

# UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2020 ANNUAL REPORT

PROJECT: 131

## Project Title

Population Estimate of Humpback Chub (*Gila cypha*) in Black Rocks.

## Bureau of Reclamation Agreement Number:

R20PG00024

## Project/Grant Period:

Start date: 10/01/2019

End date: 09/30/2024

Reporting period end date: 09/30/2020

Is this the final report? Yes \_\_\_\_\_ No X

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## Abstract:

Robust population estimates are now critical to monitor progress towards recovery of the humpback chub (USFWS 2001). Recovery goals require estimates of population size at regular intervals to measure population response to management activities. A population estimate for the Black Rocks population of humpback chub was made for the years 1998–2000 (McAda 2002), 2003–2004 (McAda 2007), and 2007–2008 (Francis and McAda 2011); a more robust design model reported on all years 1998–2012 (Francis et al. 2016) and 1998–2017 (Francis et al. *in prep*)<sup>1</sup>. This report summarizes the work directed at a sixth estimate of population size for humpback chub in Black Rocks during the 2020–2021 time period. Young-of-year (YOY) *Gila* spp. were collected during all five summer seining trips suggesting that a very strong 2020 year-class of *Gila* spp. was produced in the upper Colorado River. In 2020, the LN transformed mean trammel net CPE for humpback chub was the highest since 1999 while for roundtail chub it was the highest ever for this project. Morphologically confirmed humpback chub captured in Black Rocks during 2020 ranged from 178 to 377 mm total length (TL; n=239), with a mean of 249 mm and median of 244 mm. Baited hoop nets and submerisble antennas continue to be useful secondary gear to capture juvenile *Gila* spp. and tagged fish, respectively; these gear will continue to be used in the future.

## Study Schedule: FY 2020–2022

## Relationship to RIPRAP:

Colorado River Action Plan: Mainstem; V.C. Estimate humpback chub populations; V.C.1. Black Rocks

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<sup>1</sup> These final reports can be found at: <http://www.coloradoriverrecovery.org/documents-publications/technical-reports/research-monitoring.html>

**Accomplishment of FY 2020 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:**

Young-of-year (YOY) *Gila* species monitoring

Five seining trips are conducted in July and August to evaluate YOY *Gila* year-class strength and attempt to determine what environmental variables are the most limiting to recruitment. Due to the pandemic there was an increased use of Ruby Horsethief Canyon by recreationists. Campsites in Black Rocks proper were all reserved months ahead of time so we were unable to secure a site for overnight hoop netting. Therefore, we sampled with seines only and floated the canyon in two consecutive days constituting a trip. Due to low water, in 2020, our sampling ended at Westwater Ranger Station (river mile {RM} 127.6) instead of the traditional terminal end of Westwater Wash (RM 124.8). In 2020, all five trips were completed from Mee Canyon to Westwater Ranger Station on the Colorado. Seining produced 768 YOY *Gila* and one adult roundtail chub (*Gila robusta*). YOY *Gila* were collected during all five trips suggesting that a very strong 2020 year-class of *Gila* spp. was produced.

Mark-recapture

Sampling for the mark-recapture portion of this study is conducted in September and October; therefore sampling overlaps two fiscal years. Sampling in calendar year 2020 overlapped into FY 2021 and sampling in calendar year 2021 will overlap into FY2022. Data analysis and final report writing will occur in FY 2022/2023.

PIT antenna deployed in 2016–2017 provided data suggesting our original sampling area did not cover the entire humpback chub occupied reach. For 2020, sampling was extended 0.5 miles downstream of the original study area. Low water, in 2020, precluded our ability to extend our reach 0.5 miles upstream of the original study area as intended. If water levels allow, the reach will be extended upstream and downstream 0.5 miles in 2021.

Our SOW calls for four sampling passes conducted during alternating weeks in September and October 2020 and 2021. Unfortunately, due to equipment issues, we were only able to complete three sampling passes (passes two through four) in 2020. However, five submersible PIT tag antennas were deployed for the entirety of the first pass.

Due to low water, in 2020, our heavier electrofishing jon boats could not up-run our traditional electrofishing sampling reaches. Therefore, only trammel and baited hoop netting were employed for 2020 sampling.

