

Challenges of Managing Large-Scale Vulnerable Ecosystems

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Many of the world's large river systems are severely stressed due to population growth, water quality and quantity problems, vulnerability to flood and drought, and the loss of native species and cultural resources. Consequences of climate change further increase uncertainties about the future. Attempts to address these major societal challenges are being helped by major transformations in how scientific and engineering research is conducted. Firstly, the emergence of science communities coalescing around 'Grand Challenges' and the maturation of how these communities function has resulted in large interdisciplinary research networks. Secondly, the major advances in sensor technologies, data synthesis and how we view data are accelerating knowledge discovery. The availability of large datasets and data mining tools are transforming the way science and predictive modeling is conducted. These factors and the creation of international research networks are allowing scientific debate to occur in an open and transparent manner. The availability of information and improved communication of scientific and engineering issues are raising the level of dialogue at the science-policy interface that will drive our ability to create sustainable futures for large sensitive ecosystems.

Three large systems that are particularly vulnerable and set within complex social systems will be examined - the California Bay-Delta region, Coastal Louisiana and the Chilean Patagonia.