BUREAU OF RECLAMATION

Long-Term Experimental & Management Plan (LTEMP) Biological Opinion Conservation Measures Update

Technical Work Group Meeting , January 26, 2023

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Incidental Take Parameters – Tier 1 Action Initiation Triggers

Tier 1 – Early Intervention	Trigger	2020	2021	2022	3-year average
1. Combined adult (>200 mm) humpback chub (HBC) in the Colorado River mainstem aggregation (≥2,000) and in the Little Colorado River (≥7,000)	**≤ 9,000**	**15,000**	**12,000**	**15,000**	**Not applicable. Trigger for adults based on annual population estimate**
OR					
2. Recruitment of sub-adult HBC (150-199 mm) does not equal or exceed estimated adult mortality					
a) Sub-adult population estimate in LCR in spring	**≤ 1,250 for 3 years**	**993**	**696**	**2,056**	**1,248**
OR					
b) Sub-adult population estimates in mainstem in Juvenile Chub Monitoring (JCM) Reach** in fall	**≤ 810 for 3 years**	**200**	**700**	**100**	**333**

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.**
****JCM Reach is RM 63.45-65.2 of mainstem**

Incidental Take Parameters – Tier 2 Action Triggers

Tier 2 – Action Triggers	TRIGGER	2020	2021	2022
Mechanical Removal implemented				
If adult HBC (≥200 mm) as estimated by the HBC population model	**<7,000**	**N/A**	**N/A**	**N/A**
Terminate Mechanical Removal				
If predator index is	**<60 rainbow trout/km in JCM reach**	**-**	**-**	**-**
and immigration rate is	**Low (to be determined)**	**-**	**-**	**-**
OR				
HBC population estimates	**> 7,500**	**-**	**-**	**-**
and survival rates of sub-adult chub	**exceeds adult mortality for at least 2 years**	**-**	**-**	**-**

Two-Tier Approach

- Tier 1 – emphasize conservation actions that take place during adult or sub-adult population declines.

- Tier 2 – predator removal if conservation actions are unsuccessful.

Humpback Chub – Tier 1 Action Triggers

- If the # of adult HBC (≥200 mm) in the LCR aggregation (includes the Colorado river mainstem and the LCR population) is < 9,000

OR

- If recruitment of sub-adult HBC (150-199mm) ≤ estimated adult mortality such that:
  - **a) Sub-adult abundance <1,250 fish (3-yr average) in the spring LCR population estimates.**

OR

  - **b) Sub-adult abundance <810 fish (3-yr average) in the fall mainstem Juvenile Chub Monitoring reach.**

Hypotheses for Decline in Sub-Adults

- Poor recruitment
- Absence of winter floods
- Lack of food/poor habitat quality in the Little Colorado River
- Possible predation by catfish & other species

Trigger Response

Close coordination with USFWS

- Submitted Trigger Response Report for 2021-2022
- No fish available in spring 2022 to transfer, moved 196 fish above Chute Falls in fall
- No larval fish collected in spring 2022
- 2023- action will be determined after larval production assessed

Conservation Measures as described in the 2016 LTEMP ROD & Biological Opinion

Resource	Conservation Measures
Humpback chub	Translocations Monitoring Non-native fish removal Refuge support Disease & parasite monitoring
Razorback sucker	Monitoring Determine hybridization extent
All native aquatic species	Non-native fish management Evaluate temperature control Evaluate fish passage Alter -12 mile backwater slough
Southwestern willow flycatcher	Monitor every 2 years
Yuma Ridgway's rail	Monitor every 3 years

