

**Glen Canyon Dam Adaptive Management Work Group**  
**Agenda Item Information**  
**August 8-9, 2013**

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Agenda Item

Long-Term Experimental and Management Plan (LTEMP) EIS

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Action Requested

Information item only

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Presenter

Rob Billerbeck, Environmental Protection Specialist, National Park Service (NPS)  
Glen Knowles, Chief, Adaptive Management Group, Environmental Resources Division, Upper  
Colorado Region, Bureau of Reclamation (Reclamation)  
Dr. Mike Runge, U.S. Geological Survey, Patuxent Wildlife Research Center

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Previous Action Taken

**December 2009:** Secretary of the Interior Ken Salazar announced that the development of a Long-Term Experimental and Management Plan (LTEMP) for Glen Canyon Dam was needed. The Secretary emphasized the inclusion of stakeholders, particularly those in the Glen Canyon Dam Adaptive Management Program (GDAMP), in the development of the LTEMP.

**November 2011:** Public scoping meetings were held in Phoenix, Flagstaff, Page, Salt Lake City, Las Vegas, and Denver. A webcast was also held to capture participation from those that could not attend in person.

**April 4-5, 2012:** A public workshop was held in Flagstaff, AZ to receive feedback on the preliminary alternative concepts.

**April 30, 2012:** The Secretary of the Interior responded to a recommendation from the AMWG by stating, “With respect to the report of the Socioeconomic Ad Hoc Group, I appreciate the comprehensive nature of the program and plan proposed, and the support of the AMWG for the implementation of these socioeconomic impact assessment studies. I am directing the interagency team for the Department of the Interior to communicate to the AMWG the specific studies and activities that should be prioritized for utilization as part of the ongoing National Environmental Policy Act process to develop a Long Term Experimental and Management Plan (LTEMP) for Glen Canyon Dam. The Technical Work Group can then identify information needs and research priorities not addressed through the LTEMP process so that the [Grand] Canyon Monitoring and Research Center can refine and develop a work plan.”

**August 30, 2012:** Motion (moved by Larry Stevens and seconded by Ted Rampton): AMWG requests that the February 2013 AMWG meeting agenda include a detailed description of the LTEMP alternatives; time for discussion and identification of issues, questions, and concerns; and possible development of a recommendation from non-DOI AMWG members.

