settlement started in the 15th century on the plateau borders of the wide most downstream basin in the vicinity of Wizna, Trzcianné and Rajgród. The 16th century saw the establishment of settlements around the middle basin near Goniądz and Lipsk and south of Grajewo (Wiśniewski, 1975). These first villages were located on the uplands, outside the Biebrza valley. At this time forest and shrub clearance for agricultural purposes commenced. The 15th century saw the development of the timber trade.

In the second half of the 16th century, guards to prevent wood robbery and poaching in the Knyszyn forest district were settled on the mineral islands (Polkowo, Jasionowo, Kopytkowo, Chrościelina and Czarny Grąd) amongst the fens on the south of the Czerwone Bagno (Wiśniewski, 1967). They possessed rights to collect 40-60 stacks of hay, which indicates that they might have mown 160 to 240 ha of fen meadows. Meadows within forest complexes and on their outskirts along the Elk and Biebrza rivers, belonged to the forest administration. Peasants from neighbouring villages and towns used these meadows for special payments. By the middle of the 16th century, manors, granges and more than twenty villages were situated in the Biebrza valley and at the end of the 16th century there were at least thirty villages. The wars in the second half of the 16th and at the beginning of the 17th century, together with plague and cholera epidemics, decimated the inhabitants of the area. It was not re-colonized until the 18th century (Wiśniewski, 2003).

The construction of the Augustowski Canal, connecting the Vistula river with Niemen in the first half of the 19th century, than Wożnowiejski, Łęg, Kapicki Canals caused significant changes in the...