

Public Meetings

Glen Canyon Dam Long-Term Experimental and Management Plan Draft Environmental Impact Statement

February and March 2016

<http://ltempeis.anl.gov>





Glen Canyon Dam

Long-Term Experimental and Management Plan EIS



Purpose of this Presentation

- Provide an overview of the LTEMP and EIS that will facilitate your review of the Draft EIS
 - Present the purpose of and need for a long-term experimental and management plan
 - Identify the scope of the LTEMP EIS
 - Describe the alternatives and key findings of the assessment



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Current Schedule

- Draft EIS was made available January 8, 2016
- Public Meetings
 - Webinar on Tuesday, February 16, 2016, 6:30 pm
 - Open House Meeting on Monday, February 22, 2016, 6:00 pm, USGS Grand Canyon Monitoring and Research Center, Flagstaff
 - Open House Meeting, Thursday, February 25, 6:00 pm, Embassy Suites Phoenix-Tempe
 - Webinar on Tuesday, March 1, 2016, 1:00 pm
- Comments due by April 7, 2016
 - Prefer comments be submitted electronically (<http://ltempeis.anl.gov>)



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Proposed Action and Purpose of the Action

- **Proposed action:** Develop and implement a structured, long-term experimental and management plan for operations of Glen Canyon Dam
- **Purpose of the proposed action:** Provide a framework for adaptively managing Glen Canyon Dam operations and other management and experimental actions over the next 20 years consistent with the Grand Canyon Protection Act and other provisions of applicable federal law



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Need for the Action

- Stems from the need to use scientific information developed since the 1996 Record of Decision to better inform Department of Interior decisions on dam operations and other management and experimental actions so that the Secretary may continue to meet statutory responsibilities for:
 - Protecting downstream resources for future generations
 - Conserving species listed under the Endangered Species Act,
 - Avoiding or mitigating impacts on *National Register of Historic Places*-eligible properties
 - Protecting the interests of American Indian Tribes
 - Meeting obligations for water delivery and the generation of hydroelectric power.
- Research conducted since 1996 indicates that there are changes in operations and other actions that would better achieve the goals of the Grand Canyon Protection Act



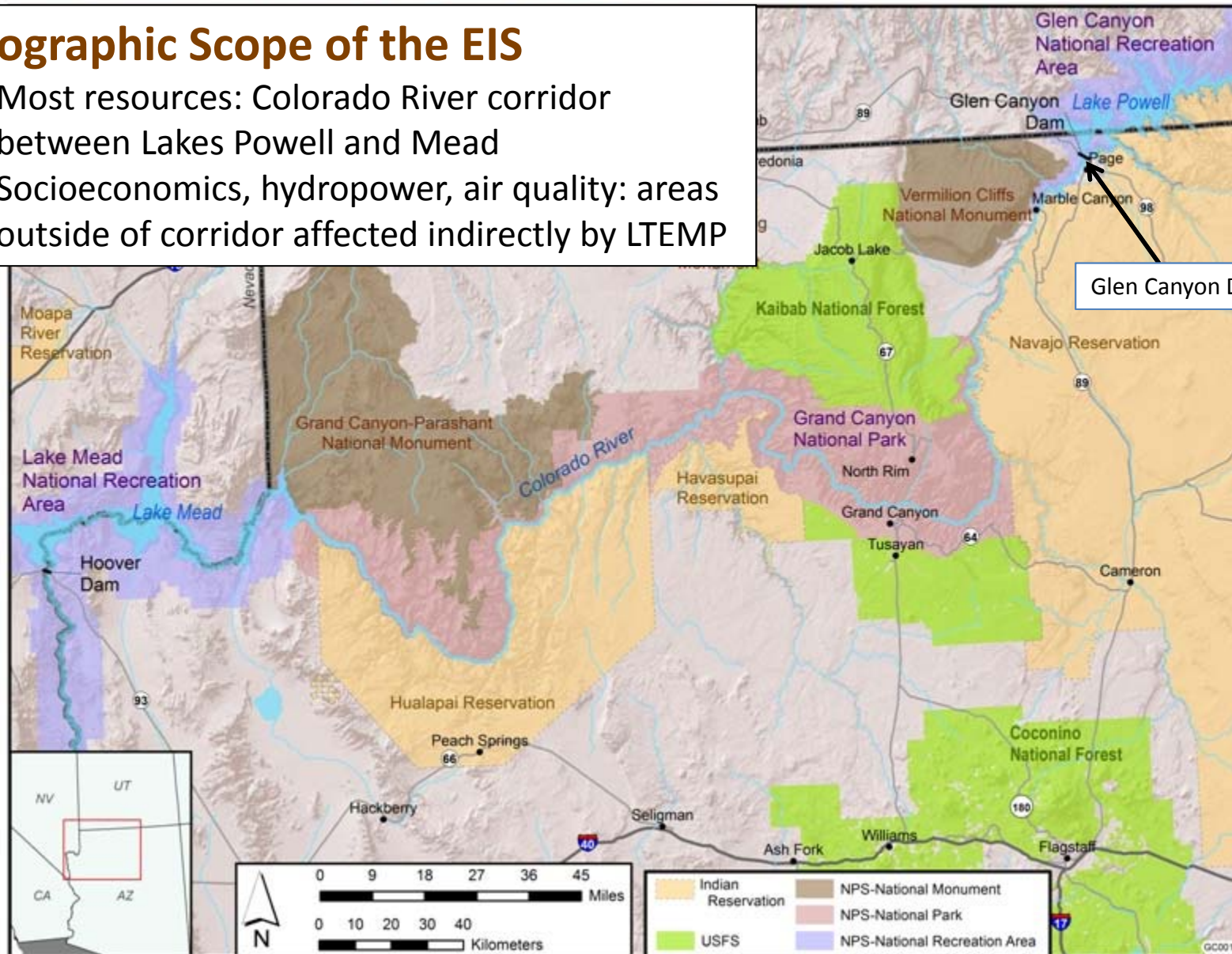
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Geographic Scope of the EIS

- Most resources: Colorado River corridor between Lakes Powell and Mead
- Socioeconomics, hydropower, air quality: areas outside of corridor affected indirectly by LTEMP





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Scope of the Proposed Action and Alternatives

- Alternatives specify Glen Canyon Dam operations and experimental flow and non-flow actions over the 20-year LTEMP period
- None of the alternatives include changes to existing dam or other infrastructure
- Operations must comply with the 2007 Interim Guidelines for coordinated operations between Lake Powell and Lake Mead
- None of the alternatives affect annual water delivery requirements



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Scope of the Proposed Action and Alternatives (Cont.)

- Minimum and maximum flow limits would remain unchanged
- All of the alternatives include High-Flow Experiments with variation in frequency, duration and constraints
- Alternatives differ in approaches to fish management
- All action alternatives include vegetation restoration activities



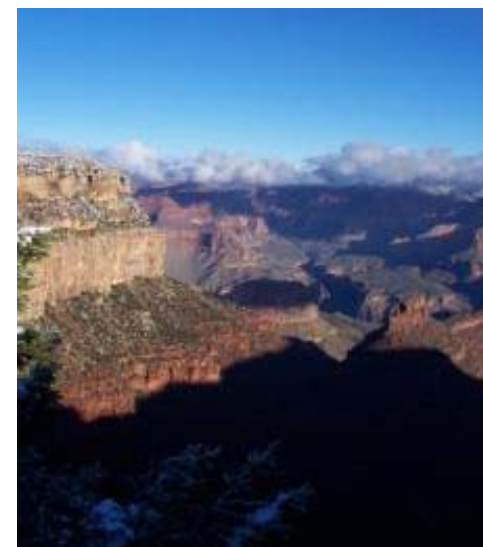
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The LTEMP Is a Joint-Lead Process

- Bureau of Reclamation operates Glen Canyon Dam
- National Park Service manages Grand Canyon National Park and Glen Canyon and Lake Mead National Recreation Areas
- Reclamation, NPS, Argonne National Laboratory, and USGS staff prepared the draft EIS





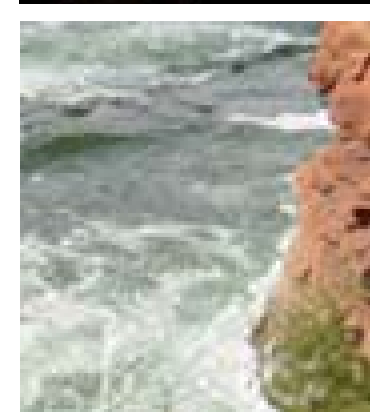
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Cooperating Agencies

- Arizona Game and Fish Department
- Bureau of Indian Affairs
- Colorado River Commission of Nevada
- Colorado River Board of California
- The Hopi Tribe
- The Hualapai Tribe
- The Havasupai Tribe
- Kaibab Band of Paiute Indians
- The Navajo Nation
- The Pueblo of Zuni
- Salt River Project
- U.S. Fish and Wildlife Service
- Upper Colorado River Commission
- Utah Associated Municipal Power Systems
- Western Area Power Administration





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Grand Canyon Protection Act (1992)

- Requires that Glen Canyon Dam be operated in such a manner as to:
 - Protect, mitigate adverse impacts to, and improve the values for which the Grand Canyon National Park and Glen Canyon National Recreation Area were established including, but not limited to, natural and cultural resources and visitor use
 - Comply with water delivery laws and requirements
- Requires long-term monitoring programs and activities that will ensure compliance with the Act





