Technical Work Group Chair Report

Adaptive Management Work Group Meeting

February 11, 2021

Seth Shanahan

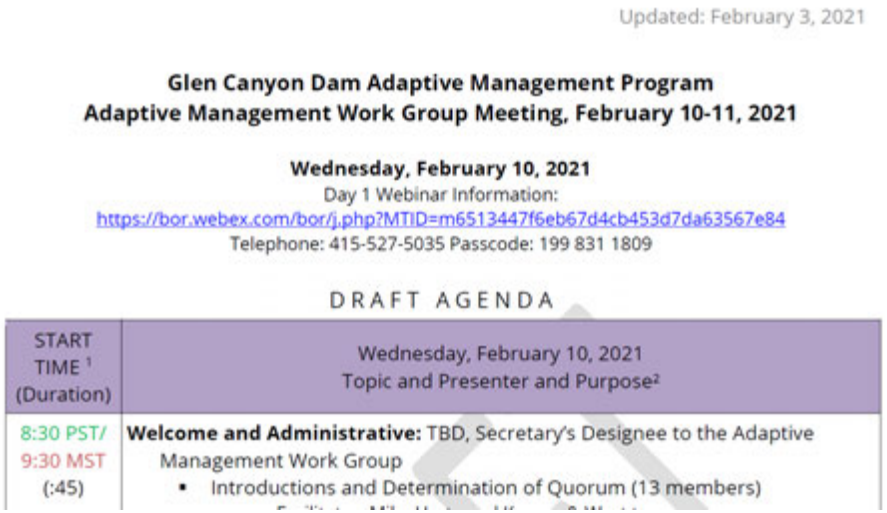
TWG Chairperson

Meetings

- Past
  - October 14-15, 2020
  - January 20-21 (AR) and 22 (TWG), 2021
- Future
  - April 13-14, 2021

Items Reported Elsewhere on AMWG Agenda

- Annual Reporting Meeting
- Basin hydrology and operations
- Brown Trout IH Program
- Possible experimental and management actions in the next 12 months



Updated: February 3, 2021

Glen Canyon Dam Adaptive Management Program
Adaptive Management Work Group Meeting, February 10-11, 2021

Wednesday, February 10, 2021
Day 1 Webinar Information:
https://bor.webex.com/bor/j.php?MTID=m6513447f6eb67d4cb453d7da63567e84
Telephone: 415-527-5035 Passcode: 199 831 1809

