

Agnese Rudusāne, Juris Pētersons LIFE REstore projekts, Dabas aizsardzības pārvalde
agnese.rudusane@daba.gov.lv

INTRODUCTION

Since the drainage system was installed and the peat extraction started in the 1960's, the water level in the Višezers lake has fallen by 1.3 m. This factor has affected the pristine structure of the lake. The conditions created by land amelioration have caused significant disturbance in the natural ecosystem of the Višezers lake and the entire Lauga Mire.

Over several years, five different types of peat and wood dams have been established outside the restricted area, at the frontier of the nature reserve, increasing the water level of the Višezers lake. Historical changes in the hydrological regime of the mire are the main factor influencing the nature

MATERIALS AND METHODS

Reclamation of the degraded peatland - renaturalization - stabilization of the water level in the long term was carried out in the demo site of the LIFE REstore project in the Lauga mire. The demo site is located in the nature reserve "Lauga Mire", which is included in the Natura 2000 network. Lauga Mire is located in the north-western part of Vidzeme, Vidriži parish of Limbaži County and in Lēdurga parish of Krimulda County (Figure 1). Total area of the mire is 1876 ha. The nature reserve includes the central part of the Lauga Mire with an area of 740 ha.

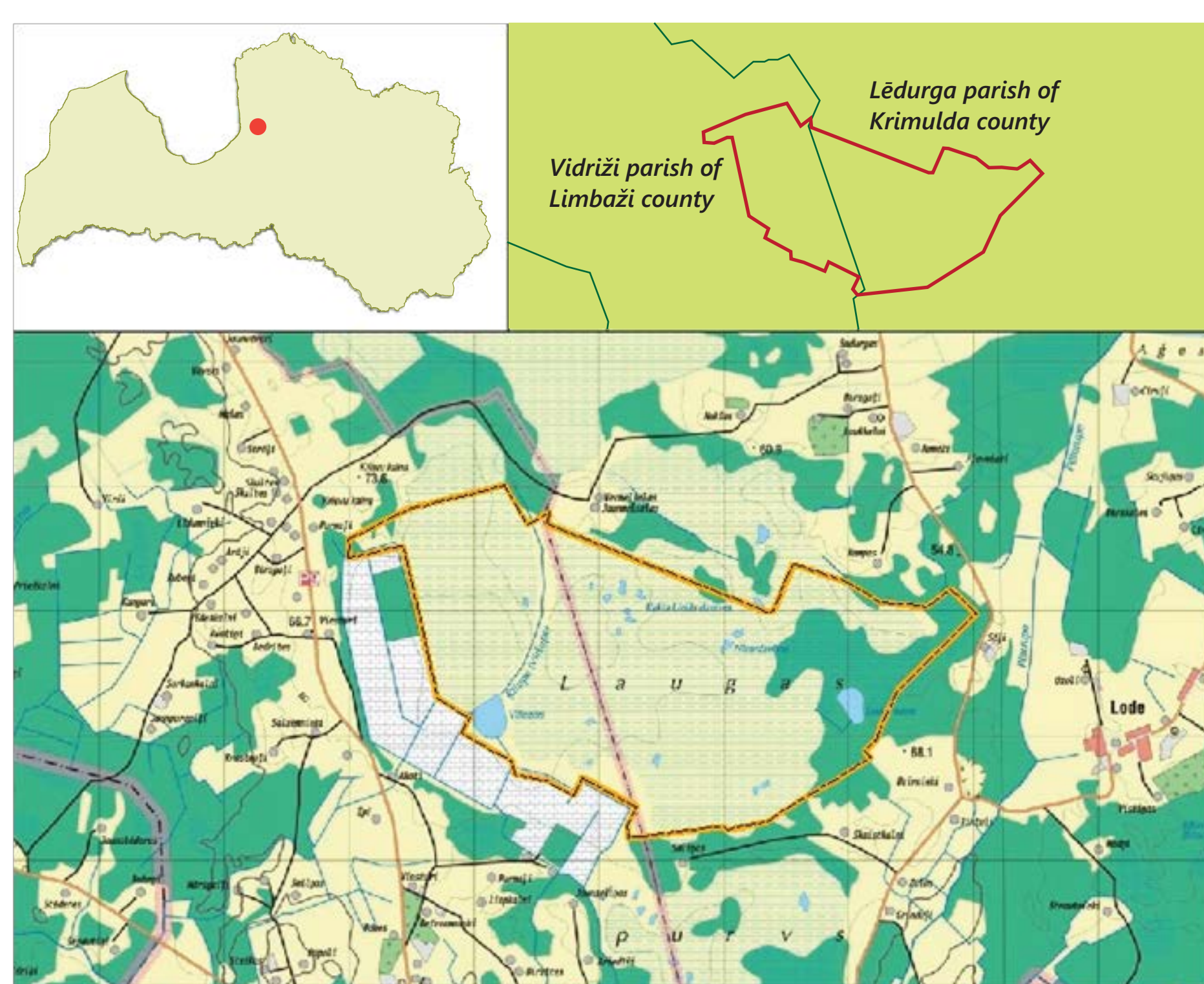


Figure 1. Location of Nature reserve "Laugas mire". Author: Rūta Sniedze - Kretalova

The trees and shrubs in the area were cut to prepare for the dam construction. Ditches and other material that have accumulated over many years have been cleaned from the ditch base. Since peat dams are built on a peat layer of ~ 6.0 m thick the ditches were cleaned, reaching a stable peat compaction (Figure 4 A). The material needed for the construction of peat dams was taken downstream of the dam site. During the construction work it was important to get the dams in places with the existing peat layer intertwined. This ensures that the dams are firmly held in place, keeping the water pressure in the Višezers, and preventing water flow through the edges of the dams. After construction of the dams, they were covered with a mire acrylic removed during construction (Figure 4 B). It helps dams grow faster with vegetation, which will provide faster integration into the landscape. In total 3 peat dams were made near Višezers (Figure 5).

in Lauga Mire, affecting both the water level of the Višezers Lake and the habitats of Lauga Mire, as well as the long term stability of the old dams.

