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A Update on the LTEMP Decision Analysis

Adaptive Management Working Group
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Outline

- Upcoming steps in the LTEMP decision analysis
- Expected value of information, long-term strategies, and experimental design
- Approach to climate change analysis

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LTEMP Decision Analysis

Upcoming Steps

Role of SDA in LTEMP

- Structured decision analysis is *one* of the analytical tools being used to evaluate alternatives in the LTEMP EIS
  - Particularly to enhance wide stakeholder input
- The negotiation & selection of a preferred alternative will be based on the full EIS analysis, qualitative and quantitative evaluations, public comment, socioeconomic considerations, and consultation with stakeholders

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Upcoming Steps

1. Completion of modeling
2. Joint-lead compilation of quantitative results
3. Stakeholder swing-weighting
4. Multi-criteria decision analysis, including effects of the weights on ranking of alternatives

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Upcoming Steps

5. Expected value of information (EVPI) analysis
6. Development of experimental design (adaptive strategies) based on the EVPI analysis
7. Evaluation of adaptive strategies (narrative evaluation)

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Stakeholder Swing-weighting

- DOI and the joint-lead agencies are very interested in the structured input of the individual AMWG member agencies
- Steps
  - Webinar to prepare the swing-weighting exercise
  - Workshop to share the modeling results
  - Time to complete swing-weighting

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Adaptive Strategies

Expected value of information, long-term strategies, and experimental design

Critical Uncertainty

- Uncertainty that impedes the choice of a long-term management strategy
  - Because different hypotheses lead to different management strategies
  - Information that is “need to know”, not just “nice to know”
- Up front articulation of uncertainty
  - Expression of uncertainty as alternative hypotheses about how the system responds to management

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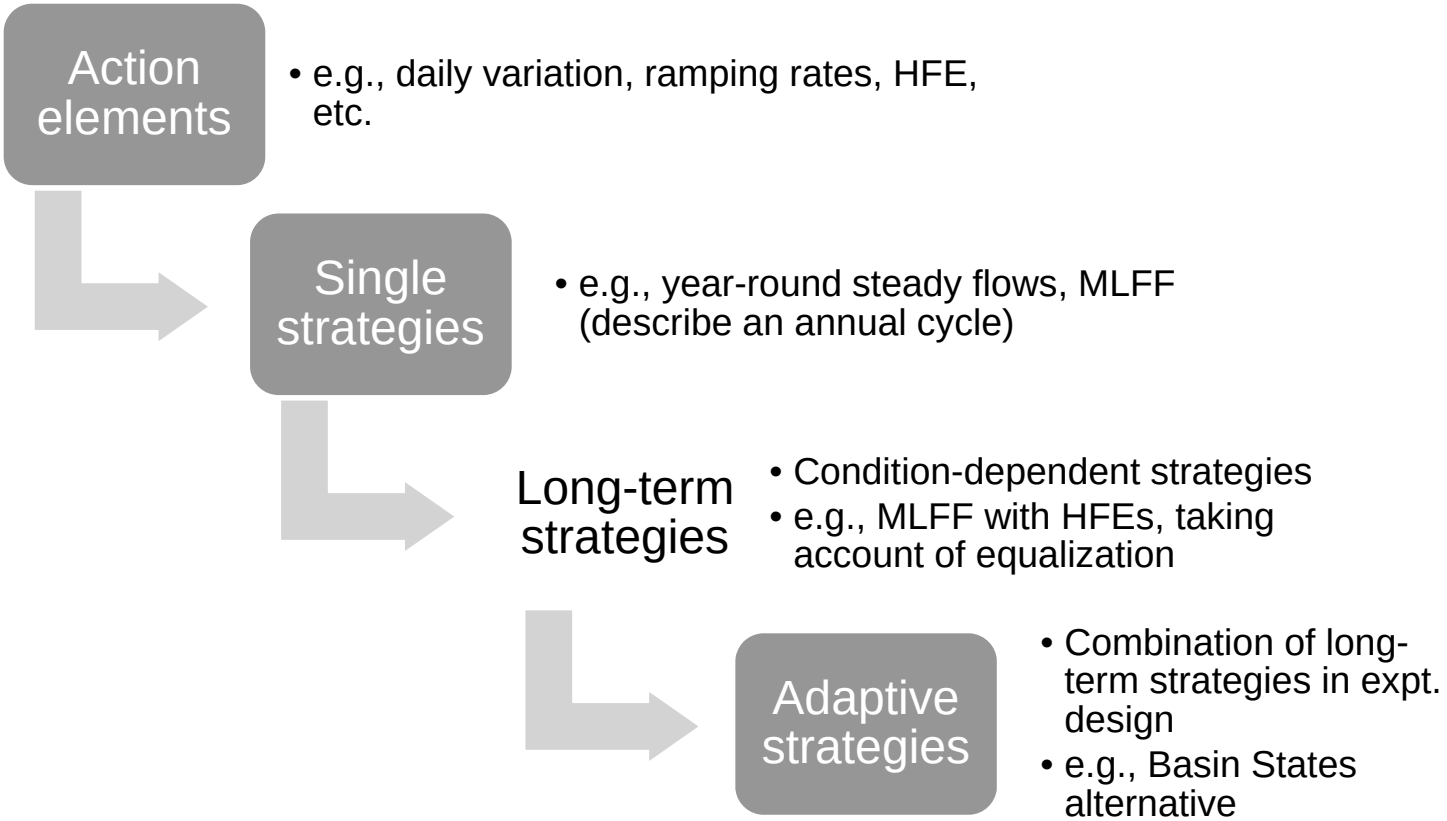
(de-)Constructing Alternatives



