

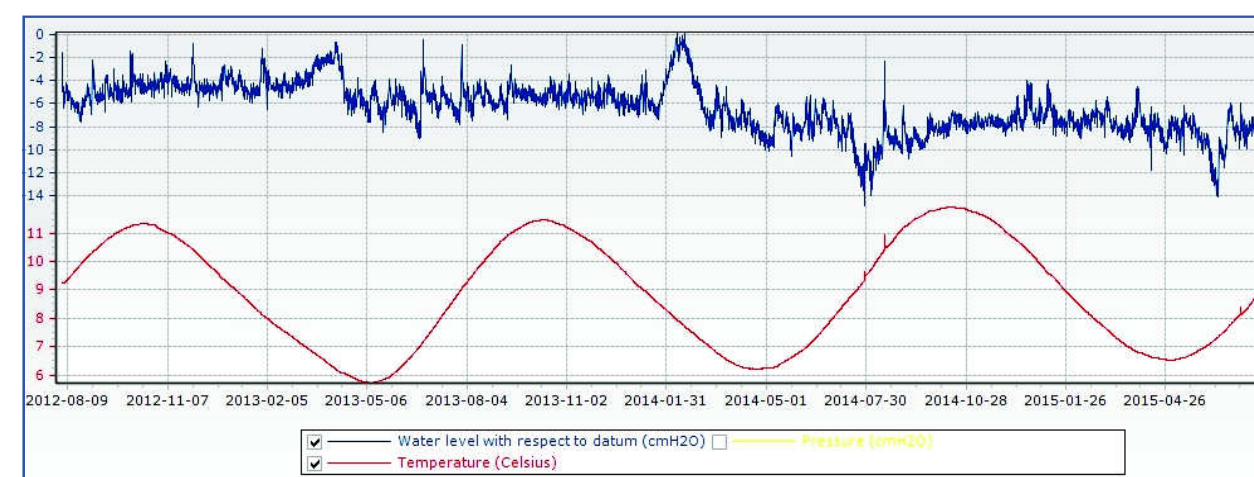
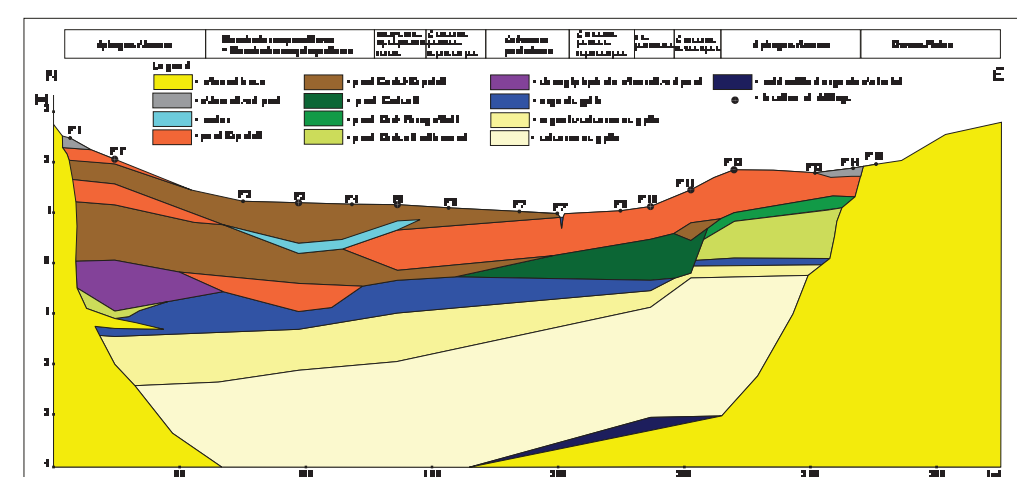
# WATER CONDITIONS OF SELECTED ALKALINE FENS IN POLAND

