

RECLAMATION

Managing Water in the West

Mimicking Nature: The Re-operation of Navajo Reservoir

Colorado Riparian Association

October 6, 2005



U.S. Department of the Interior
Bureau of Reclamation

ALTERNATE TITLE #1

Achieving Equity in Anger: The Challenges of Operating a Multi-Purpose Water Project

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ALTERNATE TITLE #2

**“Can’t We All Just Get Along?:
The Impossible Goal of
Completely Appeasing All
Competing Water Uses**

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Mimicking Nature

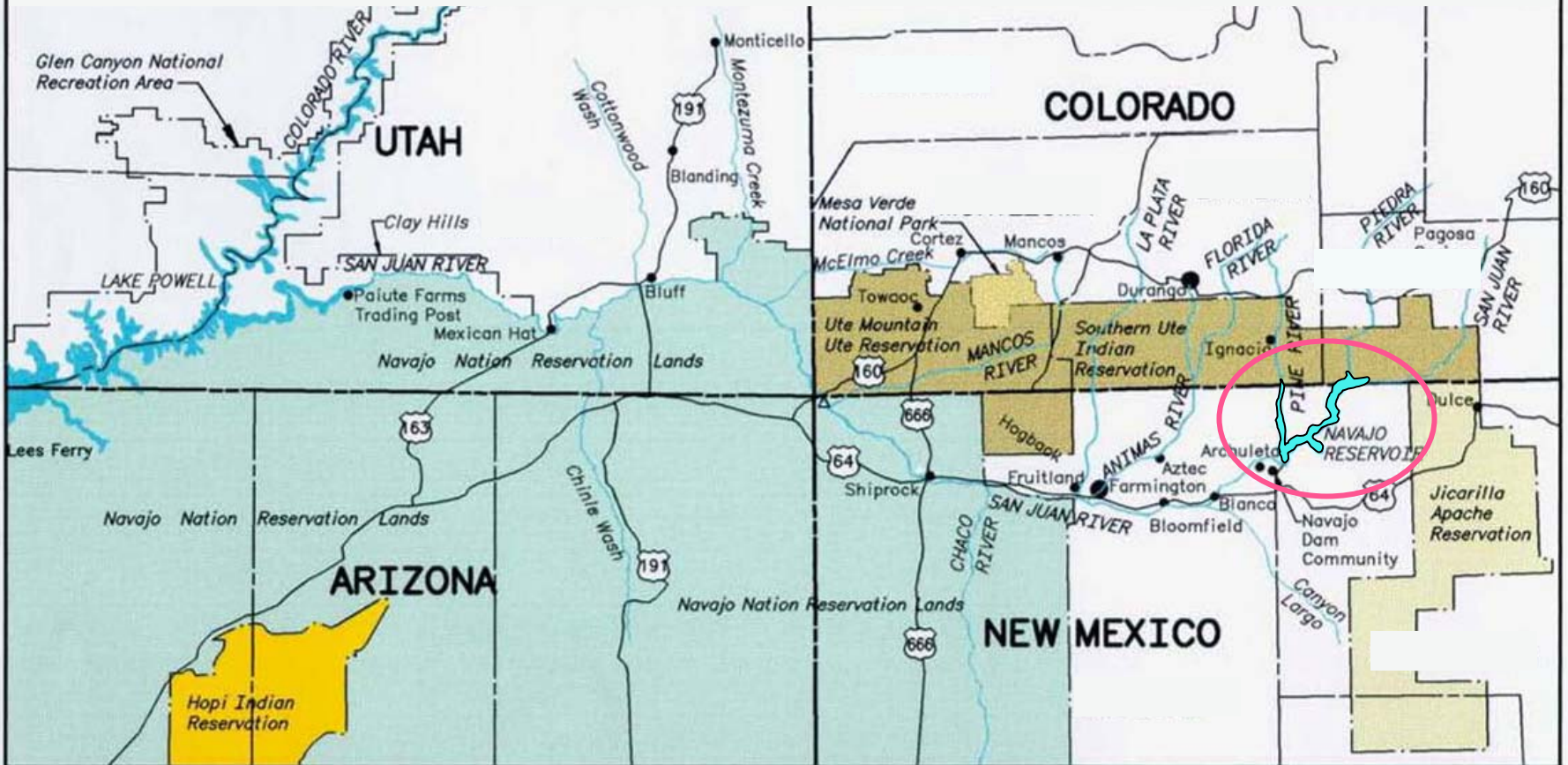
- **Historical Operation**
- **Flow Recommendations**
- **Challenges**
- **Impacts**
- **Future Outlook**