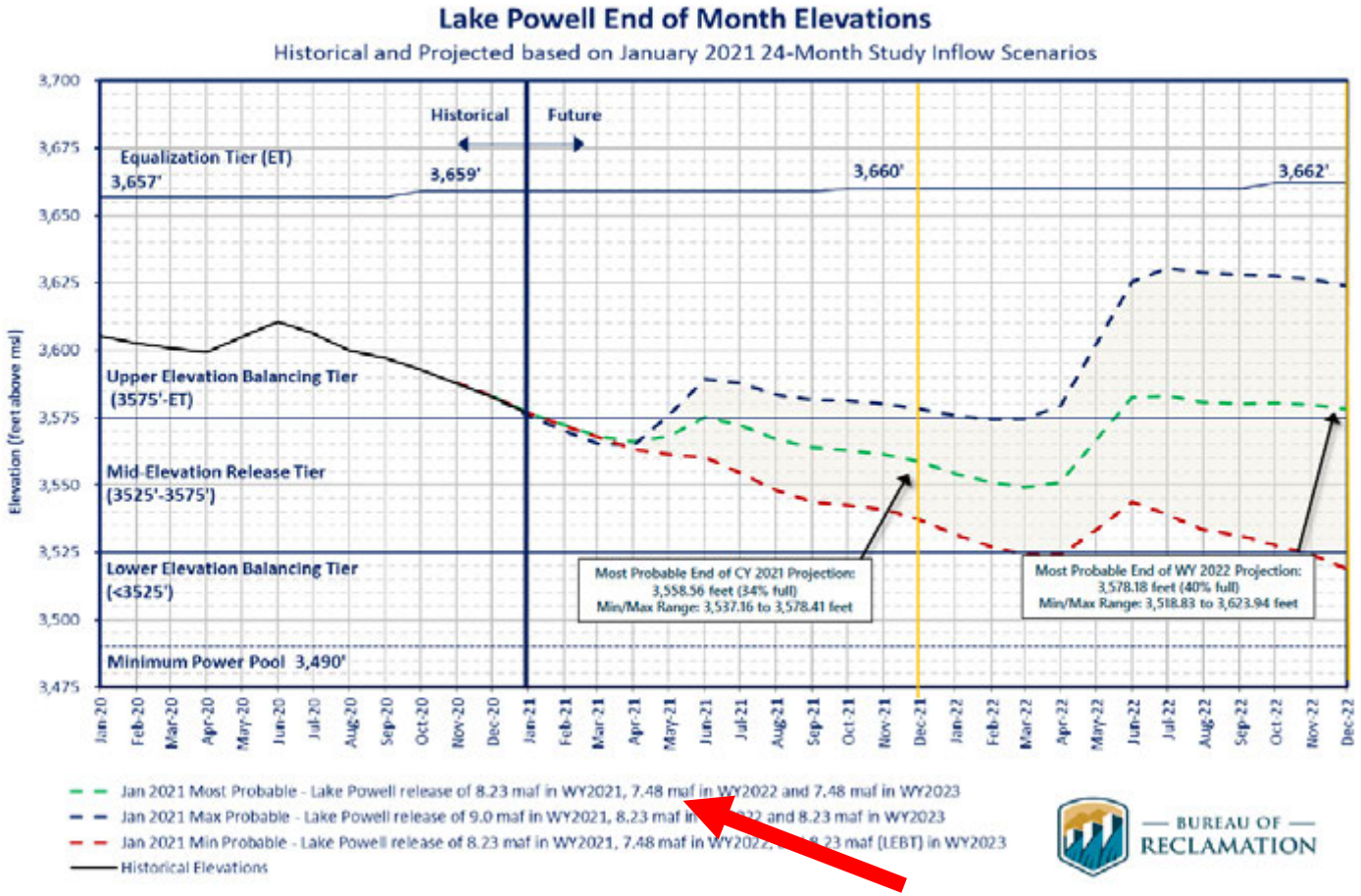
DRAFT AGENDA

START TIME [1] (Duration)	Wednesday, February 10, 2021 Topic and Presenter and Purpose[2]
8:30 PST/ 9:30 MST (:45)	**Welcome and Administrative:** TBD, Secretary's Designee to the Adaptive Management Work Group • Introductions and Determination of Quorum (13 members)