Baited Hoop Nets

Baited (with dog food) specialty hoop nets were deployed throughout the reach with hopes to increase capture of juvenile and YOY *Gila* spp. The hoop nets are specialty 54 inch long Delta H turtle nets with ¼ inch mesh and a 4 inch throat. These nets are set the first afternoon and are checked and baited the next afternoon, repeated throughout the trip. For 2020, baited hoop nets produced 3,911 roundtail chub captures (not individuals), 152 humpback chub (129 adults and 23 juveniles) captures, 21 age 1+ juvenile *Gila* spp. and 22 YOY *Gila* spp. captures.

The LN transformed mean catch rates (by pass) of humpback chub captured in baited hoop nets ranged between about 0.03 to 0.07 fish per net hour in 2020. During all passes mean catch-per-unit-effort (CPE)

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varied, though not significantly. Baited hoop netting was first utilized as a sampling technique in 2012 and catch rates varied, but not significantly, between years (Figure 1).

The LN transformed mean catch rates (by pass) of juvenile *Gila* species (23 confirmed humpback chub and 21 that couldn't be morphologically distinguished) captured in baited hoop nets ranged between about 0.02 to 0.03 fish per net hour in 2020. During all passes mean catch-per-unit-effort (CPE) varied, though not significantly. Baited hoop netting was first utilized as a sampling technique in 2012 and catch rates varied, but not significantly, between years (Figure 2).

The LN transformed mean catch rates (by pass) of roundtail chub captured in baited hoop nets ranged between about 0.51 to 0.96 fish per net hour in 2020. During all passes mean catch-per-unit-effort (CPE) varied, though not significantly. Baited hoop netting was first utilized as a sampling technique in 2012 and catch rates varied, but not significantly, between the years 2012–2017. However, roundtail chub LN transformed mean hoop net catch rates achieved in 2020 were significantly higher than all other sampling years (Figure 3).

### Trammel Nets

Seventy-five foot trammel nets have been the primary method used throughout the years and are crucial for comparing catch per effort and fish community changes through time. Four to five trammel nets, with one inch inner mesh, were set to minimize the time between net checks. Attempts were made to keep net sets at one to two hours between net checks. For 2020, trammel nets provided 772 roundtail chub captures (not individuals), 111 humpback chub (110 adults, one juvenile) captures, 10 bonytail (*Gila elegans*) captures, five Colorado pikeminnow (*Ptychocheilus lucius*), and 2 razorback sucker (*Xyrauchen texanus*) captures.

The LN transformed mean catch rates (by pass) of humpback chub captured in trammel nets ranged between about 0.16 to 0.50 fish per net hour in 2020. The LN transformed mean CPE for humpback chub was significantly higher in 1998, 1999 and 2020 when compared to all subsequent years, except for some overlap between 1998 and 2016 (Figure 4).

The LN transformed mean catch rates (by pass) of roundtail chub captured in trammel nets ranged between about 0.82 to 1.80 fish per net hour in 2020. The LN transformed mean CPE for roundtail chub increased significantly in 2003 when compared to 1998–2000, and remained significantly higher through 2020 (with the exception of 2007). The LN transformed mean CPE for roundtail chub was significantly higher in 2008 and 2020 when compared to all other years (Figure 5).

### Size Structure

Morphologically confirmed humpback chub captured in Black Rocks during 2020 ranged from 178 to 377 mm total length (TL; n=239), with a mean of 249 mm and median of 244 mm (Figure 6). In 2020, 43 juvenile and YOY *Gila* spp. (roundtail chub, humpback chub, or an intergrade that couldn't be morphologically distinguished) captured ranged from 55 to 198 mm TL, with a mean of 116 mm and median of 83 mm (Figure 6).

Roundtail chub captured in Black Rocks during 2020 ranged from 147 to 411 mm TL (n=4,608 out of 4,619), with a mean of 217 mm and median of 204 mm (Figure 7).

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### Submersible PIT Antenna

Five PIT tag antenna were deployed in 2020. These fully submersible PIT tag antennas (a product of BioMark) are one meter in diameter with a read range of 40 inches. Tentative 2020 data from these antennas include 3,773 sightings of 1,199 unique tags. These belong to 759 roundtail chub, 112 humpback chub (106 adults and six juvenile), seven age-1+ juvenile *Gila* spp. (at last capture), 53 bonytail, 24 Colorado pikeminnow, 173 razorback sucker, three tagged flannelmouth sucker (*Catostomus latippinis*), and one razorback by flannelmouth hybrid sucker. There were 67 PIT tags sighted that belong to fish whose data hasn't been reported to the Upper Colorado River Recovery Program (UCRRP) database STReAMS through January 2021.

