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Freshwater ecosystems of the south of the Russian Far East in conditions of a changing climate

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The Russian Far East is mainly a mountainous region, where plains and lowlands make up less than 25% of its territory. South of the Russian Far East is located in a monsoon climate zone. Freshwater ecosystems of the region are under the influence of the extreme environmental phenomena (especially catastrophic floods, draughts and riverbed freezing) that define the characteristics of their structure-functional organization. The regular alternation of low and high water periods favorably influences the general ecological situation in the rivers and the bottomland lakes. Such alternation allows support for rather high biological diversity of freshwater communities. It is expected that in the 21st century global changes (deforestation due to logging and fires, global warming, etc.) will change the natural cycles of flooding, likely increasing the strength of floods, but decreasing the likelihood of heavy showers during the dry season. At the same time we know that major floods can lead to the rapid depletion of river phytoplankton and zoobenthos, and can cause long-term mean water hyper-eutrophication (mass development of algae) in water bodies. Higher water temperatures can cause thermal shock and massive loss of Pacific salmon spawning grounds. Drier summers will increase the likelihood of forest fires, lowering water regimes of rivers and increasing nutrient load in the water. The loss of forest cover due to logging and fires will change the water balance, which in turn will cause an imbalance of nutrients within ecosystems with rivers drying, fish spawning grounds drying in summer, and freezing in winter. With changing thermal regimes water turbidity will also increase. In the face of global environmental change, increasing anthropogenic pressures and in the absence of protective measures it is expected that there will be significant loss of biodiversity of freshwater biota of the south of the Russian Far East, with the reduced water quality and the loss of valuable fisheries, increasing contamination of commercially important species with helminthic parasites and increasing number of invasive species in aquatic ecosystems.