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Experimentation since 1996

- 1996 beach/habitat-building flow test
- 2000 low steady flow test
- 2002-2006 translocation of humpback chub and removal of nonnative fish
- 2004 beach/habitat-building flow test
- 2008 high flow experiment (HFE)
- 2008-2012 Sep.-Oct. steady flows
- 2012, 2013, and 2014 fall HFEs





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Alternatives Analyzed in the LTEMP EIS

Alternative	Characteristics
A (No Action)	No change from current operations and actions.
B	Higher within-day fluctuations in flow. Experiments include HFEs, trout management, hydropower improvement actions, and vegetation restoration.
C	Highest flows in Dec., Jan. and Jul.; reduced flows in Aug.–Nov.; lower fluctuations throughout year. Experiments include HFEs, trout management, low summer flows, and vegetation restoration.
D (Preferred)	Relatively even release pattern that attempts to follow Western’s contract rate of delivery, but with higher flows in Aug.; fluctuations comparable to current. Experiments include HFEs, trout management, low summer flows, steady low weekend flows from May-Aug, and vegetation restoration.
E	Relatively even release pattern that attempts to follow Western’s contract rate of delivery, but with lower flows in Aug. and Sep.; higher fluctuations. Experiments include HFEs, trout management, low summer flows, and vegetation restoration.
F	High releases in spring; steady flows throughout year. Experiments include HFEs and vegetation restoration.
G	Equal monthly releases and steady flows throughout year. Experiments include HFEs, trout management, and vegetation restoration.



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Alternative D—the Preferred Alternative

- Developed using characteristics of other alternatives that performed well for certain resources
 - Monthly release patterns
 - Fluctuation levels
 - Experimental flow and non-flow actions



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Would Monthly Release Patterns Change under the Preferred Alternative?

- Preferred alternative would provide a more even monthly release pattern than currently occurs
- Release pattern attempts to follow the monthly pattern of Western's current schedule of power deliveries to customers, and is expected to reduce resource impacts downstream from the dam
- There would be no difference in the total annual volume of water released

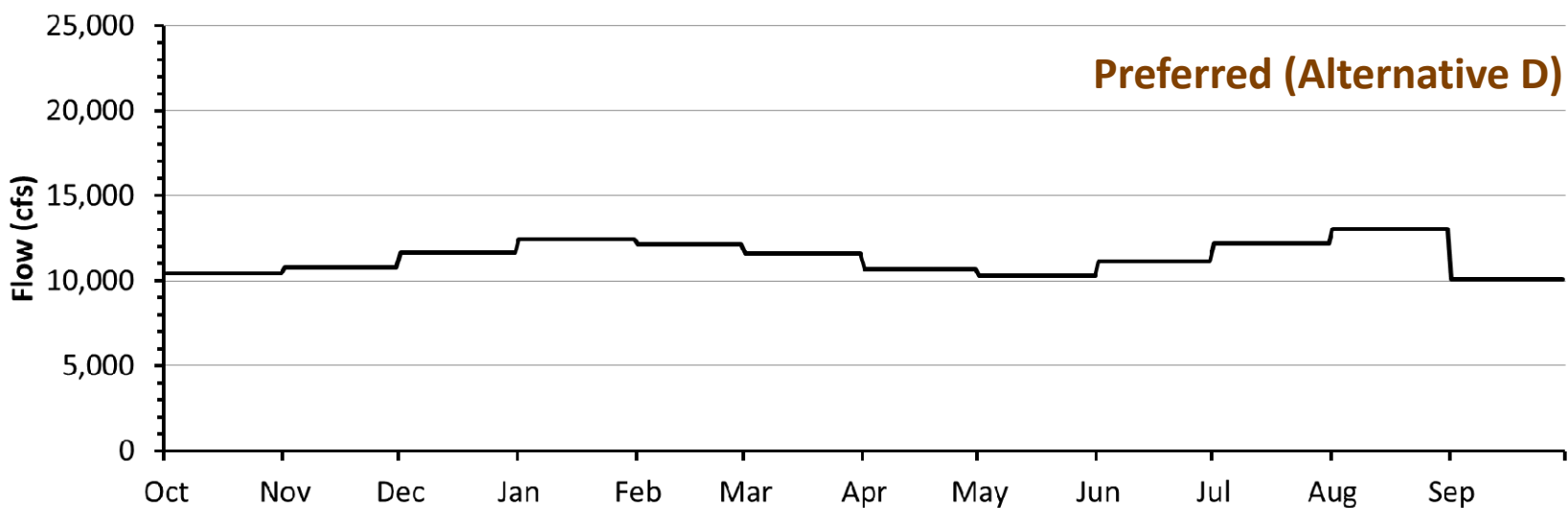
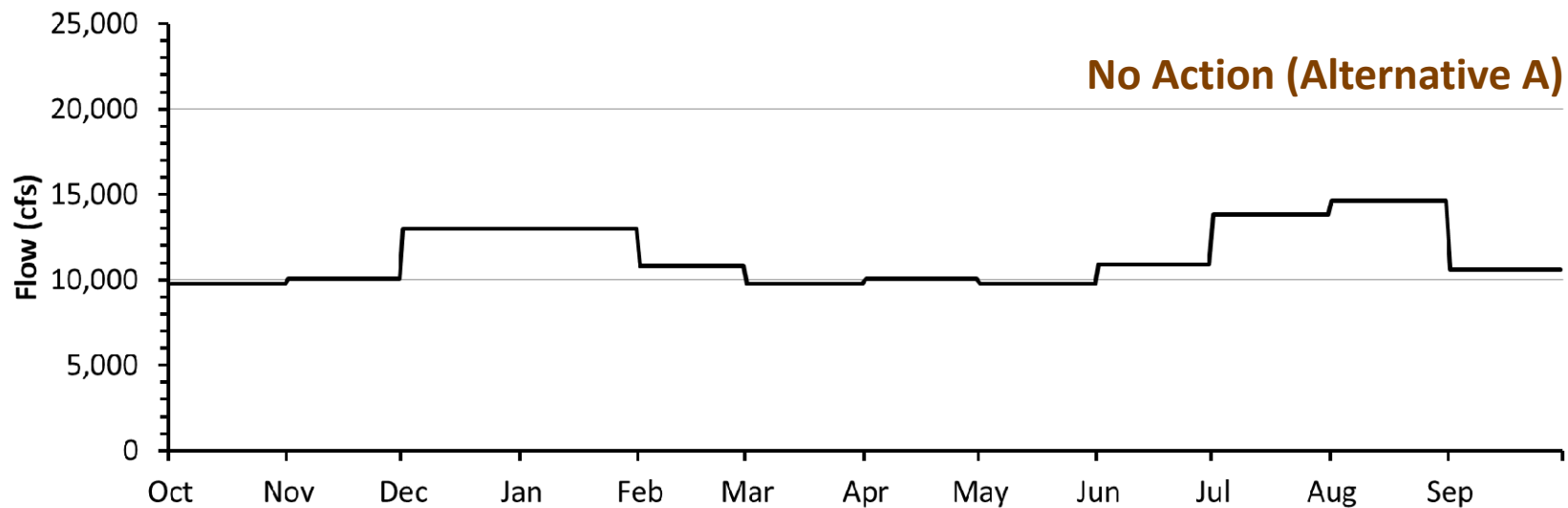


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Mean Daily Flow—No Action and Preferred Alternative