### Population Estimates

Population estimates, capture probabilities, and coefficients of variations will be included in the final report scheduled to be submitted to the Biology Committee for review 12/15/2022. To provide these now would be premature as the larger analysis including data from 1998 to the present will allow for more precise and robust estimates.

### **Additional noteworthy observations:**

Non-native fishes removed in 2020 include 24 green sunfish, three gizzard shad, 14 largemouth bass, four smallmouth bass, one white by flannelmouth sucker hybrid, one white by bluehead sucker hybrid, and three white sucker.

### **Recommendations:**

Continue project as designed.

If water levels allow, the sampled reach will be extended upstream and downstream 0.5 miles from the original study reach in 2021.

Project Status:

On track.

### **FY 2020 Budget Status**

Funds Provided: \$91,830

Funds Expended: \$91,830

Difference: -0-

Percent of the FY 2020 work completed, and projected costs to complete: 100%

Recovery Program funds spent for publication charges: -0-

### **Status of Data Submission**

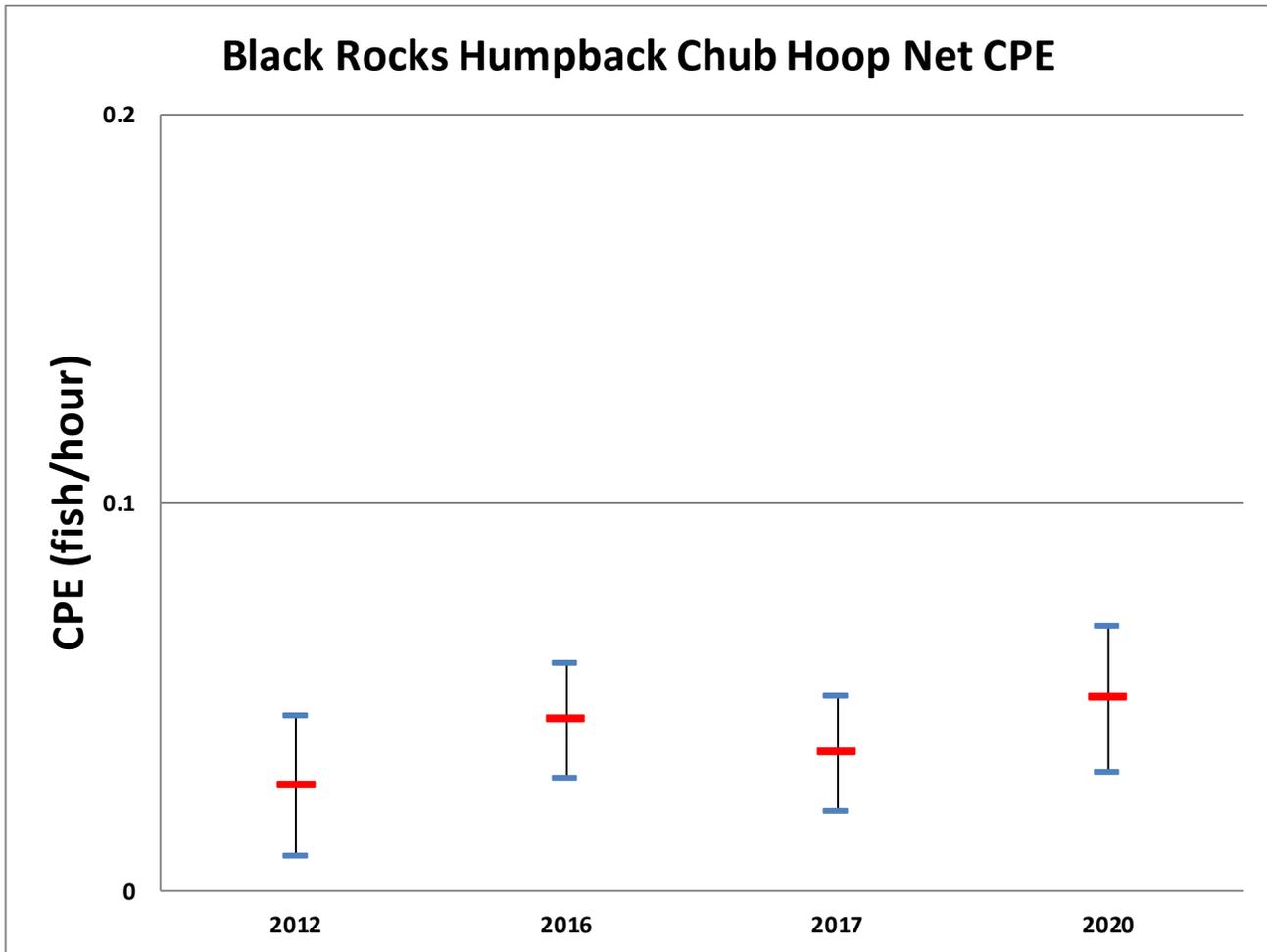
Data will be uploaded into STReAMS by the end of (January, 2021)

