

Glen Canyon Dam Adaptive Management Work Group
Agenda Item Form
February 15-16, 2017

Agenda Item

Knowledge Assessment Update

Purpose of Agenda Item

To increase understanding of the pilot process that the TWG is using to organize and display information about current knowledge of resource status and trends and cause-effect relationships, and uncertainties in this current knowledge.

Action Requested

Information item only; we will answer questions but no action is requested.

Presenters

Seth Shanahan, Southern Nevada Water Authority, TWG Chair
David Braun, Sound Science, Science Advisors Executive Coordinator

Previous Action Taken

The AMP community has carried out several previous Knowledge Assessments, either comprehensive or focused on individual resource topics. The most recent comprehensive assessment was in 2005-06 and the most recent limited assessment, on fish and aquatic resources, was in 2011-12.

Relevant Science

N/A

Summary of Presentation and Background Information

Knowledge assessments are a standard tool in adaptive management, with two purposes:

- (1) They assess the state of knowledge concerning:
 - Status and trend for resources central to an adaptive management program
 - The factors (*aka* 'drivers') that shape resource status and trends
 - The ways in which past, current, and planned future management actions affect these drivers or directly affect resource status.
- (2) They identify areas of uncertainty in this knowledge that the adaptive management team may want to address through additional investigations, including but not limited to field monitoring or research.

The present (FY 2017) knowledge assessment is timed to coincide with and inform the Annual Reporting process and development of the next GCDAMP Triennial Work Plan for FY 2018-2020. This knowledge assessment is testing a methodology for better organizing, displaying, and communicating its findings, potentially to carry forward to guide future knowledge assessments as well.

The presentation will cover the pilot process and some preliminary findings.

Glen Canyon Dam Adaptive Management Program:
2017 Knowledge Assessment

Seth Shanahan, TWG Chair
& David P. Braun, Sound Science LLC:
GCDAMP Executive Coordinator for Science Advisors
GCDAMP AMWG Meeting, February 15, 2017, Phoenix, AZ

Thanks to the Steering Committee Ad Hoc Group

Shane Capron

Marianne Crawford

Craig Ellsworth

Katrina Grantz

John Jordan

Vineetha Kartha

Peggy Roefer

Larry Stevens

Scott VanderKooi

Linda Whetton

The Core Issue



It's Complicated!



Why a Knowledge Assessment?

- To respond to TWG stakeholder requests to better understand:
 - What we know
 - What we don't know
 - Confidence in our knowledge



Knowledge Assessment

- Objectives
 - Summarize what is known
 - Assess ongoing needs for monitoring to sustain crucial knowledge
 - Identify critical knowledge gaps and weaknesses that require attention
- Desired Outcomes
 - Crucial information for work planning and budgeting
 - Tabular graphics to improve communication with stakeholders and general public
 - A standard assessment process, repeatable with minimal effort



Structure of Assessment

Eleven “Resource Topics”

- Aquatic food base
- Archaeological and cultural resources
- Humpback chub
- Hydropower and energy
- Invasive fish species
- Other native fish species
- Rainbow trout fishery
- Recreational experience
- Riparian vegetation
- Sediment
- Water quality

Tribal Cultural Values

- Addressed parallel to western science assessment



“Knowledge” Assessed

- Status and Trend
 - Status of the condition(s) addressed by the topic
 - Direction of any trend(s) in these conditions
- Effects of Key Drivers and Constraints
 - What key external factors significantly shape status and trend?
 - Strength and direction of these effects
- Effects of LTEMP Experimental and Management Actions
 - How will actions affect status and trend?
 - Strength and direction of these effects
- Critical Certainties/Uncertainties in Understanding
 - Expert confidence

LTEMP Experimental and Management Actions

- Spring HFEs \leq 45,000 cfs in March or April
- Proactive Spring HFEs \leq 45,000 cfs in April, May, or June
- Fall HFEs \leq 45,000 cfs in October or November
- Fall HFEs $>$ 96-hr duration
- Trout management flows
- Macroinvertebrate production flows
- Humpback chub translocation
- Mechanical removal of rainbow trout from LCR reach
- Mechanical removal of invasive fish species
- Larval humpback chub head-start program
- Riparian vegetation restoration



