



# General Monitoring and Research Plan for High Flow Experimental Protocol

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**Adaptive Management Work Group  
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# 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 of 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
- Archeological site monitoring
- Lake Powell and Lee Ferry Water Quality
- Hydropower production and revenues (WAPA)



# 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!