Humpback Chub

Conservation Measures	2022 Updates
Translocations	196 sub-adults translocated above Chute Falls (October 2022)
Monitoring	1 trip to Shinumo Inflow reach (Late August/Early September 2022) 1 trip (June 2022) to CO river inflow around Bright Angel, Shinumo & Havasu Creeks (93 humpback chub) 1 trip in June 2022 to Bright Angel Creek (21 humpback chub – including 14 during electrofishing season) 2 trips (October 2021 & May 2022) to Havasu Creek (272 humpback chub)
Non-native fish removal	4,274 brown trout & 4,216 rainbow trout (electrofishing) No trout removed via weir due to monsoonal flooding
Refuge Support	No larval fish available for collection in spring 2022
Disease & parasite monitoring	32 humpback chub sampled at LCR – 4 tapeworms detected in 3 fish. 47 humpback chub sampled in Western Grand Canyon (RM 273) – 2 tapeworms detected in 2 fish USFWS & AZGFD examined all fish caught during routine monitoring for external parasites (*Lernea* & others)

Razorback Sucker

Conservation Measure	2022 Update
Monitoring	• Monitoring trips in March (larval only), April, May, June, July, August, September (small-bodied only) • 0 small-bodied razorback suckers • 0 larval razorback suckers

Other Species Identified on Monitoring Trips

Non-native Species	# of Juveniles	# of Larvae
Brown trout	0	0
Channel catfish	0	0
Common carp	54	54
Fathead minnow	293	185
Green sunfish	1	0
Plains killifish	276	53
Rainbow trout	132	2
Red shiner	71	1
Striped bass	1	6
Walleye	1	0
Western mosquitofish	14	5

Native Species	# of Juveniles	# of Larvae
Bluehead suckers	239	7,812
Flannelmouth suckers	9,066	10,566
Humpback chub	1,168	444
Speckled dace	6,450	4,121
Unidentified Cyprinid	11	0
Unidentified Sucker	1,964	15

Razorback Sucker Hybridization

Conservation Measure	Updates

Determine extent of hybridization of razorback suckers	• 2022-Reclamation initiated project with SNARRC
	• Expansion of study conducted by Pilar Rinker
	• Cross non-hybrid razorback suckers with flannel mouth suckers
	  • Examine genetic & morphological outcomes
	  • Rates of survival & growth

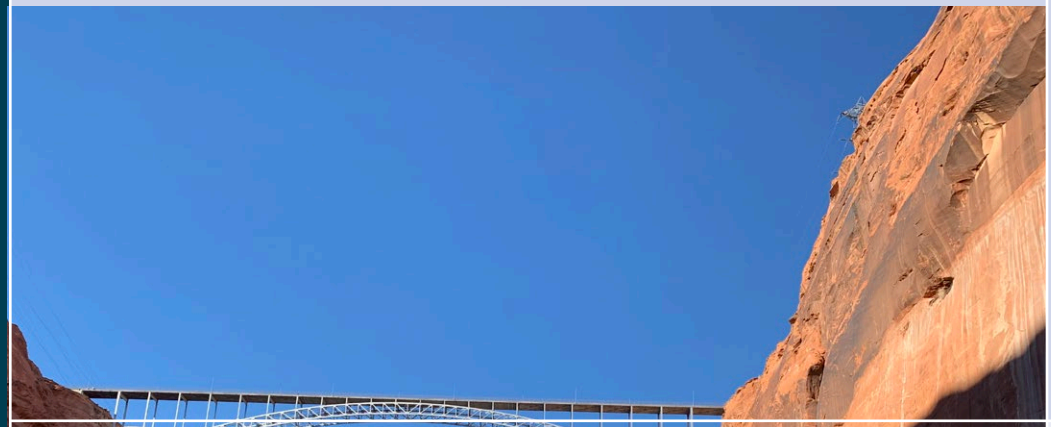
Avian Surveys

Conservation Measure	2022 Updates
Partially assist with funding monitoring of Southwestern Willow Flycatcher (SWFL) every 2 years.	No surveys planned or conducted – next survey planned for 2023.
Partially assist with funding monitoring of Yuma Ridgway's Rail (YRRA) every 3 years.	No YRRAs detected during two surveys conducted in March and April.