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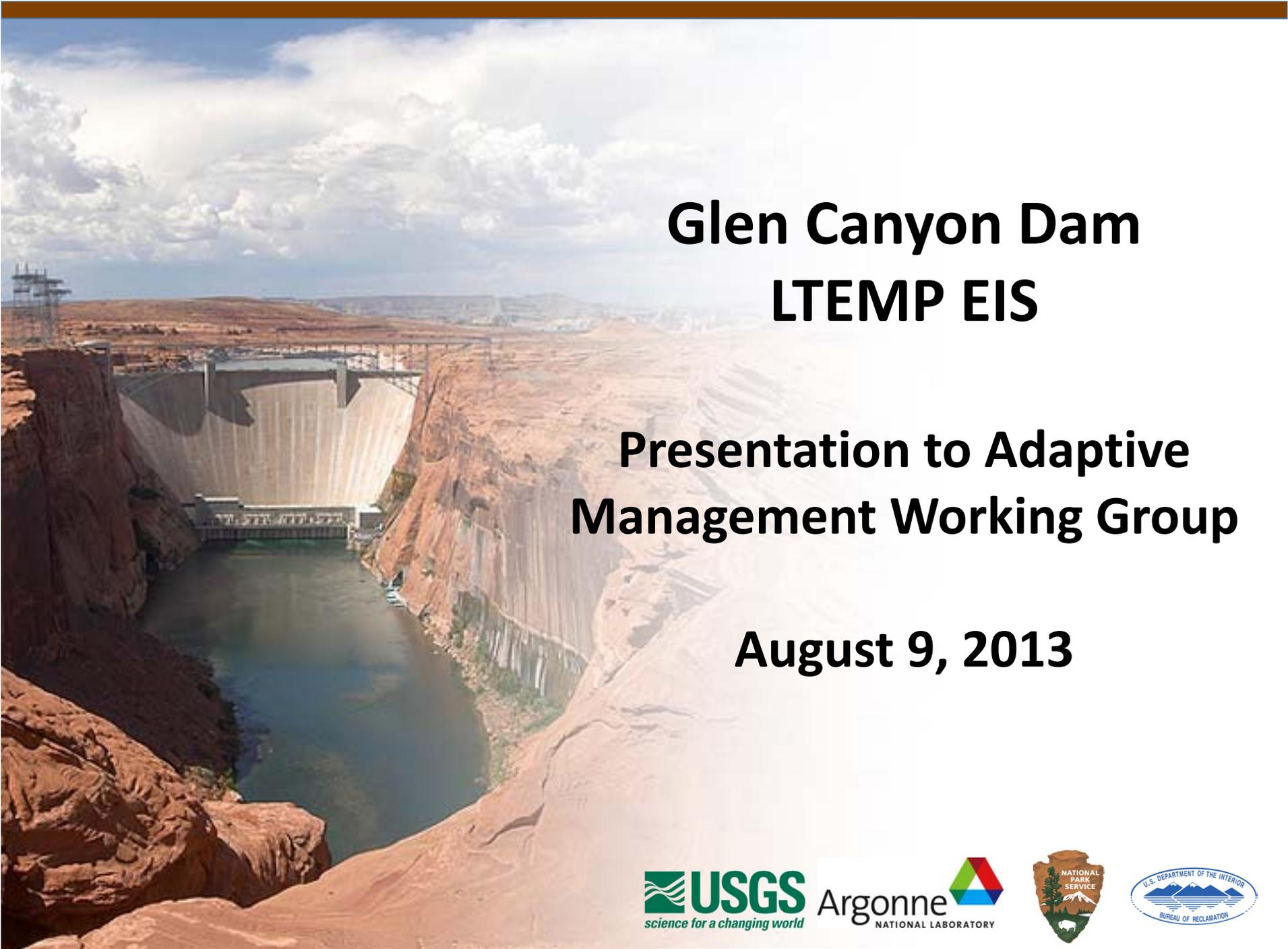
Relevant Science

Science and research completed since the GCDMP was established will be used in the development of the EIS and assessment of impacts.

### Background Information

The Department of the Interior (Department), through Reclamation and NPS, is preparing a draft EIS for adoption of the LTEMP for the operation of Glen Canyon Dam. The purpose of the proposed LTEMP is to utilize current, and develop additional, scientific information to better inform Departmental decisions and to operate the dam in such a manner as to improve and protect important downstream resources while maintaining compliance with the Grand Canyon Protection Act (GCPA), the Law of the River, and the Endangered Species Act, among others, and to fully evaluate dam operations and identify management actions and experimental options that will provide a framework for adaptively managing Glen Canyon Dam over the next 15 to 20 years, consistent with the GCPA and other provisions of applicable Federal law.

The LTEMP EIS Team will be conducting a LTEMP EIS Stakeholder Workshop, which will be held August 5-7, 2013, with AMWG stakeholders and cooperating agencies. At the workshop, initial results of the analysis of alternatives using resource-specific performance metrics will be presented and stakeholders will have the opportunity to participate in the LTEMP structured-decision analysis process. The LTEMP EIS Team will provide a review of the Stakeholder Workshop at the AMWG meeting. The LTEMP EIS team will also discuss the relationship between the NPS Comprehensive Fisheries Management Plan for Glen Canyon National Recreation Area and Grand Canyon National Park and the LTEMP EIS, and provide an update on recent activities, progress to date, upcoming planned meetings, and the current schedule for completion of the EIS.