In the framework of project "Sustainable and responsible management and re-use of degraded peatlands in Latvia" (LIFE REstore, LIFE14 CCM/LV/001103), renaturalization of the territory was planned by stabilizing the hydrological regime and peatland ecosystems which were degraded by the peat extraction and drainage. Rewetting and mitigation of drainage influence were necessary for the raised mire in the Lauga Mire Nature Reserve.

In order to carry out the hydrological regime stabilization works in Lauga mire, which is an area of NATURA 2000, the activities should be planned in the nature protection plan. The nature protection plan was made, including the objectives and measures aiming to the restoration of the hydrological regime of the mire and stabilization of the hydrological regime of the Višezers.

The nature protection plan for "Lauga Mire" was the first nature protection plan in Latvia, which included the assessment of the ecosystem services. **The Nature protection plan stated that a significant contribution to achieving the long-term objectives can be achieved by performing a single management measure - replacing the existing temporary dams with new regulated ones.**

Dams were built according to the technical specification of the building design (Figure 2,3). Lauga is a raised mire that borders with peat extraction fields where peat cutting takes place, as well as cranberry plantations and Lauga Mire Nature Reserve territory. These land uses require different water levels, so regulated dams were built and they can be manually adjusted as needed to provide the required water level. Peat dams also provide water drainage from the Višezers if the water level in the lake exceeds the maximum set in the nature protection plan, i.e. 58.3-58.5 m a.s.l.



Figure 4. A - Peat dam construction. B - The same peat dam when construction is complete. Photo: Juris Pētersons

Seven hydrological monitoring wells have been installed in the natural mire part of the nature reserve "Lauga Mire" for evaluation of hydrological stabilization works (Figure 5). Each well is equipped with a DN50 tube with a filter for monitoring water level changes. Monitoring of water level changes is carried out by the Nature Conservation Agency – a habitat expert performs water level measurements once a month in the installed monitoring wells.

AIM

The aim of the experiment was to ascertain whether the reintroduction of the characteristic vegetation after peat extraction is possible, as well as to identify the most effective reintroduction method by planting various combinations of sphagnum and other mire plant species both on pre-prepared peat surface and without the surface preparation.