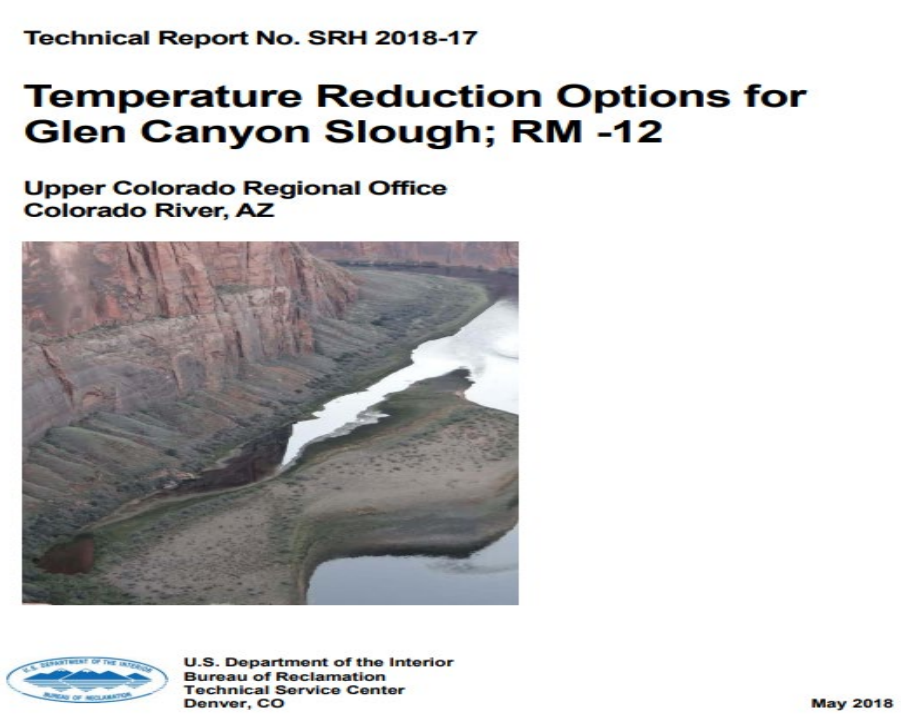
All Native Aquatic Species – Temperature Control

Conservation Measure	Updates
Explore efficacy of temperature control device	Temperature Control Device Update Provided in 2018: https://www.usbr.gov/uc/progact/amp/twg/2018-10-10-twg-meeting/Attach_01.pdf
	Technical Services Center completed report in 2020 that reviewed options & identify unapplied technologies (https://www.usbr.gov/tsc/techreferences/hydraulics_lab/pubs/PAP/PAP-1184.pdf) Technology search conducted by Yet2 with various ideas reviewed during April 2021 TWG
	Temperature Control Update Provided in June 2021 Includes history of progress on TCD since 1978
	Power office looking at appraisal level study to examine bypass generation at river outlets

