

# White Paper 6: Alternative Management Paradigms For The Future Of The Colorado And Green Rivers | Colorado River Studies

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Our ability to sustainably manage the Colorado River is clearly in doubt. The Bureau of Reclamation's 2012 Water Supply and Demand Study demonstrated the precarious balance that currently exists between water supply and the amount consumptively used by society. A future with either declining water supplies or additional consumptive uses will undoubtedly upset this balance. This balance is threatened, because:

- Climate change science predicts that watershed runoff will decline due to increased evapotranspiration from rising temperatures; and
- Water users, especially in the Upper Basin, aspire to increase consumptive uses by developing new projects.

A new white paper describes how declining runoff and increased consumptive use will impact water supplies and ecosystems, and also considers how these risks can be addressed.

The objective of the paper is to encourage wide-ranging and innovative thinking about how to sustainably manage the water supply, while simultaneously encouraging the negotiators of new agreements to consider their effects

on ecosystems. The authors introduce a wide variety of alternative management paradigms that offer significant modifications or entirely new approaches to the status quo. They describe and evaluate approaches that some might consider radical due to existing and assumed physical or management constraints. The goal is to encourage conversation and consideration of new management concepts that will better meet future needs.

A gradual and incremental approach to adaptation is unlikely to meet the challenges of the future. If the Millennium Drought, which has now persisted for more than two decades, has become the 'new normal', or if the progressive decline of runoff resulting from climate change becomes even more apparent, major structural changes to water management in the basin will be urgently required. As a result of these emerging and uncertain risks, a new discussion about the Law of the River has begun to identify a more sustainable and adaptive approach to manage the Colorado River. Sustainability will inevitably require governance that can incorporate such an approach into the Law of the River.

To provide a menu of provocative ideas, we briefly describe 24 alternative management paradigms. These ideas represent major changes in the management of the Colorado River's water supply which can be broadly grouped into three categories:

- Changes in the rules of water-supply allocation
- and/or accounting
- Changes in the operating rules of existing infrastructure
- Changes in the infrastructure

Some alternatives represent relatively simple adaptations of management practices, while others suggest major changes to the way water is accounted for and allocated. Still others reflect physical changes to the system that would require a substantial amount of time and investment to implement. These ideas are presented so that water-supply stakeholders, scientists, engineers, non-government organizations, and tribal interests might consider them for further analysis, and the hope is that these analyses provoke others to identify many more alternative paradigms and management strategies.

In the study, authors analyze the effectiveness of five alternative management paradigms using the CRSS modeling tool, and when appropriate, a reservoir temperature release model. The combination of these tools allowed them to evaluate the potential implications of these alternatives on existing water supplies, power production, and key ecosystem drivers of river flow

regimes and temperature conditions. All the alternative management paradigms point to a common result: changes in reservoir operations will not solve the supply-demand imbalance. To sustainably manage the Colorado River, water managers will have to match demands to continuously changing supplies using new forms of demand management. The Law of the River will need to be adapted more dynamically than ever before.