IMPACT OF PEAT EXCAVATION ON THE NATURE RESERVE GORBACZ

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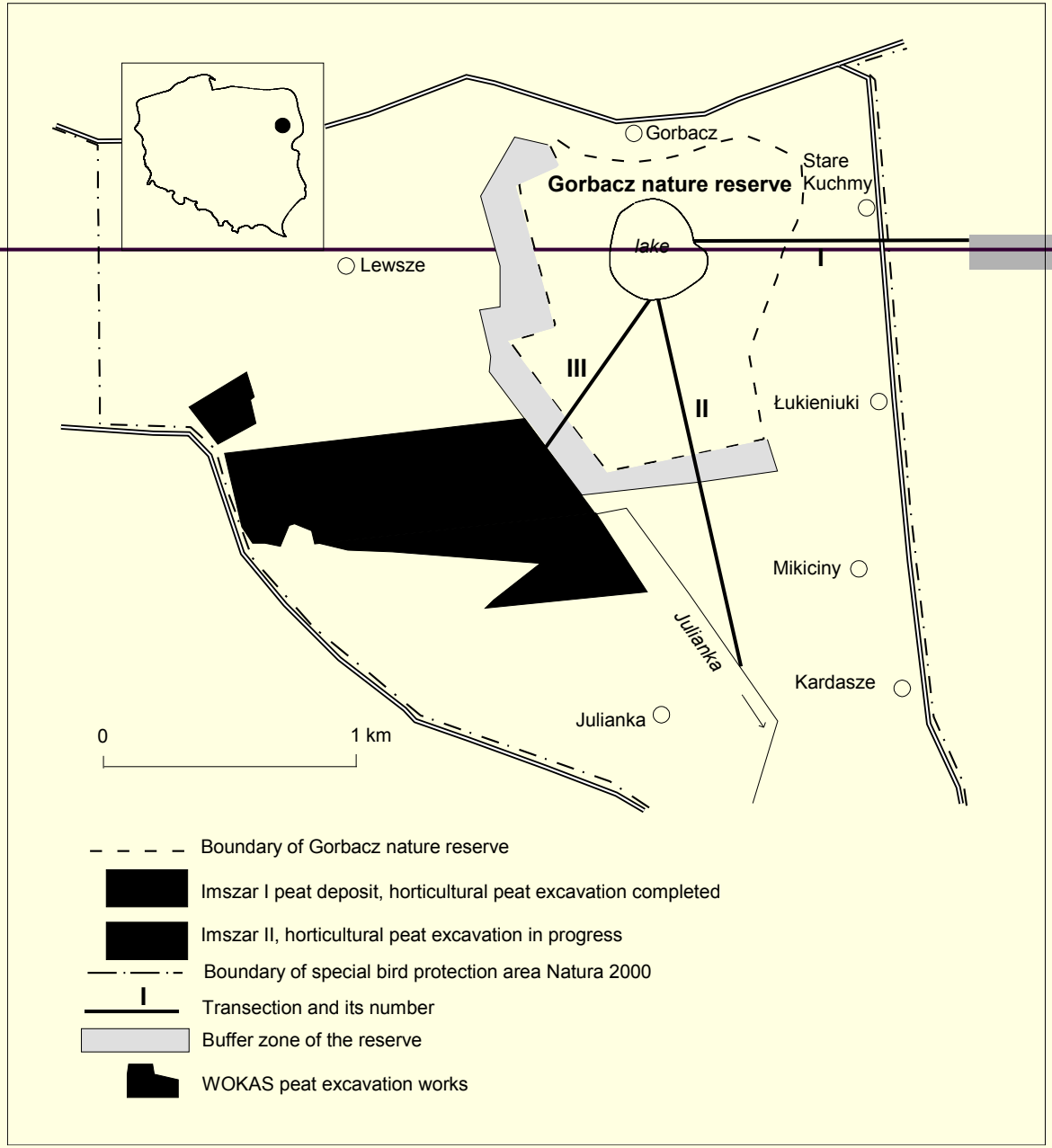
Aim of the investigation

- Is peat excavation by WOKAS plant and agriculture a threat for nature reserve Gorbacz or not?
- Which impact is more dangerous?



