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Domesticated Rivers

Humans' exceptional ability for ecosystem engineering has helped to sustain unprecedented population growth over the past half century, to such an extent that humans now consume about one-third of all terrestrial net primary production. Entire landscapes have been shifted into, and then maintained in, a highly compromised structural and functional state as the result of multiple temporal and spatial feedbacks between human and nature. More than 75% of Earth's ice-free land showed evidence of human alteration leading to the first identification of 18 terrestrial, anthropogenic biomes based on global patterns of sustained, direct human interaction with ecosystems.

Large rivers and their fringing floodplains were among the first ecosystems which have been manipulated for few ecosystem services that provide major economic benefit to humans – i.e. "domesticated" – because they have been focal points of human communities and cultural development. River systems have been managed for improved navigation, flood control, water supply, and recreation. These uses are accepted, perpetuate and despite severe modifications rivers still deliver some additional ecosystem services such as nutrient retention and drinking water.

However, negative consequences of domestication become increasingly visible, as raising flood damages, uncontrolled river beds incision, depleted fisheries, and significant loss of freshwater biodiversity. In addition, large rivers are increasingly dominated by novel communities that do not share a common evolutionary development, and therefore lack historical analogies or references.

The domestication of river systems, i.e. their fundamental and irreversible change, combined with the rapid turnover of biotic communities, calls for a fundamental rethinking of the future management of freshwater ecosystems.

About six presentations provide detailed overview about irreversible hydromorphological changes in navigable waterways, the loss of key habitats, their ecological impacts, factors supporting invasive versus native species, the effects of neobiota on biodiversity in large rivers or the effects of domestication or floodplain loss on food-webs in large rivers. A summary draws the ecological potential of large domesticated rivers as well as the challenges for improvements.