



## Climate impact on large temperate river (River Salaca) ecosystem in Latvia

Gunta Springe (1), Janis Birzaks (3), Agrita Briede (1), Ivars Druvietis (2), Dāvis Ozoliņš (2), Valerijs Rodinovs (2), and Agnija Skuja (2)

(1) University of Latvia, Faculty of Geography and Earth Science, 19 Raina Blvd., Riga LV 1586, Latvia  
(gunta.springe@lu.lv), (2) University of Latvia, Institute of Biology, 3 Miera Str., Salaspils LV- 2169, (3) Institute of Food Safety, Animal Health and Environment, 3 Lejupes Str., Riga, LV-1076

Freshwater ecosystems are one of the most sensitive systems on the Earth according climate change impact. It is well known that ongoing climate change in surface waters appears in the changes of physico-chemical parameters and hydrological regime causing changes in biota. Finding out the best suited climate change indicators at the regional scale is important task allowing to make possible actions for adaptation to climate change as one of the greatest environmental and socio-economic threats. Long-term ecological investigations of the temperate River Salaca situated in the anthropogenically little affected North Vidzeme Biosphere Reserve, Latvia, show that changes in the river ecosystem taking place since 2000 are caused largely by climate change. It is found that mean air and water temperature in the Salaca River has an upward trend especially concerning the spring period. Increase in temperature is the most likely effect of climate change and have secondary effects on various water quality parameters, including decrease in dissolved oxygen, especially in summer. At the same time the river's discharge typically increases during winter.

Interactions between climate change, other stressors and biota always are complex and it is not easy to state what are the main reasons for restructuring of biota. In any case, changes of the Salaca River biota happen concerning both primary (phytoplankton) and secondary (fish) producers. Strong impact of temperature to phytoplankton biomass is found as well as to some restructuring of Cyanobacteria community. Comparatively changeless are data concerning macroinvertebrate taxa composition and abundance. At the same time changes of fish communities' structure are stated. In ratio of fish ecological guilds the fraction of tolerant fish species has increased and among them phytophilic and omnivore fish species show the evident growth. Changes of cold-water species occurrence are not so unequivocal.