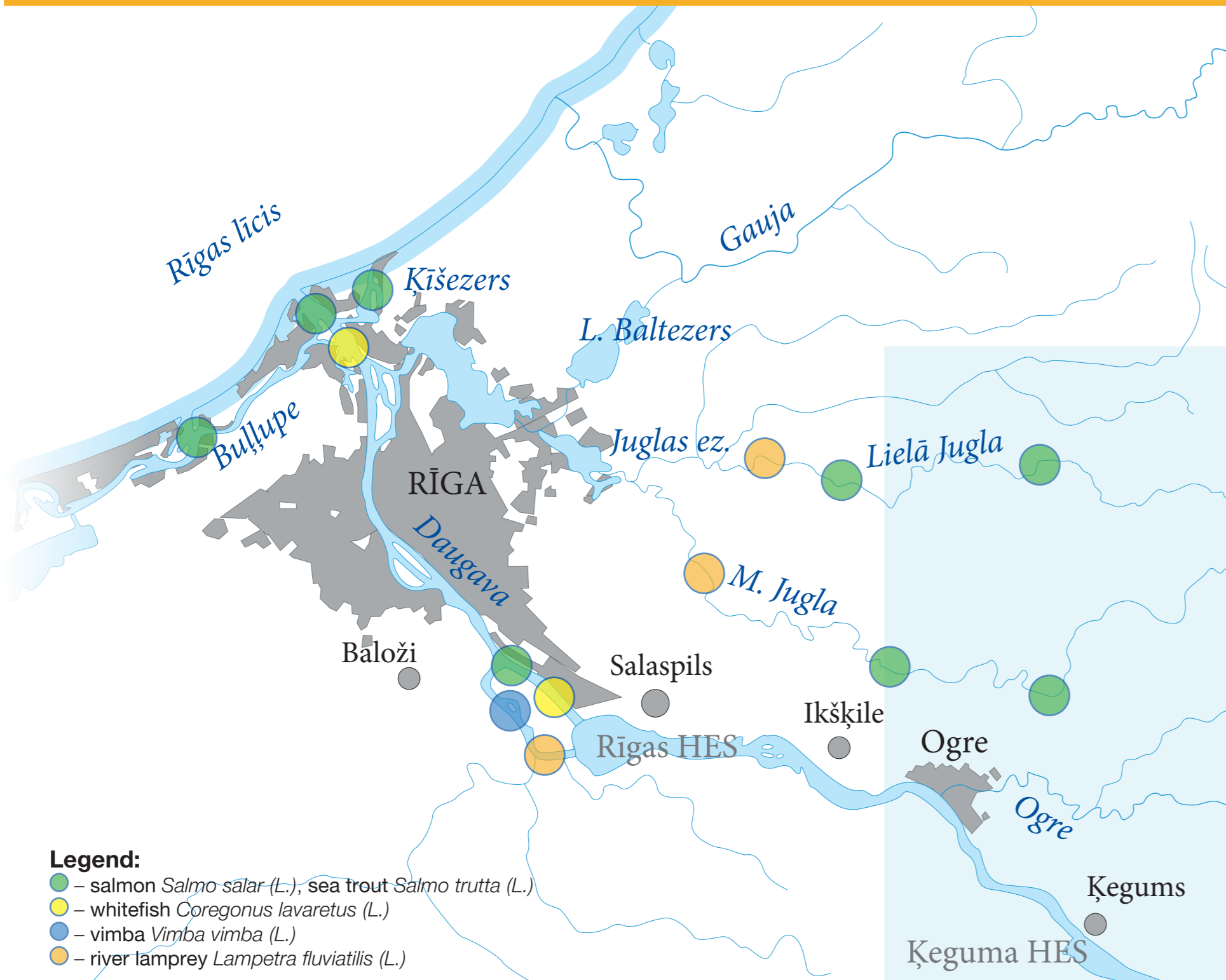


Mitigating the impact of hydropower plants on diadromous species: Latvenergo AS (Latvia) experience

