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

Technical Work Group Meeting , April 10, 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 | 2023 | 2024 | 2025 | 3-year average |
|---|--------------------------|--------|--------|--------|---|
| 1. Combined adult (>200 mm) humpback chub (HBC) in the Colorado River mainstem aggregation ($\geq 2,000$) and in the Little Colorado River ($\geq 7,000$) | $\leq 9,000$ | 14,000 | 12,000 | 18,000 | Not applicable. Trigger for adults based on <u>annual</u> 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 | $\leq 1,250$ for 3 years | 1,004 | 1700 | 2878 | 1860 |
| OR | | | | | |
| b) Sub-adult population estimates in mainstem in Juvenile Chub Monitoring (JCM) Reach** in fall | ≤ 810 for 3 years | 737 | 1150 | 1400 | 1,100 |

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) \leq 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

Coordination with USFWS and NPS

- 14 juvenile LCR chub moved into Big Canyon pools
- 66 adult fish translocated to Emerald Pool (Big Canyon)
- No larval fish collected from LCR



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Humpback Chub

Conservation Measures

2025 Updates

Translocations

14 juvenile and 66 adults translocated to Big Canyon

Monitoring

Little Colorado River, April and May
Havasu Creek Mark recapture, May 20-28
Colorado River adjacent to Bright Angel, Shinumo, and Havasu Creeks, June 11-22
Bright Angel Creek HBC mark recapture, September 4-11, cancelled due to Dragon Bravo Fire
Havasu Creek, September 29-Oct 6, shortened due to shutdown Havasu
May and Col River inflows June

Bright Angel Creek non-native fish removal

Bright Angel Creek-wide backpack electrofishing, Sept – January
Bright Angel Creek weir, Oct – March
5,325 brown trout & 5,714 rainbow trout (electrofishing)
4 brown trout and 89 rainbow trout removed associated with weir
RBT abundance estimate is above and BNT is below 2012-13 baseline

Refuge Support

No larval fish transported to SNARRC this year

Disease & parasite monitoring

eDNA pilot study continues (GCMRC and U. Oregon, not directly GCDAPM funded)
HBC parasite monitoring by FWS



Razorback Sucker

Conservation Measure

2025 Update

Monitoring

- July, August, and September trips (larval, and small-bodied)
- No telemetry hits in 2025 (no active fish from past studies)
- 0 larval or small-bodied razorback suckers

| Non-native Species | # of Juveniles/Adults | # of Larvae |
|----------------------|-----------------------|-------------|
| Common Carp | 4 | 0 |
| Fathead minnow | 198 | 20 |
| Plains killifish | 406 | 7 |
| Western mosquitofish | 15 | 4 |
| Red shiner | 253 | 8 |
| Rainbow trout | 14 | 3 |

| Native Species | # of Juveniles | # of Larvae |
|-----------------------|----------------|-------------|
| Bluehead suckers | 50 | 0 |
| Flannelmouth suckers | 366 | 2 |
| Humpback chub | 318 | 25 |
| Speckled dace | 664 | 97 |
| Unidentified Cyprinid | 1 | 0 |
| Unidentified Sucker | 8 | 0 |



Avian Surveys

| Conservation Measure | 2025 Updates |
|--|--|
| Partially assist with funding monitoring of Southwestern Willow Flycatcher (SWFL) every 2 years. | 3 surveys May through July 2025, no SWFLs detected |
| Partially assist with funding monitoring of Yuma Ridgway's Rail (YRRA) every 3 years. | Surveys discontinued due to lack of habitat |



All Native Aquatic Species – Fish Passage

| Conservation Measure | Recent Progress |
|--|--|
| Evaluate means to prevent fish passage through the dam | Hydroacoustics update Thermal curtain update Electric fish barrier TCD discussions/law? |



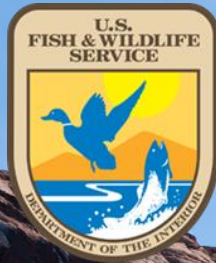
All Native Aquatic Species – Cool Mix bass flows



Post-2026 Biological Assessment



Questions?



American Southwest
Ichthyological Researchers, L.L.C.



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



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All Native Aquatic Species – Slough modification



Thanks Taryn!



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 |



Where do we go from here?

| Possible Action | Status |
|---|---|
| -12mi Slough modification | In progress |
| Disrupt bass spawning (short term) | 2024 bass flows, planning 2025 actions |
| Disrupt bass spawning (long term) | Thermal curtain (Value Planning Study completed) Low head power (extremely long term) Post-2026 EIS in progress |
| Mechanical removals | Multi-agency GRCA and GLCA, in progress |
| Understanding and preventing entrainment | Hydroacoustic studies in progress |
| Identify new habitat for chub translocations | FWS, NPS and others in progress |
| Understand status of western GC humpback chub | Expert being assembled |
| ESA coverage for other bass flow alts | In progress |
| Reviewing conservation measures | In progress |

