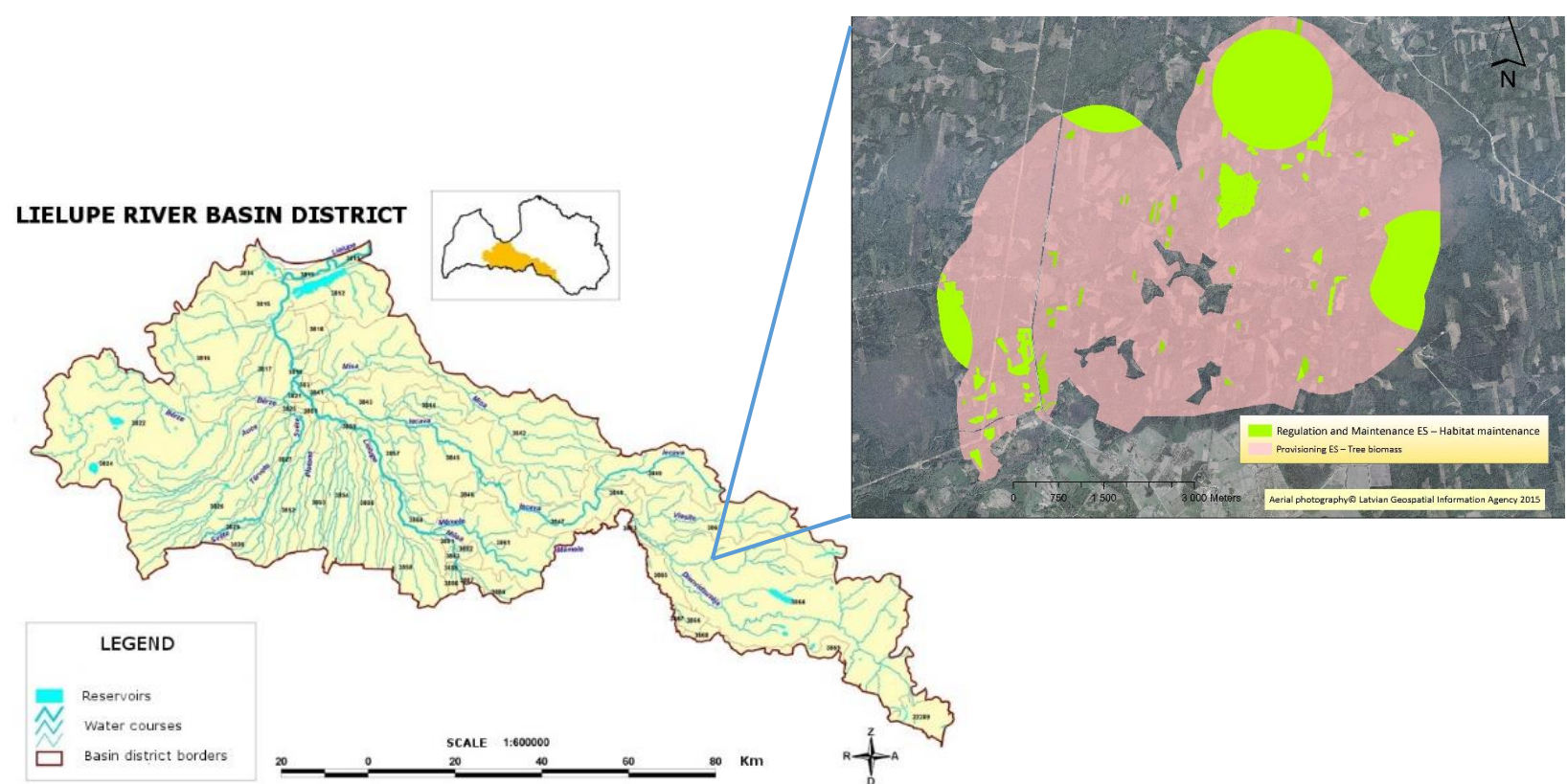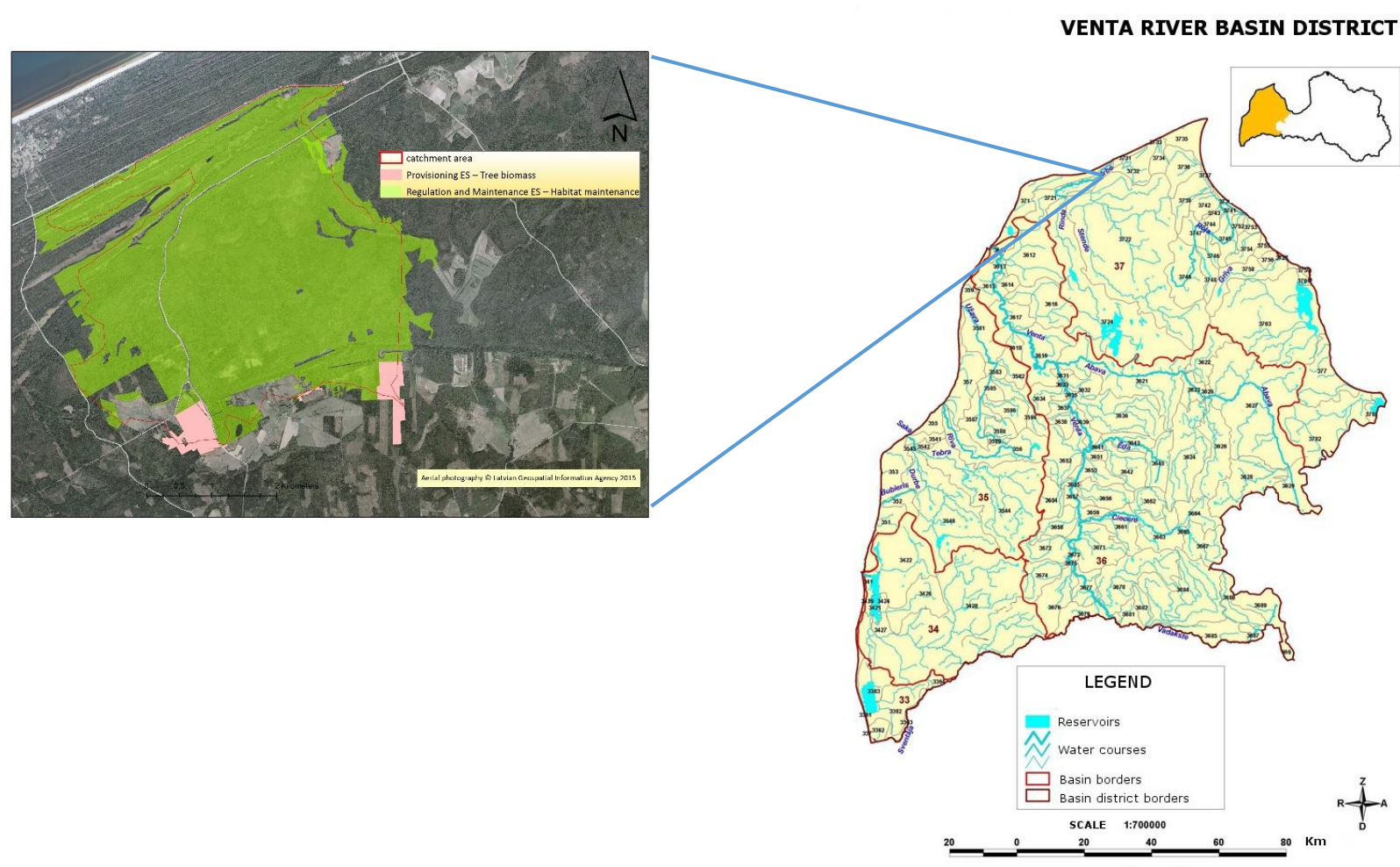# MODELLING THE IMPACT OF FOREST MANAGEMENT OPERATIONS ON FOREST ECOSYSTEM SERVICES. CASE STUDY FROM LATVIAN STATE FORESTS