Information Structure

- Resource Topic
 - “Resource Characteristics”
 - “Specific Measures”
 - Status & Trend (relative to benchmark)
 - Drivers & Constraints: Strength and direction of effect
 - LTEMP Experimental and Management Actions: Strength and direction of effect (known or expected)
- Data “roll-up”
 - Specific measures → resource characteristic
 - Resource characteristics → resource topic



For each specific measure:



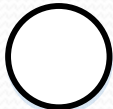


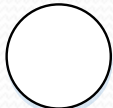


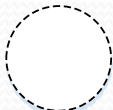


- Status
 - Good/Moderate Concern/Significant Concern/Unknown
- Trend
 - Improving/Unchanging/Deteriorating/Unknown
- Strength of Effect
 - Strong/Moderate/Weak/Unknown
- Direction of Effect
 - Positive (beneficial)/None/Negative (detrimental)/ Unknown
- Confidence
 - High/Medium/Low
- Rationale (for each entry)



Methodology Source

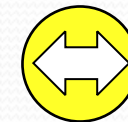
- National Park Service, Natural Resources Condition Assessment (NRCA) methodology
- Sacramento-San Joaquin Delta Ecosystem Restoration Program “Decision-Support Tools to Guide Ecosystem Restoration Planning and Adaptive Management”

Graphic Summary of Results (1)

Status/Trend Symbol Set					
Resource Status		Trend in Status		Confidence in Status & Trend Assessments	
	Resource is in Good Condition		Condition is Improving		High
	Condition Warrants Moderate Concern		Condition is Unchanging		Medium
	Condition Warrants Significant Concern		Condition is Deteriorating		Low
	Status Unknown		Trend Unknown	(n/a)	



**Condition good;
trend improving;
confidence high**



**Condition of moderate
concern; no trend;
confidence medium**



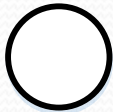


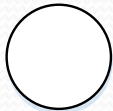


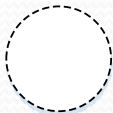




**Condition of
significant concern;
trend deteriorating;
confidence low**



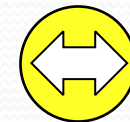
**Condition unknown;
trend unknown;
confidence low**

Graphic Summary of Results (2)

Driver & Constraint <i>and</i> Experimental & Management Action Symbol Sets					
Strength of Effect		Direction of Effect		Confidence in Strength & Direction Assessments	
	Strong Effect		Positive (Beneficial) Effect		High
	Moderate Effect		No Effect		Medium
	Weak Effect		Negative (Detrimental) Effect		Low
	Strength of Effect Unknown		Direction of Effect Unknown	(n/a)	



Strong, positive effect; confidence high



Moderate effect, not positive or negative; confidence medium



Weak, negative effect; confidence low



Strength and direction of effect unknown; confidence low

Assessment Team Leads

Topic	Western Science Lead(s)	Tribal Leads
Aquatic food base	Ted Kennedy	Charley Bulletts Kerry Christensen Melinda Arviso-Ciocco Mike Yeatts Kurt Dongoske
Archaeological and cultural resources	Jan Balsom and Theresa Pasqual	
Humpback chub	Charles Yackulic	
Hydropower and energy	Craig Ellsworth	
Invasive fish species	Dave Rogowski	
Other native fish species	Brian Healy	
Rainbow trout fishery	Mike Yard	
Recreational experience	Lucas Bair	
Riparian vegetation	Emily Palmquist	
Sediment	Paul Grams	
Water quality	David Topping (below the Dam) and Robert Radtke (Lake Powell)	

Initial Results (3)

Resource Topic	Spring HFEs ≤ 45,000 cfs in March or April	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Fall HFEs ≤ 45,000 cfs in October or November	Fall HFEs > 96-hr duration	Trout management flows	Macroinvertebrate production flows	Humpback chub translocation	Mechanical removal of rainbow trout from LCR reach	Mechanical removal of invasive fish species	Larval humpback chub head-start program	Riparian vegetation restoration
Archaeological and cultural resources											
Humpback chub											
Hydropower and energy											
Invasive fish species											
Riparian vegetation											



Plans for Completion

- All teams to turn in spreadsheets by today (2/15/17)
- Draft graphics output returned to teams by 2/22/17
- All teams return edits (if needed) by 3/8/17
- Final report from Science Advisors-Executive Coordinator to TWG by 3/15/17
 - Timing critical to informing FY 2018-2020 Triennial Work Plan & Budget

Questions?