7.48 MAF Release in WY22 (???) – Resource Outcomes (???)

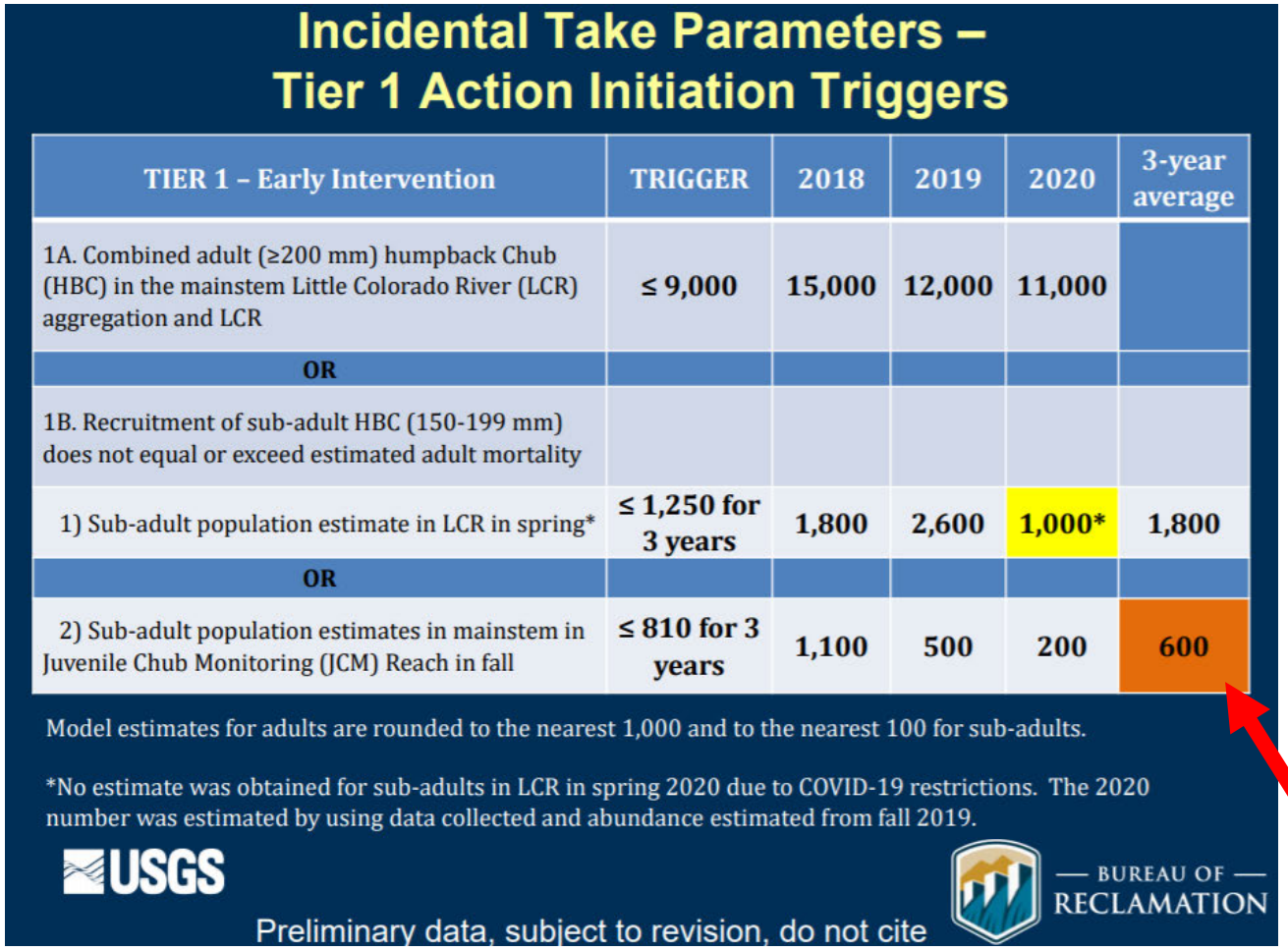
Table 1. Summary of Lake Powell and Lake Mead Coordinated Operations 2008-2019.

	Lake Powell Operations (WY)					Lake Mead Operations (CY)
Year	Operating Tier	April Adjustment	WY Unregulated Inflow (% average)	Release Volume (maf)	Equalization Volume (maf)	Operating Condition
2008	Upper Elevation Balancing	Equalization	112	8.98	0.75	Normal/ICS Surplus
2009	Upper Elevation Balancing	None	94	8.24[1]	-	Normal/ICS Surplus
2010	Upper Elevation Balancing	None	78	8.23	-	Normal/ICS Surplus
2011	Upper Elevation Balancing	Equalization	147	12.52	4.29[2]	Normal/ICS Surplus
2012	Equalization	NA	45	9.47	1.23[3]	Normal/ICS Surplus
2013	Upper Elevation Balancing	None	47	8.23	-	Normal/ICS Surplus
2014	Mid-Elevation Release	NA	96	7.48	-	Normal/ICS Surplus
2015	Upper Elevation Balancing	Balancing	94	9.00	-	Normal/ICS Surplus
2016	Upper Elevation Balancing	Balancing	89	9.00	-	Normal/ICS Surplus
2017	Upper Elevation Balancing	Balancing	110	9.00	-	Normal/ICS Surplus
2018	Upper Elevation Balancing	Balancing	43	9.00	-	Normal/ICS Surplus
2019	Upper Elevation Balancing	Balancing	120	9.00	-	Normal/ICS Surplus



October 2021 Powell elev. is projected to be ~ 60 ft lower than in October 2014

Tier 1 Conservation Action Response Triggered



Incidental Take Parameters – Tier 1 Action Initiation Triggers

TIER 1 – Early Intervention	TRIGGER	2018	2019	2020	3-year average
1A. Combined adult (≥200 mm) humpback Chub (HBC) in the mainstem Little Colorado River (LCR) aggregation and LCR	≤ 9,000	15,000	12,000	11,000	
OR					
1B. Recruitment of sub-adult HBC (150-199 mm) does not equal or exceed estimated adult mortality					
1) Sub-adult population estimate in LCR in spring*	≤ 1,250 for 3 years	1,800	2,600	1,000*	1,800
OR					
2) Sub-adult population estimates in mainstem in Juvenile Chub Monitoring (JCM) Reach in fall	≤ 810 for 3 years	1,100	500	200	600

Model estimates for adults are rounded to the nearest 1,000 and to the nearest 100 for sub-adults.