Photo by KB Engineering

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— San Juan River

SAN JUAN RIVER General Map



— San Juan River

SAN JUAN RIVER General Map



- █ San Juan River
- █ Critical Habitat

SAN JUAN RIVER General Map



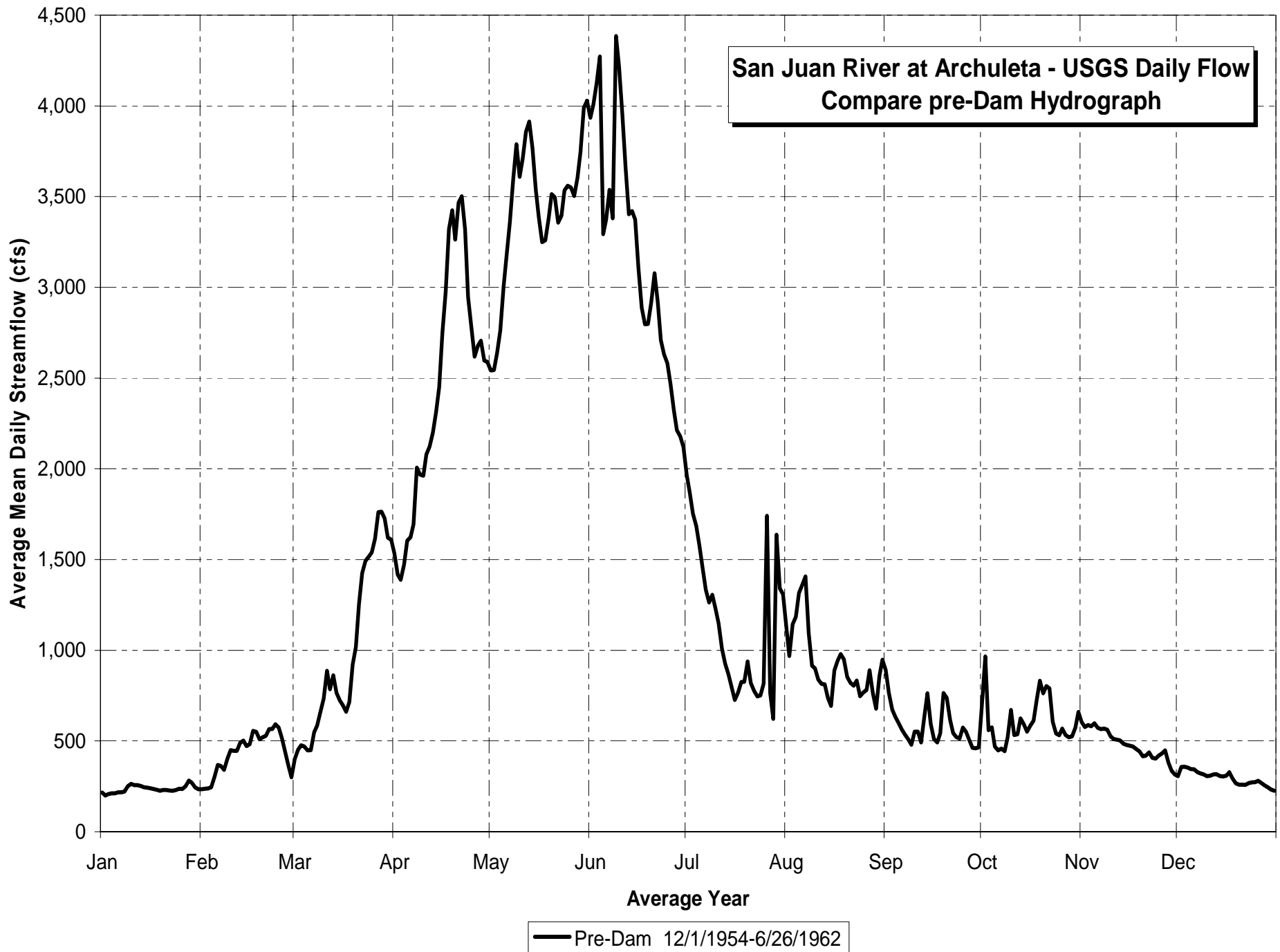
Historical Operation



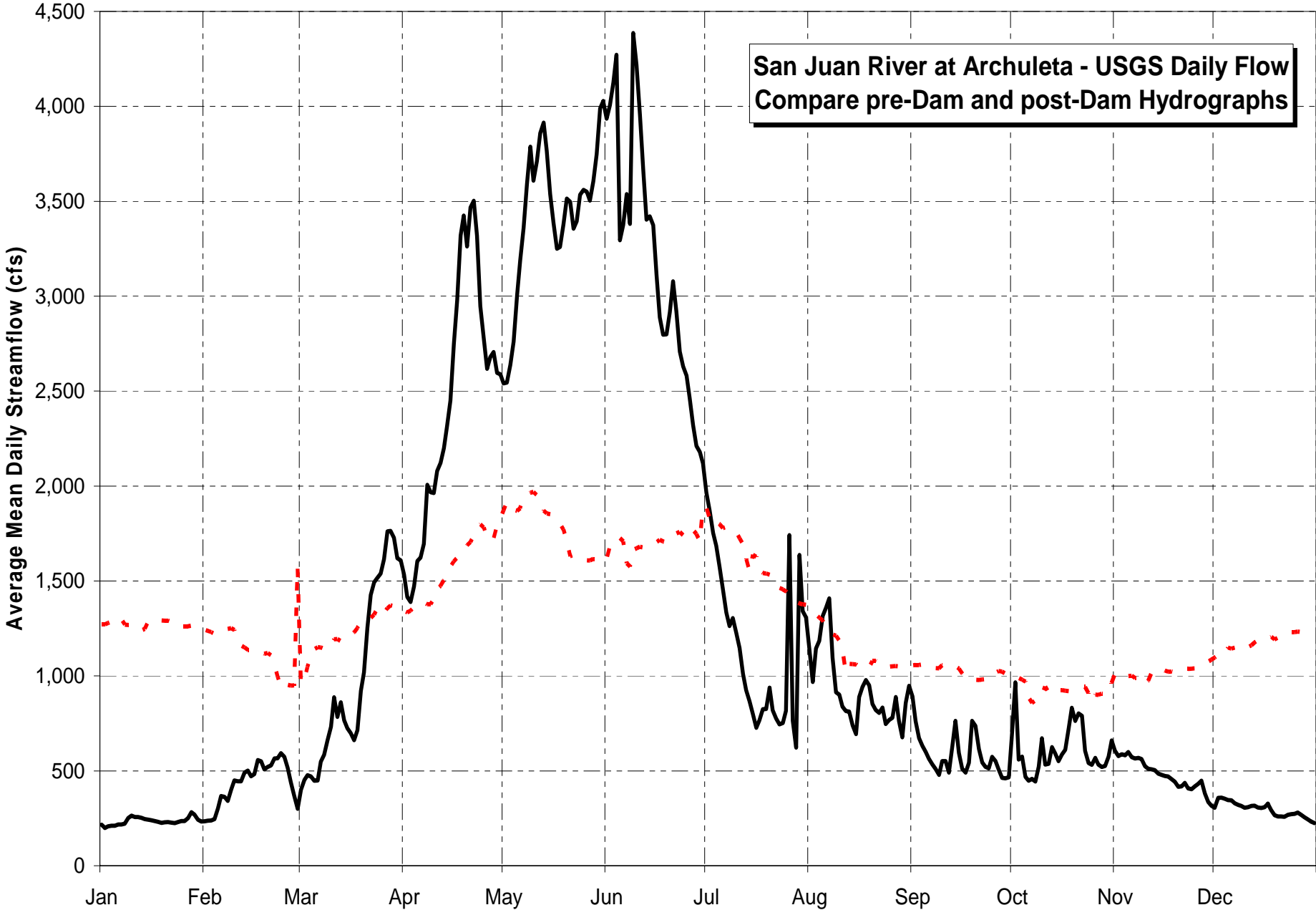
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Historical Operation

- **Colorado River Compact – 1922**
- **Upper Colo. River Basin Compact - 1956**
- **Colo. River Storage Project Act – 1956**
 - **Glen Canyon**
 - **Flaming Gorge**
 - **Curecanti (Aspinall Units)**
 - **Navajo**
- **Purpose**
 - **Allow Upper Basin States to use their Compact Apportionments**



**San Juan River at Archuleta - USGS Daily Flow
Compare pre-Dam and post-Dam Hydrographs**



— Pre-Dam 12/1/1954-6/26/1962 - - - Post-Dam 6/30/1973-12/31/1991

Flow Recommendations

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Flow Recommendations



Razorback Sucker



Colorado pikeminnow

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Development of Flow Recommendations