# Glen Canyon Dam LTEMP EIS

## Presentation to Adaptive Management Working Group

August 9, 2013





# Glen Canyon Dam

Long-Term Experimental and Management Plan EIS



## LTEMP EIS

# Relationship of NPS Comprehensive Fisheries Management Plan (CFMP)



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## Reclamation and NPS Compliance

### Past, Current, and Future compliance actions

- 2007 Final Biological Opinion for the Proposed Adoption of Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead
- 2011 High Flow Experimental Protocol EA
- 2011 Nonnative Fish Control EA
- 2011 Final Biological Opinion on the Operation of Glen Canyon Dam including High Flow Experiments and Non-Native Fish Control
- 2013 NPS Comprehensive Fisheries Management Plan
- LTEMP EIS



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## Reclamation – NPS

### Common Actions

### Reclamation Conservation Measures that are part of the NPS CFMP:

1. Humpback chub (HBC) translocation to tributary streams in Grand Canyon
2. Comprehensive control of brown trout in Bright Angel Creek and the mainstem Colorado River near Bright Angel Creek
3. Monitoring and conservation of Colorado River mainstem aggregations
4. Razorback sucker habitat evaluation and potential augmentation.



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## LTEMP EIS and the NPS CFMP

### CFMP

Goals, Objectives, Desired Conditions for the native fishery in Grand Canyon

### LTEMP EIS

Resource Goals and Resource Objectives

- In general the CFMP provides more specific objectives than the LTEMP EIS.
- The CFMP goals, objectives, and Desired Conditions are consistent with the broader goals of the LTEMP EIS.
- The LTEMP EIS will not adopt the more specific goals of the NPS CFMP.



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## LTEMP EIS and the NPS CFMP

### CFMP

Entirely focused on recreational and native fishery in GCNRA and GCNP and actions to meet goals for these resources

### LTEMP EIS

Focus is on dam operations and related actions to meet requirements of GCPA to protect, mitigate impacts to, and improve resources in GCNRA and GCNP.

- The LTEMP EIS is considering additional tools to help the CFMP such as nonnative fish control in Lees Ferry and at the LCR, and Trout Management Flows.
- The CFMP is designed to work with any alternative that is selected as a preferred alternative in the LTEMP EIS process.