Map of the Imszar peatland

- Michałowo-Imszar peatland 4 280 ha consist of the Michałowo fen (ca 3800 ha) and Imszar raised bog (450 ha).
- Imszar is located on the watershed between river Supraśl and Narew
- Stratigraphy of the Imszar raised bog
- Total depth of peat 4-5 m.
- Sphagnum peat H-10-20%, pH 2.5, ash content <5%, depth 1-2 m
- Sphagnum-Carex peat, H-20-30%, depth 1-3 m
- Sedge-reed and sedge-Hypnum peat, H-15-40%, ash content 14-25%, depth 1-2 m

Peat excavation activity

- Production of milled peat for the horticulture
- Imszar I 38,3 ha 1976-1968, finished (1.2 m deep layer has been extracted)
- Imszar II 16,53 ha excavation started in 2004
- Imszar III 0.95 ha excavation planed – balneological peat

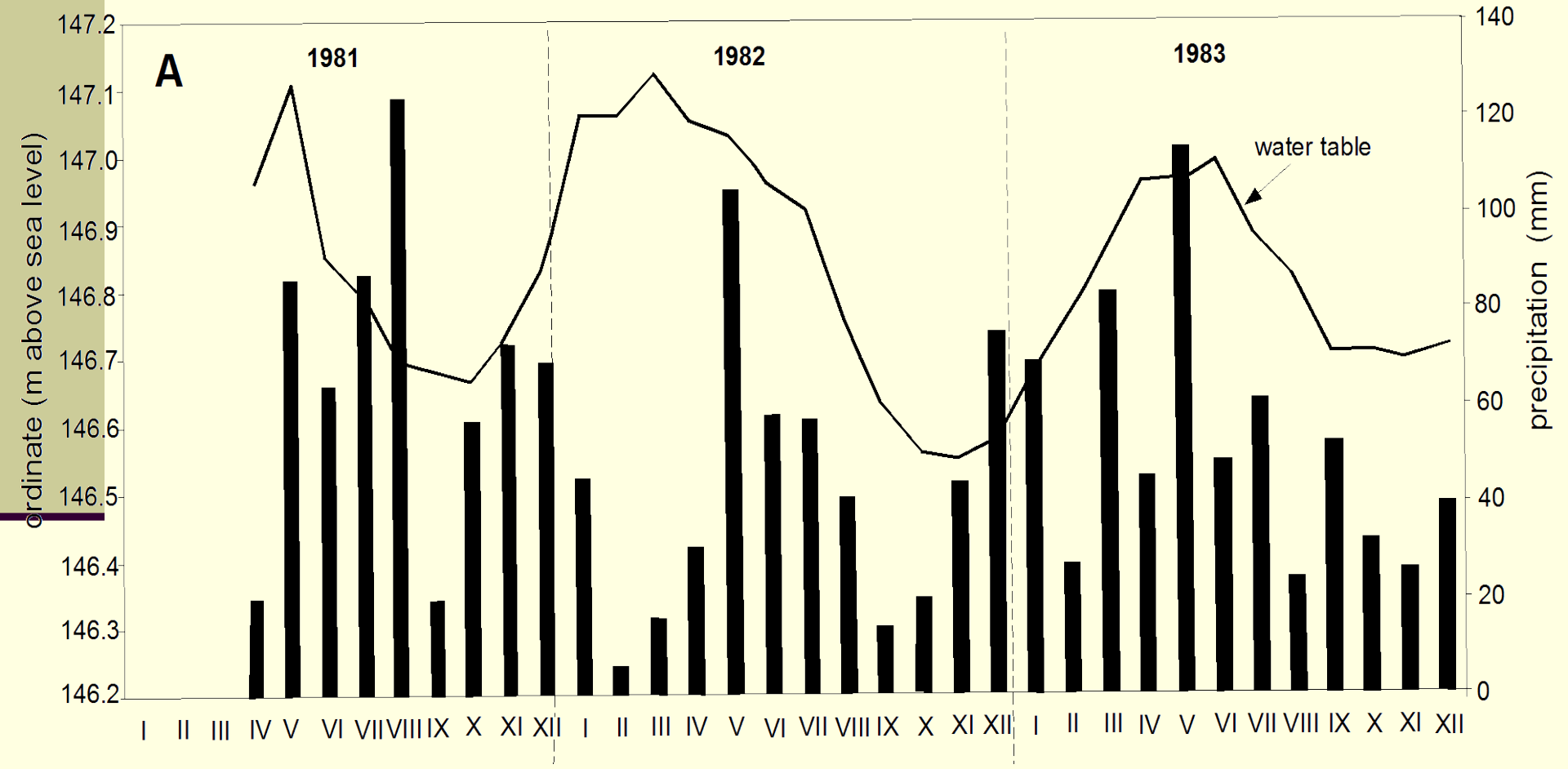
Precipitation

- Since 1966 the annual precipitation is lower than the multi-annual average
- Białowieża station
  - 1949-1996 - 631 mm
  - 1951-1980 - 594 mm
  - 1981-1990 - 542 mm
- Specially dry years: 1991, 1992, 1996, 1999, 2000

