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# Overview of Reservoir Operations and Water Management in New Mexico

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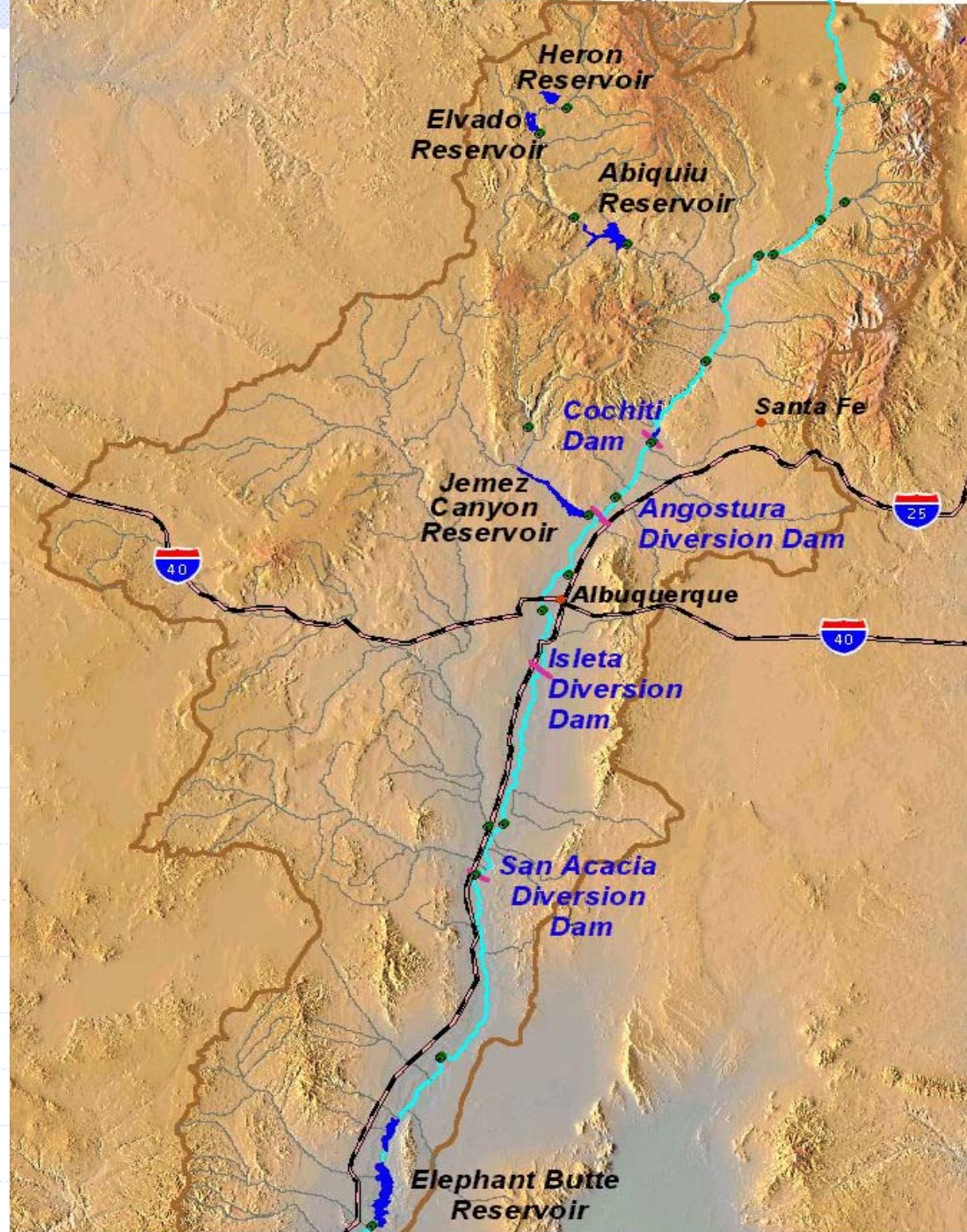
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# **Overview of Reservoir Operations and Water Management in New Mexico**

**Kevin G. Flanigan**

**New Mexico  
Interstate Stream Commission**

# Rio Grande Basin above Elephant Butte Reservoir



# Perspective on Storage Volumes

- City of Albuquerque consumes roughly 50,000 acre-feet per year
- Bosque and riparian vegetation between Cochiti and Elephant Butte Reservoirs consumes about 250,000 acre-feet per year
- Supplemental ESA water leased and released by Bureau of Reclamation for silvery minnow has averaged about 50,000 acre-feet per year since 1996
- Long-term average flow at the Otowi gage is about 1,100,000 acre-feet per year



# Heron Reservoir

- Located on Willow Creek just above Rio Chama
- Owned and operated by US Bureau of Reclamation
- Constructed in 1971 with capacity of 400,000 acre-feet
- Storage reservoir for San Juan-Chama Project water
- Not authorized for storage of native Rio Grande water