*No estimate was obtained for sub-adults in LCR in spring 2020 due to COVID-19 restrictions. The 2020 number was estimated by using data collected and abundance estimated from fall 2019.

USGS

Preliminary data, subject to revision, do not cite

BUREAU OF RECLAMATION

"Ongoing translocations in the LCR above Chute Falls (~300 fish/year) as well as outside the LCR population (e.g., to Havasu Creek, etc.) will continue, regardless if Tier 1 triggers are met or not." (BA p. O-181)

Tier 1 Conservation Action Response Triggered (cont.)

- "LCR - Expand translocation actions in the LCR by collecting an additional 300-600 young of the year (YOY) HBC and move to above Chute Falls in October.
- LCR - Assess efficacy of transporting larval HBC (April/May) into Big Canyon and above Blue Springs in the LCR system. Evaluate growth and survival of these transplants.
- Mainstem LCR Aggregation - Larval fish will be removed from LCR (April/May) and head-started at Southwest Native Aquatic Resources and Recovery Center (SNARRC). Once fish reach 150-200 mm they will be translocated to the mainstem LCR reach the following year (currently grow-out space at SNARRC is limited to 750 HBC, use of fish for this purpose would reduce numbers available for other actions, e.g. Havasu, Shinumo.)
- Additional conservation actions as identified and evaluated." (BA p. O-181)