Compensatory diadromous fish stocking in the Daugava River basin



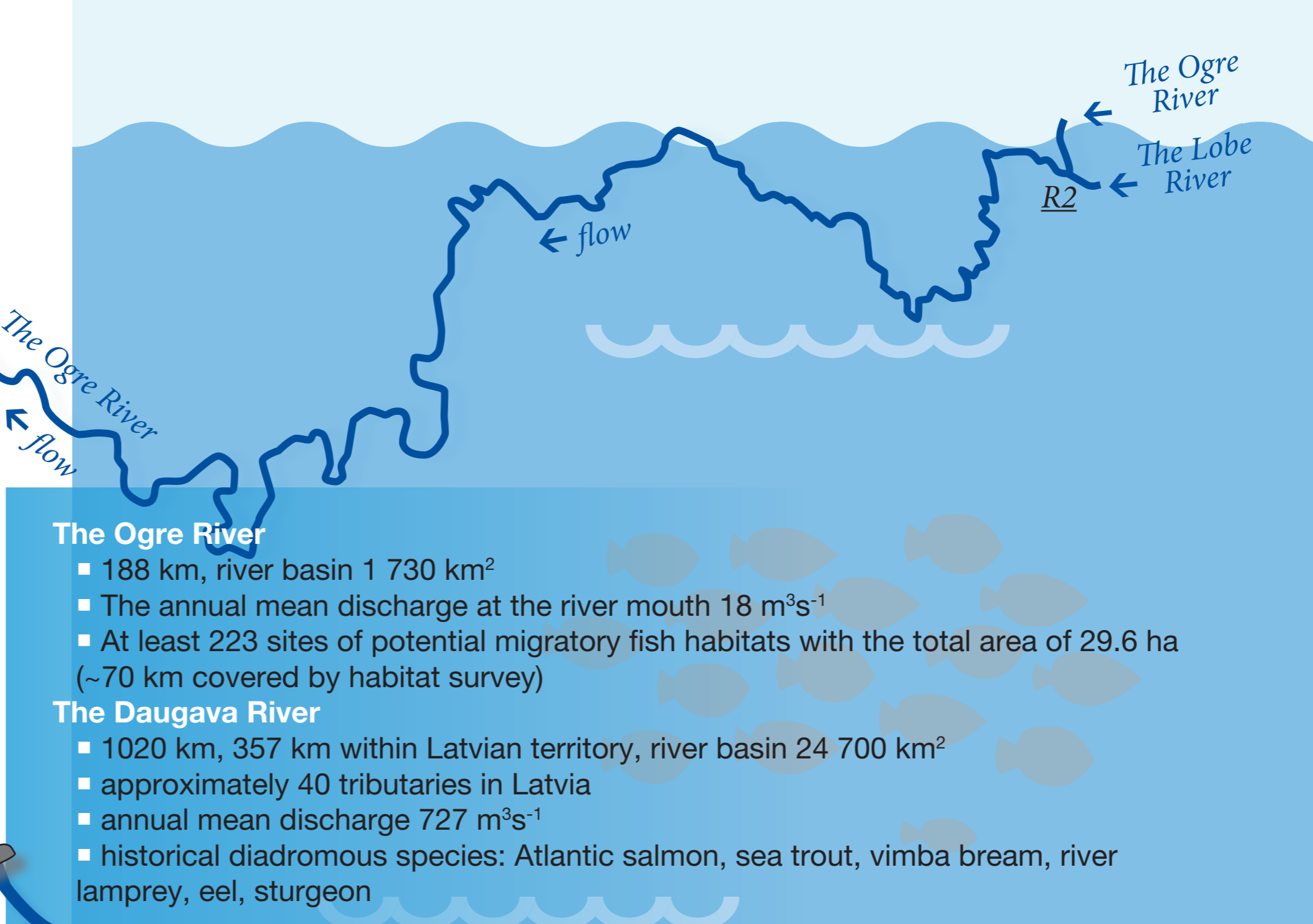
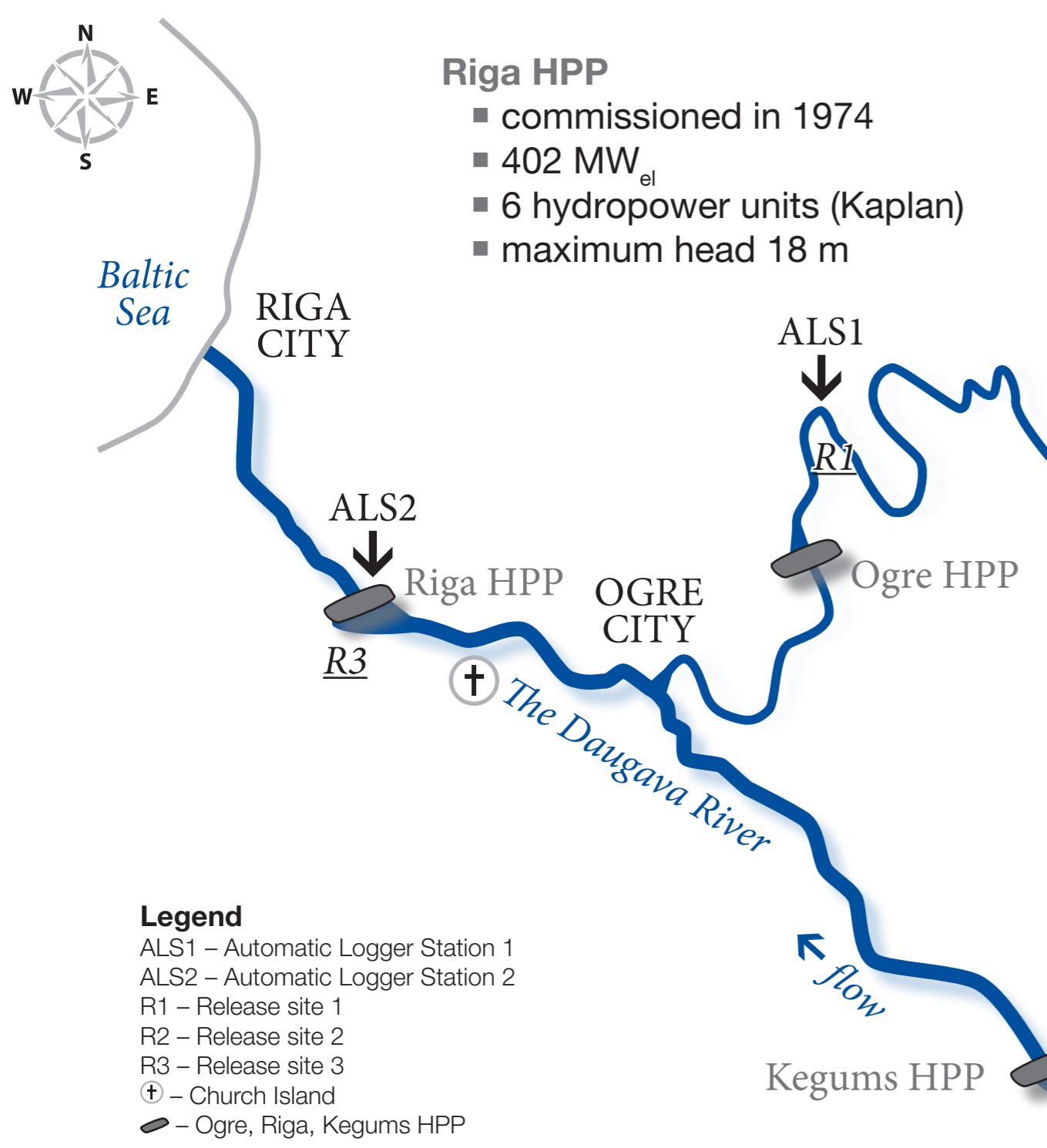
The Daugava River is the largest river in Latvia. Daugava hydropower plants built in 1939 – 1974 and owned by power supply company Latvenergo AS are Latvia’s most important renewable resource in generation of electricity with a total installed capacity of 1,56 GW. The absence of fish passage structures excludes migration of Atlantic salmon and other diadromous species. The impact of Latvenergo AS hydropower plants is annually compensated by stocking of salmon, sea trout (600 thousands of smolts and fries annually) and other species: vimba, pike, pikeperch, river lamprey, whitefish (700 thousands of fries and 5 millions of larvae annually) with annual costs of 1 035 000 EUR. Fish stocking is provided by Institute of Food Safety, Animal Health and Environment BIOR hatcheries.