# El Vado Reservoir

- Located on Rio Chama immediately below Heron
- Operated by US Bureau of Reclamation pursuant to agreement with MRGCD
- Ownership at issue in cross-claims in *Minnow v Keys*
- Constructed in 1935 with capacity of 180,000 acre-feet
- Primarily stores native Rio Grande water for irrigation use
- State Engineer Permit 1690 issued in 1930

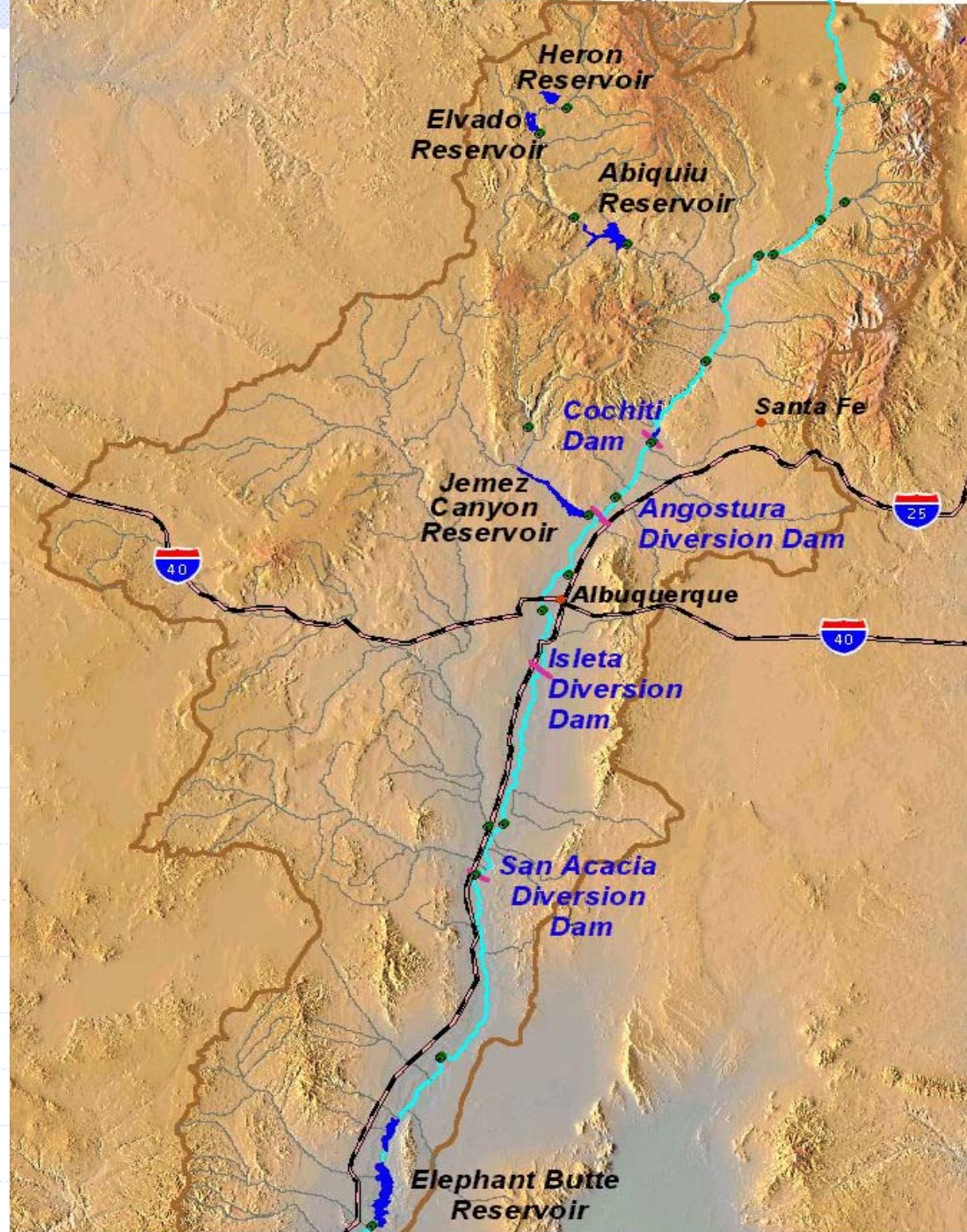




# Abiquiu Reservoir

- Located on Rio Chama roughly 30 miles below El Vado and approximately 30 miles above confluence of Rio Chama and Rio Grande
- Operated by US Army Corps of Engineers
- Constructed in 1963 with capacity of 1.2 MAF at spillway crest
- Part of Middle Rio Grande Project – original purpose was solely flood and sediment control
- Authorized in 1981 to store up to 200,000 acre-feet of San Juan-Chama Project water
- Authorized in 1988 to store up to 200,000 acre-feet of native Rio Grande if space not needed for San Juan-Chama water