R. Stańko<sup>1)</sup>, F. Jarzombkowski<sup>2)</sup>, K. Dziendziela<sup>3)</sup>

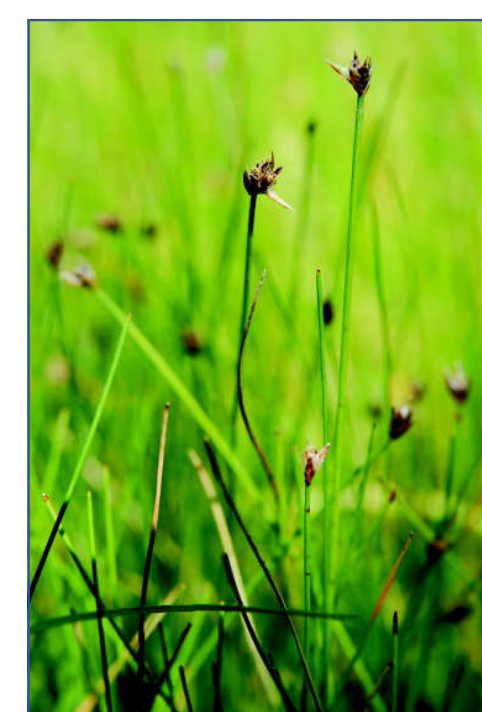
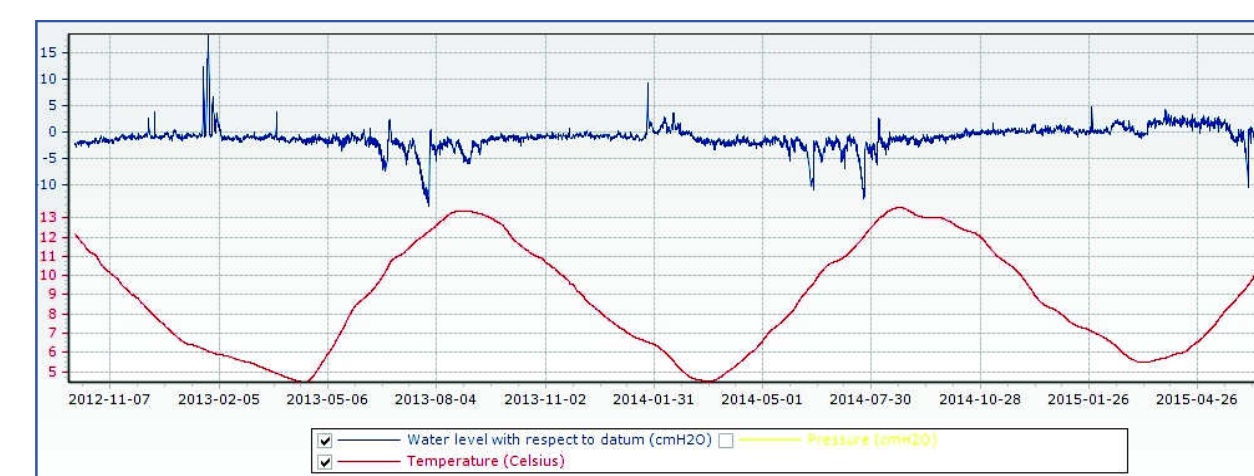
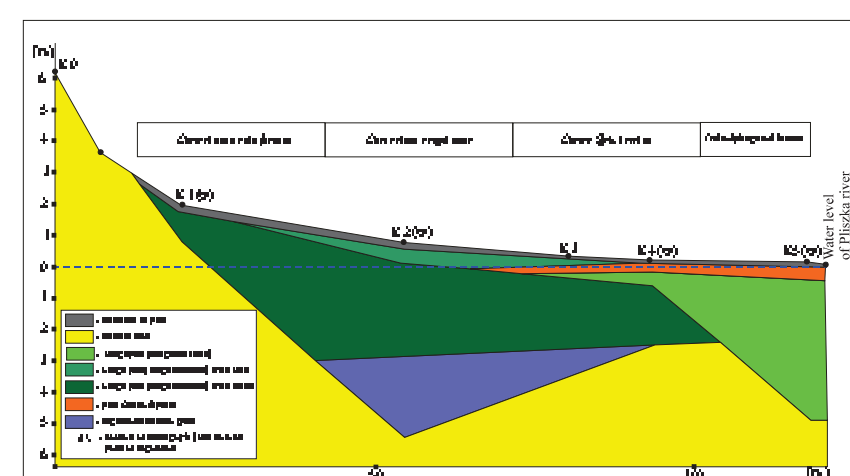
The subject of the presentation are selected aspects of hydrology of five alkaline fens located in different parts of the Poland. They represent different hydrogenetic types of soligenous mires: floating fens, percolating mires and spring mires. The main criterion for selection of the objects was a considerably good conservation state and similarity vegetation cover (alliance *Caricion davallianae*), which remained unchanged within the past 10-20 years. The study provides information on the geological structure of peat deposits as a factor with significant impact on vegetation dynamics in the situation of changing water conditions. The stratigraphy of peat deposits was recognised in borings located on the transects. Hydrological observations concerned registration of water level fluctuations and water temperature changes. Automatic recorders (so called divers) were placed in piezometers at a depth of 1 to 2 m. Measurements were conducted with frequency of four counts per day for at least two years.