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Model catchment for the analysis of impact of forest management on ecosystem services in managed forests (with preliminary mapping of prevalent ES)

Background. Following the growing interest in mapping and evaluation of ecosystem services (ES) both on European level and internationally, several initiatives have been launched also in Latvia during recent years, the first of these dealing with meadows and coastal ecosystems. The most widely represented terrestrial ecosystems in Latvia, however, are the forests. With 54% forest cover (according to FAO, 2015, data), Latvia is the 4th most forested country in Europe. One half of all forests belong to the state and are managed by Joint Stock Company "Latvian State Forests".
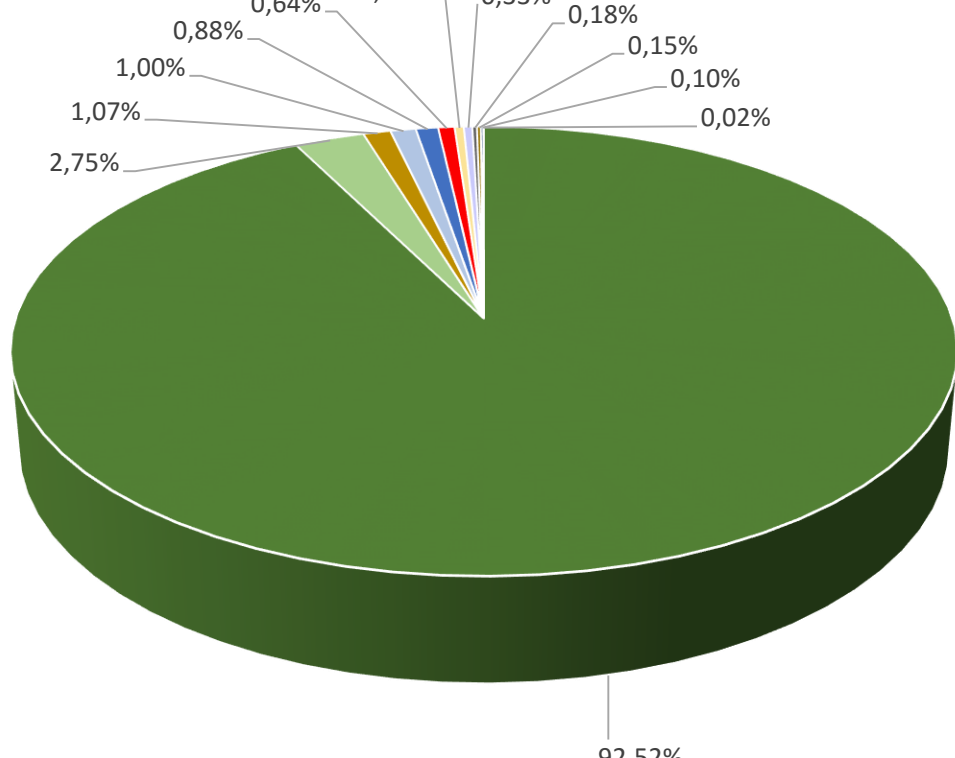

Model catchment for the comparison in protected forests (with preliminary mapping of prevalent ES)