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## LTEMP EIS

# Summary of Stakeholder Tradeoff Analysis Workshop



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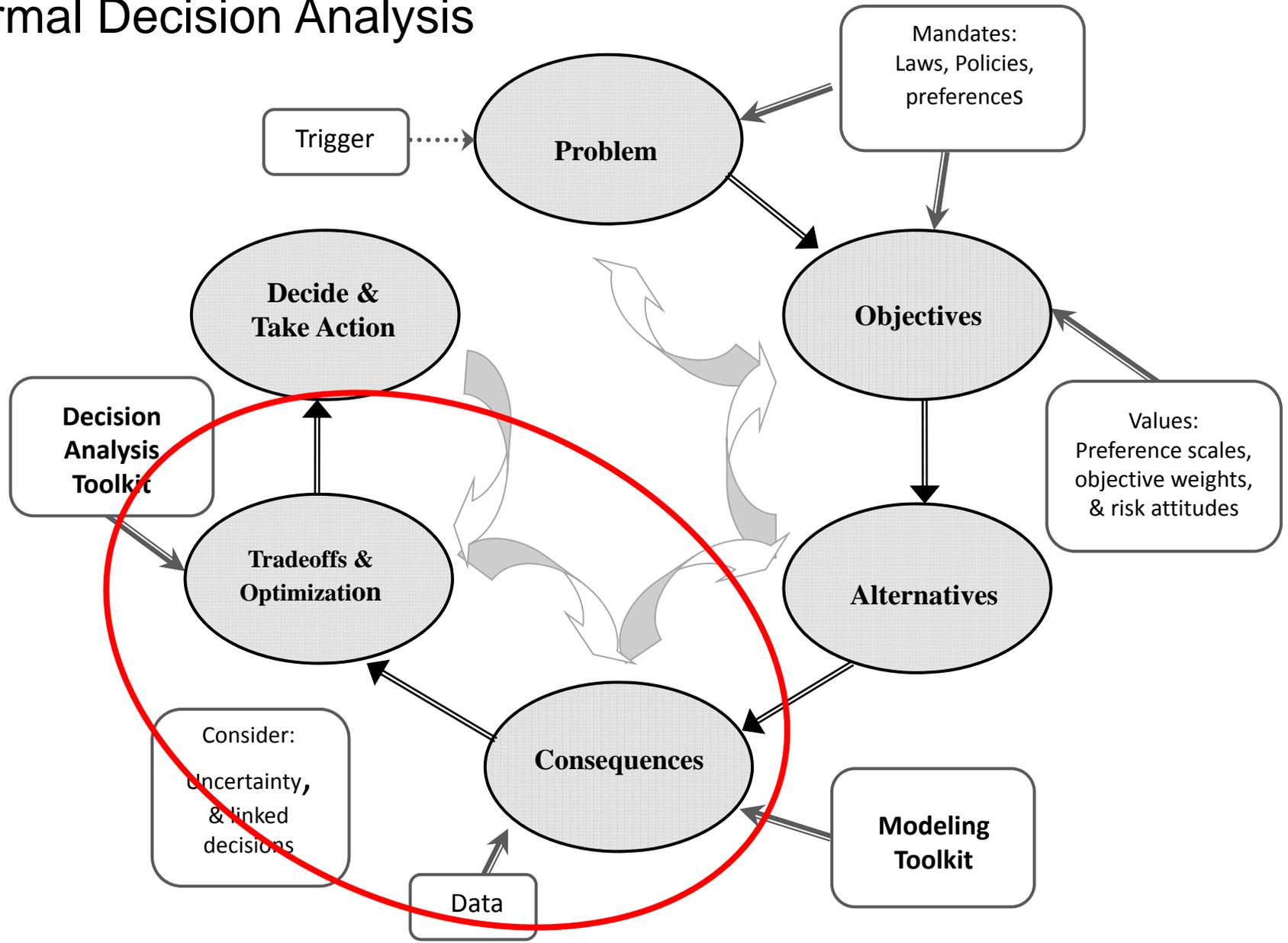
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## Stakeholder Workshop Purposes

- Present preliminary modeling methods and results to AMWG stakeholders; seek input
- Solicit from individual stakeholder agencies their value judgments regarding the relative importance of the resource goals
- Outline subsequent steps
- Note: the purpose was *not* to identify a preferred alternative. We are at a much earlier stage of analysis. We expect refinement of all aspects (alternative, metrics, models).

# Formal Decision Analysis



Source: Jean Fitts Cochrane



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## Preliminary Consequence Analysis

- Presentations from 9 subject-matter expert leads
  - Nine alternatives analyzed against
  - ~35 performance metrics
- Topics
  - Hydrology, temperature, and water delivery
  - Aquatic ecology
  - Hydropower
  - Sediment
  - Riparian vegetation
  - Natural processes
  - Recreation
  - Archaeological and cultural resources
  - Tribal resources



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## Performance Metrics

- Quantitative expression of the *fundamental* objectives (resource goals)
  - The scales on which the alternatives will be evaluated
  - The outputs of the models
- It is remarkably challenging to develop a performance metric that
  - Accurately and directly represents a resource goal
  - Can be evaluated with existing data, models, and expertise



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## Tribal Values

- DOI and the lead agencies have invested special effort to engage the tribes in this process
  - March 2013 workshop with tribal representatives
  - Numerous webinars and calls
  - May – July 2013 Visits to cultural resource advisors and elders at Hualapai, Hopi, Zuni, and Southern Paiute
- Developing quantitative metrics for cultural and spiritual values is challenging
  - Deliberate effort to give voice to objectives that often remain unheard
  - Work in progress
  - We're grateful for the dedication of the LTEMP tribal representatives



