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

Technical Work Group Meeting

January 13, 2022

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Incidental Take Parameters – Tier 1 Action Initiation Triggers

Tier 1 – Early Intervention	Trigger	2019	2020	2021	3-year average
Combined adult (>200 mm) humpback chub (HBC) in the mainstem Little Colorado River (LCR) aggregation and LCR	**≤ 9,000**	**12,000**	**11,000**	**TBD**	Not applicable. Trigger for adults based on annual population estimate
OR					
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**	**2,600**	**1,000**	**TBD**	TBD but likely to be above trigger
OR					
2) Sub-adult population estimates in mainstem in Juvenile Chub Monitoring (JCM) Reach in fall	**≤ 810 for 3 years**	**500**	**200**	**TBD**	***TBD but likely <u>below</u> trigger***

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.**

Incidental Take Parameters – Tier 2 Action Triggers

Tier 2 – Action Triggers	TRIGGER	2019	2020	2021
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.**

Trigger Response

Sub-adult decline in mainstem due to:

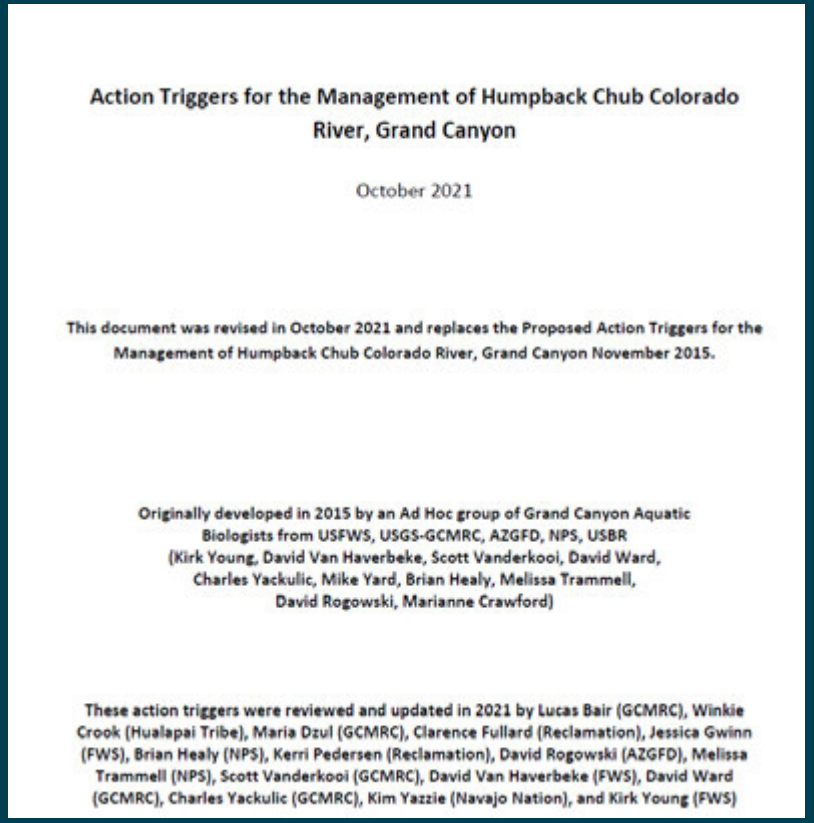
- Poor recruitment
- Poor condition of adults in mainstem
- Habitat quality in the Little Colorado River
- Predation by catfish & other species

Close coordination with USFWS

- Developing & updating dynamic response plan
- 535 sub-adults translocated above Chute Falls in the LCR
- 2022- action determined after larval production assessed

5-year trigger review

- **LTEMP BO –** requires review of triggers at least every 5 years
- **<u>2021 review complete</u> and officially submitted to USFWS**
  - **Assessed/updated technical assumptions & conservation action options**
  - **Improved clarity to document**
  - **Identified topics for additional evaluation**
    - **Western Grand Canyon**
    - **Bioeconomic model**
    - **Predator index**



Action Triggers for the Management of Humpback Chub Colorado River, Grand Canyon

October 2021

This document was revised in October 2021 and replaces the Proposed Action Triggers for the Management of Humpback Chub Colorado River, Grand Canyon November 2015.