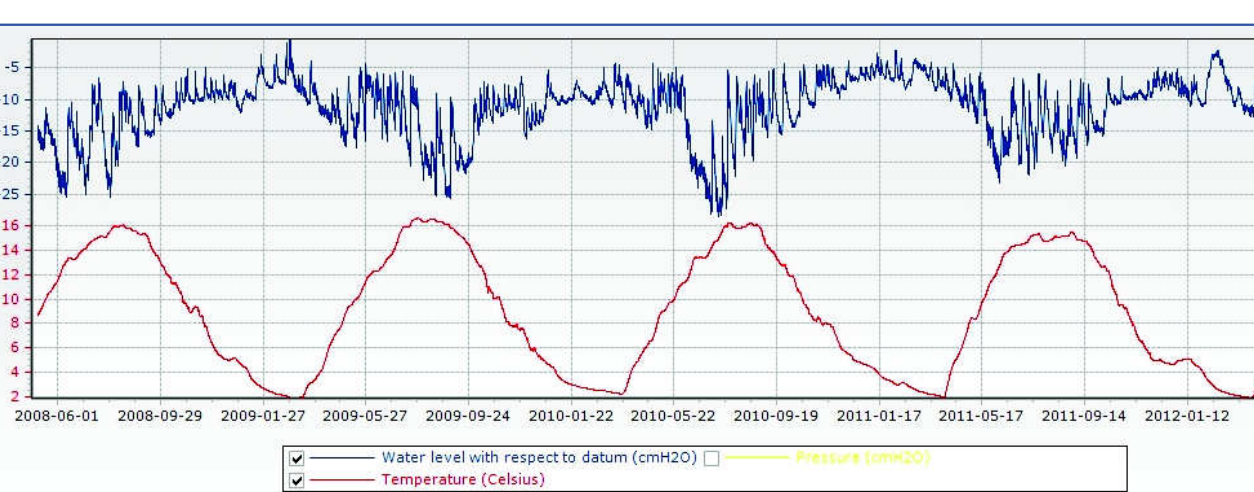
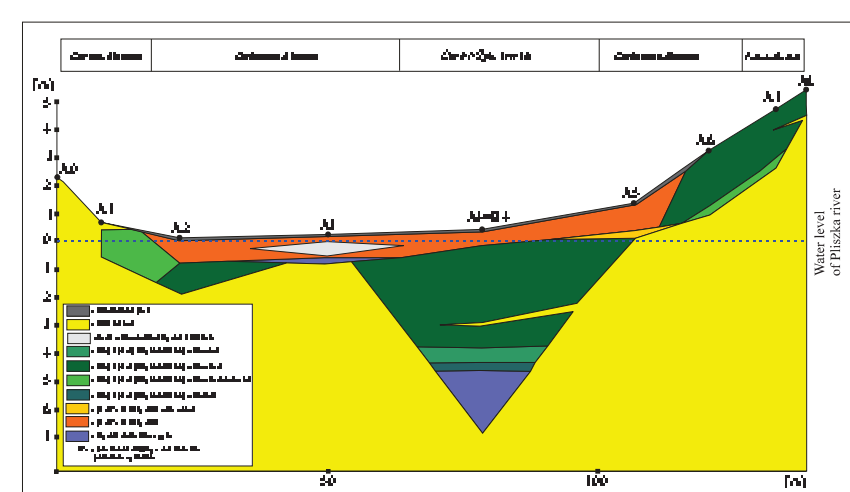
**Bagno Stawek.** Big (area of approx. 40 hectares) and one of the best preserved alkaline fens (of lake origin) in western Poland. Surrounded by the forest complex in the outwash plain landscape (sandur). Its high value is determined by, among others, by rare flora, such as: *Saxifraga hirculus*, *Liparis loeselii*, *Mesia triquetra*, *Cinclidium stygium*, *Pseudocalliergon triarum*. Stratigraphy studies indicate stable water conditions during the development of fen – the amplitude of water level fluctuation was approx. 15 cm. In the peat deposit weakly decomposed brown moss- and sedge- peats dominate. Analysis of bibliographic data, and recent observations indicate a very slow process of vegetation changes in the direction of open ombrotrophic mire and, partly, towards rushes and a bog woodland. The fen has not been used for at least 50 years.



