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Influence of flood risk management measures on socio-economic and ecological vulnerabilities in a large water system - A case study of Lake Vänern and the Göta älv River, Sweden

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An important feature of flood risk management is to integrate ecological, economical and social aspects on prevention and mitigation measures. Protective measures could potentially be in conflict with sound functions of ecosystems or cause conflicts in upstream/downstream relations. A case study of a large water system in south-western Sweden – Lake Vänern and the Göta älv River – was used to analyse the relation between socio-economic and ecological vulnerabilities and to identify opposing interests regarding water level fluctuations and high-water-level situations in the lake. Lake Vänern with its area of 5,500 km2 is the largest lake in Sweden and within the European Union. The Göta älv River runs from the lake outlet 90 km down to the sea at Gothenburg. The total catchment area upstream of the river mouth is 51,000 km2. Vänern and Göta älv are used for hydropower production, shipping, tourism, fishing, drinking water supply, as waste water recipient, etc. The risk system is complex with flood risks in the lake and in Gothenburg which are connected to landslide risks and industrial risks in the river valley, and where the drinking water supply for 700,000 persons in the Gothenburg region is at stake. Because of the landslide risks along the downstream river, the water discharge from Lake Vänern is limited. During periods of high inflow to the lake, situations of high water-levels last at least for six months. Substantial increases in precipitation during the 21st century, according to IPCC, will give a corresponding increase in flood risks.