Originally developed in 2015 by an Ad Hoc group of Grand Canyon Aquatic Biologists from USFWS, USGS-GCMRC, AZGFD, NPS, USBR (Kirk Young, David Van Haverbeke, Scott Vanderkooi, David Ward, Charles Yackulic, Mike Yard, Brian Healy, Melissa Trammell, David Rogowski, Marianne Crawford)

These action triggers were reviewed and updated in 2021 by Lucas Bair (GCMRC), Winkie Crook (Hualapai Tribe), Maria Dzul (GCMRC), Clarence Fullard (Reclamation), Jessica Gwinn (FWS), Brian Healy (NPS), Kerri Pedersen (Reclamation), David Rogowski (AZGFD), Melissa Trammell (NPS), Scott Vanderkooi (GCMRC), David Van Haverbeke (FWS), David Ward (GCMRC), Charles Yackulic (GCMRC), Kim Yazzie (Navajo Nation), and Kirk Young (FWS)

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
Southwestern willow flycatcher	Monitor every 2 years
Yuma Ridgway's rail	Monitor every 3 years

Humpback Chub

Conservation Measures	2021 Updates
Translocations	535 sub-adults translocated above Chute Falls (response to trigger)
Monitoring	1 trip to Shinumo Inflow reach (September 2021) 1 trip to the CO river inflow around Bright Angel, Shinumo & Havasu Creeks (June 2021) 1 trip to Bright Angel Creek (June 2021) 2 trips to Havasu Creek (October 2020 & May 2021)
Non-native fish removal	26 brown trout & 96 rainbow trout (electrofishing) 8 brown trout & 18 rainbow trout (weir)
Refuge Support	Collections occurred in spring 2021 but priority was placed on translocations above Chute Falls to respond to the trigger and no additional fish were added to the refuge in 2021.
Disease & parasite monitoring	No Asian tapeworm monitoring occurred in the LCR in 2021 Monitoring for Asian tapeworm is scheduled to occur mainstem & LCR in 2022 USFWS & AZGFD examined all fish caught during routine monitoring for external parasites (*Lernea* & others)

Razorback Sucker

Conservation Measure	2021 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	1	0
Channel catfish	1	0
Common carp	1	17
Fathead minnow	236	290
Plains killifish	321	64
Green sunfish	15	0
Red shiner	343	31
Western mosquitofish	21	6
Rainbow trout	163	6

Native Species	# of Juveniles	# of Larvae
Bluehead suckers	101	8,448
Flannelmouth suckers	2,707	14,253
Humpback chub	368	325
Speckled dace	3,429	3,471
Unidentified Cyprinid	1	0
Unidentified Sucker	2,044	22

Avian Surveys

Conservation Measure	2021 Updates
Partially assist with funding monitoring of Southwestern Willow Flycatcher (SWFL) every 2 years.	Surveys occurred in May, June & July. Willow Flycatchers detected on first trip but no SWFLs.
Partially assist with funding monitoring of Yuma Ridgway's Rail every 3 years.	No surveys planned or conducted – next survey planned for 2022.

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 at 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

Potential Role of TWG:
Identify environmental benefits of temperature control with clear objectives (target temperature, resources that benefit, etc.)

