LTEMP Science Plan
Technical Workgroup Meeting
October 18-19, 2016
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U.S. Geological Survey
LTEMP EIS:

Final EIS released Oct 7

ROD in November

Implemented over the next 20 years
Preferred Alternative: Sediment-Related Adjustments to Base Operations

- Fall and spring HFEs (up to 96 hours)
- Proactive spring HFEs (initially 24 hours)
- Extended-duration HFEs (up to 250 hours)
- Trout management flows
Arrows show where scientific information needed.
Streamflow, Sediment Transport, and Sand Budgets in the Colorado River
Provides technical data to managers and stakeholders in near real time to facilitate river management decisions.

- Suspended- and bed-sediment data
- Sediment loads (silt and clay loads and sand loads)
- User-interactive sand budgets in 6 reaches from Lees Ferry to Lake Mead

www.gcmrc.gov

http://www.gcmrc.gov/discharge_qw_sediment/
Annual Sandbar and Campsite Monitoring

Data at www.gcmrc.gov/sandbar/

Preliminary data, do not cite
Remote Cameras: Immediate sandbar response to HFEs

Photos at www.gcmrc.gov/sandbar/

11/09/2014

11/17/2014

Channel Mapping: Long-term trends in sand storage and bed composition

- Monitor long-term changes in sand storage and bed composition
  - Marble Canyon and eastern Grand Canyon
  - Possibly other reaches

Preliminary data, do not cite
Remote sensing

• Aerial, lidar, and satellite imagery and data.
• Data are used for:
  • Maps to support field data collection and river navigation
  • Analysis and change detection of sandbars, riparian vegetation, backwater and near-shore habitats, and other ecosystem-wide mapping
Extended Duration and Proactive HFE Monitoring

- Temporal and longitudinal changes in suspended sediment concentration during floods
- Lateral changes in concentration in eddy deposition zones
- Temporal and longitudinal comparisons of sandbar topography during floods to determine changes in deposition rates of fine sediment in eddies
- Suggest establishing contingency fund to support more extensive evaluation
Preferred Alternative: Aquatic Resource-Related Adjustments to Operations and Non-Flow Actions

- Trout control actions
  - Trout management flows (TMF)
  - Mechanical removal from the LCR reach
- Macroinvertebrate production flows
- Low summer flows
- Non-flow vegetation treatments
Humpback Chub Monitoring

![Graph showing adult chub population over years]

- **USGS**
Rainbow Trout Monitoring

Preliminary data, do not cite

Dustin Patar
Nonnative/Invasive Fish Monitoring
Methods: electrofishing, netting (hoop, trammel), mark-recapture, CPUE, and emerging technology.
Fisheries Program Protocol
Evaluation Panel
Monitoring the prey base

Invertebrate Drift

**Plankton nets**
- Optimized for large rivers
- Proportional to benthic density
- Direct measure of prey availability for drift feeding fishes

Insect emergence

**Sticky traps**
- Developed new methods that are quick and easy to deploy
- Proportional to benthic density
- Understudied life stage
- Has shed light on why so few insects

**Light traps**
Studying insect egg laying

Artificial substrates

Natural substrates

Multiple approaches will be used to determine how “bug flows” affects the environment for insect egg laying and rearing
Preferred Alternative: Other Resources

- **Vegetation**
  - nonnative plant removal
  - revegetation with native species
  - mitigation at specific and appropriate cultural sites

- **Cultural Resources**
  - Preservation of historic properties through a program of research, monitoring, and mitigation
    - archeological and ethnographic sites
    - *National Register* historic properties
Riparian vegetation

- Future issues
  - Vegetation removal/restoration per LTEMP
  - Tamarisk and tamarisk beetles
  - Continued vegetation expansion onto sandbars
Dam Operations, Geomorphic Processes & the Future of Archaeological Sites

Draft plan for monitoring effects of geomorphic processes at archaeological sites in Grand & Glen Canyon

Draft prepared as originally proposed in: Project Element 4.2. of the Glen Canyon Dam Adaptive Management Program Triennial Budget and Work Plan—Fiscal Years 2015–2017

(East et al. 2016)
Questions?