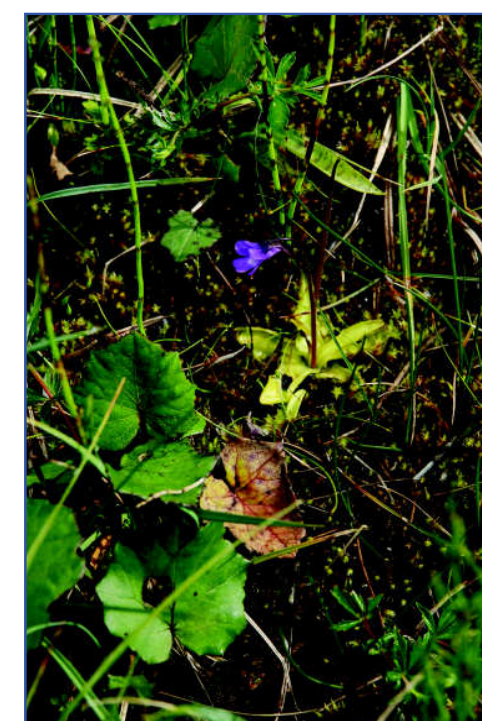
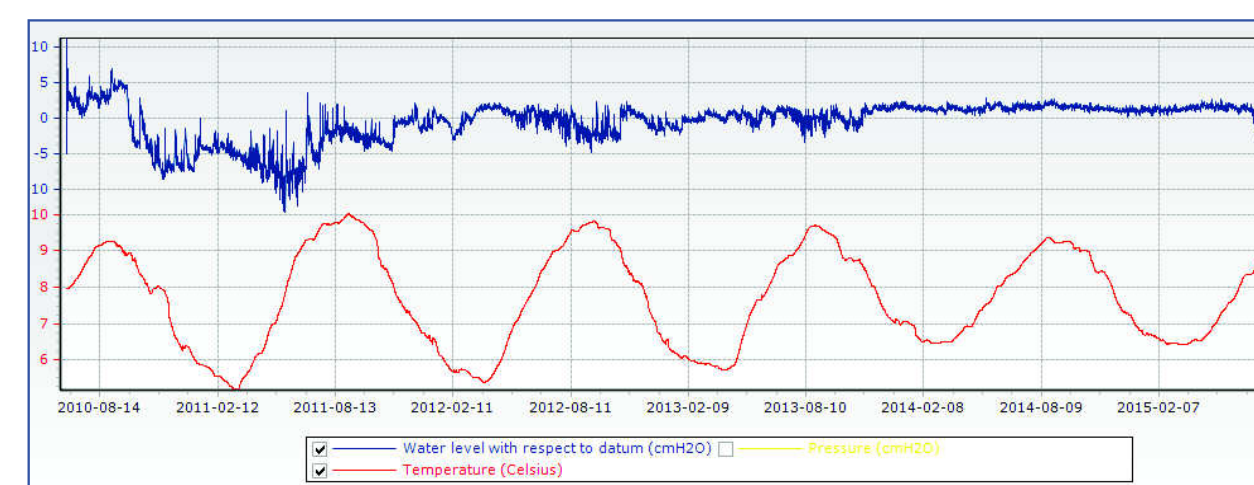
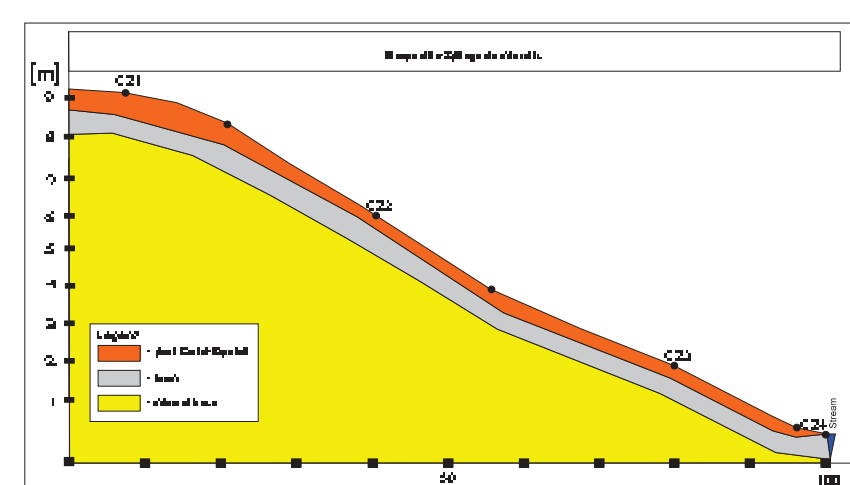
**Kijewo fen.** A fragment of approx. 1 hectare of a fen complex situated in the Pliszka river valley eroded in an outwash plain. Surface- and groundwater catchment is almost entirely forested. In peat profiles weakly decomposed sedge-peat dominate. Brown moss-sedge peat occurs only in the top layer. The surface layer of peat is highly decomposed near the mineral edges of the fen. During the observation period (years 2012-2015) the fluctuations in water level amounted to approx. 20 cm. The dominant associations in the fen are *Menyanthes-Sphagnetum teretis* and *Eleocharietum pauciflorae*. It has not been used for at least 40 years. Over the past 20 years a fairly rapid process of overgrowing by forest vegetation has been observed.