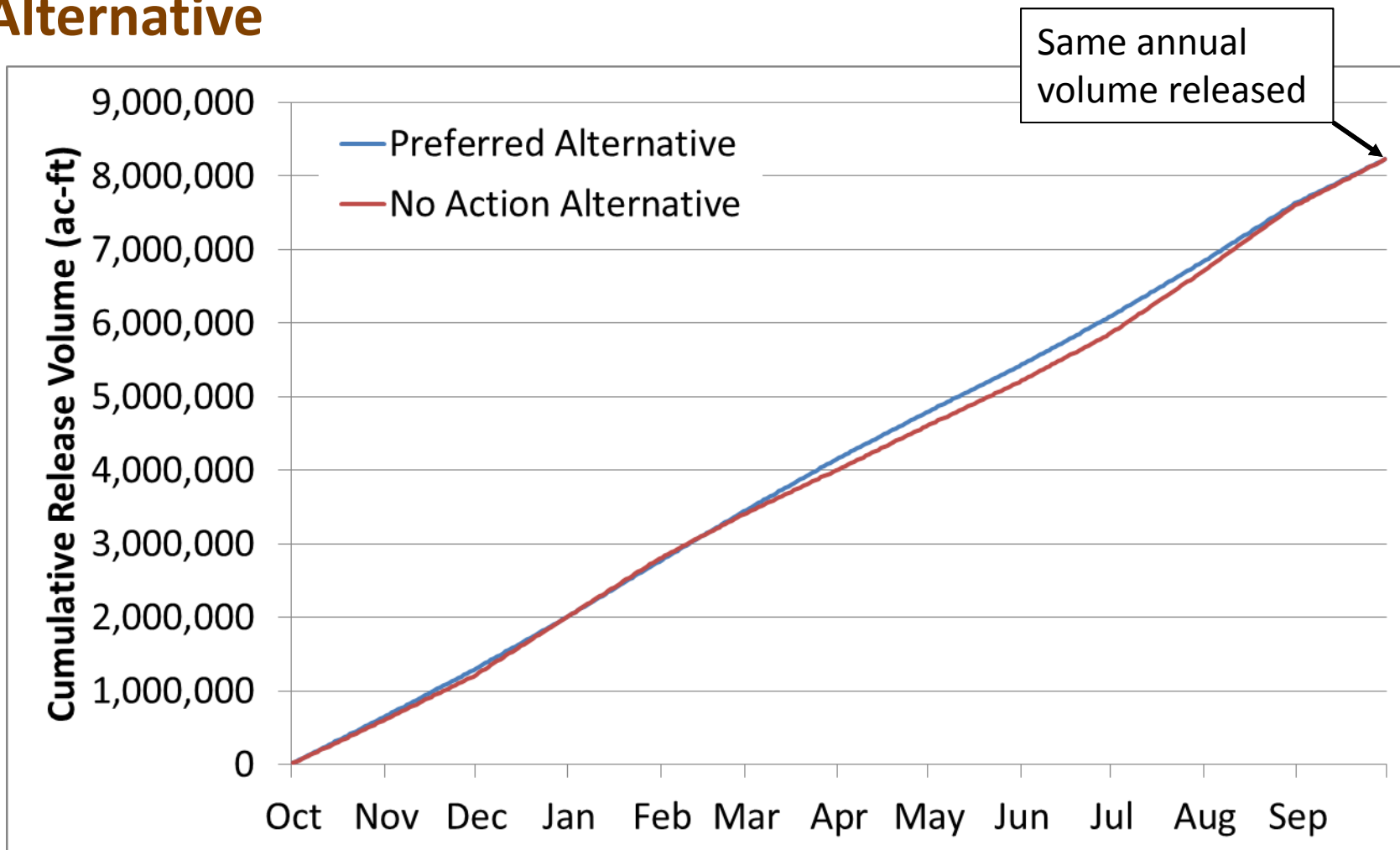


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Cumulative Release Volume—No Action and Preferred Alternative





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Would Daily Flow Fluctuations Change under the Preferred Alternative?

- Under current operations, the within-day fluctuation level is set at 5,000 cfs, 6,000 cfs or 8,000 cfs depending on the monthly volume
- Under the preferred alternative, fluctuations would be proportional to the the monthly volume rather than a fixed value, but would be no greater than 8,000 cfs
- The highest fluctuations would be in January, July, and August, much like they are now

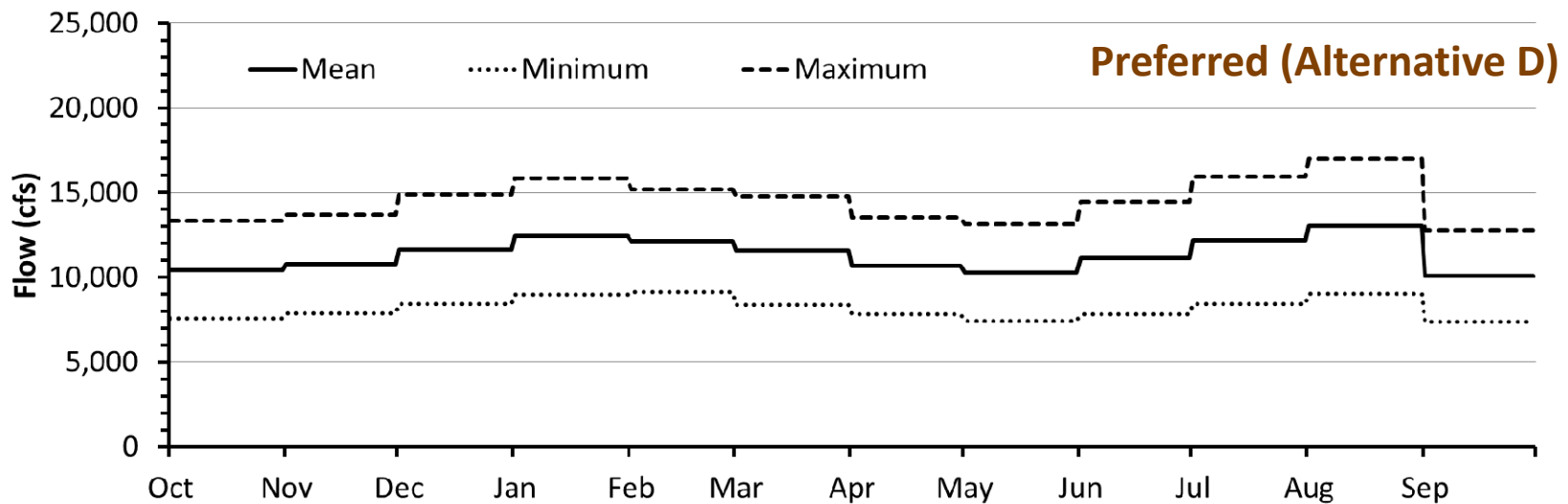
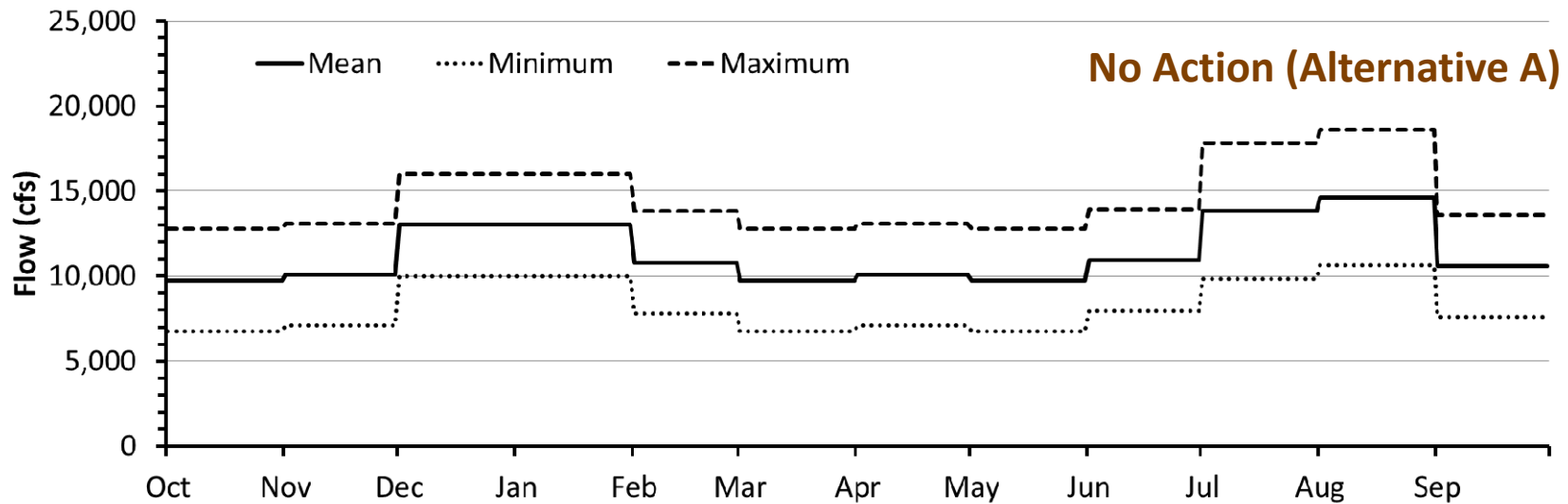


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Daily Fluctuations—No Action and Preferred Alternative





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Experiments under the Preferred Alternative

- **Sediment-triggered spring and fall HFEs** (similar to existing protocol)
- **Proactive spring HFEs:** up to 24 hour, 45,000 cfs release in the spring of high volume years (≥ 10 maf) to conserve sediment
- **Extended duration fall HFEs:** up to 250 hr, 45,000 cfs release in years with very large inputs of sediment from the Paria River

