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

Technical Work Group Meeting , January 25, 2024

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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
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

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.

Incidental Take Parameters – Tier 1 Action Initiation Triggers

Tier 1 – Early Intervention	Trigger	2021	2022	2023	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**	**12,000**	**15,000**	**14,000**	**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**	**971**	**2,277**	**1,004**	**1,417**
OR					
b) Sub-adult population estimates in mainstem in Juvenile Chub Monitoring (JCM) Reach** in fall	**≤ 810 for 3 years**	**700**	**100**	**737**	**512**

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**

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.**

Incidental Take Parameters – Tier 2 Action Triggers

Tier 2 – Action Triggers	TRIGGER	2021	2022	2023
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**	**-**	**-**	**-**

Trigger Response

Close coordination with USFWS

- Moved 174 fish above Chute Falls in fall 2023
- No translocations from LCR
- 600 larval fish collected in spring 2022

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Humpback Chub

Conservation Measures	2023 Updates
Translocations	174 sub-adults translocated above Chute Falls
Monitoring	1 trip to Shinumo Inflow reach (76 humpback chub) 1 trip to CO river inflows around Bright Angel (13), Shinumo (76) & Havasu Creeks (93 humpback chub) 1 trip to Bright Angel Creek (1 humpback chub) 1 trip to Havasu Creek (53 humpback chub)
Bright Angel Creek non-native fish removal	1,705 brown trout & 3,800 rainbow trout (electrofishing) 3 brown trout and 5 rainbow trout removed via weir
Refuge Support	600 larval humpback chub collected from the LCR, transported to SNARRC
Disease & parasite monitoring	174 humpback chub translocated within the LCR treated for *Lernaea* No tapeworm detected in 40 HBC from JCM West (rm 211)

Razorback Sucker

Conservation Measure	2023 Update
Monitoring	• Monitoring trips in March (larval only), April, May, June, July, August (telemetry, larval, and small-bodied), September (telemetry and small-bodied) • 0 small-bodied razorback suckers • 0 larval razorback suckers

Non-native Species	# of Juveniles	# of Larvae
Bluegill	1	0
Channel catfish	5	0
Common carp	3	1
Fathead minnow	902	289
Plains killifish	51	109
Green sunfish	10	0
Gizzard shad	2	0
Western mosquitofish	329	46
Red shiner	99	10
Rainbow trout	13	1
Striped bass	1	0
Walleye	3	5

Native Species	# of Juveniles	# of Larvae
Bluehead suckers	165	2,637
Flannelmouth suckers	2,328	4,151
Humpback chub	1,284	529
Speckled dace	3,307	2,381
Unidentified Cyprinid	5	0
Unidentified Sucker	1,205	1

Avian Surveys

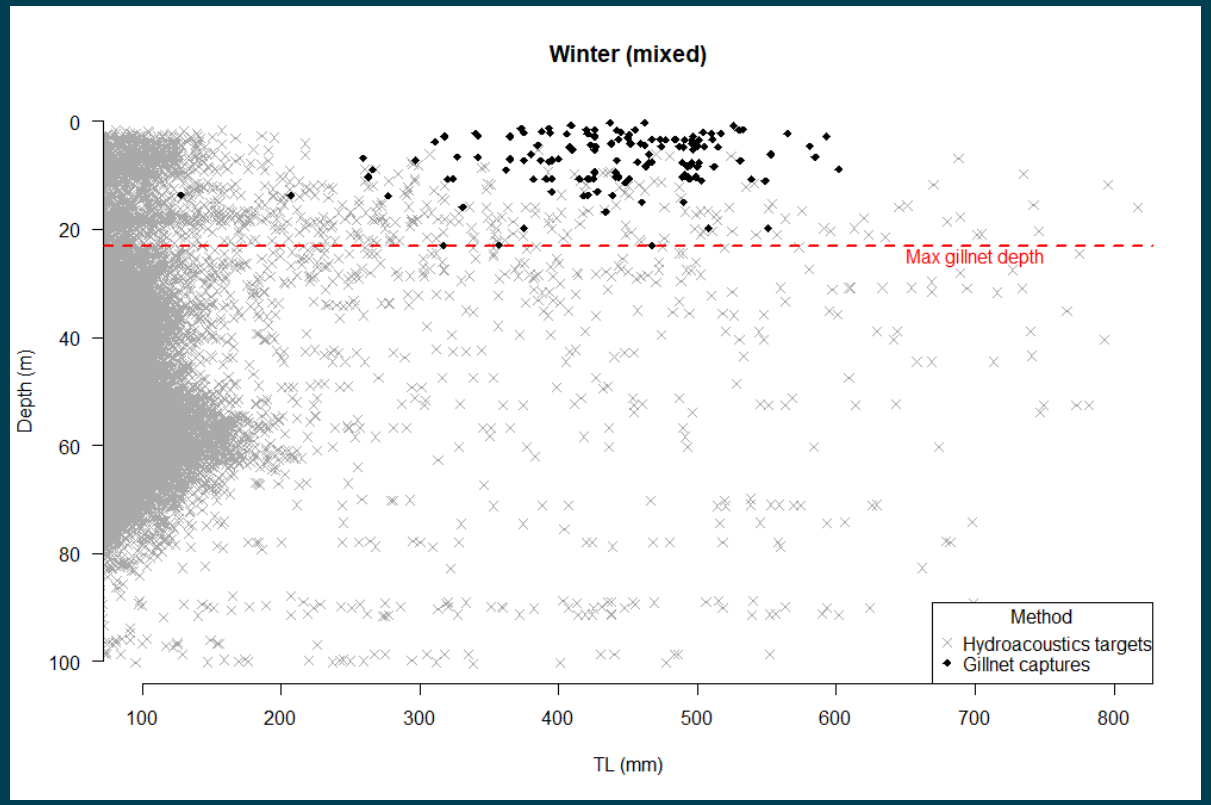
Conservation Measure	2023 Updates
Partially assist with funding monitoring of Southwestern Willow Flycatcher (SWFL) every 2 years.	Three surveys conducted (Diamond Creek to Pearce Ferry), 6 possible SWFL detected. Next survey planned for 2025
Partially assist with funding monitoring of Yuma Ridgway's Rail (YRRA) every 3 years.	No surveys planned or conducted – next survey planned for 2025