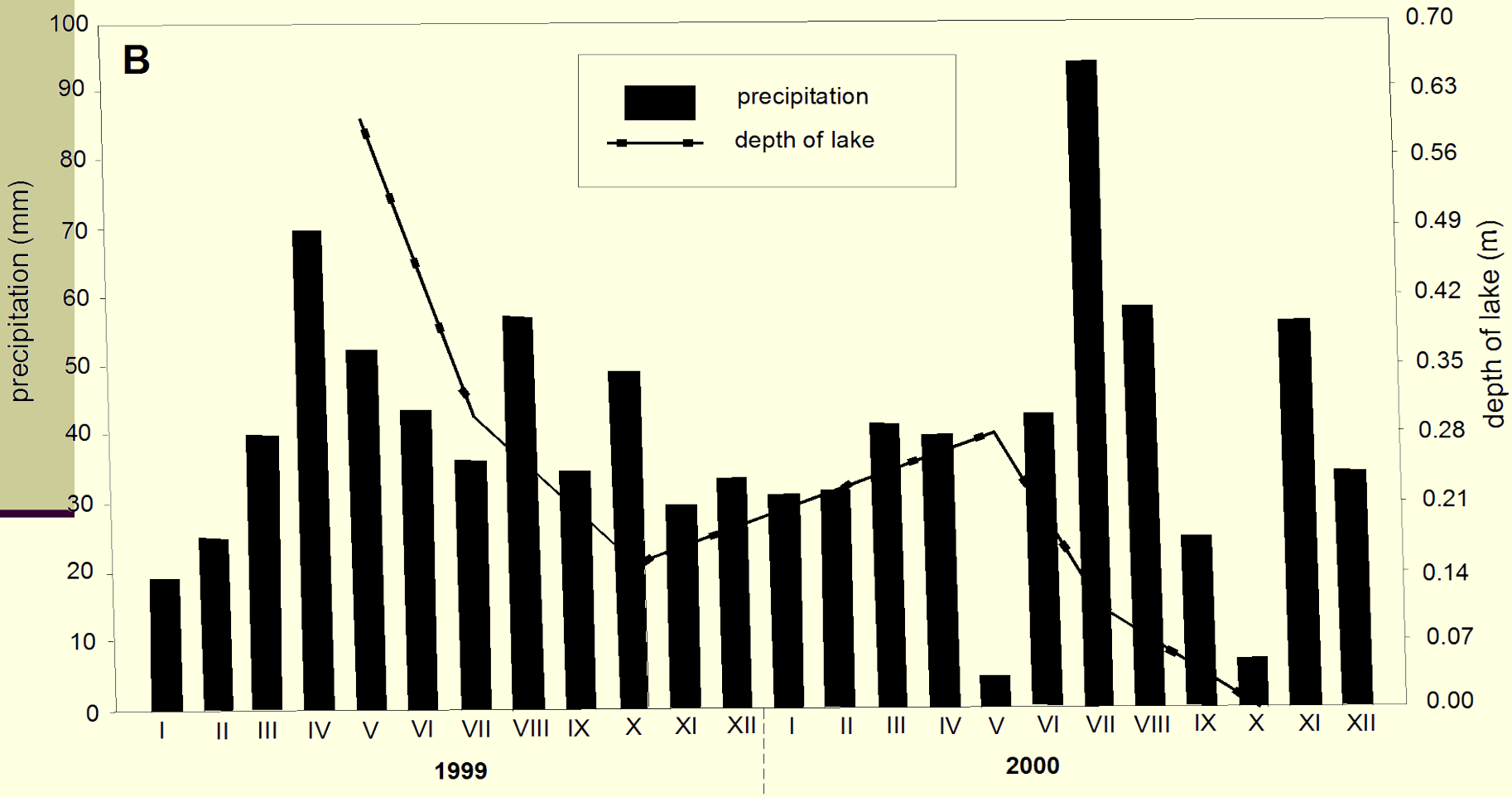
Water levels in Lake Gorbacz in 1955-1998

Date of measure-ment	Water level (m above sea level)	Date of measure-ment	Water level (m above sea level)	Date of measure-ment	Water level (m above sea level)
May 1955	147.06	May 1986	146.95	May 1991	146.74
May 1981	146.71	May 1987	146.76	May 1992	146.80
May 1982	147.03	May 1988	146.74	August 1992	146.15
May 1983	146.93	May 1989	146.82	May 1993	147.00
May 1984	146.69	May 1990	146.78	May 1998	146.68
May 1985	146.80				