Fish migration and natural reproduction restoration study in the Daugava River

In 2013 Latvenergo AS initiated the study “Fish migration and natural reproduction restoration in the Daugava River” in cooperation with Latvian, Italian and Swedish scientists. The planning of the study was performed by prioritizing the subjects of research and defining the methods and data necessary for initial evaluation and planning further steps of decision-making process.

- 1st stage (2013) review of historical data and habitat survey was performed concluding that the Ogre River meets the criteria for salmon (and other diadromous species) spawning: BIOR (LV); analysis of possible fish passage technical solutions and other fish migration restoration options: Karlstad University (SE), Politecnico di Torino (IT).
- 2nd stage (2014 – 2017): Atlantic salmon telemetry study: Karlstad University (SE), Politecnico di Torino (IT), the Institute for Environmental Solutions (LV).



Atlantic salmon telemetry study in the Ogre and the Daugava River

- 1st stage performed in Oct. – Nov. 2014
- Atlantic salmon caught in the Gulf of Riga and the Daugava near its mouth tagged with body implant transmitters and PIT-tags
- Released in three groups (R1, R2, R3)
- Monitored with two automatic logger stations (ALS1, ALS2) and performing manual tracking with ATS manual receivers
- Significant flood occurred (100-year event) during the study

Results and conclusions of the telemetry study

- Adult salmon transported above an obstacle in the tributary Ogre River did not migrate upstream, but left the Ogre River – absence of imprinted spawning behavior or result of the flood?
- Downstream passage of Ogre and Riga HPP is possible, ≥ 60% survival rate at Riga HPP
- High recapture rate of fish downstream Riga HPP (71%) – high commercial fishing pressure
- 17% moved upstream in Daugava to reach Kegums HPP
- Benefit of the study: information for planning future activities is gained
- Repeating the study in 2016-2017 is planned to exclude the impact of flood
- The results of the study will be used in the planning of other scientifically justified fish stock protection activities in the Daugava River, supplementing the current ones.