- **A-LP Consultation**
 - Biological Opinion
 - Reasonable and Prudent Alternative
- **San Juan RIP**
 - Dual Purpose
 - Conserve Endangered Fish
 - Allow for Water Development to Continue
- **7-Year Research Period - 1992-1999**

Development of Flow Recommendations

- **Flow Recommendations**
 - Maximize and Sustain Suitable Habitat
 - Hydrologic Model
- **Mimic Natural (pre-dam) Hydrograph**
 - High Spring Peak Flows
 - Low non-Spring Flows
- **Requires Change in Operation of Navajo Reservoir**

Implementing Flow Recommendations

- **Operational Limitations of Navajo Dam**
 - Maximum Release Capability
 - Historical Minimum Releases
- **Navajo Operations EIS**
 - Resources Analyzed
 - Preferred Alternative
 - Low Flow Test
 - Schedule

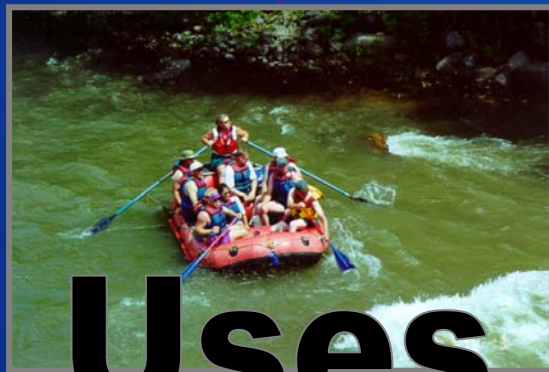
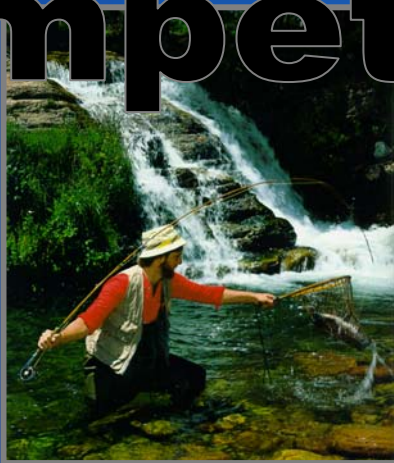
Challenges

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Challenges

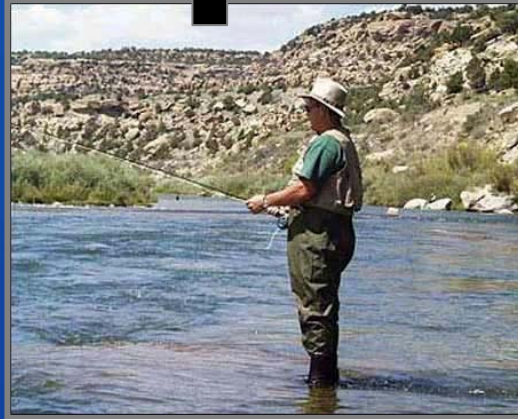
- **Maintaining Project Purposes**
 - **Competing Uses**