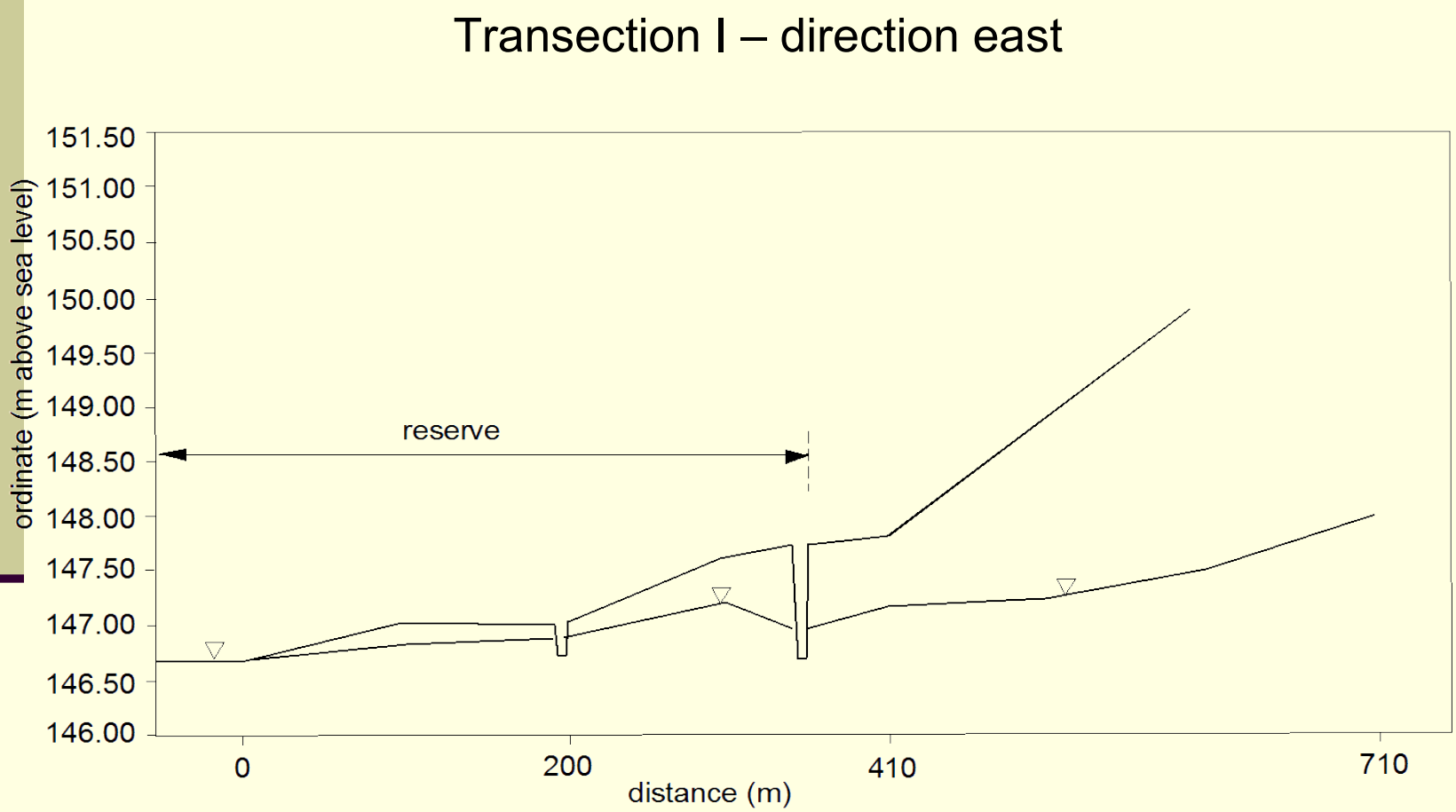
Fluctuations in water table in Lake Gorbacz in the years 1981-1983 in terms of monthly precipitation.



Fluctuations in water table in Lake Gorbacz in the years 1999-2000 in terms of monthly precipitation



Location of groundwater table on 30 April 1998 after the excavation of the Imszar I peat deposit was ceased