Study and Objects. To analyse the impact of different forest management operations (felling, drainage system maintenance, and forest road construction) on forest ecosystem services (FES) like provision of timber and non-wood forest products, clean water, carbon sequestration, soil quality and others, a 5-year collaboration project between the JSC "Latvian State Forests" and Latvian State Forest Research Institute "Silava" was started in 2016. A model catchment (size 2004 ha) in commercial forests was chosen for the study of impacts, and 1876 ha large catchment in protected area was chosen to serve as unmanaged area for comparison. Main criteria for the choice of model catchments were high degree of forest cover and representative tree species and site type composition.
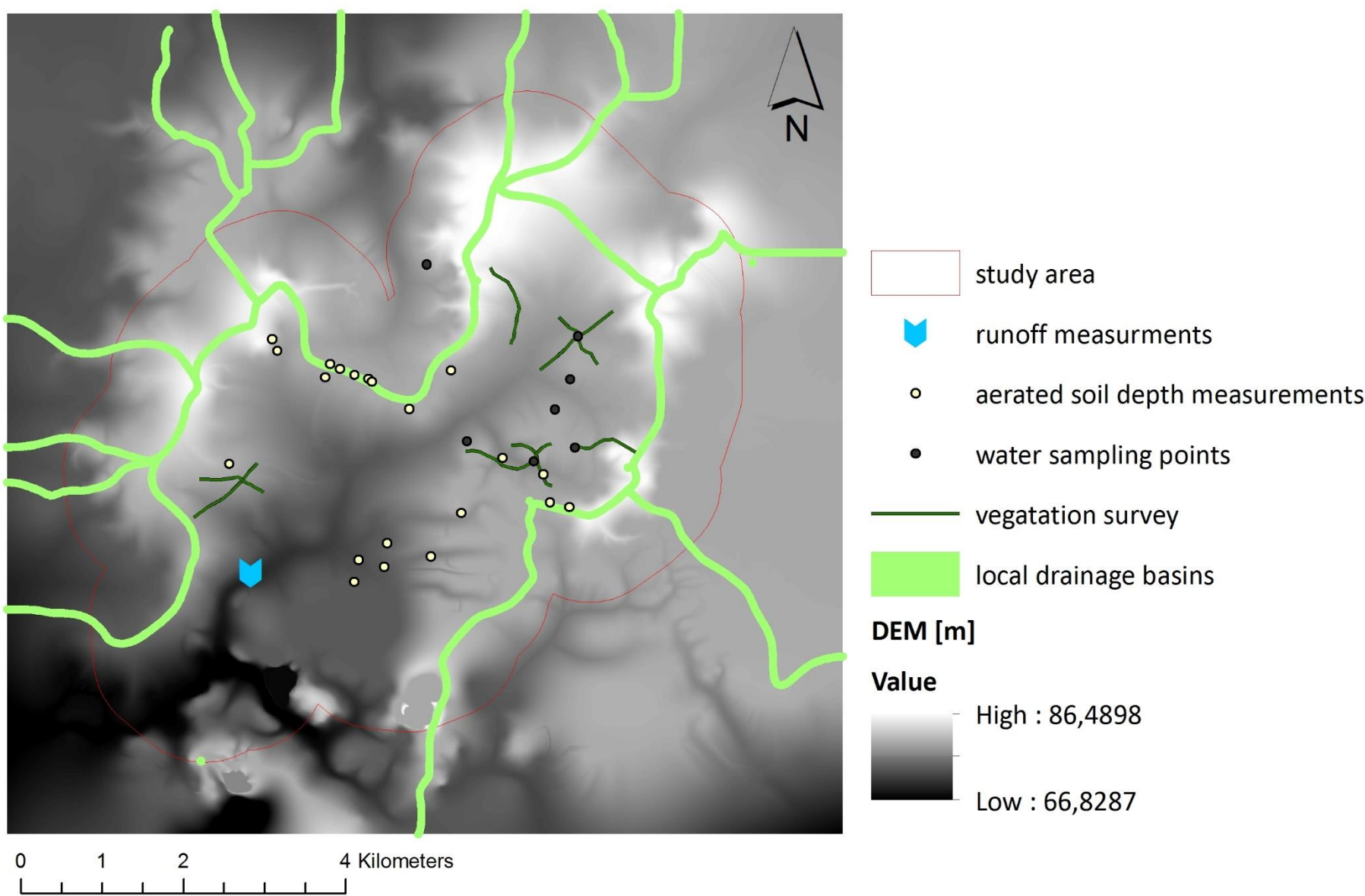
Ecosystem services. Ecosystem service classification according to CICES (Common International Classification of Ecosystem Services, 2016) is used in the project. All three groups of ecosystem services – provisioning, regulating and cultural – are represented in the model area.
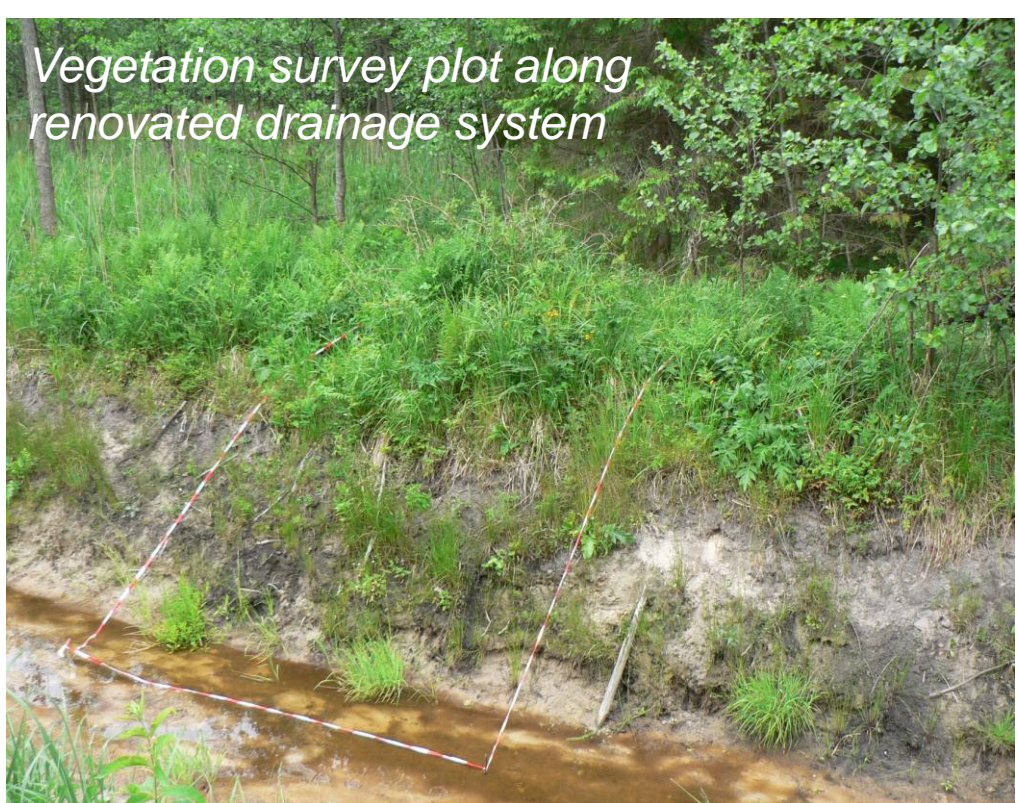