All Native Aquatic Species – Fish Passage

Conservation Measure	Recent Progress
Evaluate means to prevent fish passage through the dam	Hydroacoustics update Thermal curtain update

Fish Assemblage in Forebay Update

- August 2023 netting found 300 bluegill and green sunfish immediately adjacent to the dam down to 22m
- Hydroacoustics appear to find fish deep (nearly 80m) when the lake is mixed



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	2023 – TSC report (August 2023), further discussions at 11:15

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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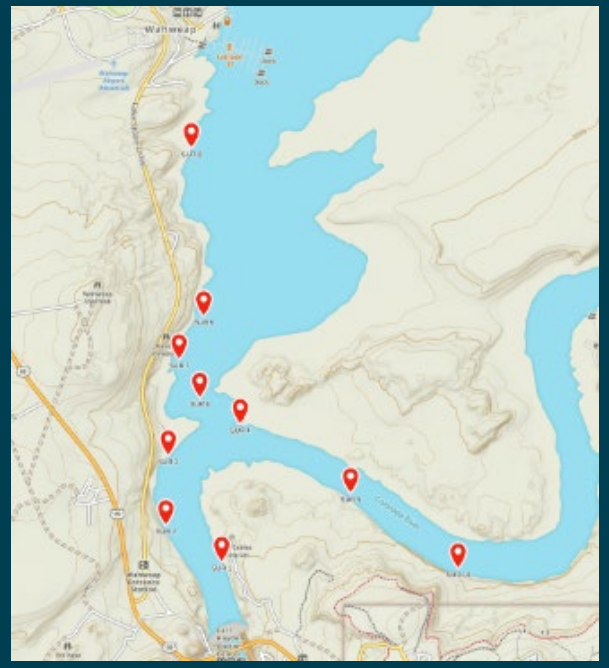
Razorback Sucker Hybridization

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

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



Where do we go from here?

Possible Action	Status
-12mi Slough modification	Conversations with NPS
Disrupt bass spawning (short term)	LTEMP SEIS in progress
Disrupt bass spawning (long term)	Thermal curtain (feasibility) Low head power (extremely long term) Post-2026 EIS in progress
Mechanical removals	Multi-agency GRCA and GLCA, in progress
Understanding and preventing entrainment	Tucker trawl net and hydroacoustic studies in progress
Identify new habitat for chub translocations	FWS, NPS and others in progress
Understand status of western GC humpback chub	Planning for 2024 field work

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

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

Glen Canyon removals

Glen Canyon Dam to Lee's Ferry

Species	Count
Black crappie	1
Bluegill	162
Brown trout	1
Common carp	17
Green sunfish	3,042
Largemouth bass	2
Smallmouth bass	141
Striped bass	1
Walleye	21

-12mi Slough

Species	Count
Bluegill	137
Brown trout	162
Common carp	11,140
Flannelmouth sucker	12
Green sunfish	4,970
Lepomis sp.	5
Other nn fish	18
Rainbow trout	114
Smallmouth bass	815

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