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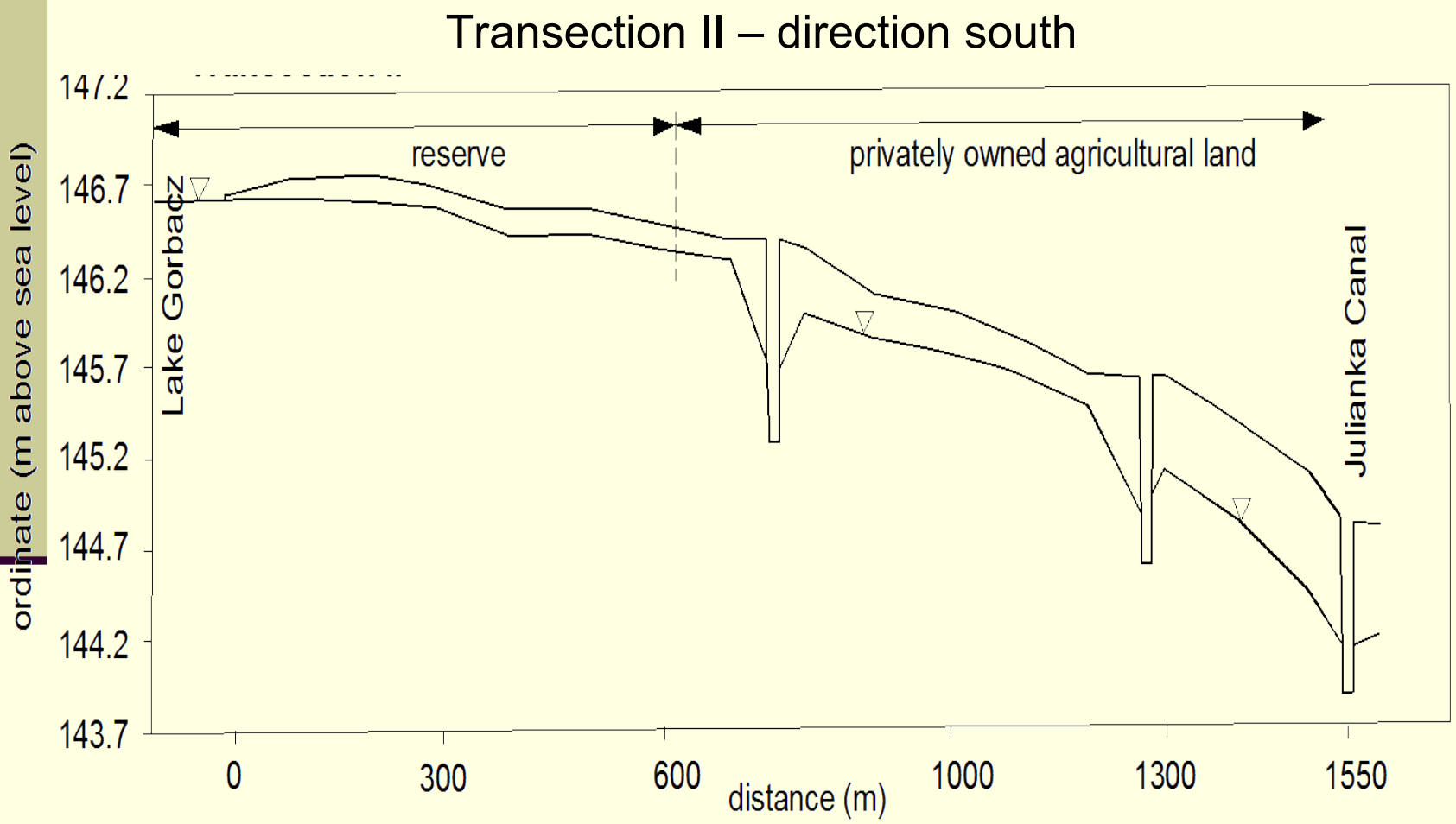