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## Some examples of performance metrics

- Natural scale
  - Resource goal: Hydropower
  - Performance metric: averaged annual hydropower generation over 20-year traces for each alternative
- Proxy scale
  - Resource goal: Sediment resources (sandbars)
  - Performance metric: sand load index (ratio of sand transported >31,500 cfs to total sand transported)
- Constructed scale
  - Resource goal: Preservation of National Register-listed or –eligible sites
  - Performance metric: Aeolian deposition index (constructed metric based on sand load index, vegetation predictions, and flow conditions)



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## Preliminary Consequence Analysis

- The subject-matter expert teams have invested tremendous effort to produce these preliminary results
  - The modeling frameworks set the stage for further analysis
- To date, most of the analysis has been over only 1 hydrologic trace
  - The intent is to run many more traces, to explore a wide range of future conditions
- As a result of feedback from the meeting, revisions will be made to
  - Alternatives
  - Performance metrics
  - Modeling methods



## Preliminary Tradeoff Analysis

- In the second half of the workshop, we elicited values weights from the stakeholders
- Swing weighting method
  - Commonly used elicitation method from the field of multi-criteria decision analysis
  - Asks a decision-maker or stakeholder to consider the relative importance of the resource goals, taking into account the possible range over which they could vary

## Swing Weighting Practice Example

Objective	Units	Desired Direction	Worst Case	Best Case	Rank	Score
Salary	\$/yr	High	80,000	120,000		
Dist. from Family	mi	Low	1000	0		
Job description	scale, 1-5	High	2	5		
Partner's opportunities	# business contacts	High	9	12		