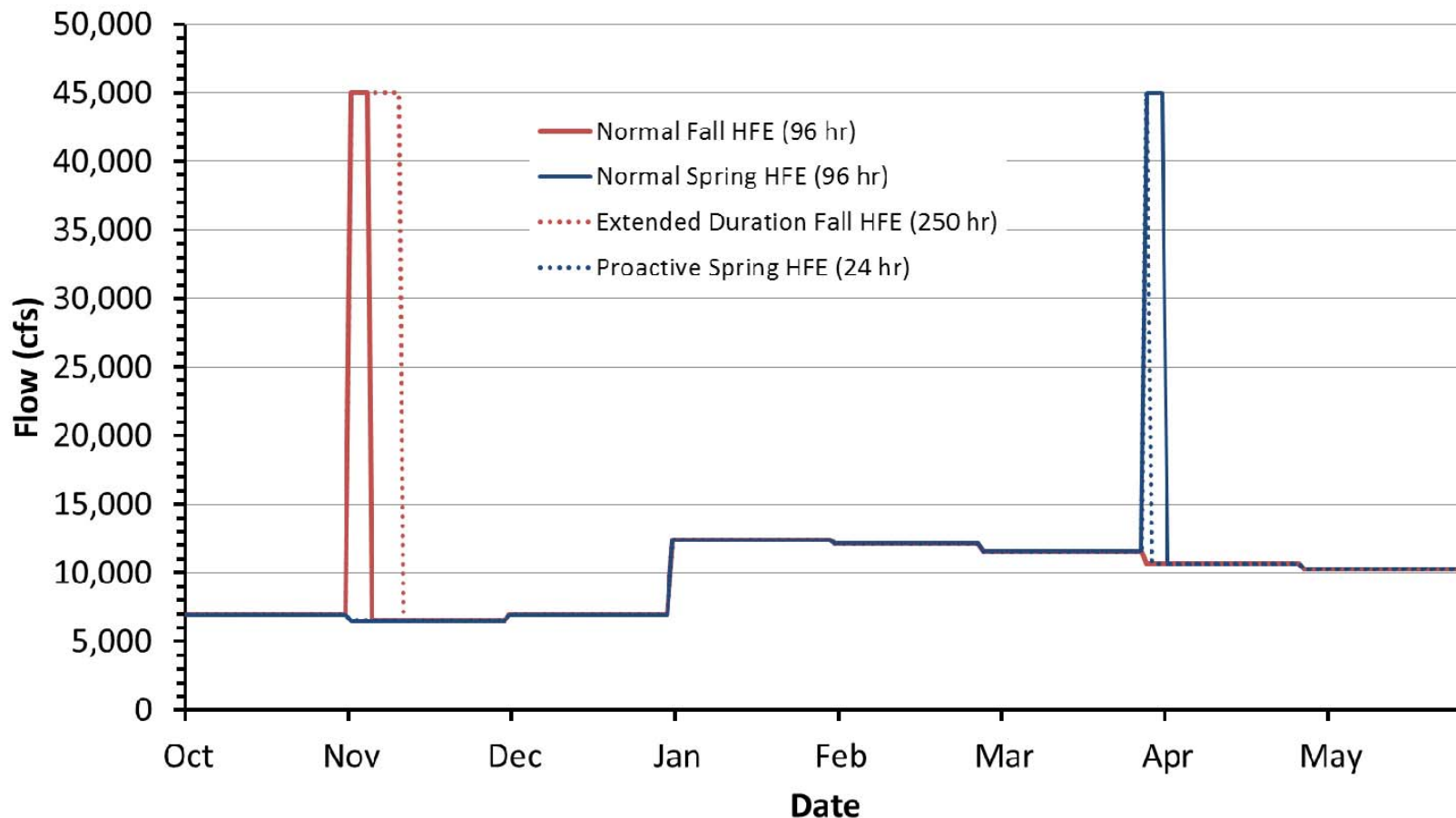


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Comparison of Normal Spring and Fall HFEs to Extended Duration and Proactive HFEs





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Experiments under the Preferred Alternative (Cont.)

- **Low summer flows:** 5,000 to 8,000 cfs reduced-fluctuation releases from Jul. through Sep. to provide warmer water for humpback chub
- **Trout management flows:** short duration high fluctuations to reduce trout production
- **Steady low weekend flows** from May through August to increase aquatic food base production
- **Mechanical removal of trout** in the Little Colorado River reach with beneficial use

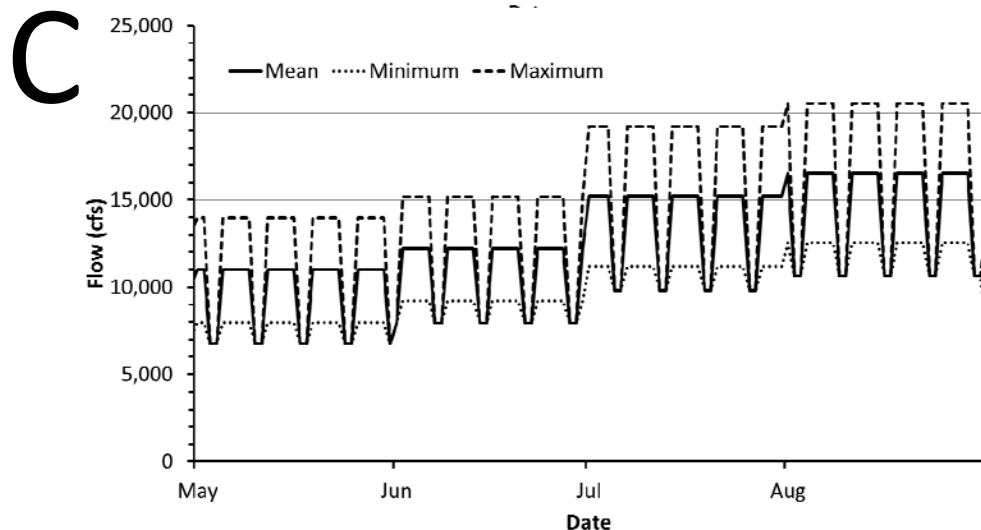
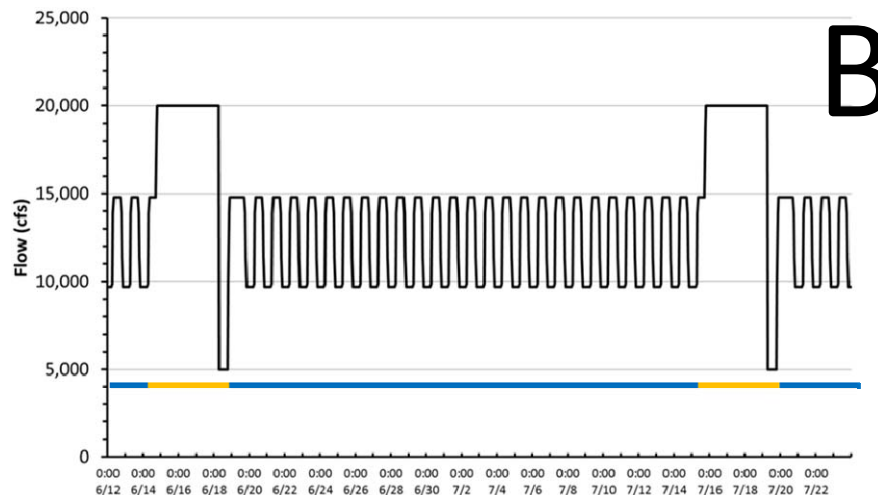
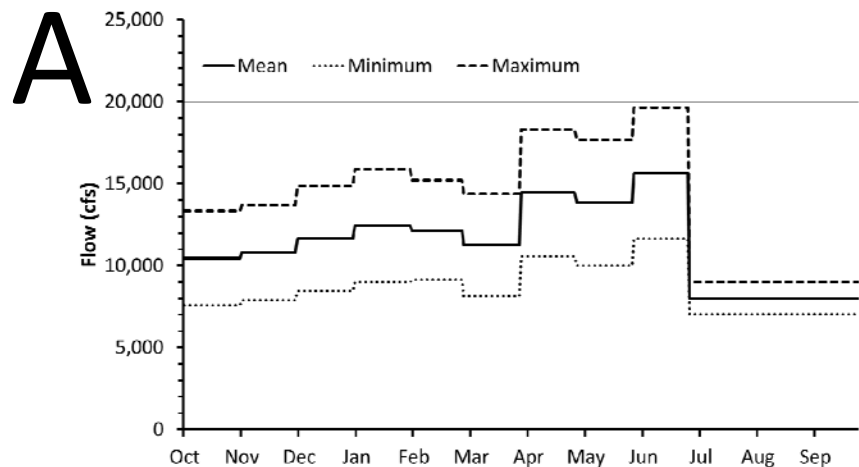


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Low Summer Flows, Trout Management Flows, and Steady Low Weekend Flows



- A. Annual hydrograph with low summer flows
- B. Trout management flows
- C. Steady low weekend flows



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Summary of Results for Key Resources

- Example results for metrics that represent impacts on key resources:
 - Sediment
 - Humpback chub
 - Trout fishery
 - Vegetation
 - Cultural resources
 - Recreation
 - Hydropower
- Other quantitative and non-quantitative assessments are presented in the EIS