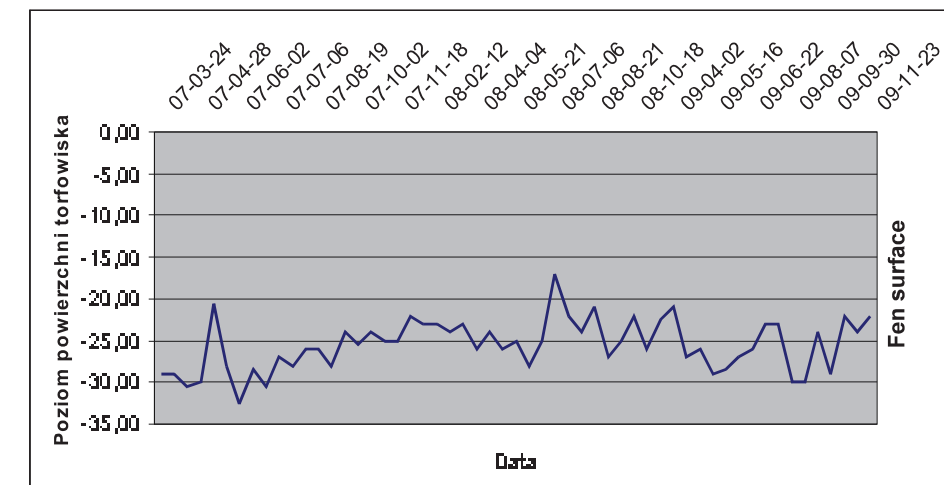
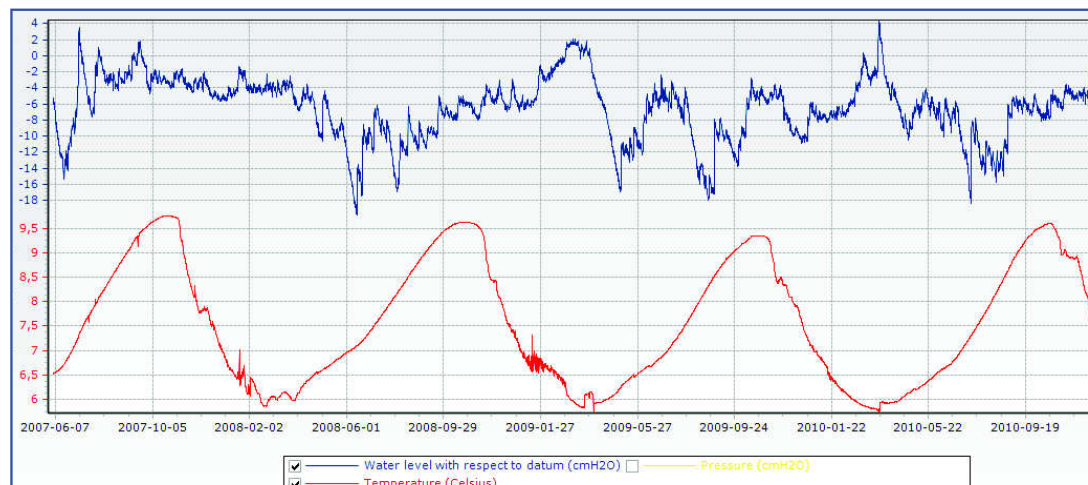
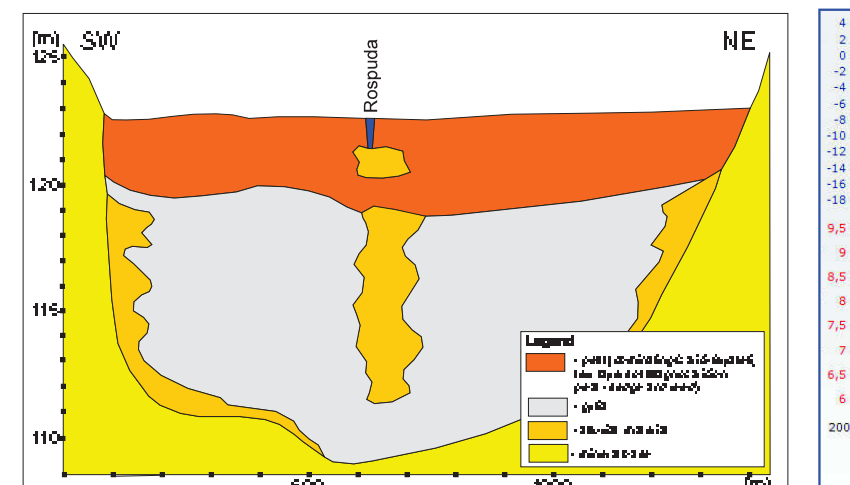
**Kosobudki fen.** Small, percolating fen that originated from terrestrialized lake, situated in the vicinity of Kijewo, in the Pliszka river valley. The top layer of peat is dominated by a sedgebrown moss peat, relatively weakly decomposed. Near the mineral edge the mire changes from the percolating mire to spring-fed fen. Water level observations (years 2008-2012) reveal the amplitude of fluctuations of approx. 25 cm. The area has not been used for at least 30 years. It is dominated by *Menyanthes-Sphagnetum teretis* association. The object is a subject to a fairly rapid process of overgrowing by forest vegetation.



