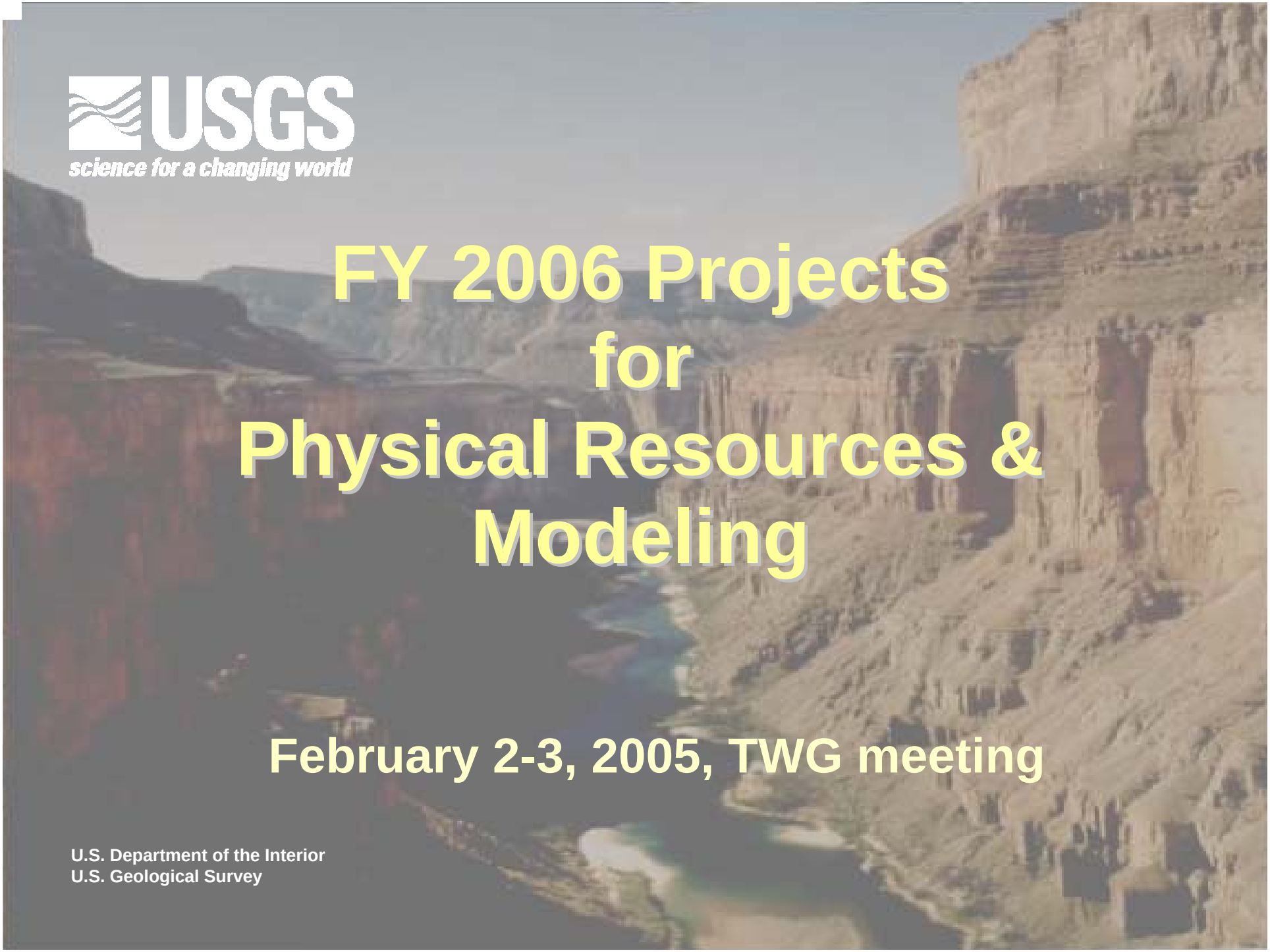

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science for a changing world

FY 2006 Projects for Physical Resources & Modeling

February 2-3, 2005, TWG meeting

U.S. Department of the Interior
U.S. Geological Survey

Upstream Integrated Quality-of-Water
Lake-Wide & Forebay – Project A.1

- **CMIN tasks/questions (7.3.1): What are the status and trends of water quality releases from Glen Canyon Dam?**
- **Data Acquisition:**
  - **Monthly fore bay sampling of water temperature, conductivity, dissolved oxygen, turbidity, nutrients, major ions, total and dissolved organic carbon, chlorophyll, phytoplankton, and zooplankton.**
  - **15-minute water temperature at 4 sites in the fore bay.**
- **Data Management, Analysis, Dissemination**
  - **Monthly web-based reports. Annual WY open file reports. Results incorporated into SCORE**
  - **Data accessioned into GCMRC Database**