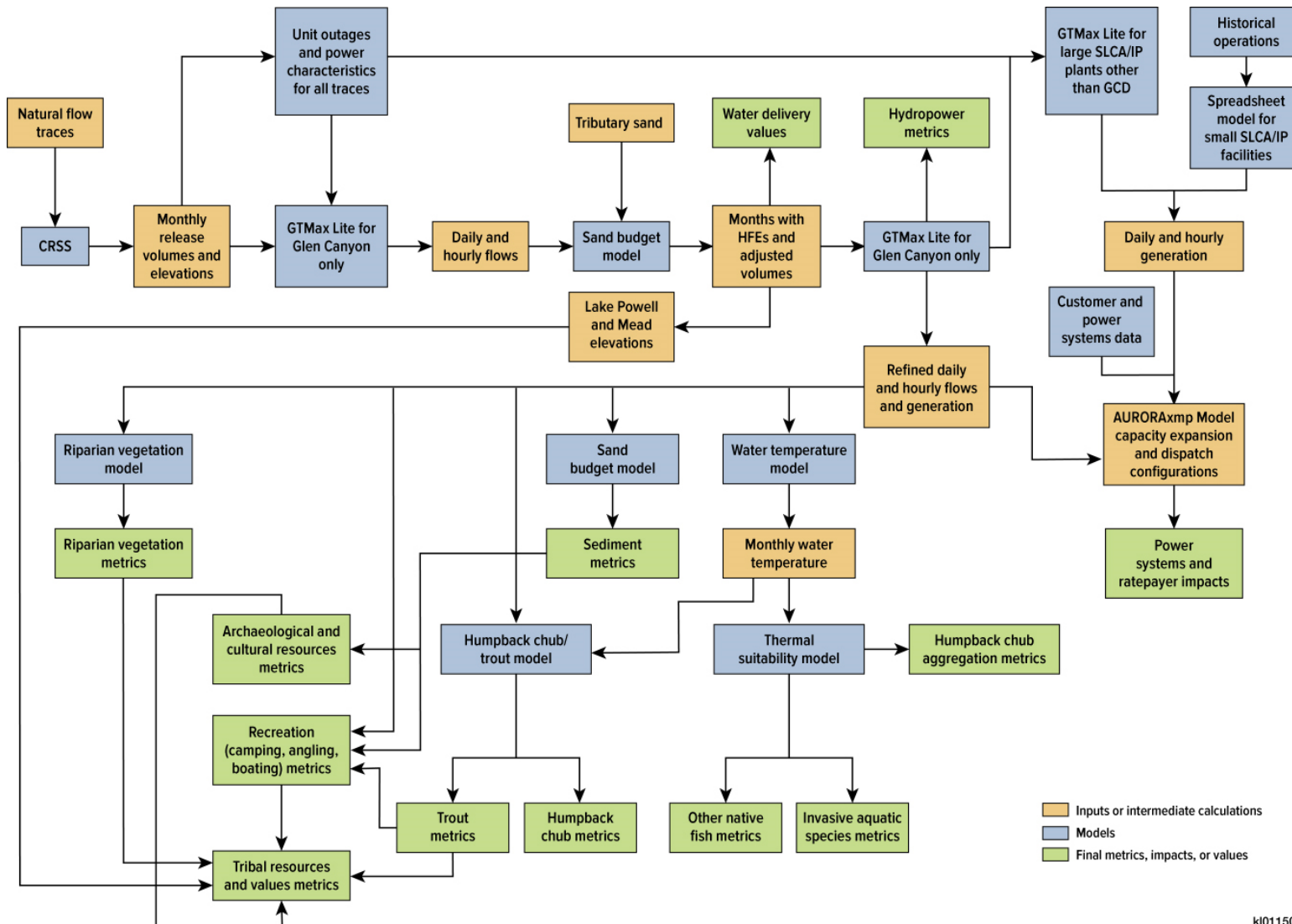


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Modeling Framework



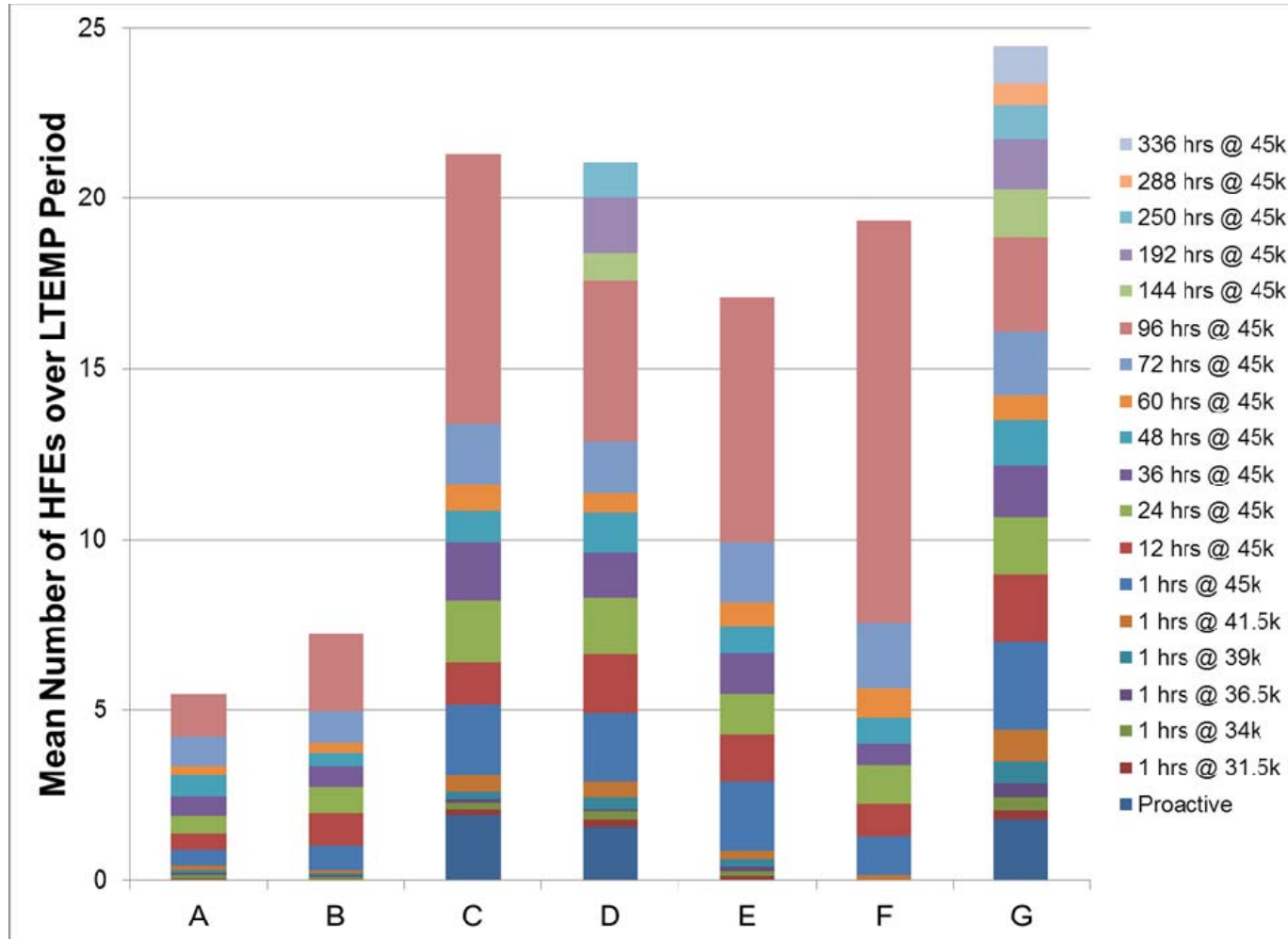


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Mean Number of HFEs over LTEMP Period





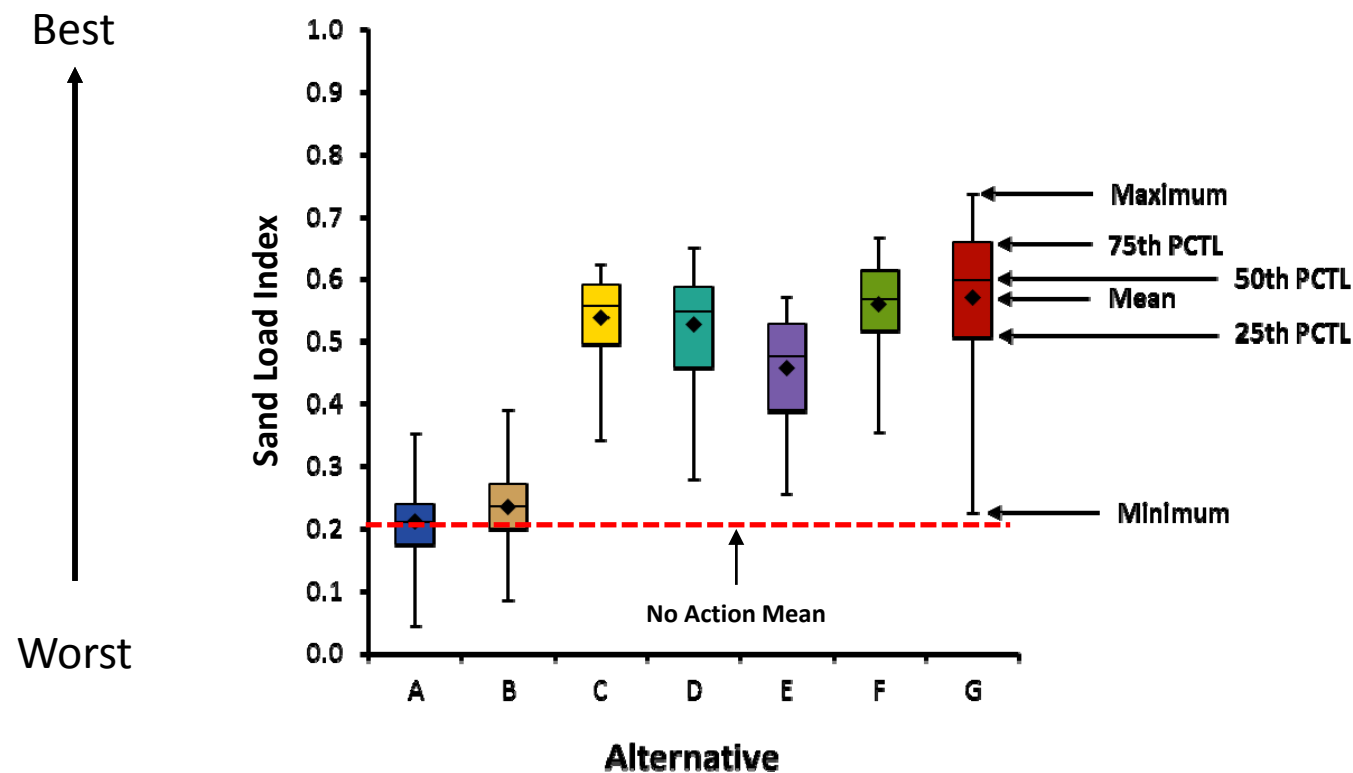
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How to Interpret Results