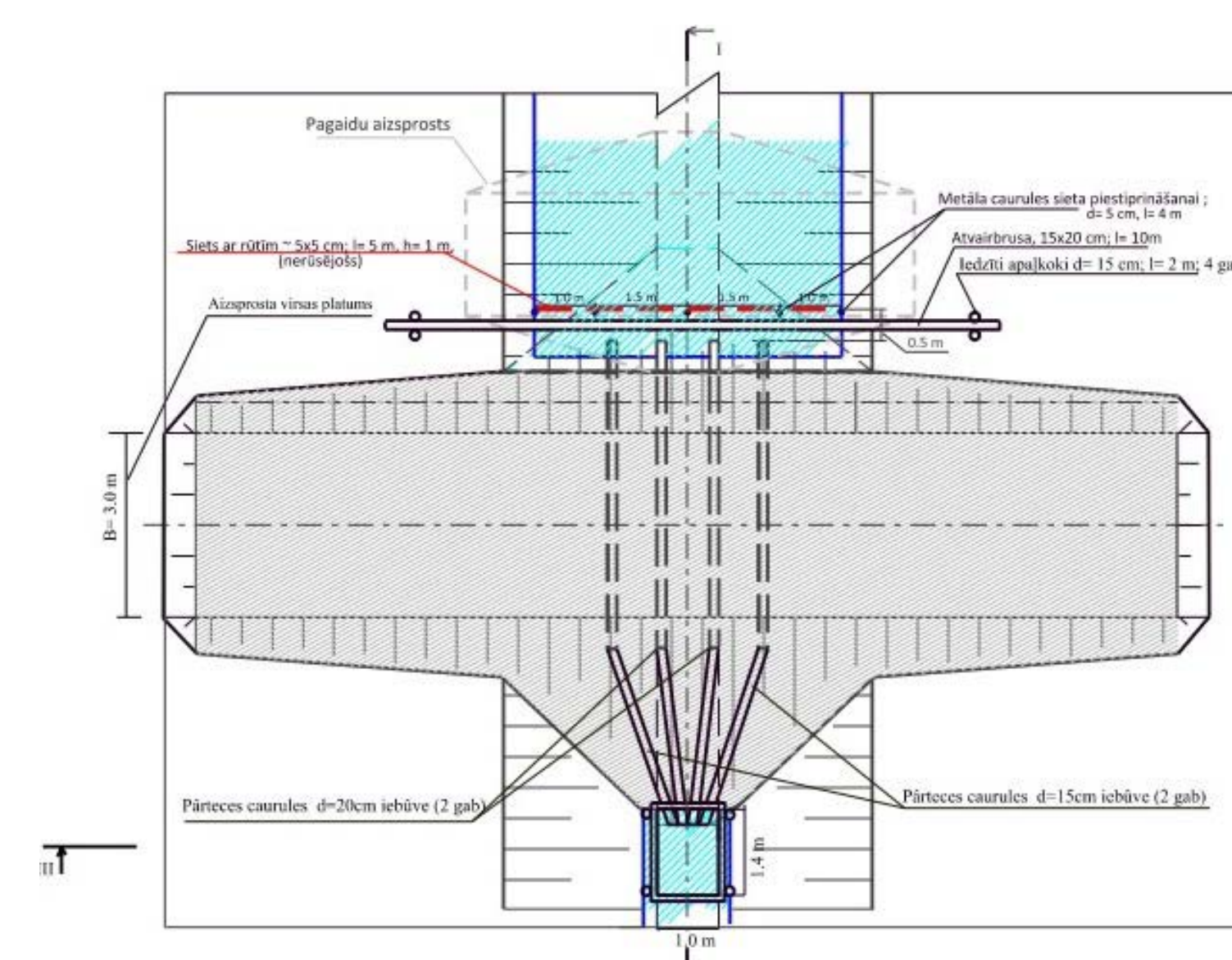


Figure 2. Drawing of dam (from above). Author: J. Nusbaums.