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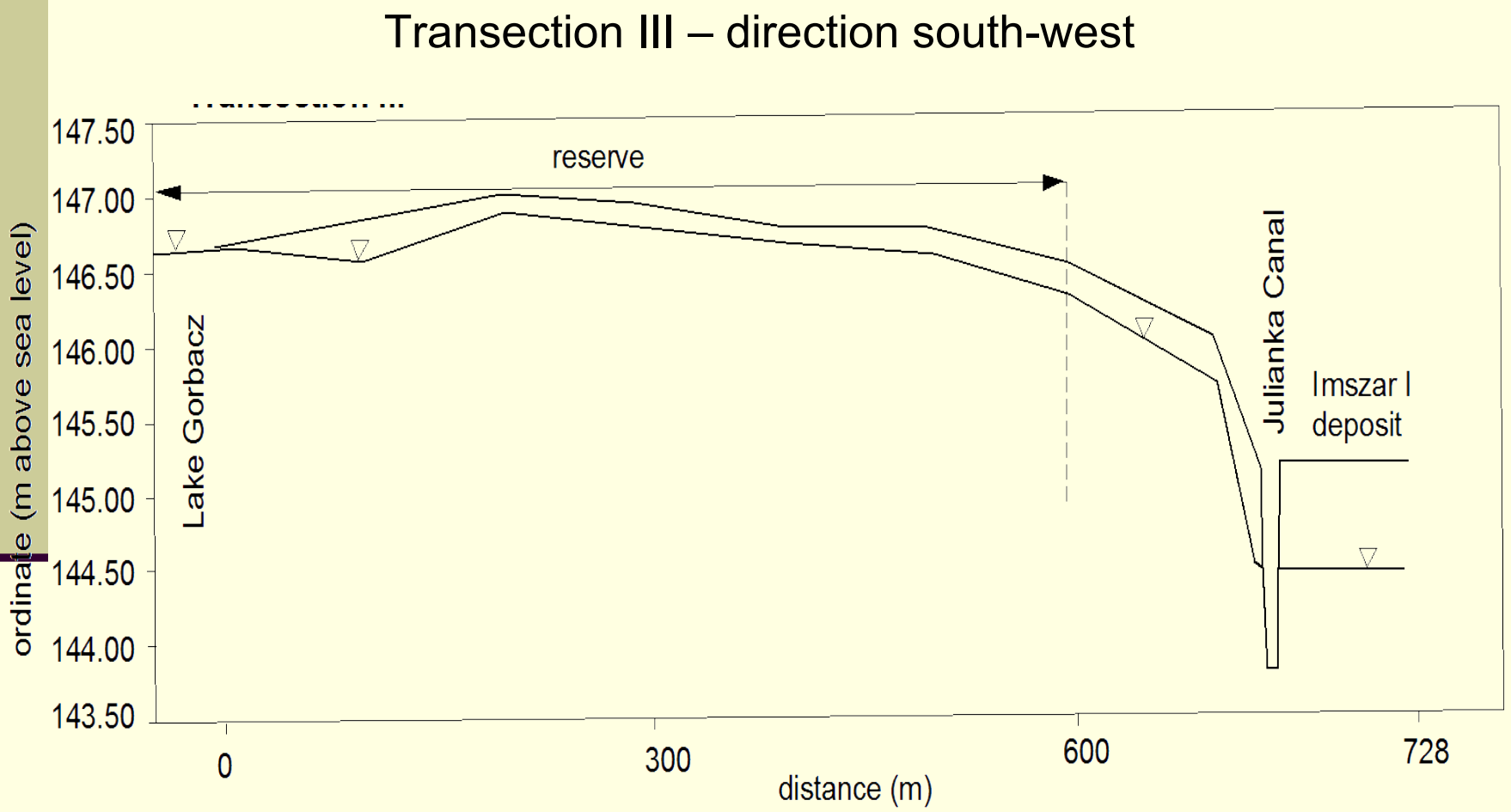
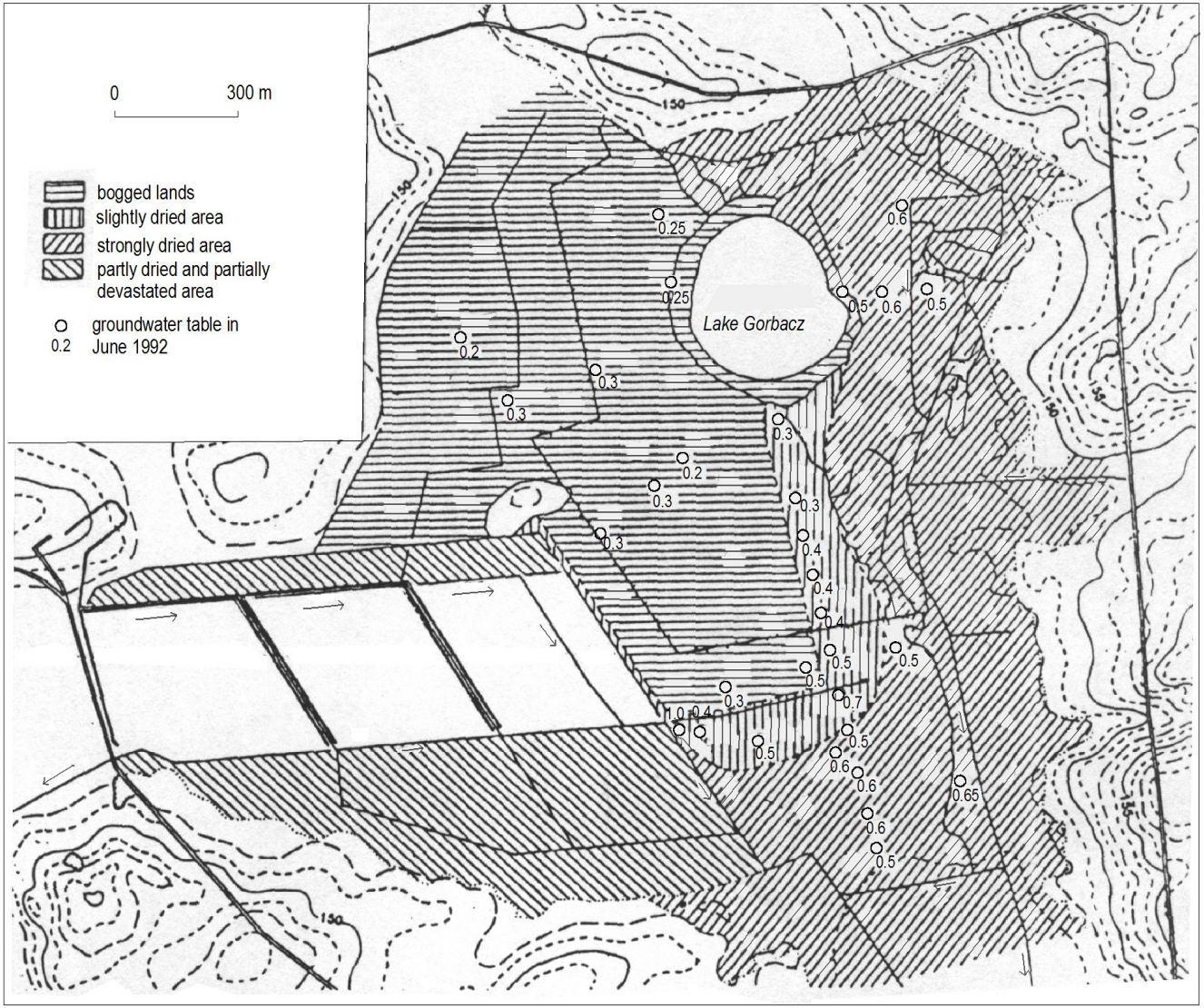