All Native Aquatic Species – Fish Passage

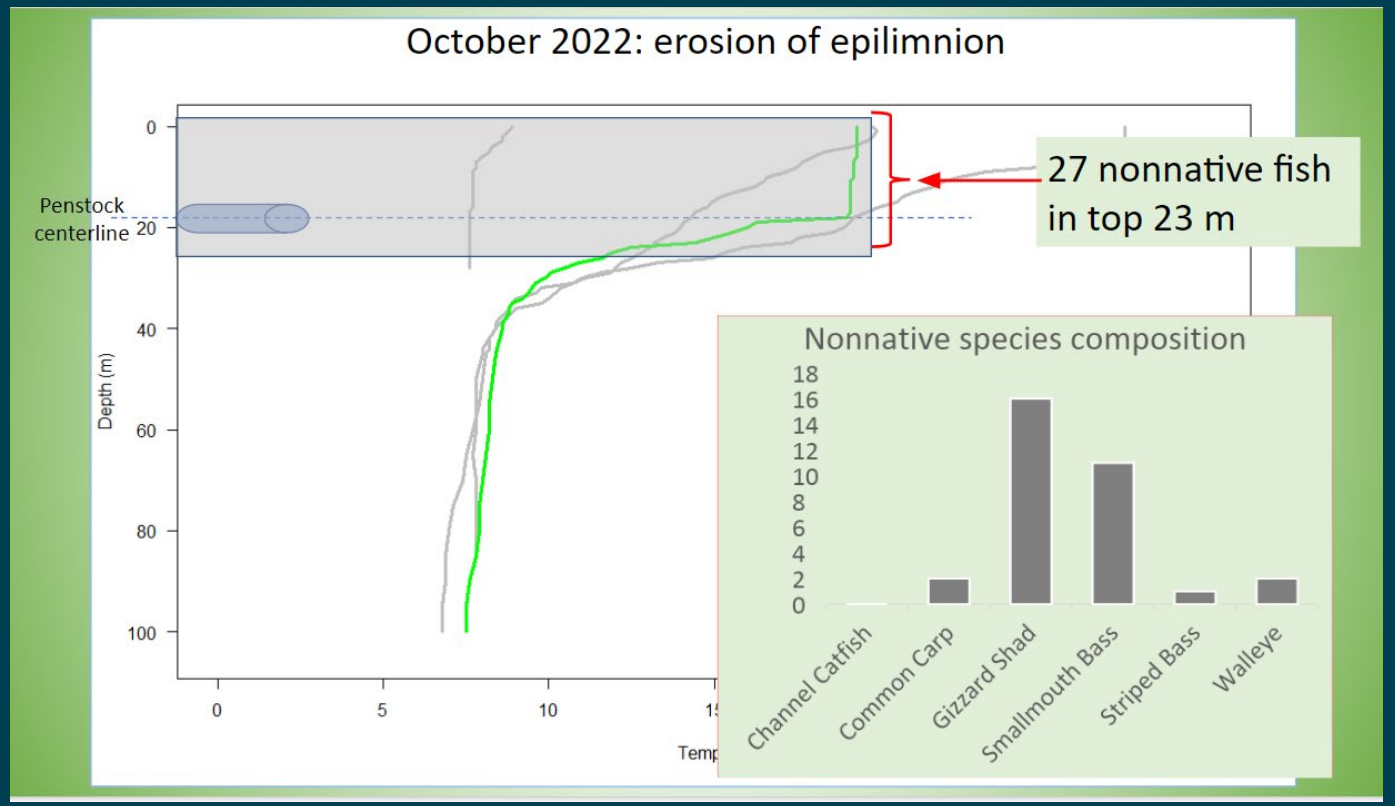
Conservation Measure	Recent Progress
Evaluate means to prevent fish passage through the dam 	2021 Reclamation initiated 3-part project to update 2007-2009 Glen Canyon Dam forebay fish survey • Utah State University is sampling the forebay to characterize the fish community • Reclamation's Technical Services Center (TSC) is sampling forebay using hydroacoustics
	2022 – Reclamation TSC completed a report on Fish Exclusion Options for Glen Canyon Dam
	2022 – Reclamation initiated a SME panel o identify an option for GCD for target mplementation in Summer 2024.

All Native Aquatic Species –Backwater slough

Conservation Measure	Updates
Complete planning and compliance of a plan to alter the backwater slough to make it unsuitable or inaccessible to warmwater non-native species	2018 - Reclamation's TSC finalized a report to examine options for reducing temperatures in the upper slough
	2022 - Reclamation initiated a project with TSC to evaluate the options to modify considering current conditions. • Site visit conducted in October 2022 • Update and report tentatively finished in April 2023