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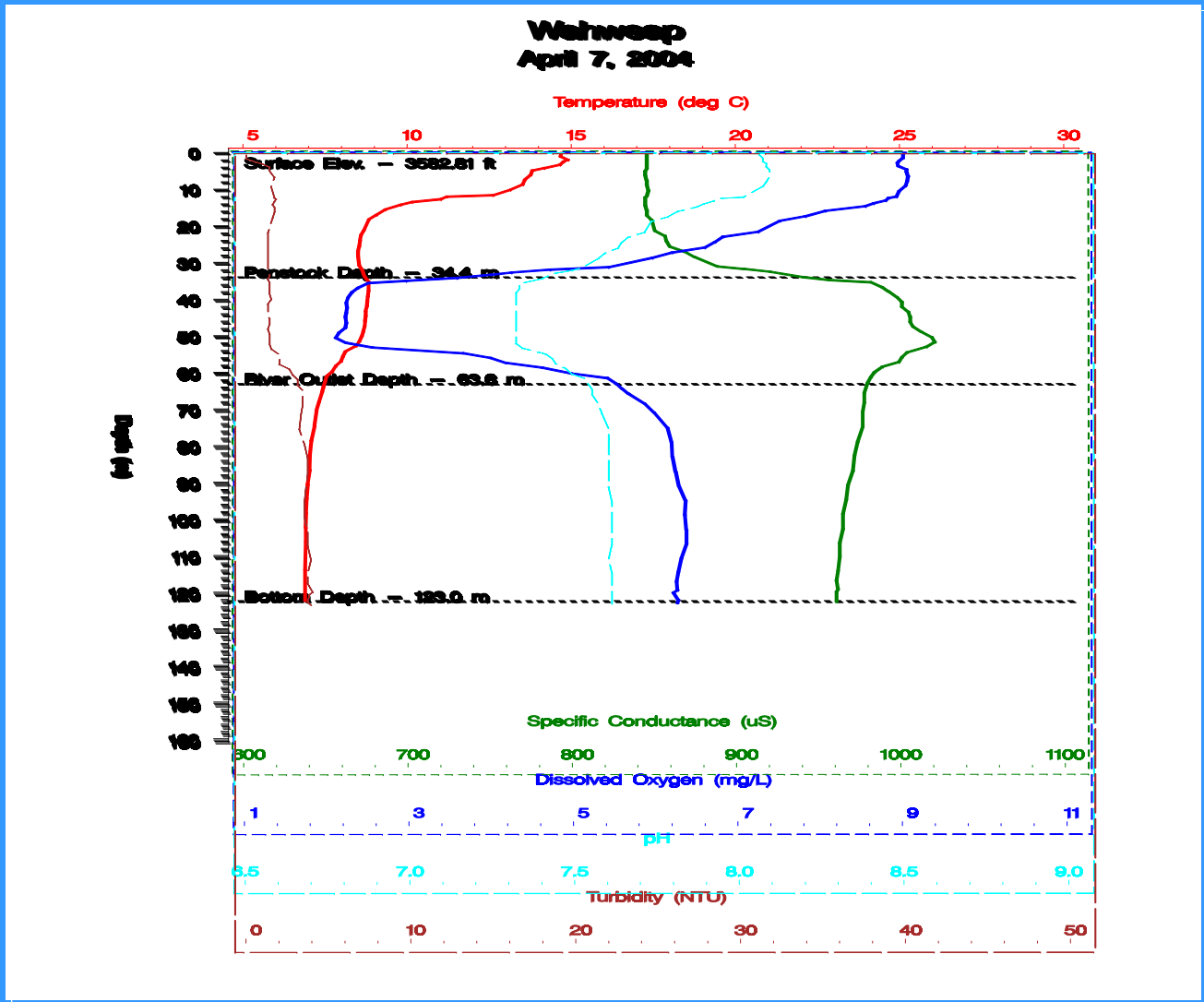
Total Upstream IQWP Budget = $215,250/yr