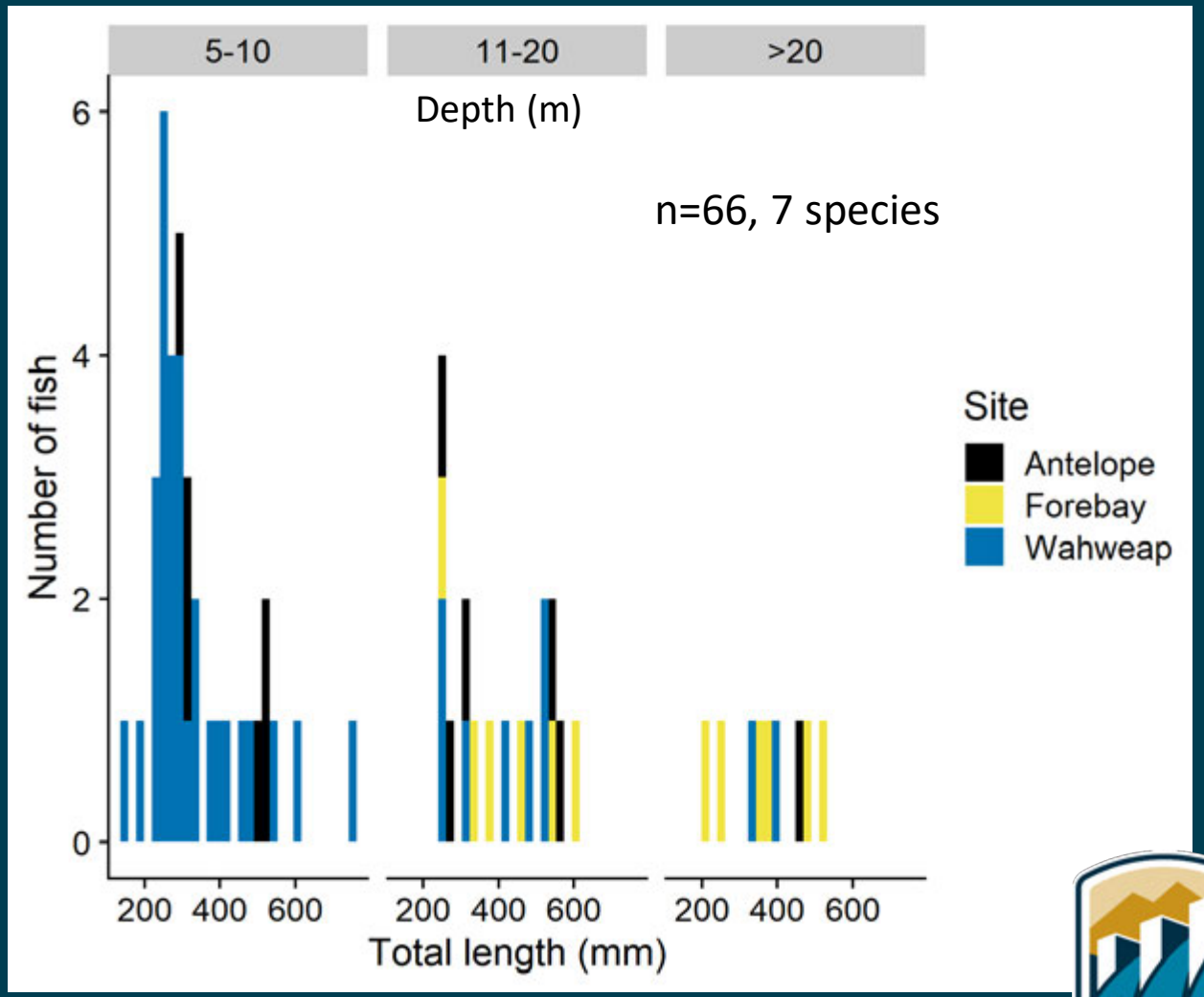
All Native Aquatic Species – Fish Passage

Conservation Measure	Recent Progress
Evaluate means to prevent fish passage through the dam	2019-2020 Reclamation & DOE partnered to present a prize competition to evaluate fish passage.
	Reclamation initiated 3-part project to update 2007-2009 Glen Canyon Dam forebay fish survey • Utah State University is sampling the forebay various times over the next couple of years to characterize the fish community • Reclamation's Technical Services Center (TSC) is sampling forebay using hydroacoustics • TSC engineering group is evaluating potential options for fish exclusion

