



Managing Large River Landscapes in the Era of the Anthropocene

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As the Anthropocene unfolds, there is clear and growing scientific evidence that we are on the verge of a major biodiversity crisis. This crisis is of an unprecedented scope and rate, and may lead to half the species on Earth going extinct; and may cause a rapid erosion of related ecosystem services. These major changes are among the biggest global challenges for humans, similar to climate change, securing energy supply, or feeding a growing world population.

Large rivers are particularly human-dominated ecosystems caused through land reclamation, floodplain drainage, navigation, water pollution, and species invasion. Today, large rivers can be considered as novel ecosystems - with no analogous state in the past. Native communities are being rapidly replaced by novel exotic-dominated assemblages leading to a strong homogenizing of biota and potentially large alterations of related ecosystem processes. Hence, it remains a major challenge to understand how novel communities alter ecosystem functioning, or stimulate evolutionary processes; and how to manage these novel ecosystems and its communities.

In the face of these drastic alterations it is becoming evident that most conservation and restoration strategies simply do not work or may achieve their goals because of non-linear relationships and time-lag effects between the causes and the effects of biodiversity decrease and ecosystem functioning; similar to what is seen for human demographic development and CO₂ increase. Concurrently, restoration targets compete with other targets and directives implemented at national, continental, and global scales. For example, strategies to reduce greenhouse gas emission have led to large-scale conversion of land for bioenergy production, further accelerating biodiversity and ecosystem service loss.

We urgently need integrated guidelines for setting priorities to concurrently manage biodiversity and ecosystem processes along novel river systems. In this presentation, I will discuss the formation and establishment of novel river ecosystems, its corresponding communities and related ecosystem processes, and then to present innovative ideas and concepts on how to manage these cultural freshwater ecosystems.