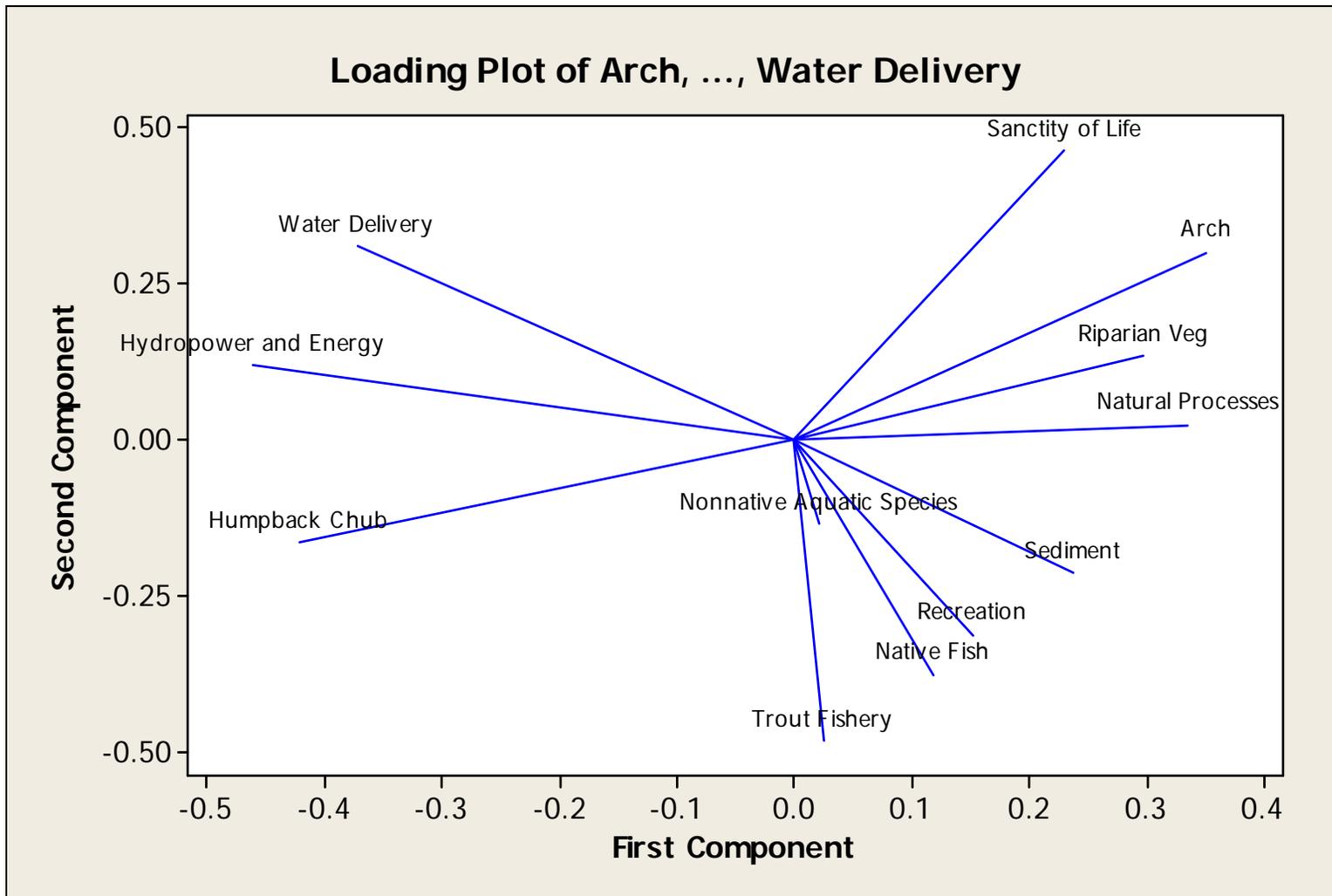


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## Stakeholder weights: correlations





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## Stakeholder Values

- The purpose was to elicit individual stakeholder values, anonymously at this stage, to begin to have a sense of the range of perspectives on the LTEMP resource goals
  - The intent is not to aggregate the results, but to retain an understanding of the individual variation
  - Each stakeholder is important to DOI; we do not want to lose the detail
- These results are only preliminary
  - The performance metrics and their ranges are likely to change
  - This is a difficult exercise the first time through
  - We will conduct a second round of values elicitation
- We are very grateful to the stakeholders for their time, energy, passion, and integrity. The feedback we have received is very valuable and will help guide the next steps



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## LTEMP EIS

# Update on Process and Schedule



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## Current EIS Schedule

### Review and discuss stakeholder comments following workshop

- Stakeholder written comments on metrics, models due Aug 23, 2013
- Cooperating agency call Aug 28, 2013

### Complete Phase I model results

- Further error checking and refinement
- Subject Matter Expert Group discussions of model interpretations, metric and index changes
- Cooperating Agency Call/Meeting - updates and modeling and metrics



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## Current EIS Schedule

### Process and Revisions between Phase 1 and Phase 2 (not in sequential order)

- Stakeholder webinars for second round of decision analysis
  - Series of webinars
- Stakeholder input regarding models, metrics and alternatives
- Refine resource goals, alternatives, performance metrics, & models
- Complete development of hypotheses for critical uncertainties
- Initiate Expert Elicitation for additional metrics if needed



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## Current EIS Schedule

### Process and Revisions between Phase 1 and Phase 2 (not in sequential order)

- Initiate Model Review Processes
- Analyze value of information
- Develop the experimental and adaptive designs in the alternatives
- Alternative Changes including incorporation of non-flow action details, adaptive strategies, experimental design
- Cooperating Agency Call/Meetings



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## Current EIS Schedule

### Phase 2 modeling and analysis

- Run a second phase of models
- Additional analyses including socioeconomic, empirical data review, qualitative analysis
- Preparation of preliminary draft EIS
- Cooperating Agency Call/Meetings



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## Current EIS Schedule

### Additional Steps in finalizing Public Draft EIS

- Public Science Meeting
- Preliminary Draft EIS – circulated for Cooperating Agency Review
- Public Draft EIS
- Draft EIS public meetings and comment period