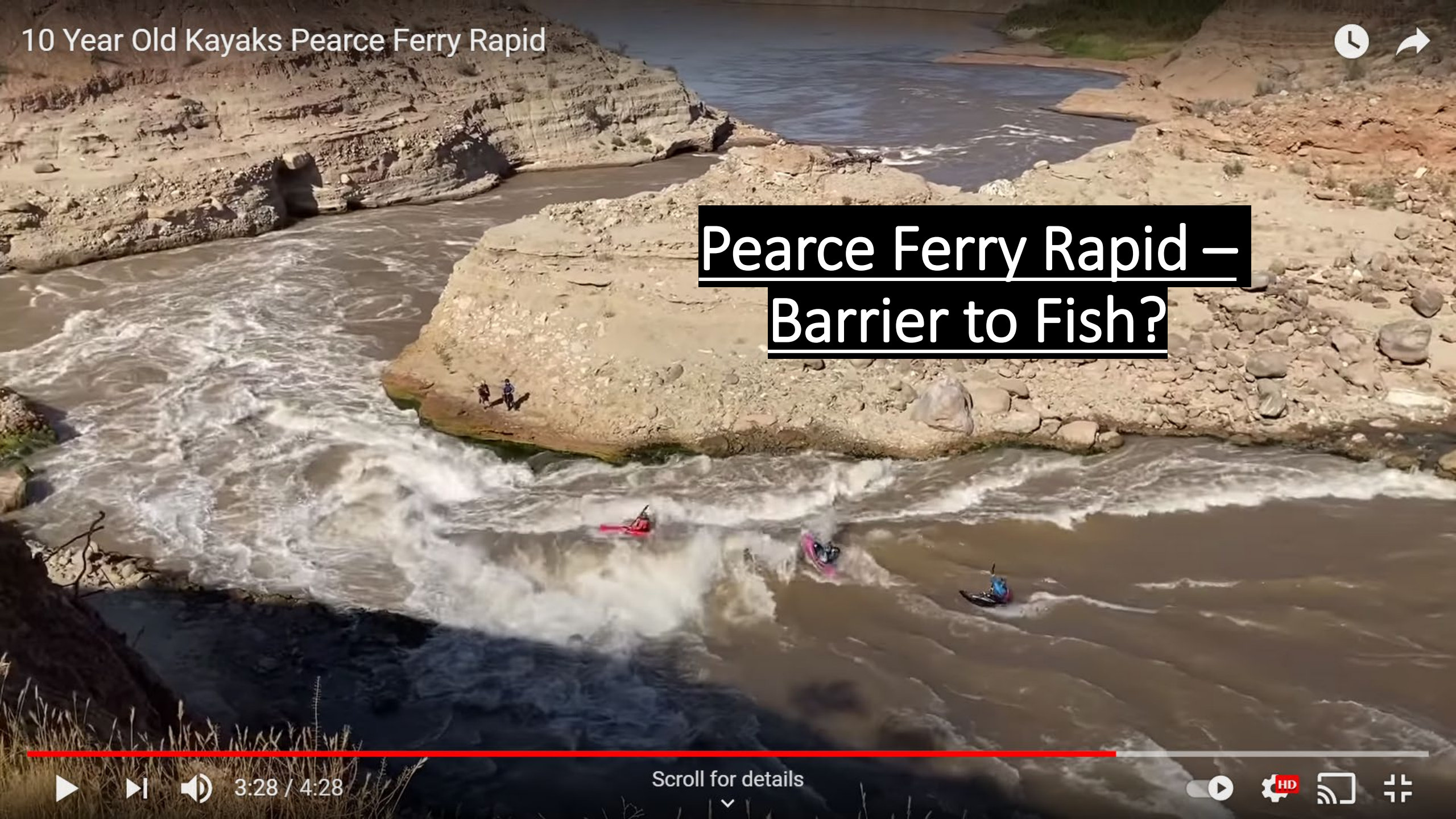

10 Year Old Kayaks Pearce Ferry Rapid
Pearce Ferry Rapid –
Barrier to Fish?
3:28 / 4:28
Scroll for details
HD

Table 1. Summary of the 18 performance metrics used in the decision analysis.

[The range for each performance metric captures the amount of variability in the metric because of the effects of the different alternatives, the hydrological and sediment traces, and structural and parametric uncertainty. The range shown was used in the swing-weighting elicitation. HBC, humpback chub; RBT, rainbow trout; #, number; >, greater than]

Number	Resource goal	Performance metric	Units	Desired direction	Range
1	Humpback chub	Minimum number of adult HBC	# adults	Increase	3,000–8,500
2		HBC temperature suitability	Index (0–1)	Increase	0.0–0.2
3	RBT fishery	RBT catch rate	Fish/angler-hour	Increase	1.0–5.0
4		RBT emigration rate	Trout/year	Decrease	15,000–125,000
5		Abundance of high-quality RBT	# fish > 16 inches	Increase	400–1,200
6	Archaeological and cultural resources	Wind transport of sediment index	Index (0–1)	Increase	0.0–0.5
7		Glen Canyon flow index	Days/year	Decrease	0–75
8		Time-off-river index	Index (0–1)	Increase	0.60–0.95
9	Hydropower and energy	Hydropower generation	Million $/year	Increase	120–200
10		Hydropower capacity	Million $/year	Increase	10–50
11	Recreation	Camping area index	Index (0–1)	Increase	0.0–0.5
12		Fluctuation index	Index (0–1)	Increase	0.0–1.0
13		Rafting use index	Visitor-days/year	Decrease	0–1,300
14	Riparian vegetation	Riparian vegetation index	Sum of ratios	Increase	2.0–6.0
15	Sediment	Sand load index	Proportion (0–1)	Increase	0.0–0.6
16	Tribal resources	Marsh vegetation ratio	Ratio	Increase	0.0–1.5
17		Mechanical removal	Years (out of 20)	Decrease	0–5
18		Trout management flows	Years (out of 20)	Decrease	0–20