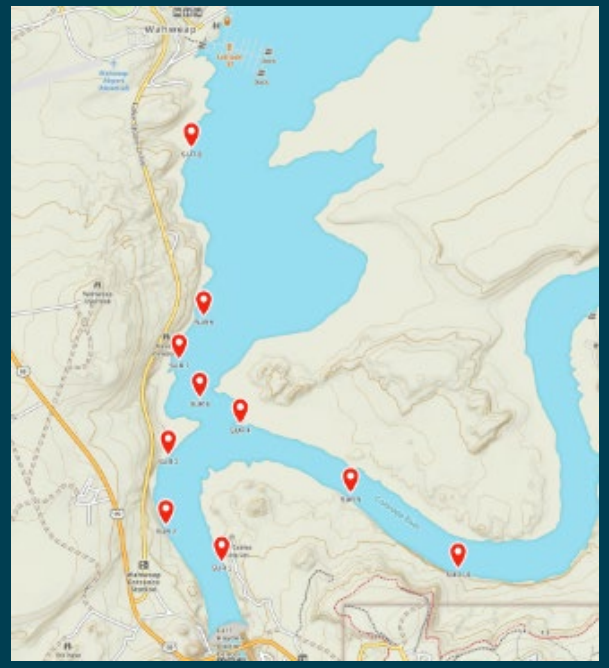
Fish Assemblage in Forebay Update

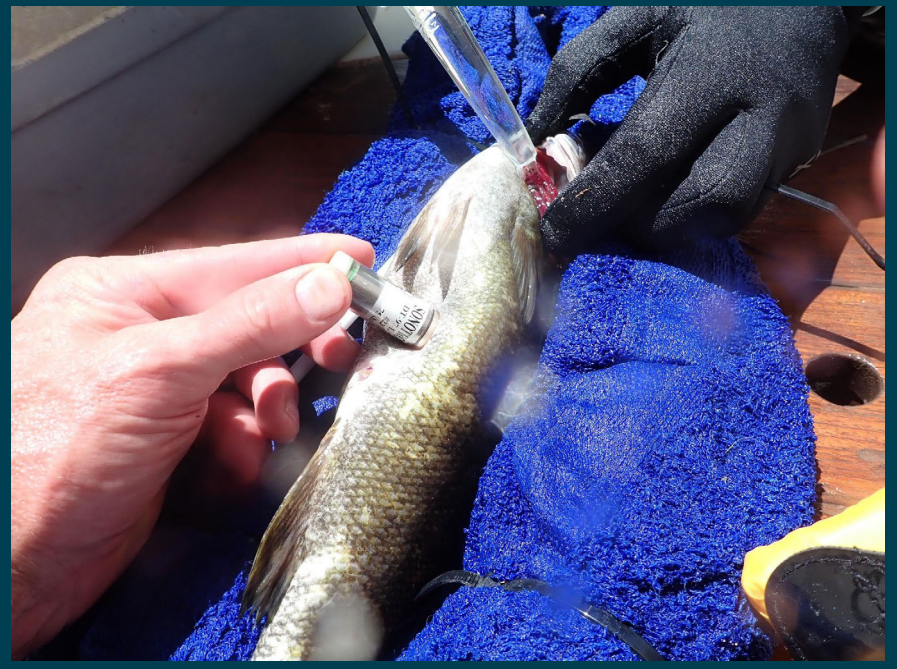
- Sampling in March, June, August & October 2022
- October highlights for forebay
  - Less fish (27 non-natives) because lake is starting to turn over
  - Non-natives found down to a depth of 23 m (≈14 m in previous months)
  - Smallmouth bass comprised 1/3 of total catch (205-325 mm)



Ultrasonic Telemetry

- 20 smallmouth bass (335-482mm) & 10 channel catfish (432-545 mm) implanted with ultrasonic transmitters
  - 2 dead – 1 caught by an angler, 1 tag transmitting from bottom (dead)
- 10-station submersible ultrasonic receiver network
- Run through October 2023 – track movement & depth





2023 Sampling Plan

- Sample shallow habitat closer to dam
- Deploy sensor fish through dam to measure conditions of passage (March)
- Model probability of successful passage by species and season
- Next trip - late February/early March 2023

Questions?

Thanks to our partners for all the hard work and collecting the data to help us meet our conservation measures!

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