### **Signed:**

Travis Francis

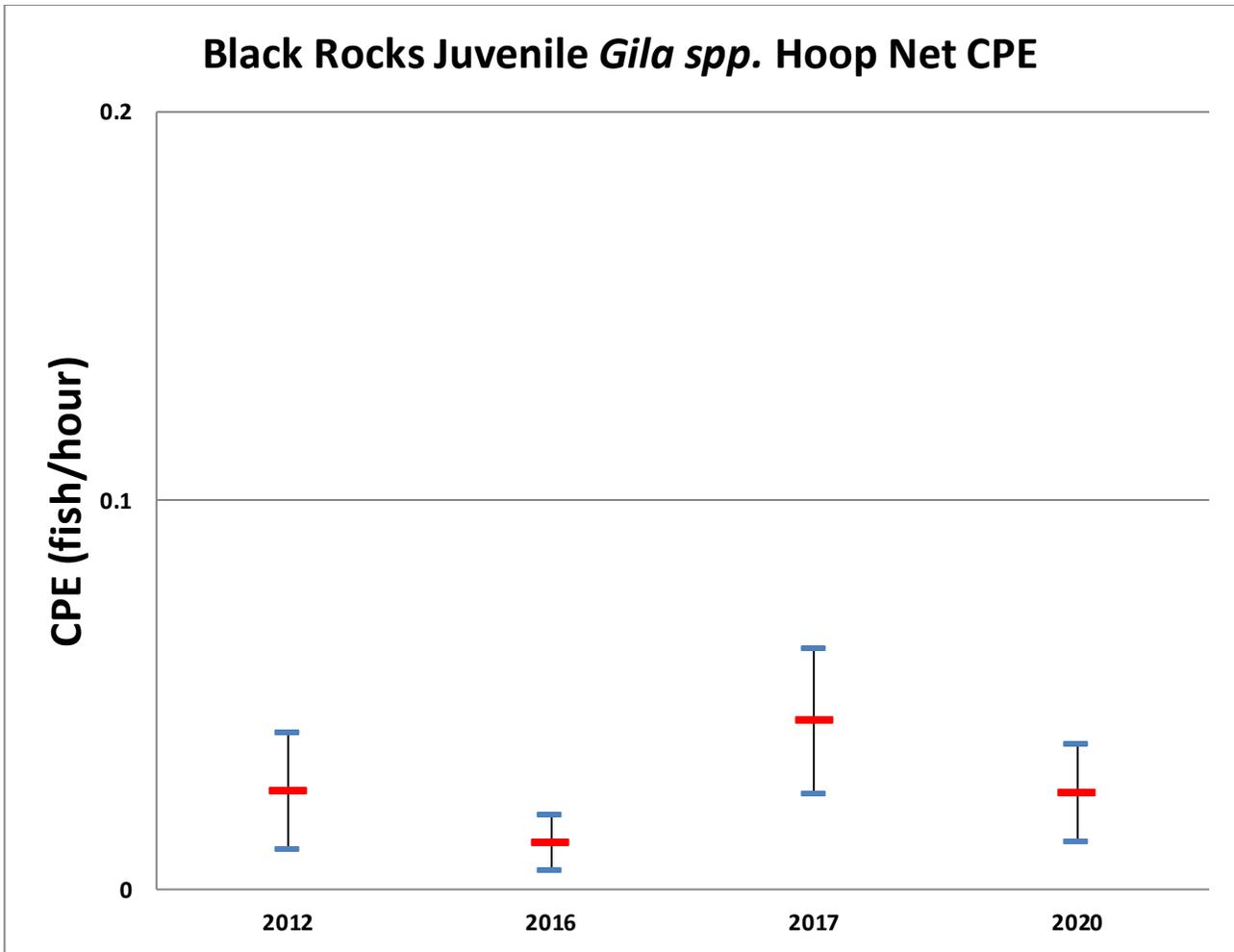
Principal Investigator