**Podwilk fen.** One of the best preserved alkaline fens in Polish Carpathians (area, approx. 1 ha) with an active process of travertine precipitation. The peat layer is very shallow (40-70 cm) built by sedge-brown moss, weakly decomposed peat. Surface water catchment is almost completely forested. The dominant association is *Menyanthes-Sphagnetum teretis*. Smaller patches are covered by *Caricetum davallianae* and *Valeriano-Caricetum flavae*. No information is available on the intensity and type of use in the past. Several years of observations point to a fairly slow process of forest expansion. Observations of water level fluctuations show very stable water conditions prevailing within the fen, despite the mountainous nature of the catchment.



**The Rospuda river valley.** The vast alkaline fens complex of the area, approx. 100 hectares in a lowland river valley, within an outwash plain. Recognized as probably the best preserved alkaline fen in Poland. The surface water catchment is occupied mostly by forested. Some of the largest Polish populations of such species as *Saxifraga hirculus* and *Liparis loeselii* occur in the area. For at least 30 years it has been unused. Probably the only form of use in the past, was occasional winter acquisition of dry biomass from the frozen fen (winter mowing). Several years of observations indicate a very slow expansion of trees within selected areas of the fen. The area has virtually no drainage ditches. The peat layer consists mainly of weakly decomposed brown moss-sedge peat with layers of sedge-peat (with a thickness of several tens of cm). The observations of water level fluctuations showed amplitude of approx. 25 cm. In the same period, observations showed a significant (20 cm) fluctuations in the fens surface itself.



## Conclusions

1. The groundwater levels in best preserved alkaline fens show fluctuations in the range of 15 to 30 cm per year.
2. The alkaline fens, depending on the degree of degradation (mineralization) of the top peat layer, are characterized by the ability of vertical movement.
3. Constantly high groundwater levels of low fluctuations' amplitude appear to be an important factor determining the type of vegetation, inhibiting the expansion of trees but are not sufficient to eliminate the process entirely (Podwilk fen).
4. A major factor inhibiting the forest expansion in fens appears to be the condition of the top layer of peat deposit, i.e. low degree of mineralization of peats capable of vertical movement following the changes in groundwater levels (the Rospuda river valley).

<sup>1)</sup>Klub Przyrodników, ul. 1 Maja 22, 66-200 Świebodzin, Poland, robert.stanko@onet.eu

<sup>2)</sup>Klub Przyrodników, ul. 1 Maja 22, 66-200 Świebodzin, Poland, filip@bagna.pl

<sup>3)</sup>Regionalna Dyrekcja Ochrony Środowiska, ul. Chmielna 54/57, 80-748 Gdańsk, Poland, katarzyna.dziendziela@gda.rdos.gov.pl