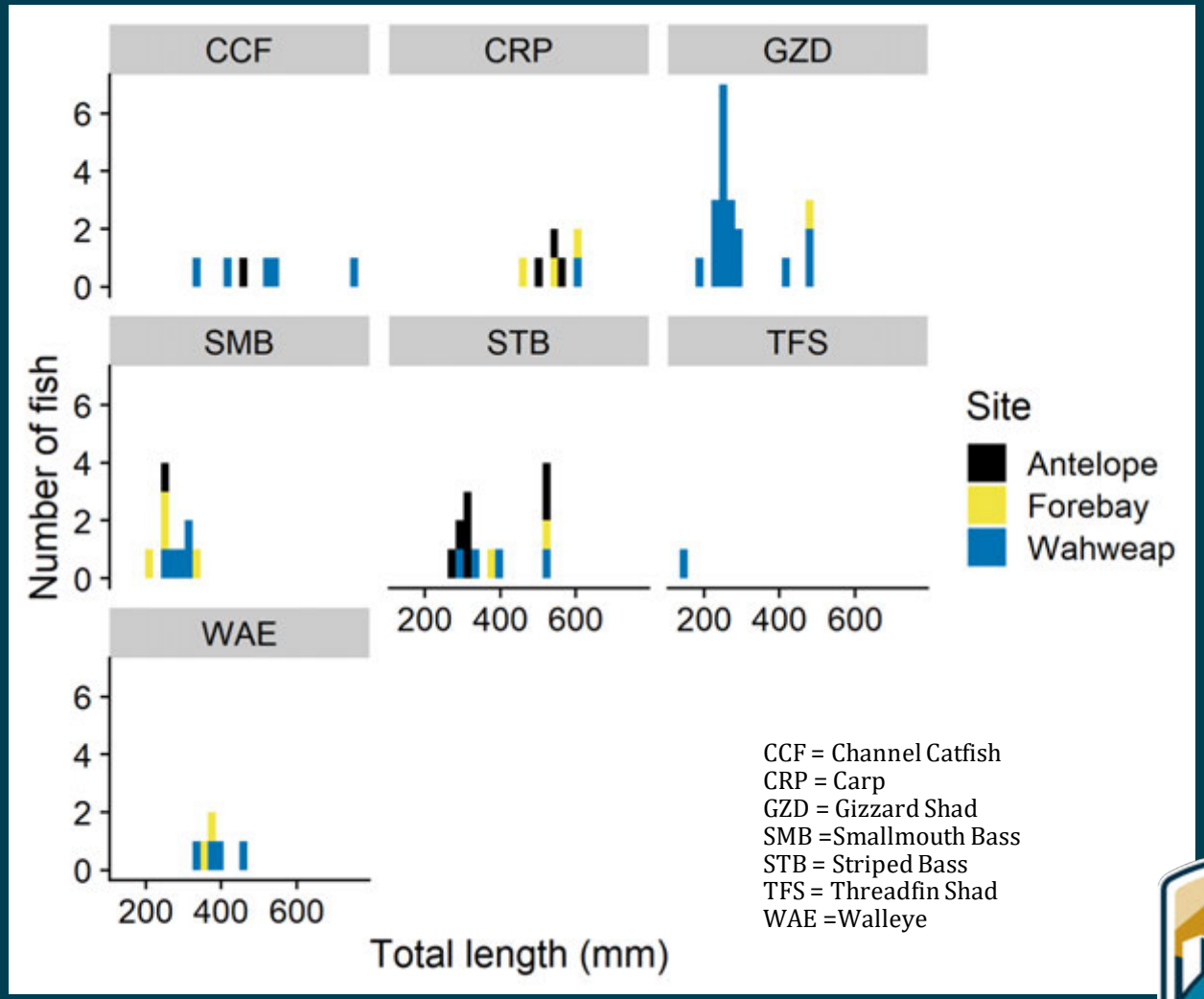
Potential role of TWG:

- **Quantify risks associated with detections for each non-native species.**
- **Determine origination of detection (through the dam, from tributary, other source, etc.)**

Results from October 2021 Lake Powell Sampling Trip



Species Identified during Lake Powell October 2021 Trip



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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TWG Discussion

Temperature Control

Refine the problem statement that includes timing, temps, location

- Are we protecting native fish or disadvantaging non-native fish?
- When do we need what temperatures in what reach of the river?
- When do we need to avoid what catastrophic temps in what reach of river?

Fish Passage

Discuss warmwater non-native detections below the dam

- Quantify risks associated with detections for each non-native species (# of species at a certain river mile or during a certain time of year, or certain size or age class, etc.)
- Determine origination of detection (through the dam, from tributary, other source, etc.)