0,64% 0,36% 0,33% 0,18%
1,00% 0,15%
0,88% 0,10%
1,07% 0,02%
2,75%
92,52%

- Forest stand
- Clearcut area
- Forest glade for game fodder
- Drainage ditch
- Mire
- Firebreak
- Road
- Flooded area
- Forest glade
- Power line
- Beaver-flooded area
- Yard

Land use categories in the model catchment (managed forests) providing potentially different ecosystem services

Impacts. Following activities are planned in the model catchment: 1) analysis of land use pattern in the model areas; 2) identification of stakeholder groups and analysis of the importance of different forest ecosystem services; 3) mapping of ecosystem services at various scales in the model areas; 4) equipment of the model catchments, water and soil sampling; 5) vegetation survey including evaluation of invasive species distribution; 6) survey of structures important for biodiversity; 7) analysis and modelling of impacts of forest management on ecosystem service provision.

- study area
- runoff measurments
- aerated soil depth measurements
- water sampling points
- vegetation survey
- local drainage basins

DEM [m]
Value
High : 86,4898
Low : 66,8287

0   1   2   4 Kilometers

Sampling points and and surveys in the model catchment (managed forests)

Runoff measurement point

Reconstructed forest road

Acquiring of meteodata

Renovated drainage system

Vegetation survey plot along renovated drainage system

Social dimension. Most important forest ecosystem services (FES) for people will be identified according to the results of the questionnaire «The importance of FES in the lives of inhabitants of Latvia». Respondents are asked to rate (from 0 to 10) different categories of provisioning, regulating and cultural FES according to their importance in their everyday lives. Responses will be available in autumn 2016.