- Full range of hydrology and sediment conditions modeled
 - 21, 20-yr hydrology scenarios and 3, 20-yr sediment scenarios
- Box and whisker plots used for comparison of alternatives
- Alternatives are color coded



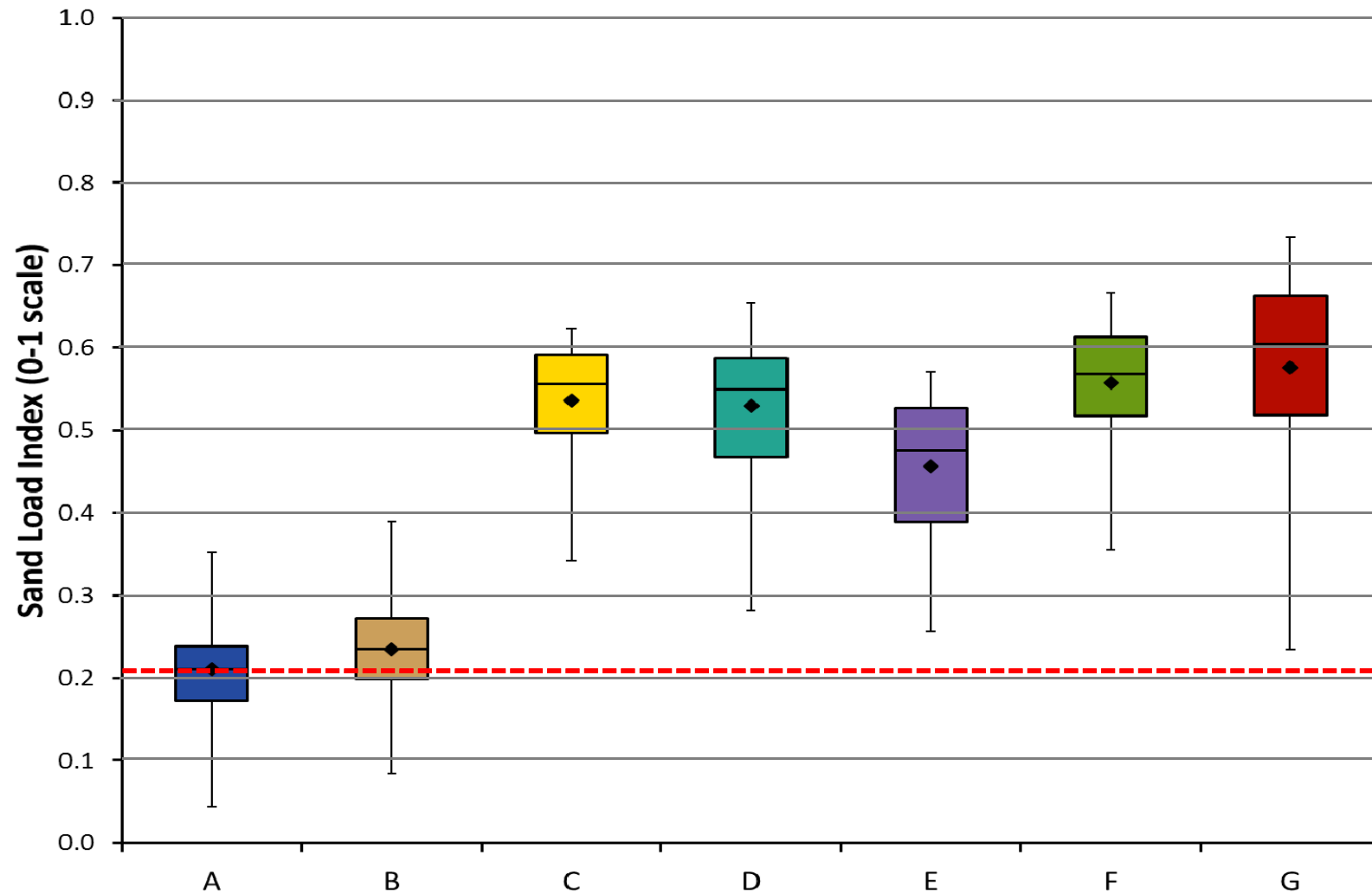


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Sediment – Sand Load Index



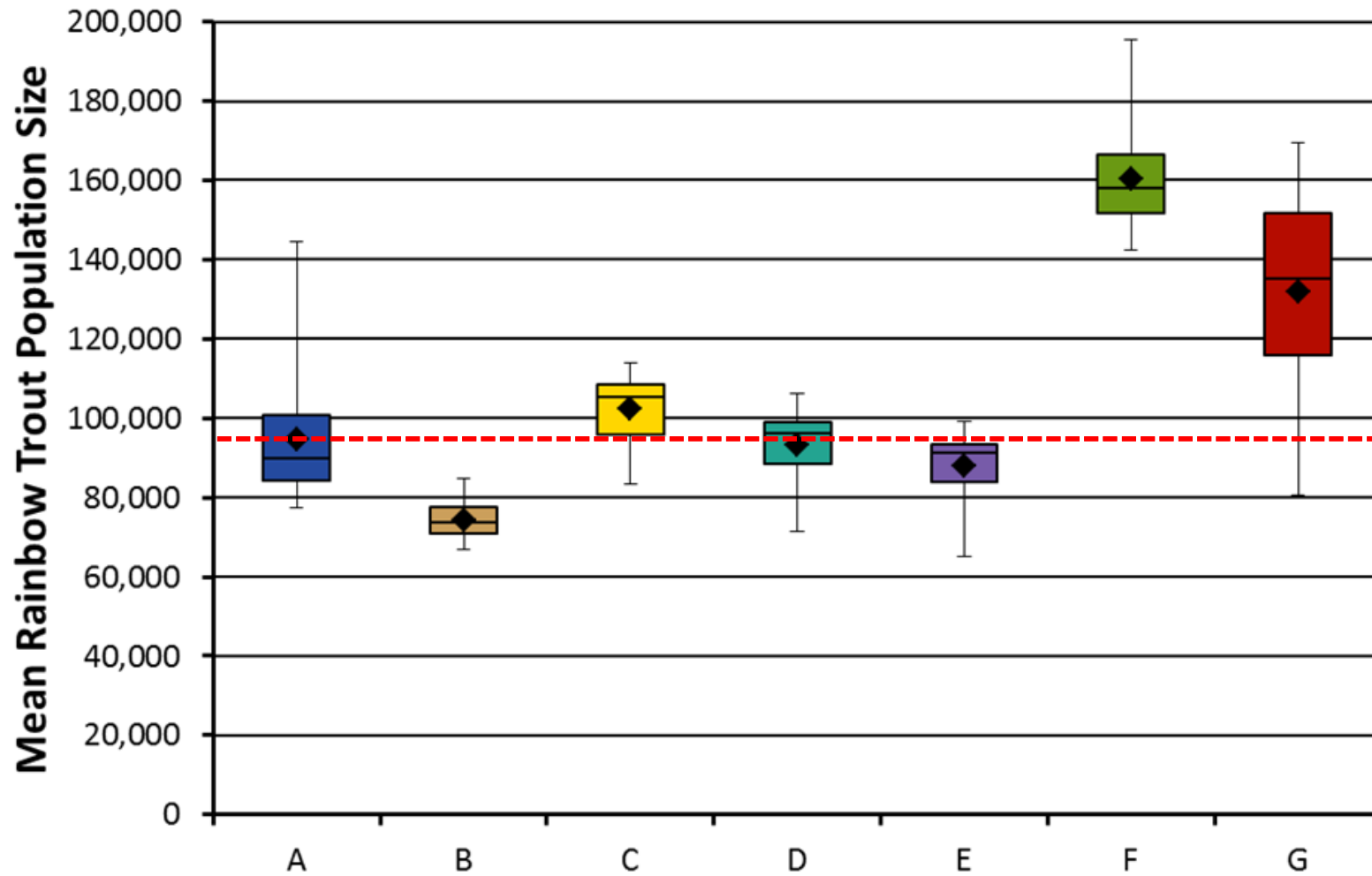


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Average Number of Rainbow Trout



