Case Studies in Reclamation

Reservoir Sediment Management & Analysis for Engineers

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Black Canyon Dam Payette River, Idaho
Built in 1924
Irrigation diversion and hydropower
Penstock at Ele 2472 ft

Approximately 17,000 acre-ft remaining of an original 45,000
Black Canyon Storage Loss
Sumner Dam

- Zoned Earthfill Embankment, 164 ft high
- Located in NM on Pecos River
- Completed in 1937
- Primarily used for irrigation
- Constructed with a capacity of about 100,000 acre-ft, and now about 50% full of sediment

- Sedimentation Rate slowed with construction of upstream dam in 1979 (Santa Rosa Dam)
Storage Loss – Bed Profile

[Graph showing the elevation of a reservoir over distance upstream of the dam, with different years indicated by colored lines.]

- Top of Active Pool

Elevation (meters)

Distance Upstream of Dam (meters)

- 1935
- 1944
- 1964
- 1973
Paonia Dam, CO

- Zoned Earthfill Embankment
- Dam Completed – 1962
- Outlet Works
  - Right Abutment
  - Square Intake Tower
  - Tunnel
  - Twin HP Gates
- Spillway
  - Uncontrolled Ogee Crest and Open Chute
- Common Outlet/Spillway Stilling Basin
Paonia Dam
Paonia, Colorado USA
Built in 1962

Intake tower was constructed 18 m above bed

Currently mechanically-excavating sediment to keep intake clear of debris and sediment
Project Goals

- Outlet Works Rehabilitation
  - Repair the damaged intake structure
  - Modify the OW to allow for full range of operations

- Sediment Management
  - Maintain water supply for users
  - Minimize reservoir storage loss
  - Manage debris
  - Minimize abrasion
  - Minimize downstream impacts
Paonia Dam
Paonia Dam
Paonia Dam
Elephant Butte Reservoir, NM

Constructed in 1915

Original Capacity of 2.6 million acre-ft; now about 2 million acre-ft

Provides irrigation for 178,000 acres
Figure 96 - Elephant Butte Reservoir Area and Capacity Plots