General Monitoring and Research Plan for High Flow Experimental Protocol

John Hamill – Chief, Grand Canyon Monitoring and Research Center, Flagstaff AZ

Adaptive Management Work Group
February 9, 2011
Goals

- Test whether a series of sand-enriched high flows will be an effective strategy for rebuilding and maintaining sandbars.

- Evaluate the effects of series of sand-enriched high flows on other priority AMP resources.

- Separate science plan would be developed for the “Rapid Release” strategy.
General approach

- No new studies; some will be expanded
- Relies on existing quality of water, sediment, aquatic biology and other resource monitoring projects
- Coordinated-integrated with Nonnative science plan
Sandbar, Camping Beach, and Archaeological Science questions

1. Will multiple high flows result in net increases in sandbar area and volume on a sustainable basis?

2. Will multiple high flows result in net increases in campable area?

3. Will multiple high flows improve archaeological site condition as reflected in increased sand deposition, increased site stability, and reduction in rates of erosion?
Aquatic Food Base and Fish Science Question

1. What is the effect of a fall HFE on the food base at Lees Ferry?
2. How does HFE timing and frequency affect Lees Ferry rainbow trout population dynamics and out-migration?
3. Is it possible to manage the Lees Ferry trout population with a spring HFE held at slightly different times?
4. What are the direct effects of a fall HFE on displacement of humpback chub?
5. What are the indirect effects of increases in rainbow trout associated with HFEs on humpback chub?
Recreation, Riparian Vegetation, and Springs

1. How will multiple high flows affect recreational experience quality in the Colorado River corridor in Glen Canyon?
2. How does HFE timing and frequency affect woody riparian and marsh vegetation composition?
3. How does riparian vegetation influence sandbar building, campable area, and wind-blown transport of sand?
4. How do Kanab ambersnail populations and habitat vary over a 10 year period of repeated high flows?
Water Quality and Hydropower

1. How do high flow experiments affect water quality (especially DO and temperature) in the forebay of Lake Powell and in the Colorado River between the Dam and Lee’s Ferry?

2. What are the effects of repeated HFEs on hydropower production and marketable capacity at Glen Canyon Dam?
Major Tasks

- SedTrend (channel mapping)
- Sandbar monitoring (ground surveys and remote sensing)
- Sediment flux monitoring
- Campable area monitoring
- Archaeological site monitoring
- Lake Powell and Lee Ferry Water Quality
- Hydropower production and revenues (WAPA)

USGS
Major tasks (continued)

- Aquatic food base monitoring
- Lees Ferry trout (Adult and YOY trout monitoring)
- Paria to Badger Rapid Study
- Lees Ferry recreation experience monitoring
- Native Fish
  - Mainstem fish monitoring
  - LCR fish monitoring
  - Juvenile HBC survival and abundance (NSE study)
- Riparian vegetation monitoring (Veg transect and mapping)
- Kanab Ambersnail Monitoring
Budget

- Funded primarily as part of core monitoring
- Utilizes $540K to $640K of Experimental funds annually
  - Included $100K for expanded (monthly) food base monitoring in Lees Ferry
- Assuming continued funding of key components of the Near Shore Ecology Study by Reclamation
Reporting

- Annual reporting meeting
- Annual Open File Report or fact sheet summarizing major findings
- Major synthesis at the end of the 10 year experiment
Next Steps

- Public review (Feb 25)
- Science Advisor Review (Feb 18)
- Revise and Implement Plan
Thank you!