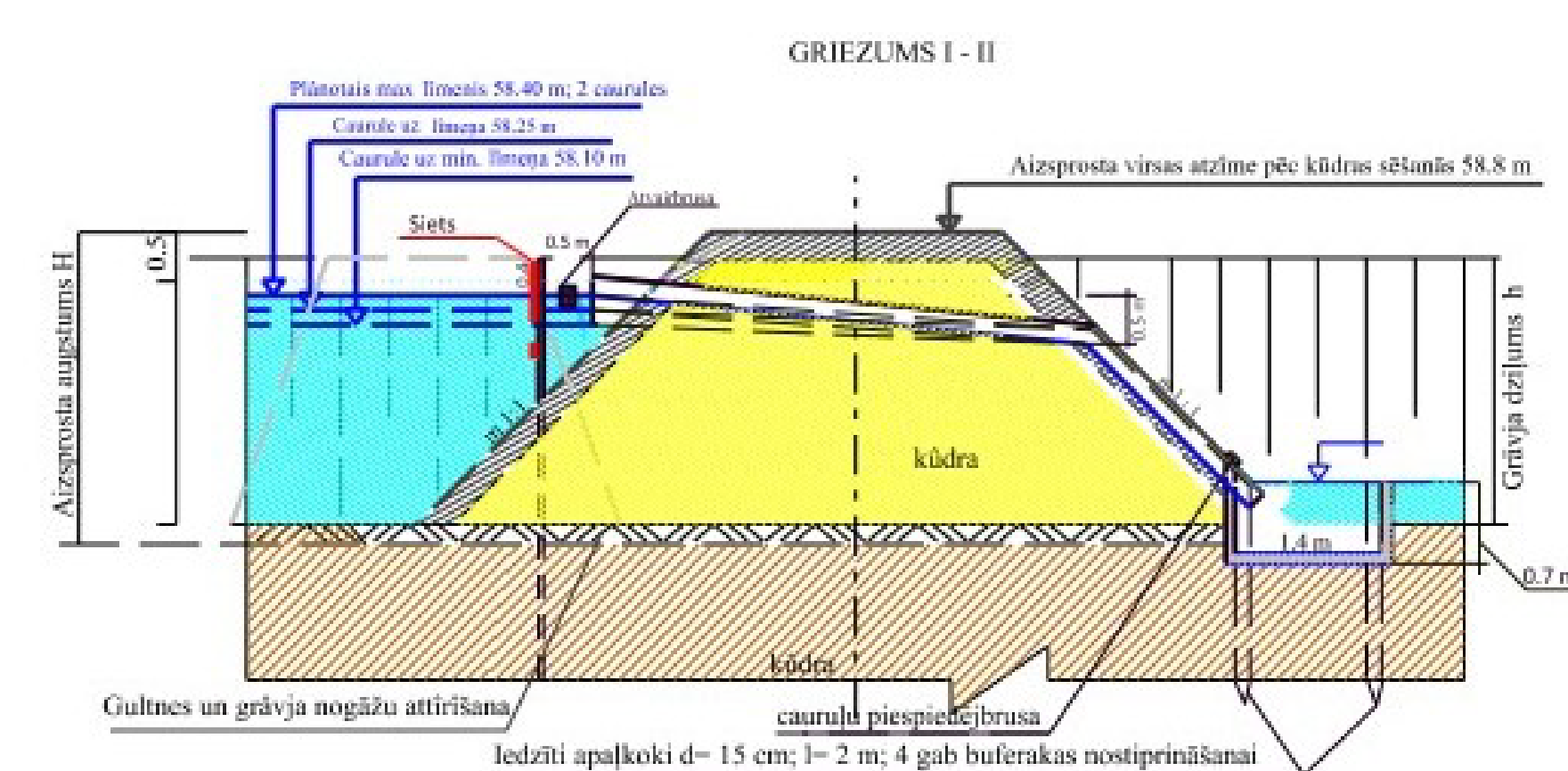


Figure 3. Drawing of dam (cross section). Author: J. Nusbaums.

