

**Photo Story**

DOI: 10.21570/EDGG.PG.62.70-72

## Waterlogging, rising groundwater levels and flooding of dry pastures and meadows on Hailuoto Island (Finland) and ways to solve the problems

Photos and text by Viktor Tsybal<sup>1,4\*</sup>, Yuri Buts<sup>2</sup>, Sergiy Khripko<sup>3</sup>, Aziza Baubekova<sup>4</sup>, Ali Torabi Haghghi<sup>4</sup>

<sup>1</sup> Department of Applied Ecology Engineering Institute of Zaporizhzhia National University, Zaporizhzhia, Ukraine

<sup>2</sup> Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine

<sup>3</sup> Alfred Nobel University, Dnipro, Ukraine

<sup>4</sup> Water, Energy and Environmental Engineering, Faculty of Tehnology, University of Oulu, Oulu, Finland

\* Corresponding author: [viktor.tsybal@oulu.fi](mailto:viktor.tsybal@oulu.fi)

Flooding causes unfavourable changes in the ecological environment. The quality of the soil is deteriorating, pastures are becoming waterlogged, which leads to the death of plants. Factors influencing the process of flooding of pastures and Palaeartic meadows are considered using the example of the territory of the island of Hailuoto in Finland. These include: abnormal precipitation, rising water levels in the Gulf of Bothnia and seismological activity. The annual sea level rise is 3.2 mm. Over the past 25 years, the increase has been 7.5 cm. The vertical movement of land in the northern part of the Baltic Sea is caused by the slow restoration of the earth's crust under the pressure of the ice sheet that covered this area during the last ice age. On the coast, the rate of land rise is from 3 to 9 mm/year. Abnormal amounts of precipitation and rising groundwater levels are the main cause of flooding of Palaeartic pastures. Rising land and climate change negatively affect the flooding of the island, as well as areas in the riverbeds of the Kalajoki and Siikajoki rivers. The island of Hailuoto is located opposite the city of Oulu and is one of the communities of the province of Northern Ostrobothnia, Finland. Island area 202.26 km<sup>2</sup> including 1.7 km<sup>2</sup> of internal waters, population - 1082 people. The total grassland area of Hailuoto Island is 536.6 hectares

From May 24 to May 29, 2024, a study of the flooded state of meadows and pastures on Hailuoto Island was carried out.



**Local landmark.**



**Hailuoto Island Lighthouse.**



**Plowing pastures and meadows on the island.**

To preserve dry pastures and meadows of the island from flooding, it is necessary to attract public attention to the problem of stopping the uncontrolled plowing of meadows and pastures, deforestation, the use of integrated drainage, the development of programs and measures to protect the lands of Hailuoto Island from floods.

#### Further Reading:

Kahma, K., Petterson, H., Boman, H. & Seinä, A. 1998. *Alimmat suositeltavat rakennuskorkeudet Pohjanlahden, Saaristomeren ja Suomenlahden rannikoilla*. Merentutkimuslaitos. Moniste.

Kahma, K., Pellikka, H., Leinonen, K., Leijala, U. & Johansson, M. 2014. Pitkän aikavälin tulvariskit ja alimmat suositeltavat rakentamiskorkeudet Suomen rannikoilla. *Ilmatieteen laitos, Raportteja* 2014:6. 48 pp.

Museovirasto. 2010. Valtakunnallisesti merkittävät rakennetut kulttuuriympäristöt.

Parjanne, A., Huokuna, M. (toim.) 2014. *Tulviin varautuminen rakentamisessa. Opas alimpien rakentamiskorkeuksien määrittämiseen ranta-alueilla*. Ympäristöopas 2014. 80 s.



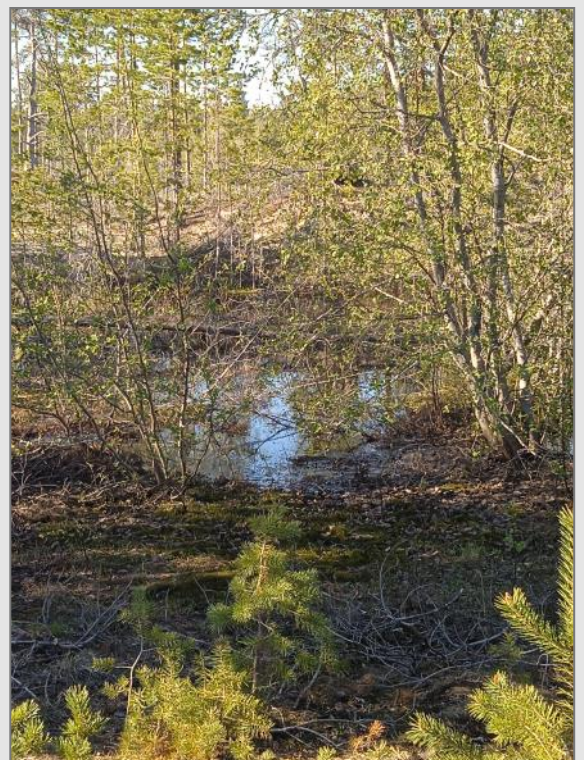
Surface drainage on Hailuoto Island.



Lake Nuottajärvi.



Island swamping.



Island swamping.