Competing

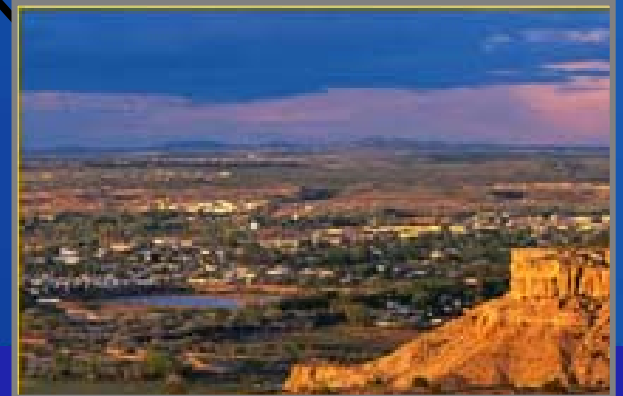


Uses

Competing






Uses



Challenges

- **Maintaining Project Purposes**
 - **Competing Uses**
- **Gaging Flows**

-  San Juan River
-  Critical Habitat
-  Gaging Stations

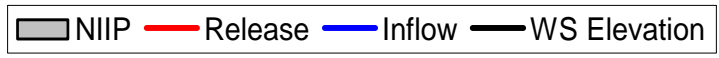
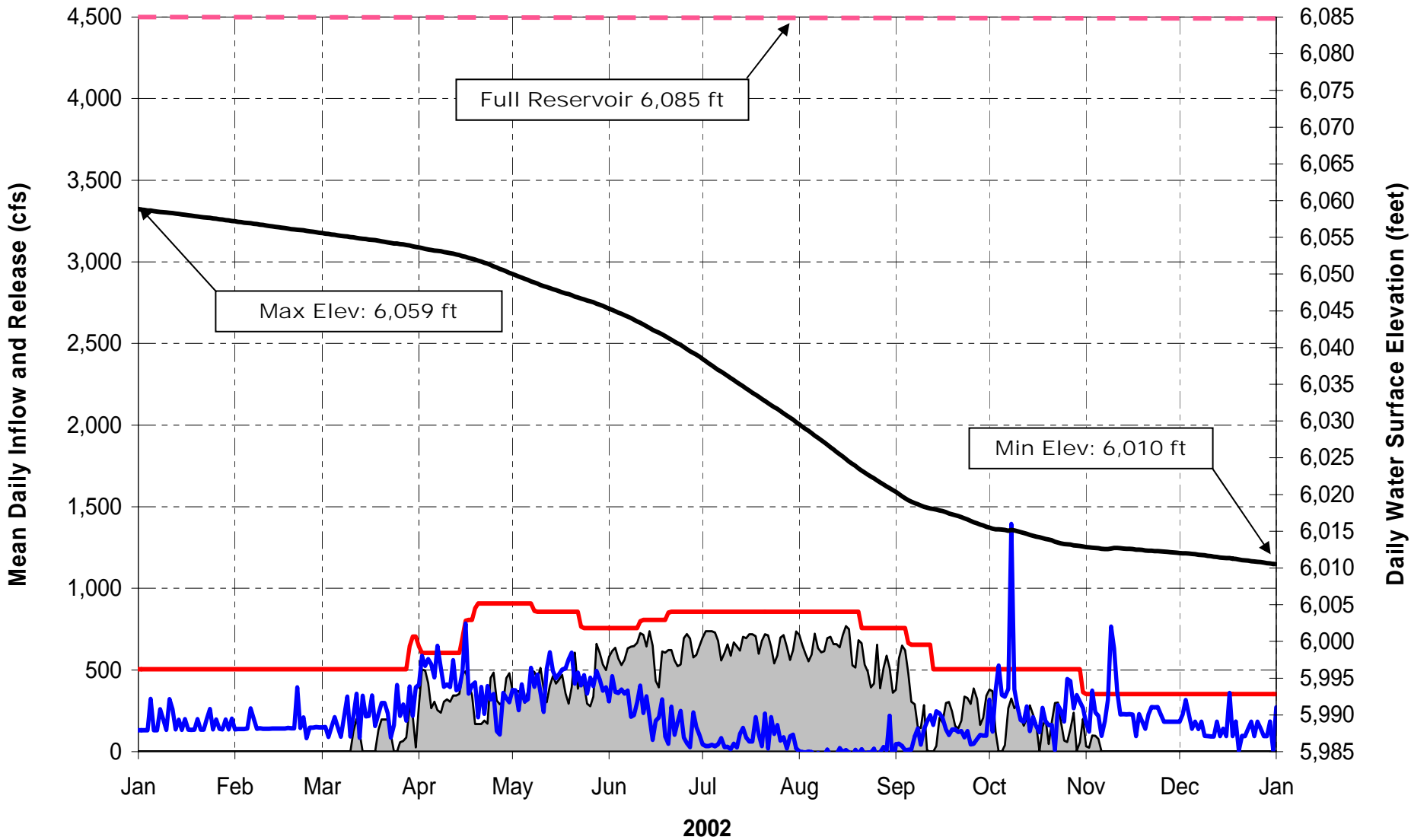
SAN JUAN RIVER General Map



