

Monitoring

GCDAMP TWG Meeting

October 1-2, 2003

Phoenix, AZ

A Preliminary Proposal for Describing and Categorizing Monitoring Efforts by GCMRC in Support of the Glen Canyon Adaptive Management Program



GCMRC Research & Monitoring Program

- Monitoring
 - Core Monitoring
 - Effects Monitoring
- Research

Core Monitoring

- Resources to be monitored:
 - **A. Sediment**
 - **B. Vegetation**
 - **C. Fish**
 - **D. Food base**
 - **E. Cultural Resources**
 - **F. Hydrology**
 - **G. Water Quality**
 - **H. Recreation**
 - **I. Threatened and endangered species**

For Each Resource....

- What do managers want to know?
- Where do they want to know it?
- How frequently do they need to know?
- What are the general methods to obtain this information?

Sediment

- What:

1. Is there any significant change in the trend of sand storage over time?

2. What is the effect of natural perturbations on sediment storage?

- Where: Lees Ferry, Marble Canyon, below the Lower Colorado River

- How often: Fine sediment storage- every 2 years

- Methods: Sand bar area & Volume
Mass balance sediment transport determinations

Vegetation

1. What is the status of non-native plant species along the river?
2. What is the status of the old high-water zone vegetation?
3. What are the changes in plant communities? (area, location)
 - **Where:** CRE
 - **When:** Every 5 years
 - **Methods:** Remote sensing will be used for macro-trend analysis. Invasive species and community competition will require some field sampling and ground truthing.

Fish

- What? 1. Status and trends of Humpback Chub (population levels, location, demographics).
- 2. Status and trend of Lees Ferry Rainbow Trout, (population and proportional stock density).
- 3. Status and trends of native species (non-endangered):
 - a. **Western Speckled Dace**
 - b. **Flannelmouth Sucker**
 - c. **Bluehead Sucker**
- 4. Status and trends of non-native fish species in the Grand Canyon.
- 5. Status and trends, and distribution and abundance of nearshore-rearing habitat in the CRE?
- Where: **CRE**
- When: **Annually**

Fish cont.....methods

Lees Ferry Rainbow Trout:

1. Where: **Dam to Lees Ferry**
2. When: **Annually**
3. Methodology: **Semi-annual sampling using electrofishing techniques**

Humpback Chub

1. Where: **LCR and confluence zone**
2. When: **Annually**
3. Methodology: **One mark/recapture sampling every year, using Hoop netting/Trammel netting techniques**

Fish cont.....methods

- **Native species**
 1. Where: **CRE**
 2. When: **Annually**
 3. Method: **Hoop net and trammel nets**

- **Non-native fish species**
 1. Where: **CRE**
 2. When: **Annually**
 3. Method: **Electrofishing, random sampling**

Foodbase

- **What are the status and trend of primary productivity and the composition of the benthic and drift invertebrate community in the CRE**
 - **a. How is the food base taxonomic composition changing over time?**
 - **b. Is there sufficient food to feed the fish?**
 - **c. Is the food base available to the fish (drift)?**
- **Where: CRE**
- **When: Annually**
- **Methods: Metabolism measurement, benthic dredge, drift nets**

Cultural Resources (tentative)

- 1. What are the status and trend of cultural properties in the CRE?
- Where: the entire CRE
- When: Once every 5 years for each site, annually for a subset of sites.
- Methods: Remote sensing supplemented by site visits

Hydrology

- 1. What are the flows (CFS) in various points in the mainstem and certain tributaries?
- Where: CRE- Lees Ferry, Sixty-mile, Grand Canyon, Diamond Creek, Paria, LCR, and selected lesser tributaries in Marble Canyon
- When: Continuous
- Methods: Selected Conventional Combined with Surrogate In Situ Monitors and USGS Gauges

Water Quality

- 1. What is the status and trends of water quality (temperature, DO (dissolved oxygen), conductivity, pH, turbidity)
- Where: CRE- Glen Canyon, Lees Ferry, Grand Canyon, Diamond Creek
- When: Continuous
- Methods: in situ sensors

Recreation (tentative)

- **1. What:** is the level of visitor satisfaction with the recreational activities in the CRE?
- **Where:** CRE wide- anglers at Lees Ferry, private boaters, commercial river-running clients
- **When:** every 5 years
- **Methods:** Visitor Satisfaction Survey

Other Threatened & Endangered Species (e.g. KAS)

- What is the status and trends of Kanab ambersnail habitat at Vasey's Paradise?
- Where: Vasey's Paradise
- When: every 3 years
- Methods: Remote sensing, with annual presence/absence surveys of Kanab ambersnail