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**OPPORTUNITIES FOR THE DEVELOPMENT OF SEASONAL ECOSYSTEM SERVICES IN THE
CONTEXT OF SUSTAINABLE RIVER HYDROLOGY**

Paula Miezāka, Jovita Pilecka-Uļčuģačeva, Inga Grīnfelde

Latvia University of Life Science and Technologies, Faculty of Forest and Environmental Sciences, Latvia

Introduction

Floodwaters regularly enrich floodplains with organic matter, so the soils here are very fertile. During floods, the floodplain becomes a huge reservoir, which at the same time acts as a natural "sponge" of water, protecting large surrounding areas, including settlements, from flooding. Floodplain meadows are considered the only completely natural meadows in Latvia. Hydroelectric power plants disrupt natural floodplain meadows. The aim of this study is to analyze the impact of the hydroelectric power plant on the water level of floodplain meadows and its impact on biodiversity in the Natura2000 area.

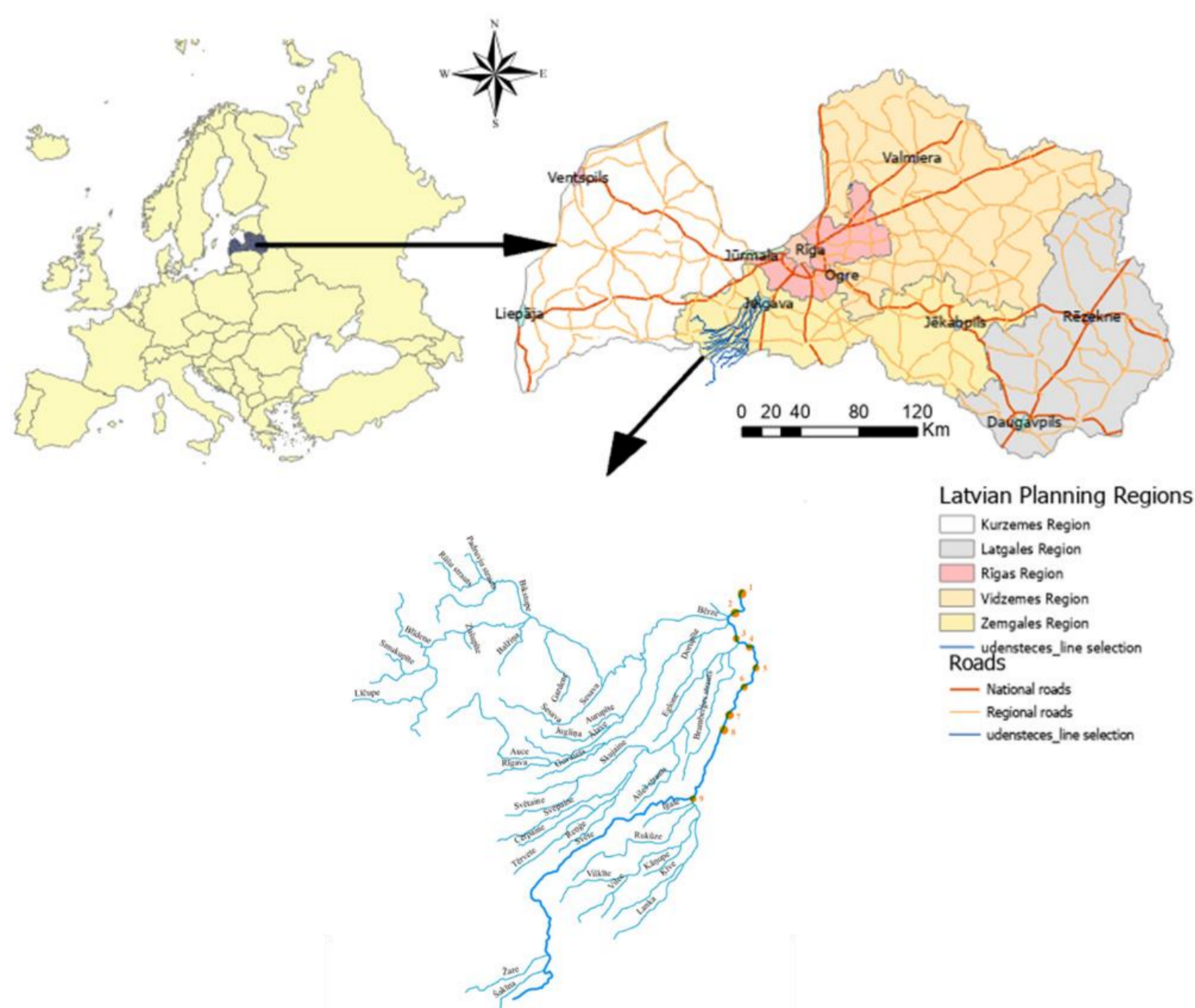


Figure 1. The location of research area.

Research

The Svete river basin is located in the central part of Latvia (Fig. 1). During the study nine monitoring stations were set up for the Svete River section in the administrative area of Jelgava municipality.

Water level measurements will be performed automated every 15 minutes with a Micro-Diver (Eijkelkamp) that measures the pressure of the water column on the unit and a Baro-Diver (Eijkelkamp) that measures the atmospheric pressure. Both devices are used as a set to automatically perform air pressure compensation. The measurement frequency for the equipment can be from 0.5 seconds to 24 hours (Fig.2). A rafter will be installed at each monitoring point using a set of M3 1 "tachometers for topographic work and situation measurement.

Flow measurements at monitoring points will be performed using hydroacoustic flow meters for rivers, lakes RiverRay ADCP, RD Instruments. This device allows the development of a river flow rate map at each flow measurement point in any section of the river, both under bridges and at meander sites, as well as at alluvial sites. RiverRay data will be validated using a transfer device to determine the flow rate in running water RHCM, Hydro-Bios.