Challenges

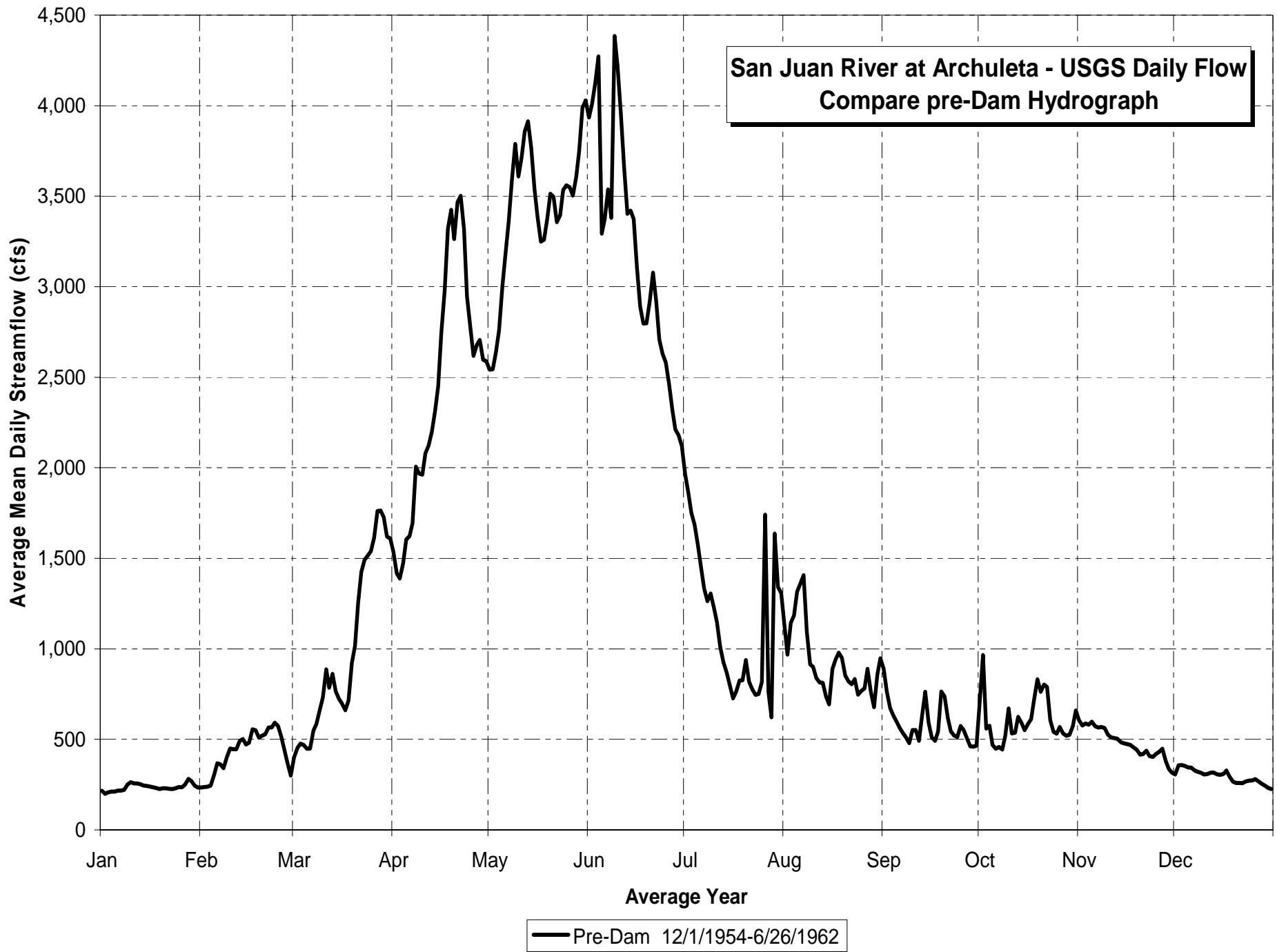
- **Maintaining Project Purposes**
 - Competing Uses
- **Gaging Flows**
- **Operational Limitations**
- **NEPA Compliance**
- **Extreme Drought**
 - Shortage Sharing

