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# River Systems as Providers of Goods and Services: A Basis for Comparing Desired and Undesired Effects of Large Dam Projects

## Abstract

In developing countries, large dam projects continue to be launched, primarily to secure a time-stable freshwater supply and to generate hydropower. Meanwhile, calls for environmentally sustainable development put pressure on the dam-building industry to integrate ecological concerns in project planning and decision-making. Such integration requires environmental impact statements (EISs) that can communicate the societal implications of the ecological effects in terms that are understandable and useful to planners and decision-makers.

The purpose of this study is to develop a basic framework for assessing the societal implications of the river ecological effects expected of a proposed large dam project. The aim is to facilitate a comparison of desired and potential undesired effects on-site and downstream. The study involves two main tasks: to identify key river goods and services that a river system may provide, and to analyze how the implementation of a large dam project may alter the on-site capacity and downstream potentials to derive river goods and services from the river system.

Three river goods and six river services are identified. River goods are defined as extractable partly man-made products and river services as naturally sustained processes. By four main types of flow manipulations, a large dam project improves the on-site capacity to derive desired river goods, but simultaneously threatens the provision of desirable river goods and services downstream. However, by adjusting the site, design, and operational schedule of the proposed dam project, undesirable effects on river goods and services can be minimized.



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