Upstream Quality-of-Water - Project A.2
Lake Powell Forebay - Example



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Integrated Quality-of-Water Project (IQWP) – Downstream - Project A.2

Surface Water Component

- **Core Monitoring**
  - **Track releases from GCD down the mainstem**
    - **Measurements at GCD, LF, 30-mile, 61-mile, and 87-mile**
  - **Measure tributary contributions**
    - **Paria River and Little Colorado River**
- **Research and Modeling**
  - **Continued validation of 1D UNSTEADY model**

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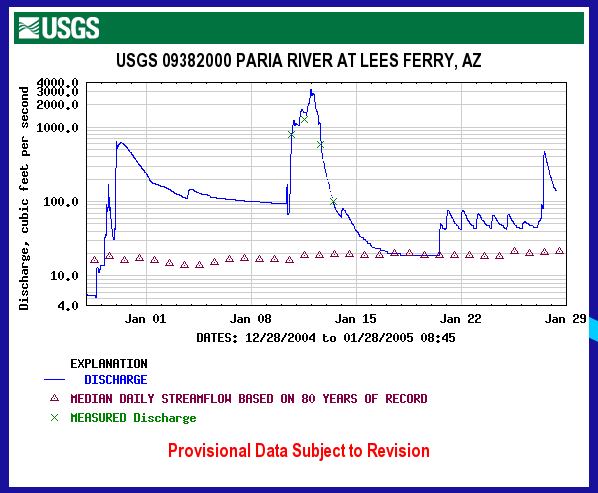
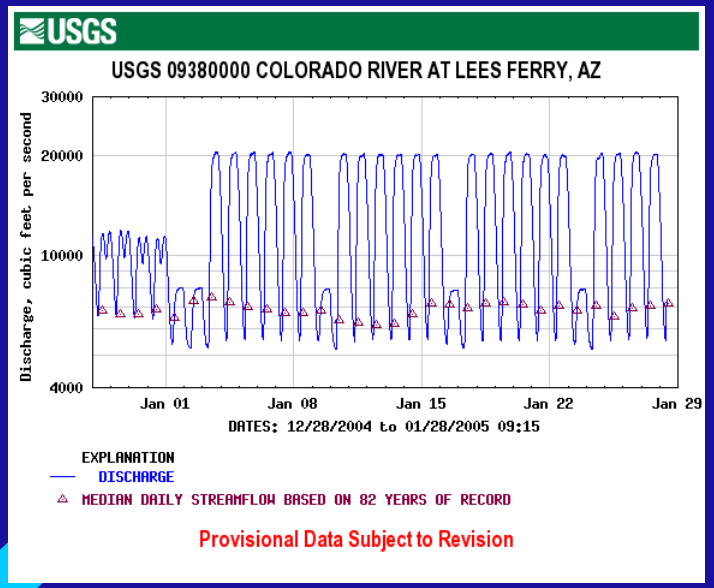
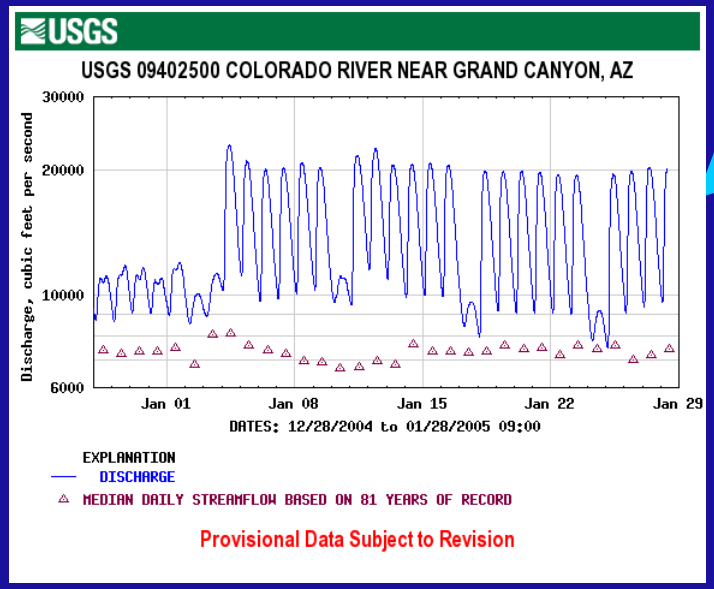
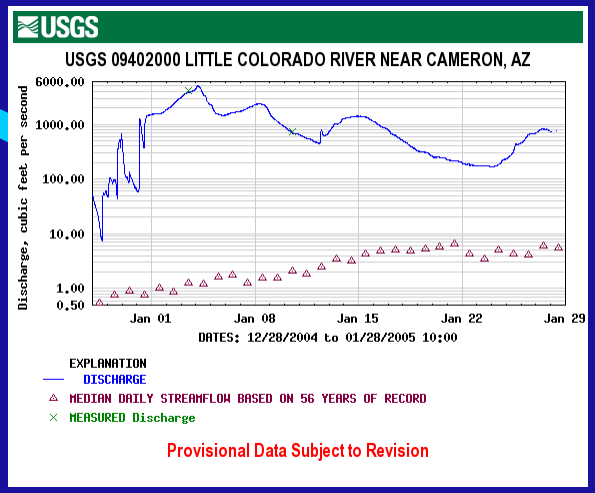
Surface Water – Project A.2
Monitoring Example