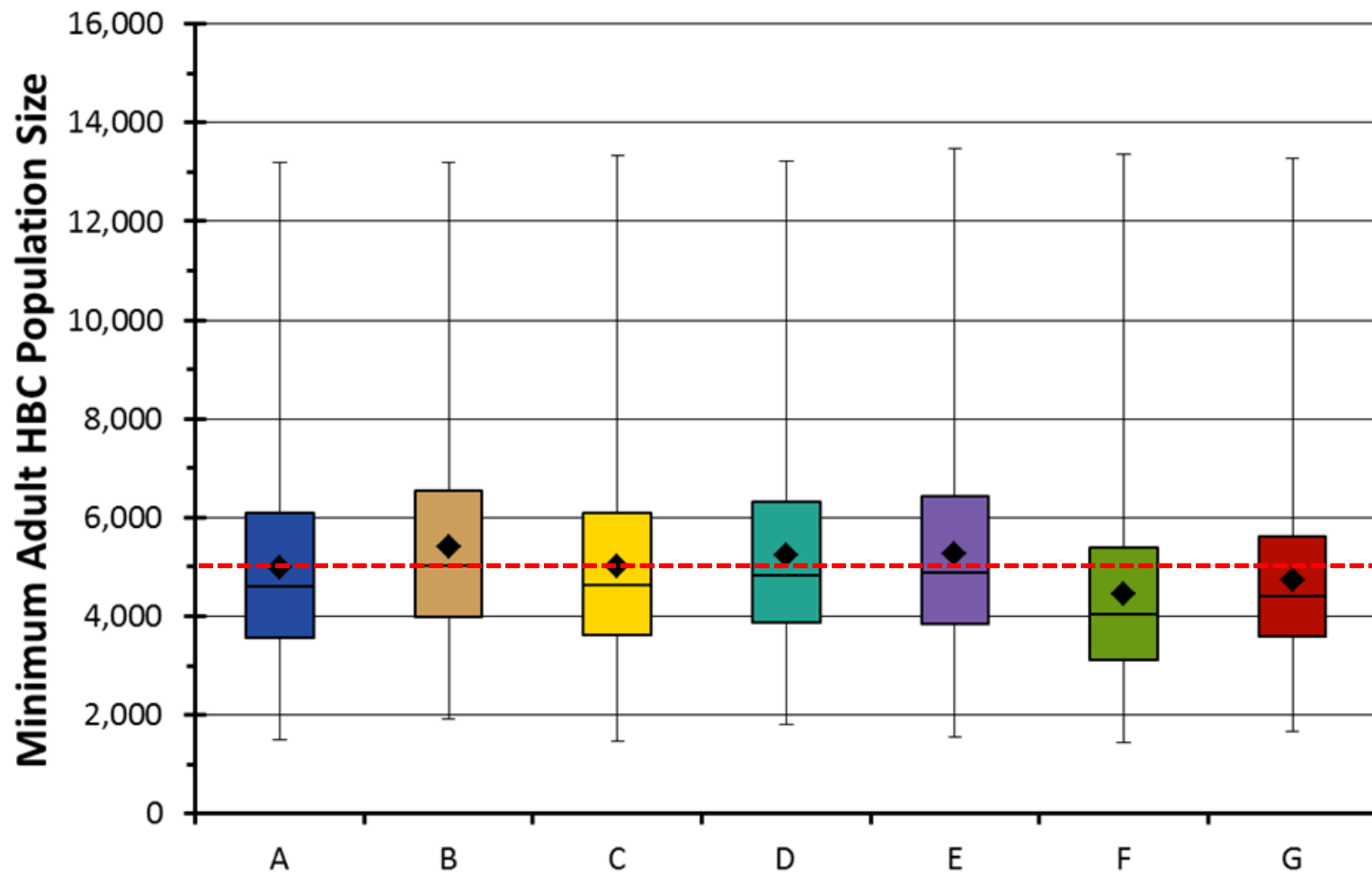


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Minimum Adult Humpback Chub Population Size



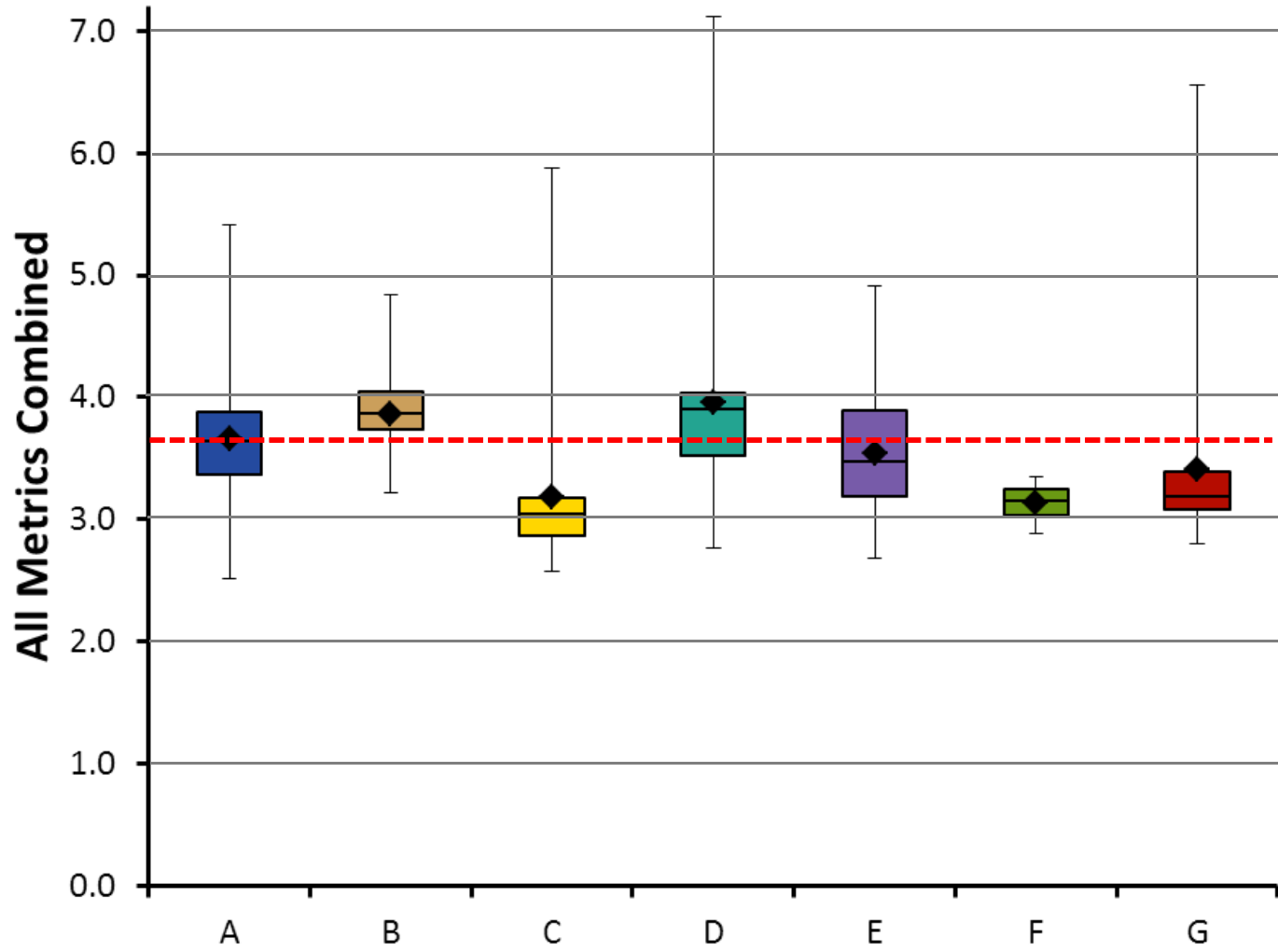


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Vegetation—Native Plants and Diversity