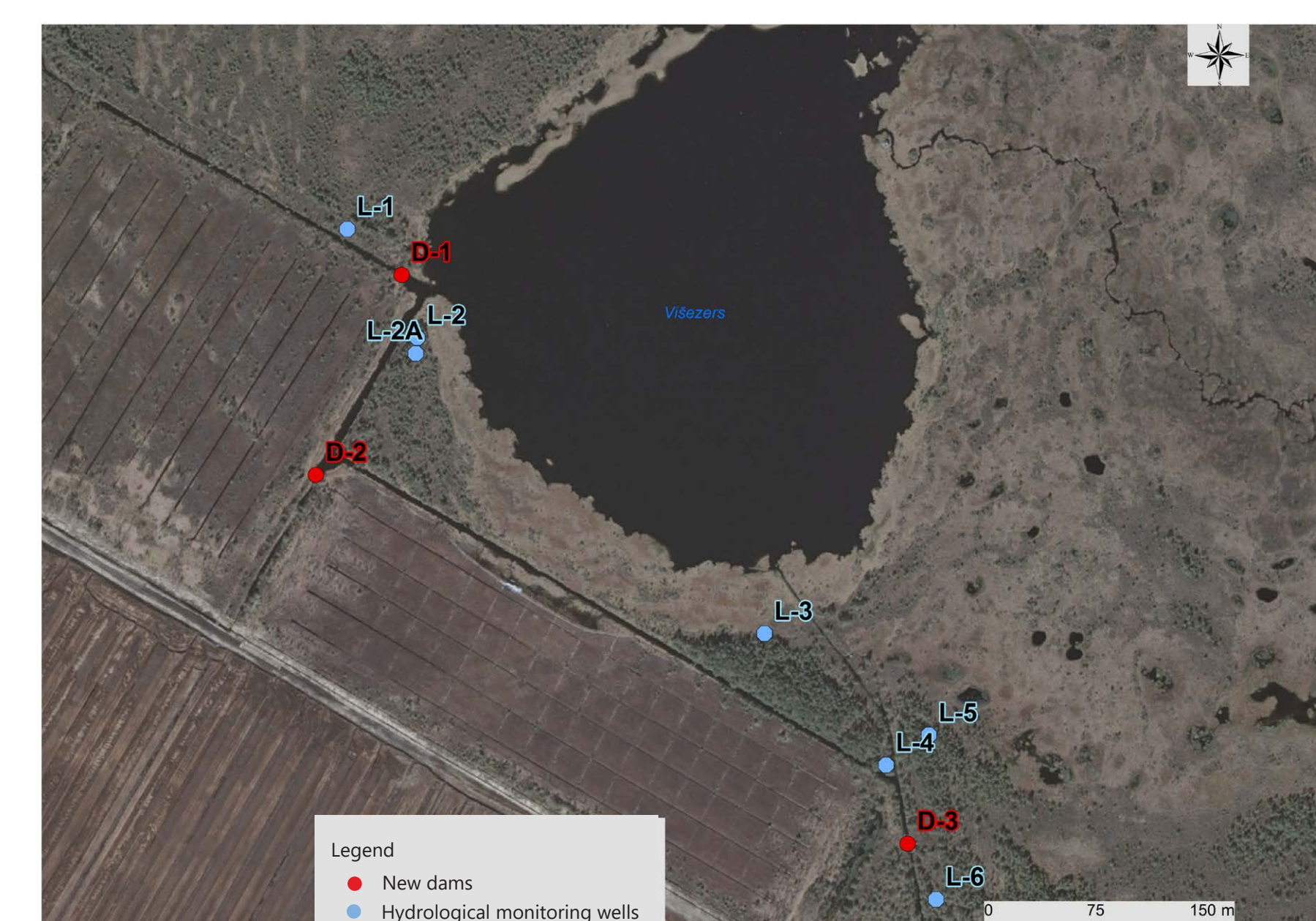


Figure 5. New dams and hydrological monitoring wells location in Lauga Mire. Map prepared by A. Rudusāne, using 5th cycle orthophoto map, 1:10 000. © Latvian Geospatial Information Agency, 2013-2015

RESULTS AND CONCLUSIONS

After the completion of the construction work, the stacked peat continues to compact and peat dams sink slightly. In order to prevent flooding of adjacent areas after the dam construction while keeping the water level in Višezers at the level of the nature protection plan, the dams have been equipped with smooth drainage pipelines DN200. Once the peat is fully compacted, the pipelines will no longer be at their height. The pipeline ends are therefore bent to 67°, which can be adjusted to the level of 0.01 m specified in the nature protection plan.

In August 2018, a low groundwater level (-31 to -124 cm) was observed (Figure 6). It is too early to make conclusions about the impact of the dams built a few months after their construction. Observations for the first seven months show a rise in groundwater levels, although precipitation levels were negligible over the observation period. A further 10 years after the end of the LIFE Restore project, changes in the hydrological regime will be observed by the Nature Conservation Agency.