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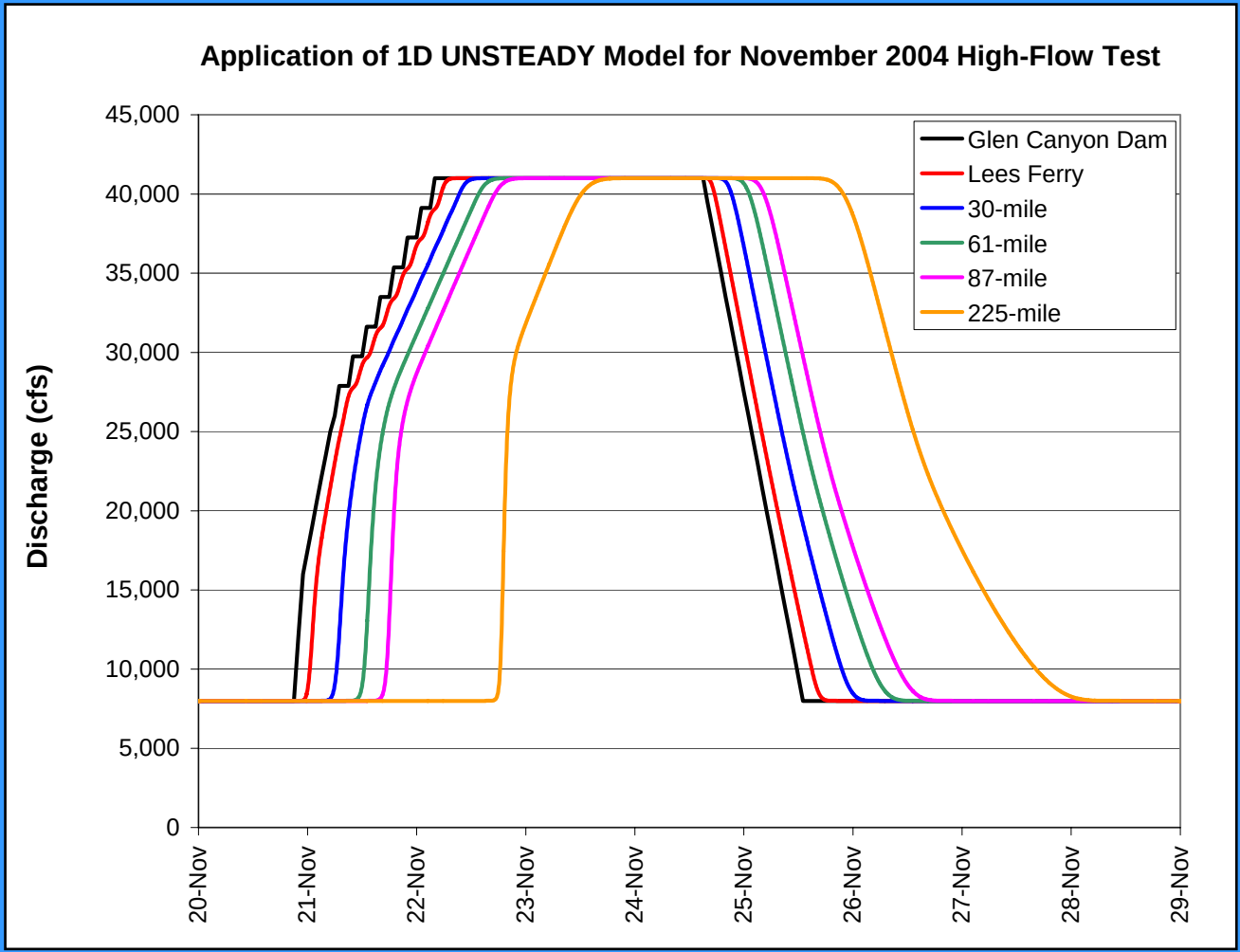
Surface Water – Project A.2