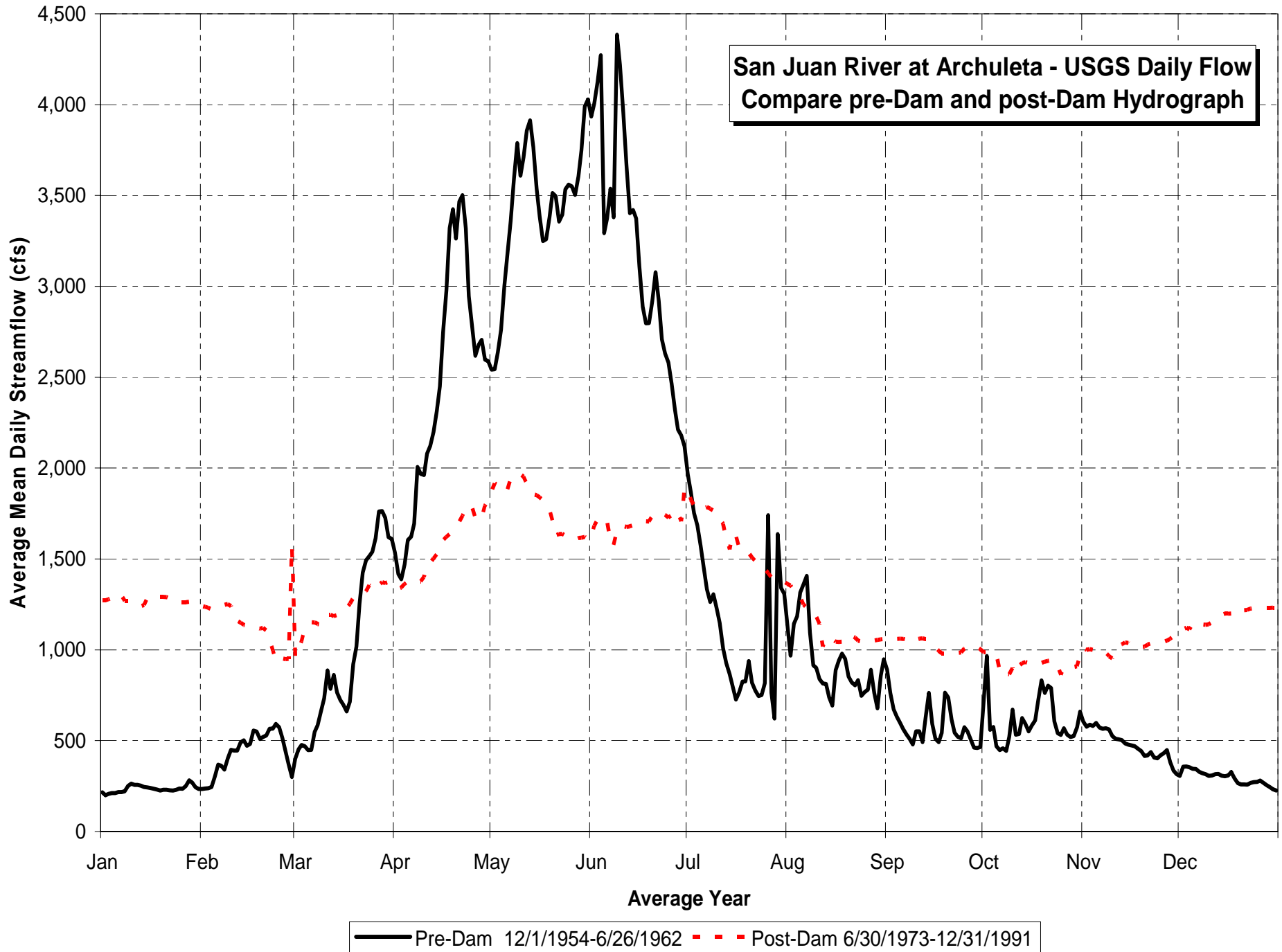
Navajo Reservoir 2002 Operations Inflow, Release and WS Elevation