# Rio Grande Basin Above Elephant Butte Reservoir





# McClure and Nichols Reservoirs

- Located on Santa Fe River a few miles upstream of the City of Santa Fe
- Owned and operated by the City of Santa Fe for conservation storage for municipal water supply
- McClure Reservoir originally constructed in 1926 and modified several times to its current capacity of 3,257 acre-feet
- Nichols Reservoir constructed in 1942 with 685 acre-feet of capacity
- Total combined capacity of 3,942 acre-feet



# Cochiti Reservoir

- Located on Rio Grande roughly 50 miles upstream of Albuquerque
- Operated by US Army Corps of Engineers
- Constructed in 1963 with capacity of 590,000 acre-feet at spillway crest
- Part of Middle Rio Grande Project – original purpose was solely flood and sediment control
- Permanent recreation pool of 1,200 surface acres (~50,000 acre-feet) of San Juan-Chama Project water authorized in 1964
- Cochiti is the only mainstem reservoir above Elephant Butte in New Mexico





# Galisteo Reservoir

- Located on Galisteo Creek ten miles upstream of Rio Grande
- Owned by US Army Corps of Engineers
- Constructed in 1970 with capacity of 90,000 acre-feet at spillway crest
- Releases are uncontrolled – what comes in equals what goes out with maximum rate of release of 5,000 cfs



# Jemez Canyon Reservoir

- Located on Jemez River just upstream of Rio Grande
- Owned and operated by US Army Corps of Engineers
- Constructed in 1953 with maximum capacity of 100,000 acre-feet at spillway crest
- Currently operated as a dry reservoir

# Legal Authorities

## Rio Grande Compact

### Federal Law

- Flood Control Acts of 1948 and 1950 – Middle Rio Grande Project and Abiquiu Reservoir
- PL 86-645 (1960) – Cochiti, Galisteo and Jemez Canyon Reservoirs; operational criteria for all four Middle Rio Grande Project Reservoirs
- PL 87-483 (1962) – San Juan-Chama Project and Heron Reservoir
- PL 88-293 (1964) – Permanent recreational pool at Cochiti Reservoir

# Legal Authorities

## Federal Law

- PL 97-140 (1981) – Storage of up to 200,000 acre-feet of San Juan-Chama water in Abiquiu
- PL 100-522 (1988) – Storage of up to 200,000 acre-feet of native Rio Grande water in Abiquiu if space not needed for storage of San Juan-Chama water
- ESA, NEPA, CWA

## State Law

- State water code
- OSE rules and regulations

# Water Operations – General Concepts

## Storage and Flow

1 cubic feet per second for 24 hours = ~ 2 acre-feet of storage

Conservation Storage: water stored to meet a future use

Flood Control Storage: water stored to prevent or alleviate downstream flooding

Permanent Storage: water stored indefinitely to provide recreational and fish and wildlife benefits

# Water Operations – General Concepts

## Water Accounting

- All reservoir storage and flows at key gages accounted to ensure compliance with Rio Grande Compact
- San Juan-Chama Project water accounted to ensure compliance with authorizing legislation
- Accounting done down to the level of individual parties such as MRGCD storage, City of Albuquerque San Juan-Chama water, etc.

# Water Operations – General Concepts

Reservoir Operations: rate and timing at which storage or inflow is released or detained

Water Operations: same as reservoir operations plus downstream monitoring to ensure desired flows are achieved. May also include diversion of released storage.

## Types of Water Operations

- Irrigation
- Flood Control
- Environmental
- Recreational



# Irrigation Operations

- Operations performed at call of MRGCD
- Involves changing rate and timing of releases from El Vado to provide sufficient flow in middle valley to meet irrigation diversion demand of MRGCD
- Also includes Prior and Paramount operations to ensure senior irrigation diversion requirements of the six Middle Rio Grande Pueblos are met

# Flood Control Operations

- Operations performed at call of US Army Corps of Engineers
- Consist of adjusting rate and timing of releases or detention of inflow at Abiquiu, Jemez, Cochiti (and Galisteo) to ensure that flow levels at critical downstream locations are not exceeded

# Environmental Operations

- Operations performed at call of US Bureau of Reclamation
- Two types:
  - To meet flow requirements of the endangered Rio Grande silvery minnow, using releases of leased stored water from willing sellers
  - To provide minimum flows for brown trout fishery in Wild and Scenic reach between El Vado and Abiquiu

# Recreational Operations

- Operations performed at call of US Bureau of Reclamation
- Done to provide rafting flows in Wild and Scenic reach
- Requires cooperation of third parties (usually MRGCD and City of Albuquerque)

# REFERENCES

- The Upper Rio Grande – A Guide to Decision-Making, Steven J. Shupe and John Folk-Williams, Western Network, Santa Fe
- Upper Rio Grande Water Operations Review and EIS, US Army Corps of Engineers, US Bureau of Reclamation & NM Interstate Stream Commission