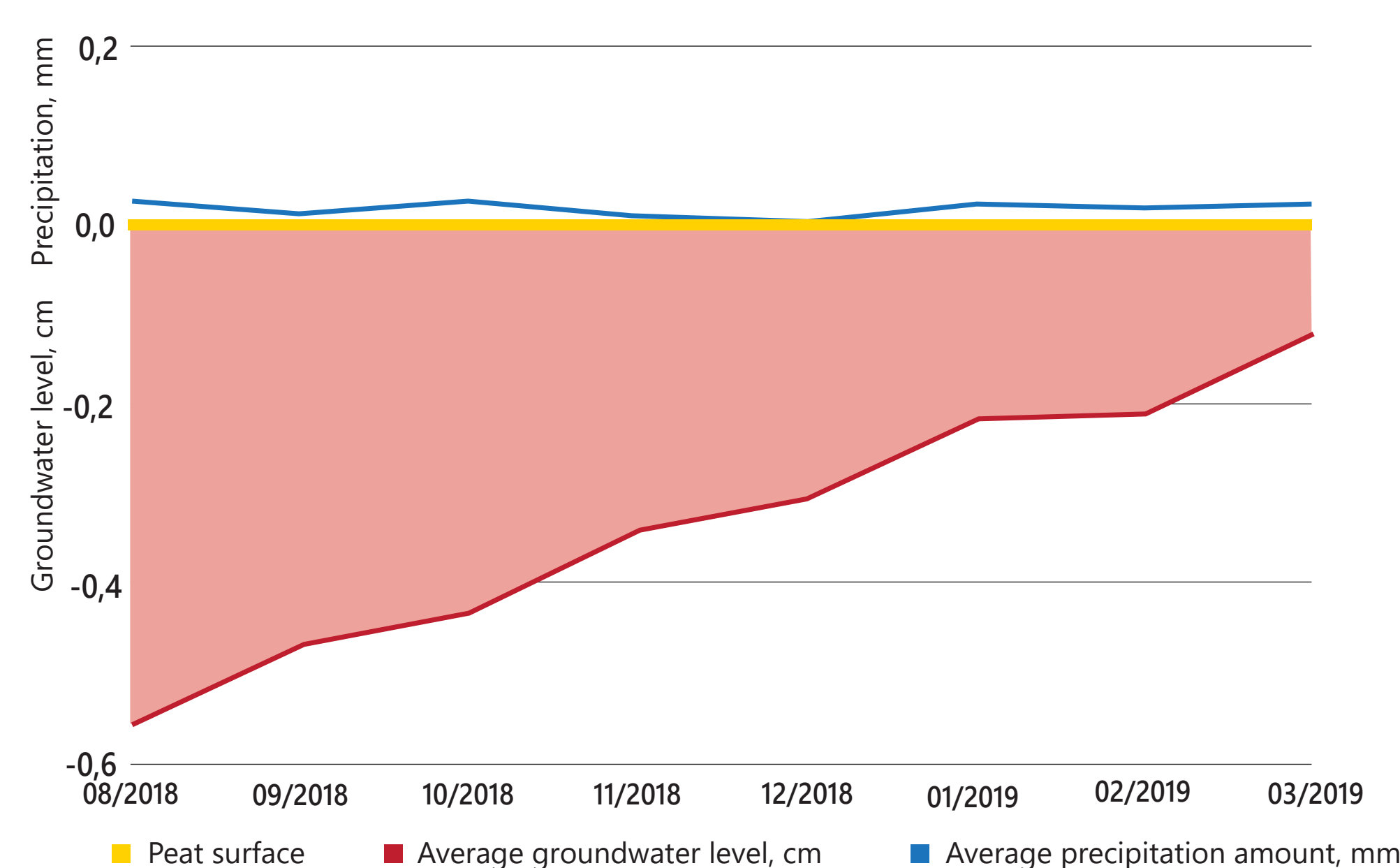


Figure 6. First results of groundwater monitoring in Lauga Mire from August 2018 to March 2019

In 2019, it is too early to assess the impact of the regulated peat dams on the restoration of the mire in the Lauga nature reserve (dams were built in November, 2018).

This is a successful long-term investment in improving the state of the mire ecosystem. It is expected that dams will ensure the conditions for the restoration of the protected habitat of EU importance Distrofi Lakes (10.01 ha) and the stabilization of Višezers current water level 58.3-58.5 m a.s.l. Dams that were built within LIFE REstore project will provide the conditions for further improvement of the quality of the mire habitats in the area of 309 ha (Višezers catchment area).