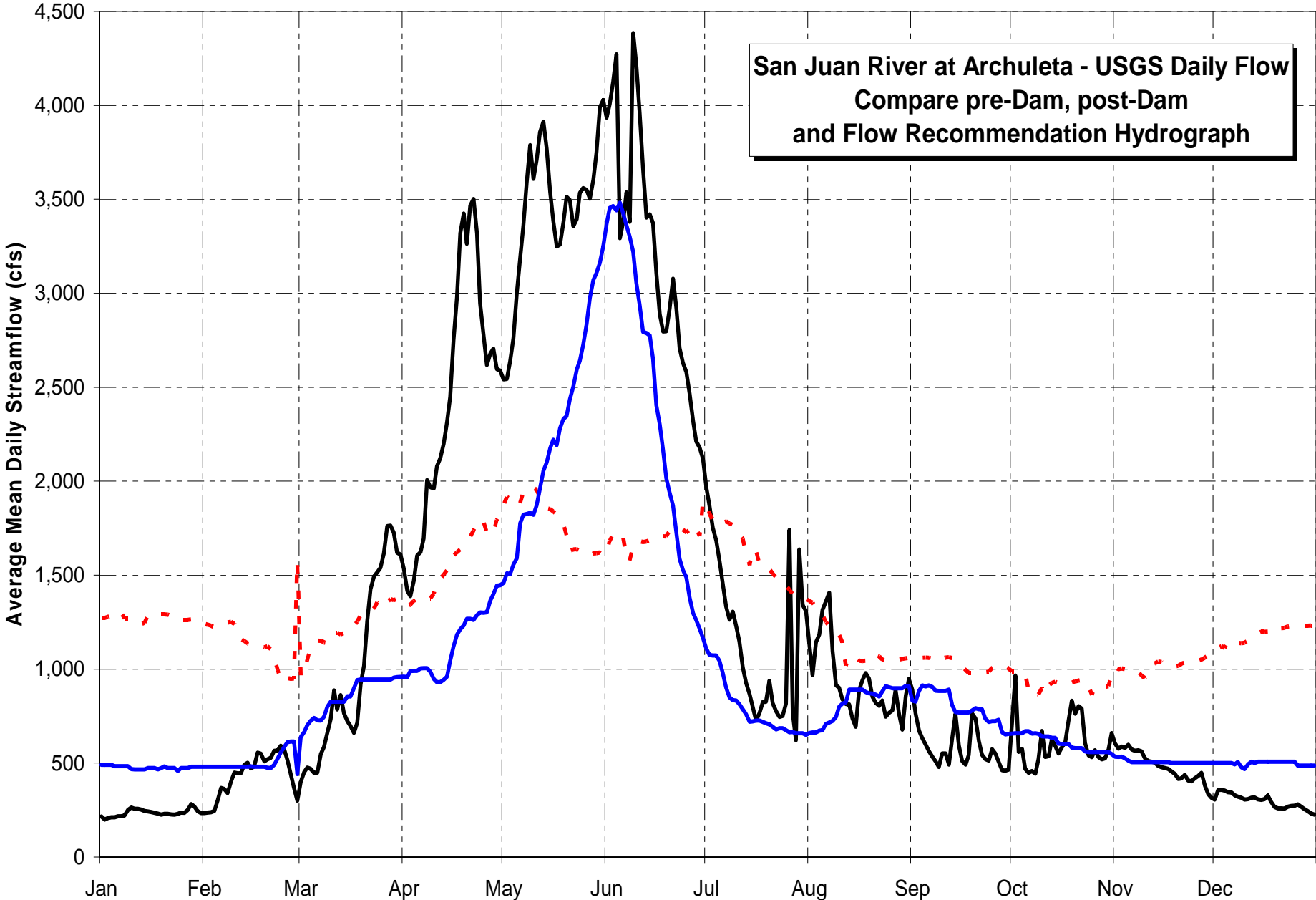
Challenges

- **Maintaining Project Purposes**
 - Competing Uses
- **Gaging Flows**
- **Operational Limitations**
- **NEPA Compliance**
- **Extreme Drought**
 - Shortage Sharing
- **How have we done so far?**





**San Juan River at Archuleta - USGS Daily Flow
Compare pre-Dam, post-Dam
and Flow Recommendation Hydrograph**



— Pre-Dam 12/1/1954-6/26/1962 - - - Post-Dam 6/30/1973-12/31/1991 — Flow Recommendations 1/1/1992-9/22/2005

Impacts

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Future Outlook

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Future Outlook

- **Operational Flexibility**
- **Adaptive Management**
- **Other RIP Elements**
 - **Nonnative Species Control**
 - **Propagation of Target Species**
 - **Identification and Removal of Fish-Passage Barriers**
- **Paradigm Shift**

UNITED STATES DEPARTMENT OF THE INTERIOR
HAROLD L. ICKES, Secretary

THE COLORADO RIVER

"A Natural Menace Becomes A National Resource"

A General Plan for the Development and Utilization of the Water Resources
of the Colorado River Basin for Irrigation, Power Production, and other
Beneficial Uses in

ARIZONA, CALIFORNIA, COLORADO, NEVADA,
NEW MEXICO, UTAH, AND WYOMING

Project Planning Report No. 34-8-1

Sponsored By

BUREAU OF RECLAMATION

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E. A. MORITZ, Regional Director
Region III, Boulder City, Nevada

E. O. LARSON, Regional Director
Region IV, Salt Lake City, Utah

OCTOBER, 1945

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An aerial photograph of a rugged mountain range. The terrain is characterized by sharp ridges, deep valleys, and a prominent, jagged peak in the center. The lighting creates strong shadows, emphasizing the three-dimensional structure of the landscape. The overall color palette is dominated by earthy tones of brown, tan, and grey.

Questions?