Modeling Example – High-Flow Test Planning



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IQWP – Downstream – Project A.2
Sediment and Ecology Component

- **Core Monitoring**
  - Track the mass-balance of sand, silt, and clay for Marble and Upper Grand Canyons
  - Water temperature and conductivity monitoring in the mainstem (including backwaters) and selected tributaries
  - DO and pH monitoring, nutrient and ion sampling, in the Lees Ferry reach. Downstream mainstem program in development in tandem with food base initiative
  - Nutrient and ion sampling in the Lees Ferry reach

- **Research and Modeling**
  - Continued testing of surrogate sediment technologies
  - Continued development, testing, and application of 1D and 2D suspended-sediment transport models
  - Development of a water temperature model for the Colorado River downstream from GCD

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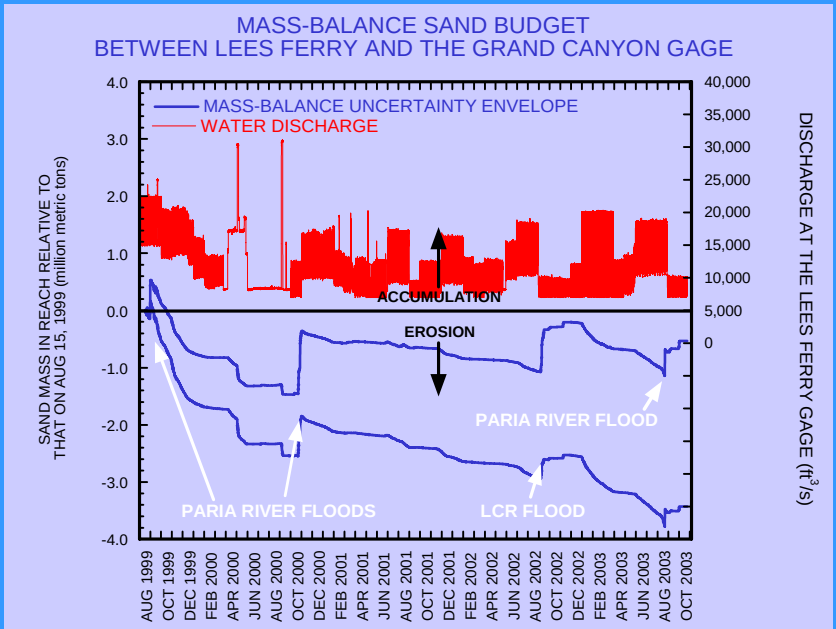
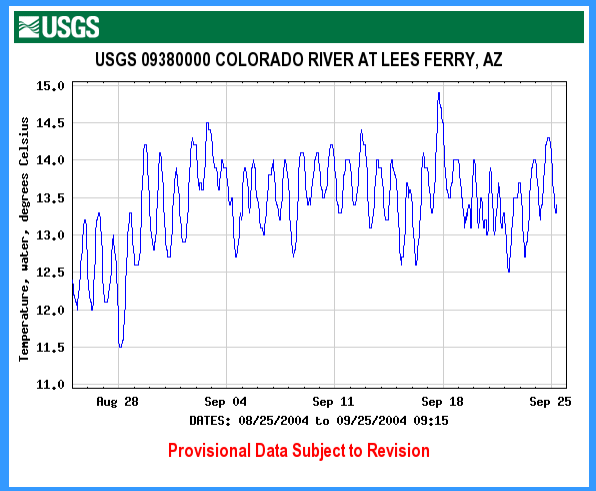
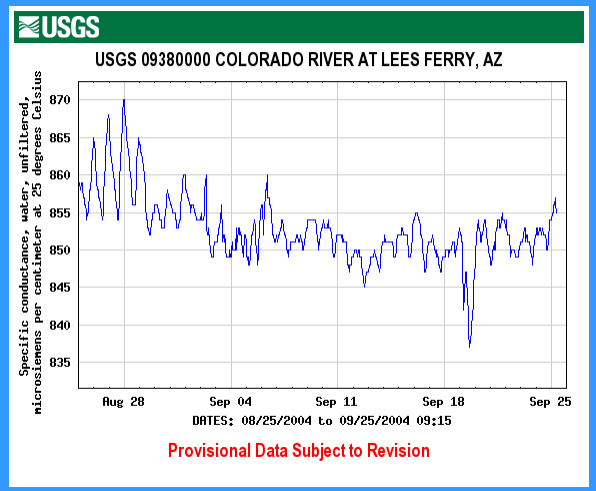
Total IQWP Downstream Budget = $1,113,373/yr