Monitoring Metrics…

still needed

Monitoring Metrics… and need to be used

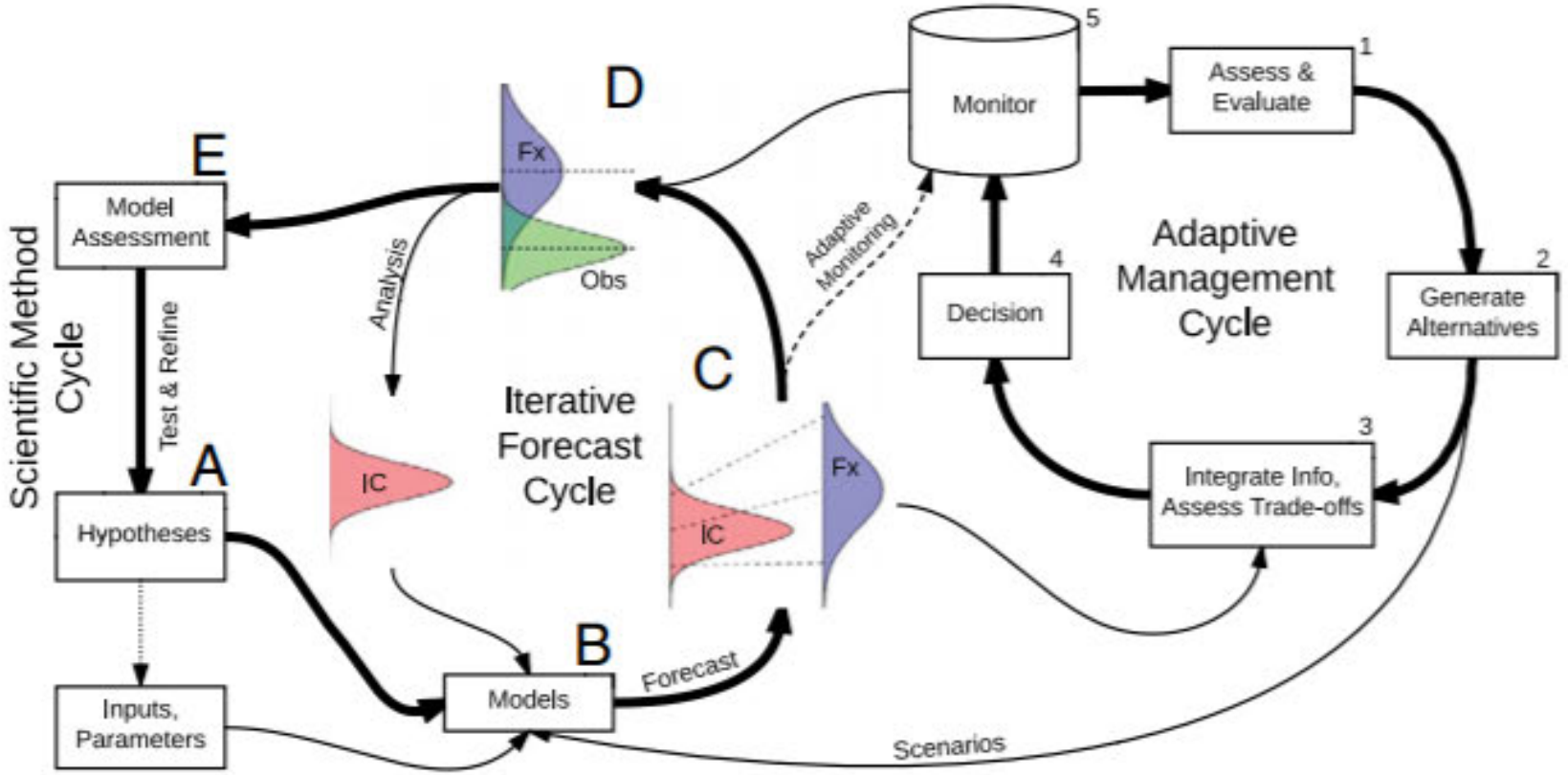
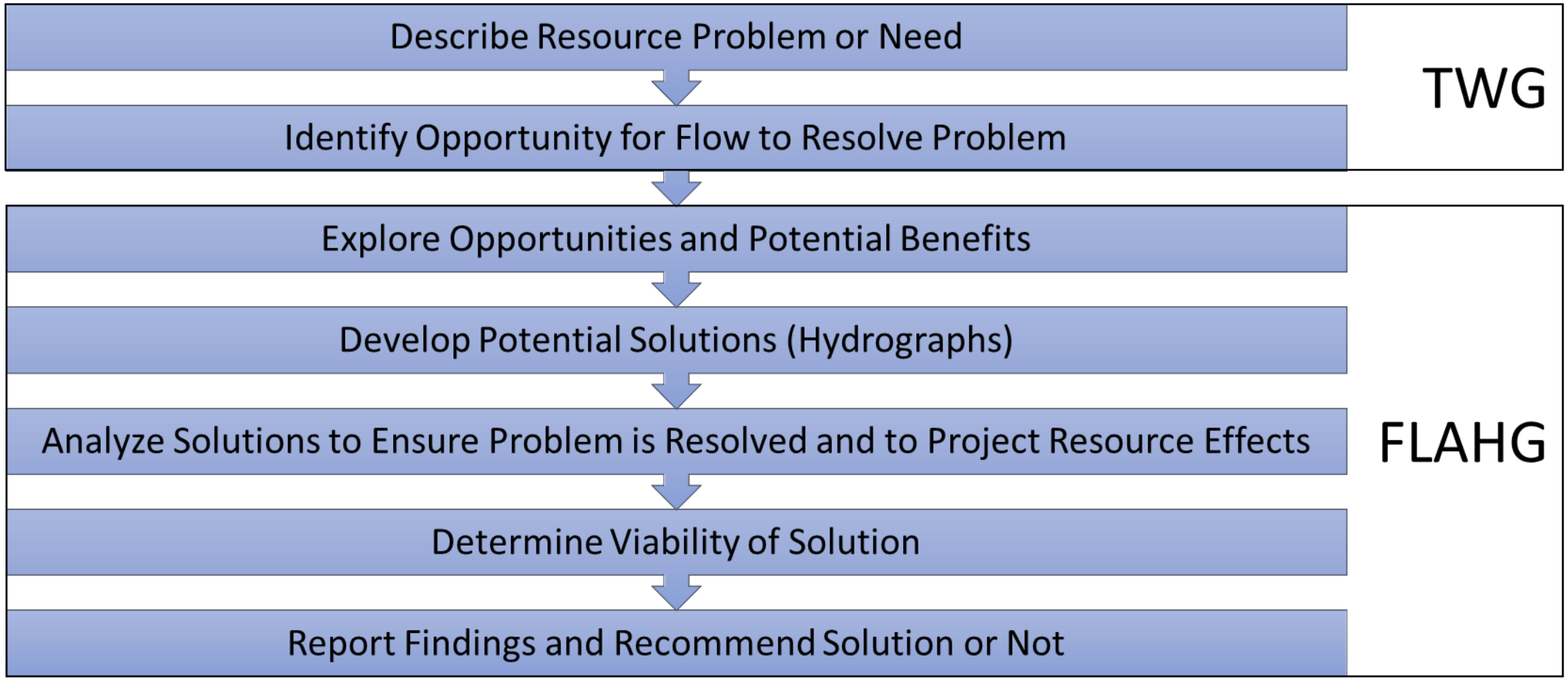