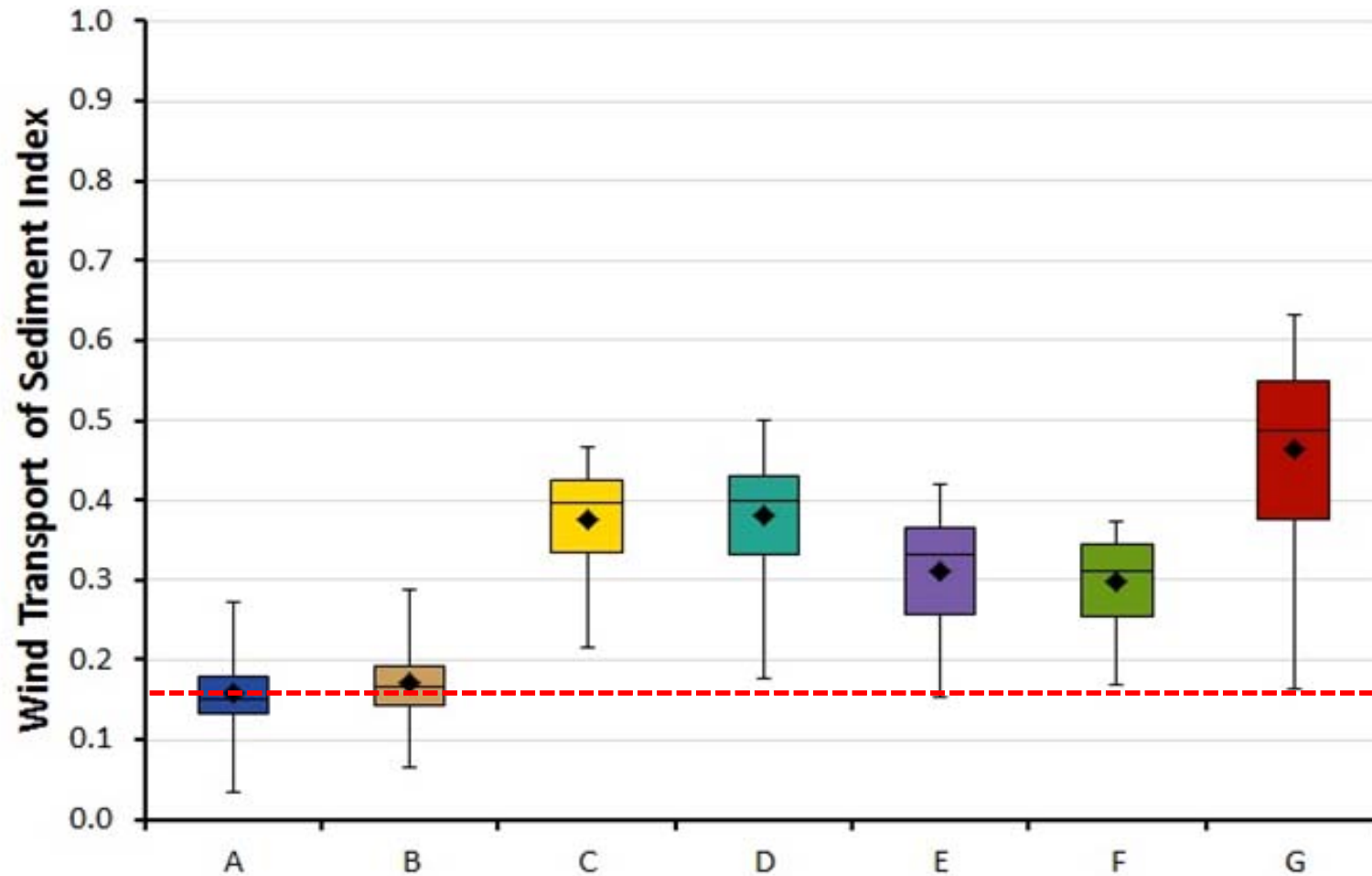


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Cultural Resources—Wind Transport of Sand



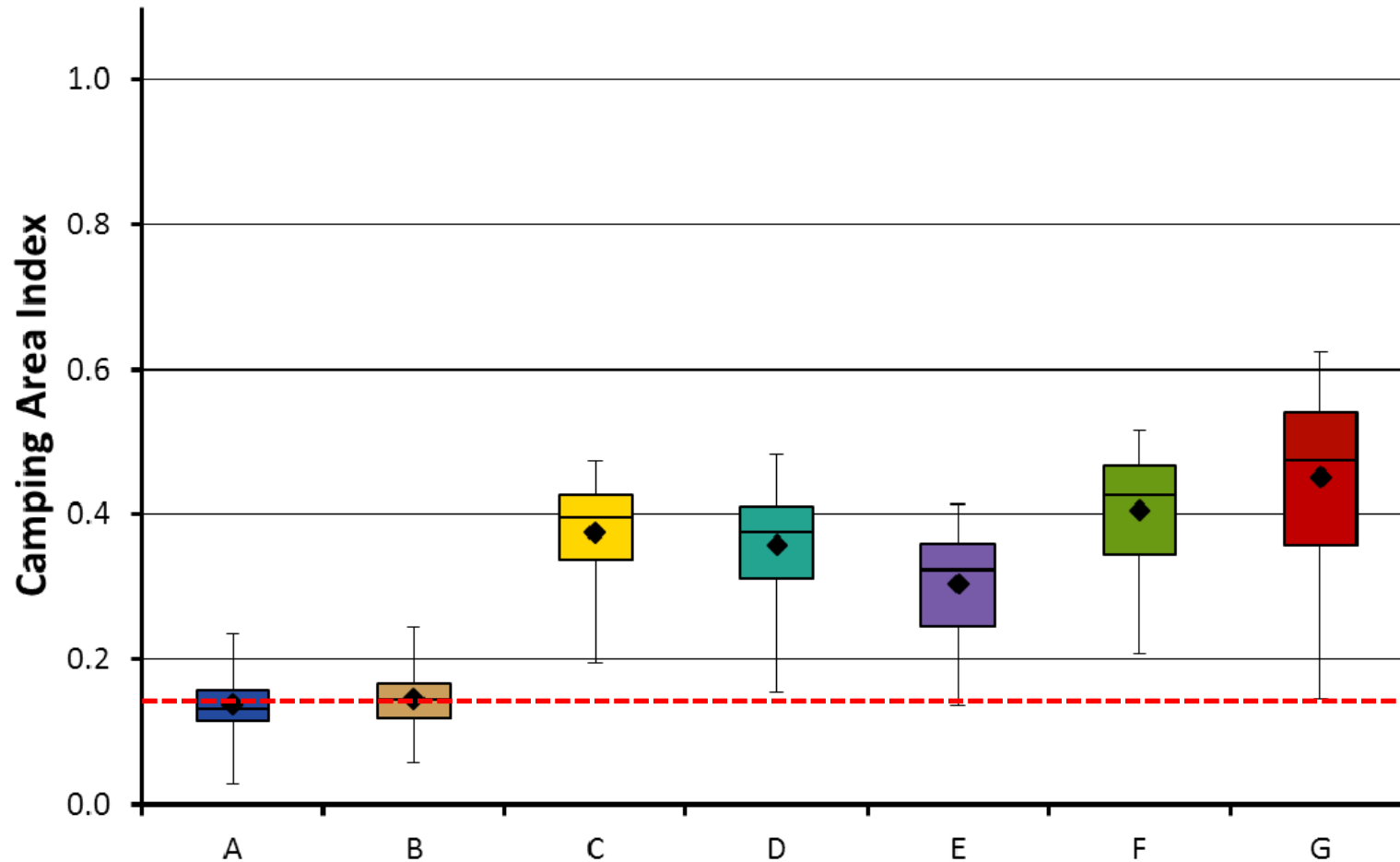


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Recreation—Camping Area Index



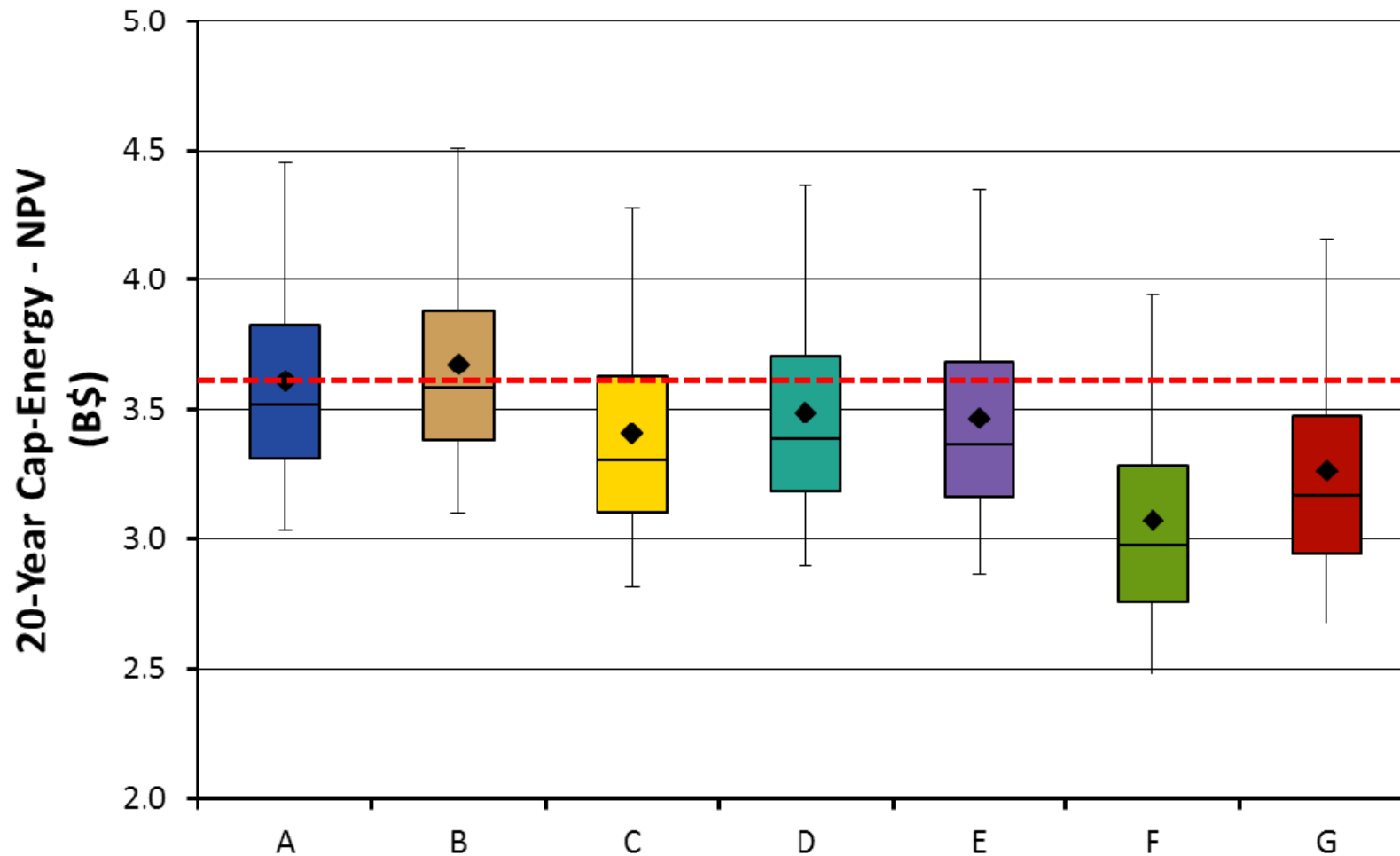


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Hydropower—Value of Capacity and Energy





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Questions?