Sediment and Ecology Component
Monitoring Examples







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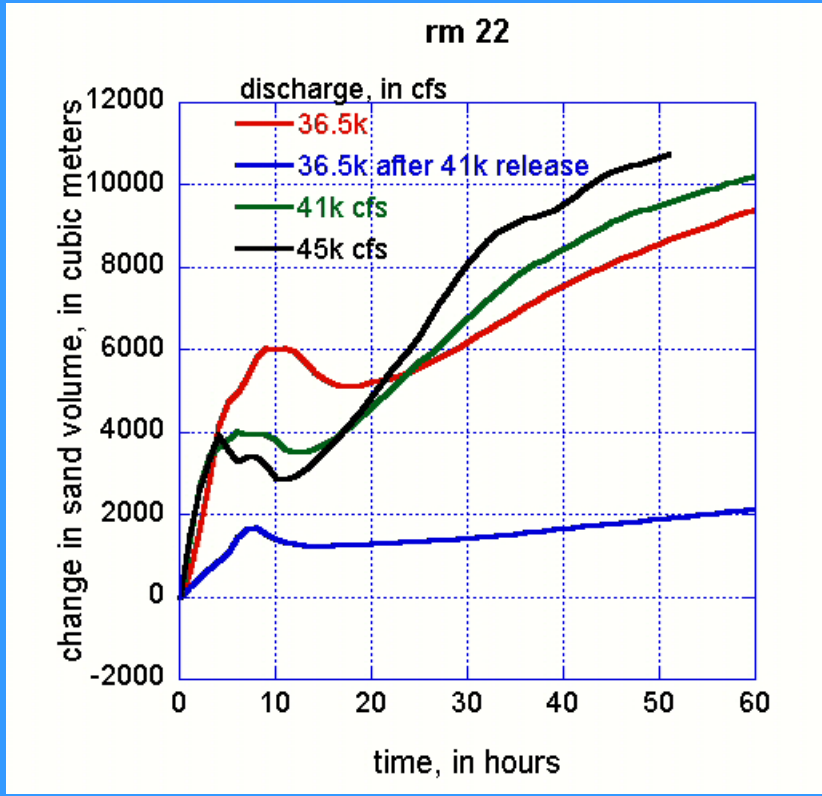
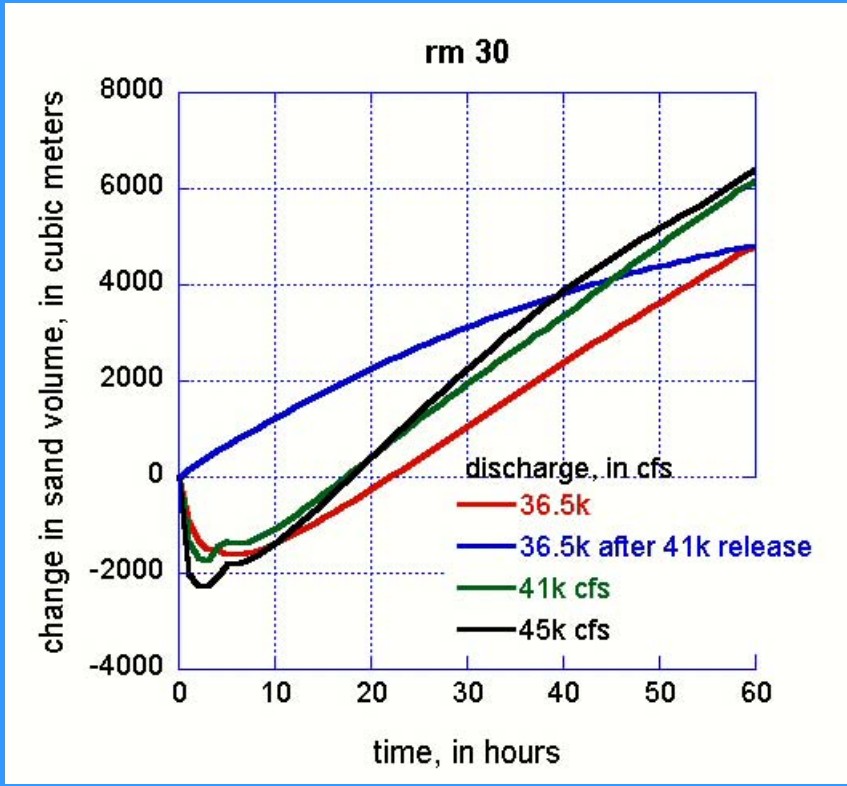
Sediment and Ecology Component