Water conditions in the Imszar peatland in 1992

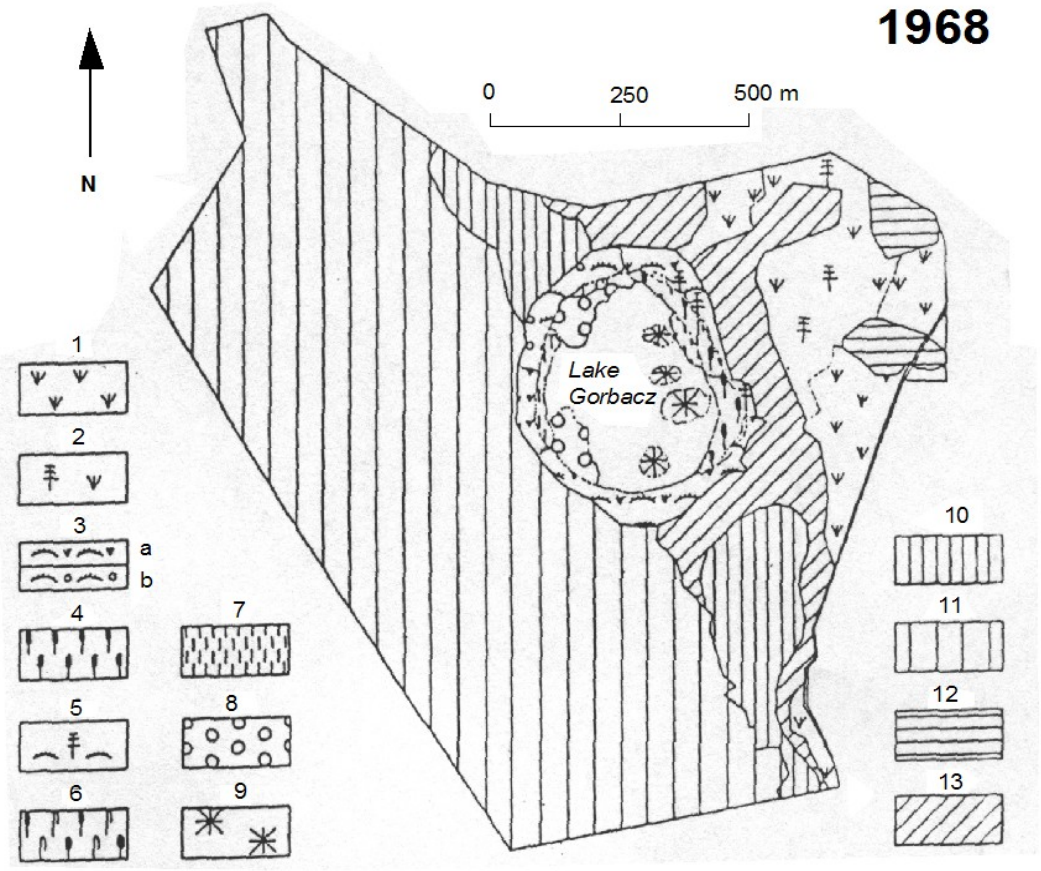


Gorbacz nature reserve

- Area 113 ha,
- established at 1966

  Southern edge of the Natura 2000 special bird protection area “Puszcza Knyszyńska”

Vegetation of the Gorbacz nature reserve in 1968



Plant communities in 1968: 1 - Caricetum gracilis; 2 - Caricetum gracilis with Pinus silvestris; 3 - Caricetum limosae, a) facies with Carex, b) facies with Oxycoccus; 4 - rushes with Typha; 5 - Caricetum lasiocarpae with Pinus and Betula; 6 - rushes with Typha and Phragmites; 7 - rushes with Equisetum; 8 - floating vegetation; 9 - bottom grasses; 10 - Vaccinio uliginosi-Pinetum typical facies; 11 - Vaccinio uliginosi-Pinetum facies after a fire; 12 - Fraxino-Ulmetum; 13 - Dryopteri thelypteris-Betuletum pubescentis