Fig. 1. Conceptual relationships between iterative ecological forecasting, adaptive decision-making, and basic science. Hypotheses (*A*) are embedded in models (*B*) that integrate over uncertainties in initial conditions (IC), inputs, and parameters to make probabilistic forecasts (Fx, *C*), often conditioned on alternative scenarios. New observations are then compared with these predictions (*D*) to update estimates of the current state of the system (Analysis) and assess model performance (*E*), allowing for the selection among alternative model hypotheses (Test and Refine). Analysis and partitioning of forecast uncertainties facilitates targeted data collection (dotted line) and adaptive monitoring (dashed line). In decision analysis, alternative decision scenarios are generated (2) based on an assessment of a problem (1). Since decisions are based on what we think will happen in the future, forecasts play a key role in assessing the trade-offs between decision alternatives (3). Adaptive decisions (4) lead to an iterative cycle of monitoring (5) and reassessment (1) that interacts continuously with iterate forecasts.

Reflections on a Successful Process – FLAHG Workflow



Future TWG Agenda Items

- Western and indigenous world views
- Tier 1 conservation actions status
- Spring experiments and UCRIP spring flows request (energy system effects)
- Pikeminnow feasibility study
- Temp. control report
- Admin. history project
- Nearby uranium mining
- Foodweb concentrations of mercury
- Adaptive management
  - Information thresholds
  - Monitoring metrics
- Preemptive sand storage
- 7.D Review, 07G 2.0, Drought Response Operations, et al.
- Budget prioritization criteria

And…a fond farewell to Vineetha Kartha!