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CDAS Long-term strategies

		Temp+	Temp+	Temp-	Temp-
		Trout+	Trout-	Trout+	Trout-
HFE/RBT+	TMF+	CDAS1	CDAS2	CDAS1	CDAS2
HFE/RBT+	TMF-	CDAS3	CDAS2	CDAS3	CDAS2
HFE/RBT-	TMF+	CDAS1	CDAS2	CDAS1	CDAS2
HFE/RBT-	TMF-	CDAS4	CDAS2	CDAS4	CDAS2

Critical Uncertainties:

HFE/RTB+	HFE effect on trout is strong (vs. weak)
TMF+	Trout management flows are effective (vs. not)
Temp+	Temperature effect on HBC productivity is strong (vs. weak)
Trout+	Trout effect on HBC survival and production is strong (vs. weak)

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Long-term Strategies

- We are currently analyzing the potential long-term strategies against a set of critical uncertainties
- We will conduct a value-of-information analysis to identify which uncertainties are most important to resolve

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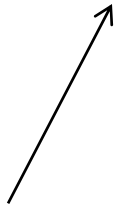
Value of Information (EVPI)

	Hypothesis$_1$	Hypothesis$_2$	Average
Alternative 1	0.50	0.50	0.5
Alternative 2	0.70	0.24	0.47
Alternative 3	0.55	0.63	0.59
Alternative 4	0.43	0.68	0.56
Best	*0.70*	*0.68*	*0.69*



The expected value of perfect information is 0.10 (a 17% increase): 0.69 – 0.59.

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Revision of Adaptive Strategies

- The existing adaptive strategies (RTCD, CDAS, and BR) are composed of various long-term strategies, and focus on different subsets of uncertainty
  - These could be revised based on the value-of-information analysis
- We expect to develop one more adaptive strategy based on the value-of-information analysis
  - Using the best from all long-term strategies

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Evaluation

- To evaluate the adaptive strategies, we will look at
  - Their expected performance in the face of uncertainty
  - The potential value-of-information associated with their experimental design
  - The power of their experimental design to resolve uncertainty
  - The costs (both direct costs and opportunity costs) of their experimental design

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Climate Change

Approach to Analysis

Two approaches considered

- Climate adaptation approach
  - Place climate effects and their uncertainty at the center of the design and analysis of strategies for LTEMP.
- Robustness to climate change approach
  - Analyze the robustness of alternatives to uncertainties in the water and sediment inputs.

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Robustness Approach

- Use “observed resampled” hydrological (21) and sediment (3) traces to represent possible future trajectories
- Weight these 63 scenarios using two schemes
  - Historical: assume future will be like past
  - Climate change: develop weights based on comparison to the Basin Study

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Robustness Approach

- Decision analysis (MCDA, EVPI) will be conducted with both weighting schemes (historical, climate change)
  - Particularly to look at whether the ranking of alternatives changes under different hydrological and sediment conditions

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