In the field, the data will be read with a universal data reader / processor B-300, Getac, which is able to read / process data sets containing up to 61,000 data units (Fig.3).



Figure 2. The Micro-Diver (Eijkelkamp).

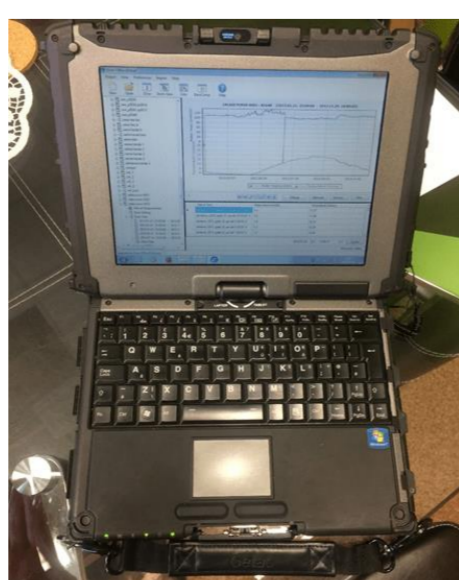


Figure 3. The universal data reader.

Results

At this stage, the Svete River has a parabolic bed shape with flat banks (see Fig.4). As the Svete River is surrounded by agricultural land at this stage, natural meandering of the Svete River is permissible, but the impact of small HPPs, which increase the risk of erosion, must be taken into account (see Fig5). Risks At this stage are water level fluctuations caused by hydropower plants, which can cause trees to fall in the river section, which can lead to morphological changes in the riverbed and hydrological changes in the river flow. As well as the formation of tree slopes in rivers promotes sedimentation. According to the legislation in force in Latvia, the Svete River is one of the rivers on which it is prohibited to build new mechanical barriers, build and renovate hydroelectric power plants. This prohibition also applies to this stage. In order for the smallest hydroelectric power plants to affect the bed of the Svete River at this stage as little as possible, the owners of small HPPs must ensure the maintenance of HPP hydraulic structures in technical order in accordance with the requirements of the building safety program.

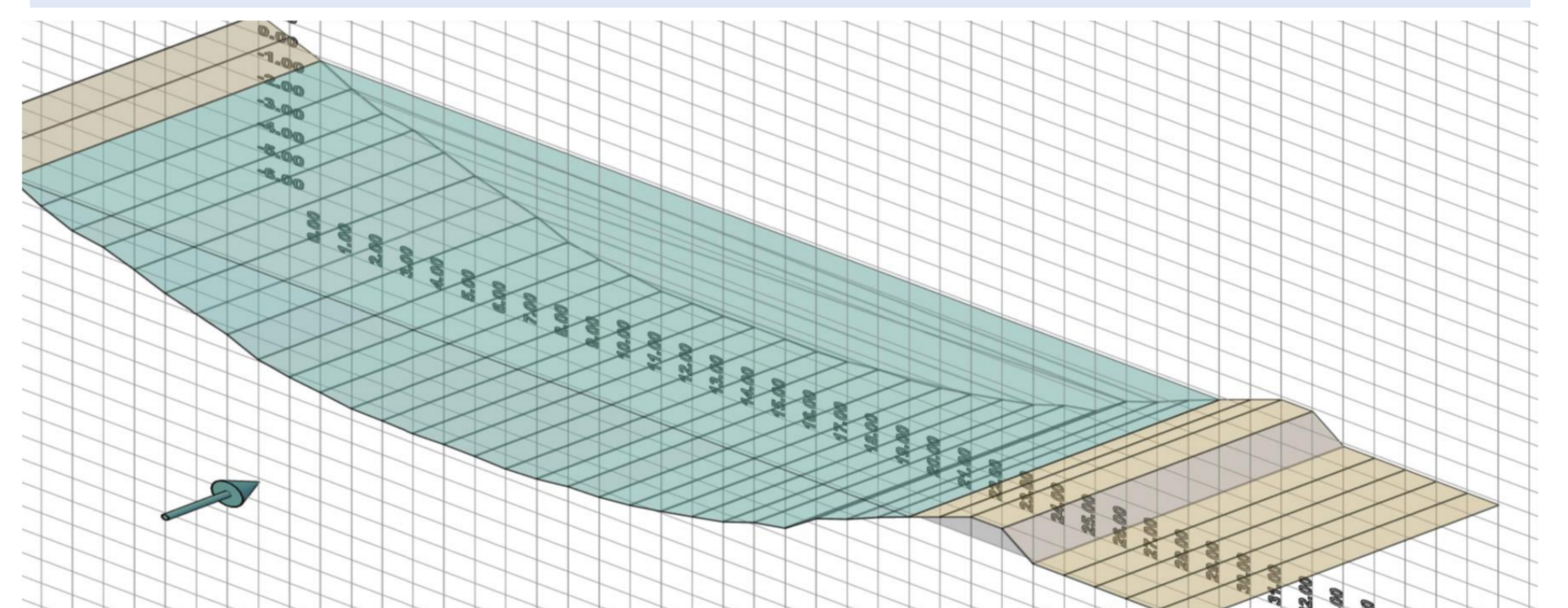


Figure 4. The section of Svete river 3D model.



Figure 5. The meander of Svete river.

Conclusion

The results of the study show that the hydroelectric power plant has a significant impact on the downstream, where increased river overgrowth with plants is observed, because of the inability to provide ecological run-off during the summer. The results of one year water quality investigation show different results. In August, the oxygen content of the Svete River ranged from 5.2 mg l⁻¹ to 5.6 mg l⁻¹. The maximum values of nitrate ions were found in February, when they range from 52-56 mg l⁻¹.