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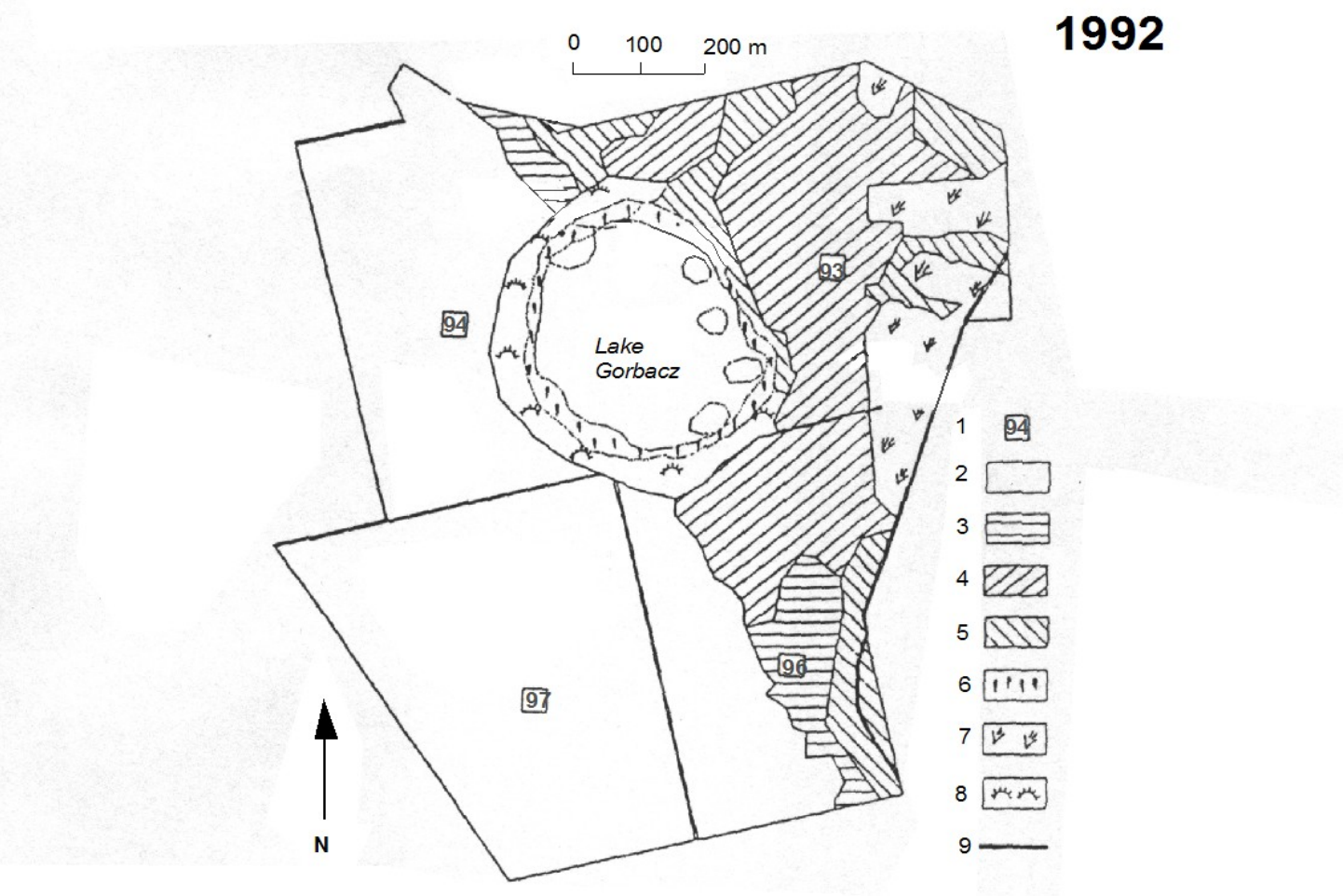

Plant communities in 1992: 1 - division number; 2 - Vaccinio uliginosi-Pinetum facies after a fire;
3 - Vaccinio uliginosi-Pinetum dried facies; 4 - Viola palustris-Pinus silvestris;
5 - Carici elongatae-Alnetum; 6 - Thyphetum latifoliae; 7 - cultivated meadows of class Molinietalia;
8 - Caricetum limosae; 9 - division line

Conclusions

1. In peat excavation fields a lowering of the groundwater table at 0,6-0,9 m below ground level is required. The depth of ditches (1.0 m) and canals (2.0-2.5 m) is large.
2. Through the low permeability of Sphagnum peat the range of deep ditches do not exceed 50 m. Thus the existing buffer zone (with 180 m) eliminate the negative drainage effect of peat excavation in the nature reserve.

Conclusions

1. The eastern part of the reserve is composed of fen peat with high permeability, and a ditch is located on the nature reserve border, only 300 m from the lake.
2. In 2000 the lake Gorbacz is completely overgrowing through the systematically decreasing precipitation and limited inflow of water from the east.