Modeling Example – High-Flow Peak scenarios





IQWP – Downstream
Project A.2.

Implications of FY06 Budget:

- No budget for additional monitoring and research around experiments

- No mainstem or tributary sediment monitoring d/s from Phantom Ranch

- Limited (or no) DO, pH, nutrient, or ion sampling d/s from Lees Ferry

- Reduced routine maintenance and SS sampling at SS-flux monitoring site

**** FY 2003-2005 budget totals reflect implementation of sediment and flow experimentation**

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Fine-Sediment Storage Changes Project A.3

- **Core Monitoring**
  - Track the biennial sand bar area, volume and grain-size changes within and outside of eddies below 5,000 cfs, between 5,000 and 25,000 cfs stage, and above 25,000 cfs, by reach
- **Research and Modeling**
  - Evaluate the reach-based approach for characterizing system-wide sand bar response.
  - Evaluate various methodologies for measuring and characterizing the bed sediment of the Colorado River.
  - Provides topographic data needed for development and testing of the 1D and 2D sediment models.

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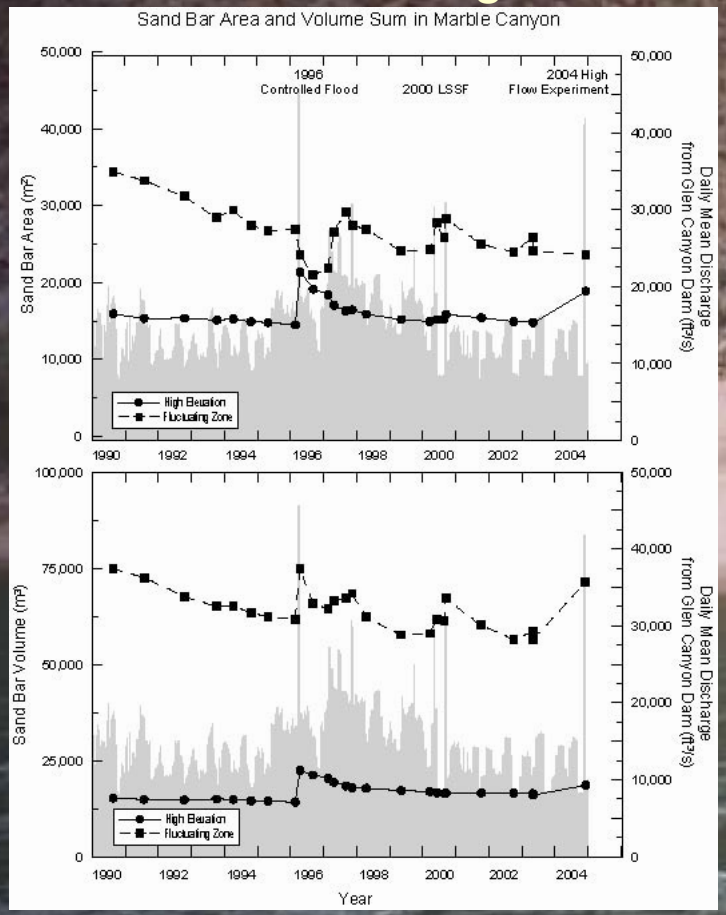
Budget = $294,688/yr

Fine-Sediment Storage Changes

Examples

Time series of sand bar changes



Bathymetric mapping and bed sediment characterization

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Fine-Sediment Storage Changes

Project A.3 – History, 2001 - 2006

This is the final (reporting and peer review) year for the existing Cooperative Agreements related to this project. No field work is scheduled. Recommendations from this report will be used to design future monitoring efforts.

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