1/22/2021

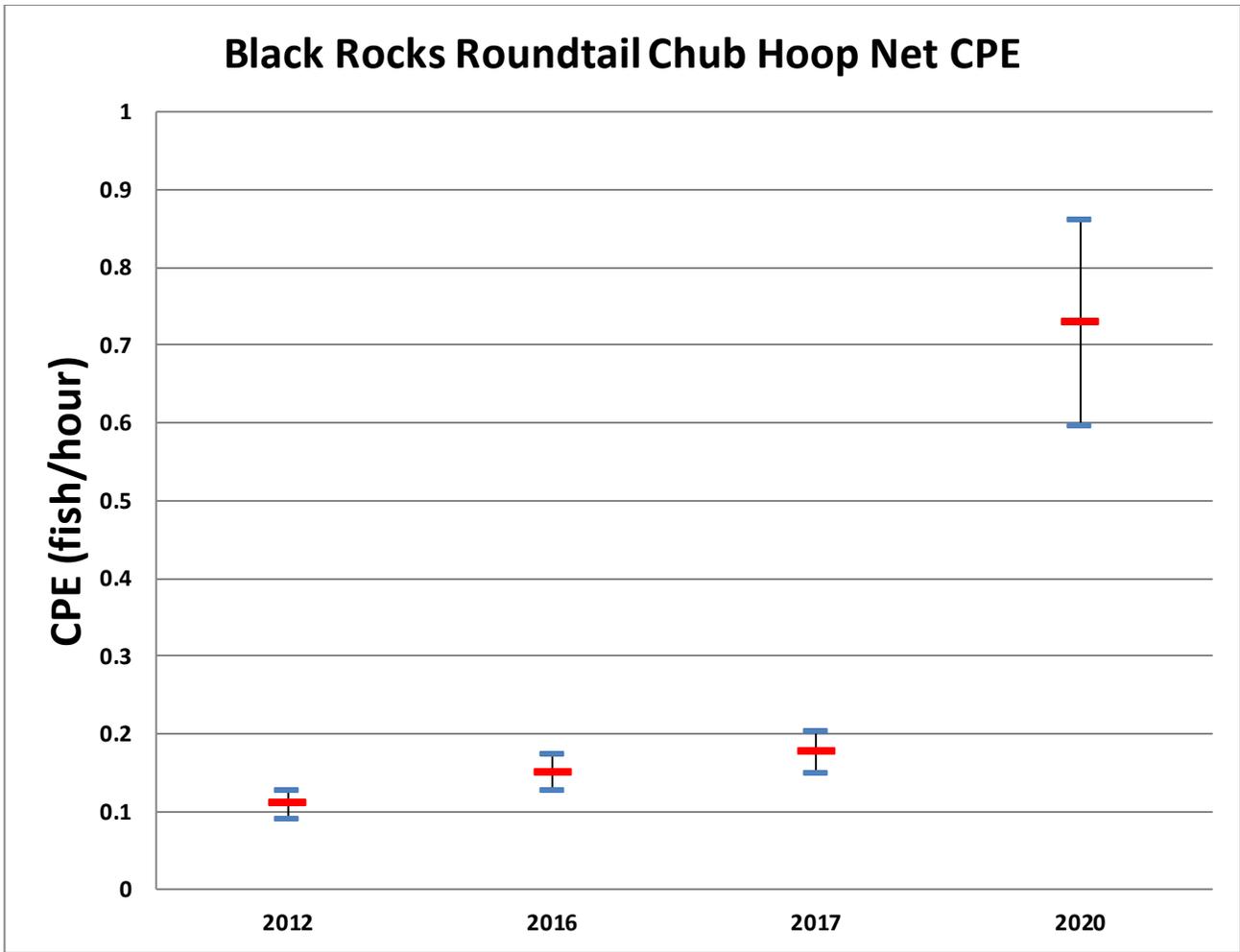


**Figure #1.**

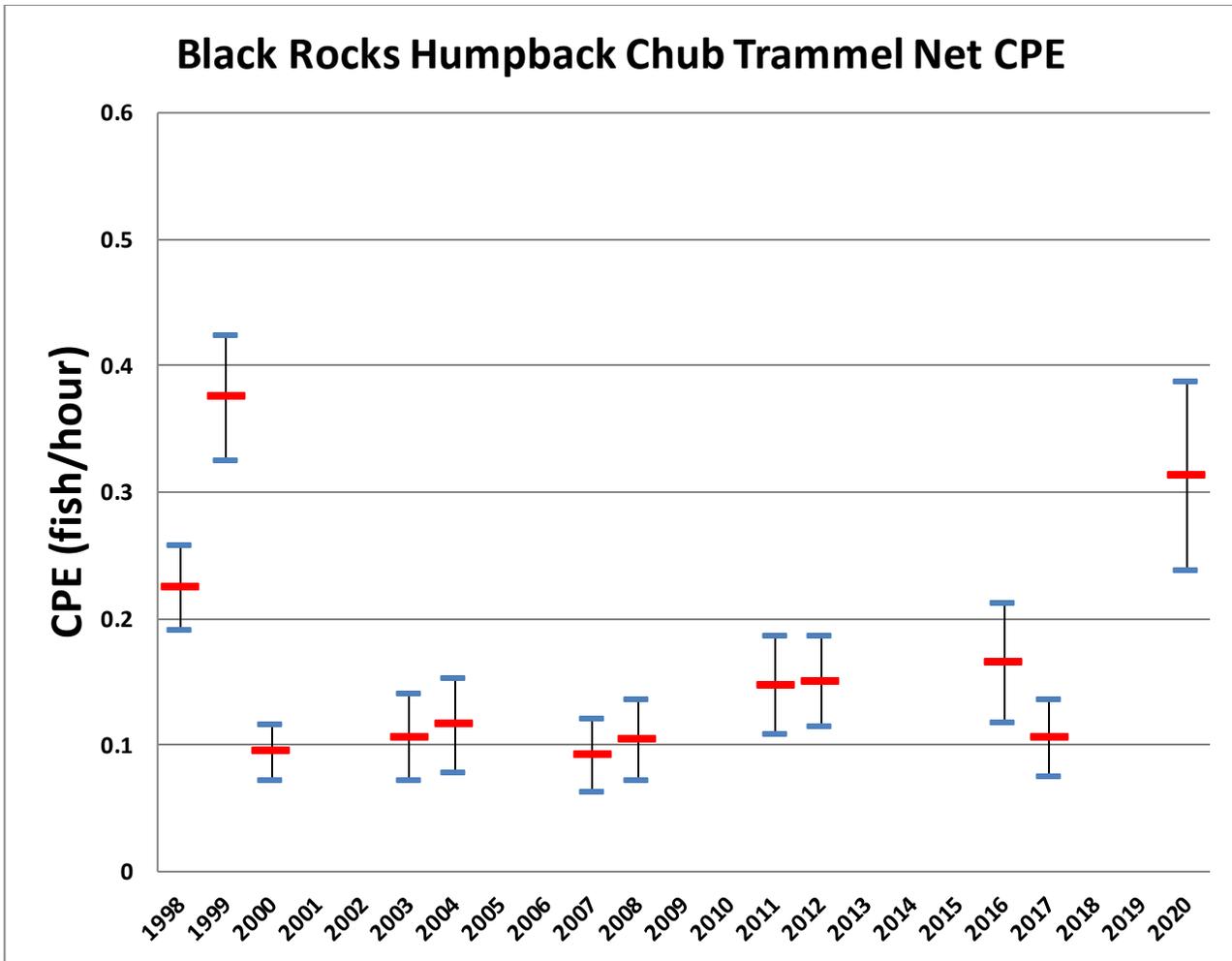
LN transformed mean CPE (fish/hr; 95% CI) for humpback chub captured using hoop nets; 2012–2020.



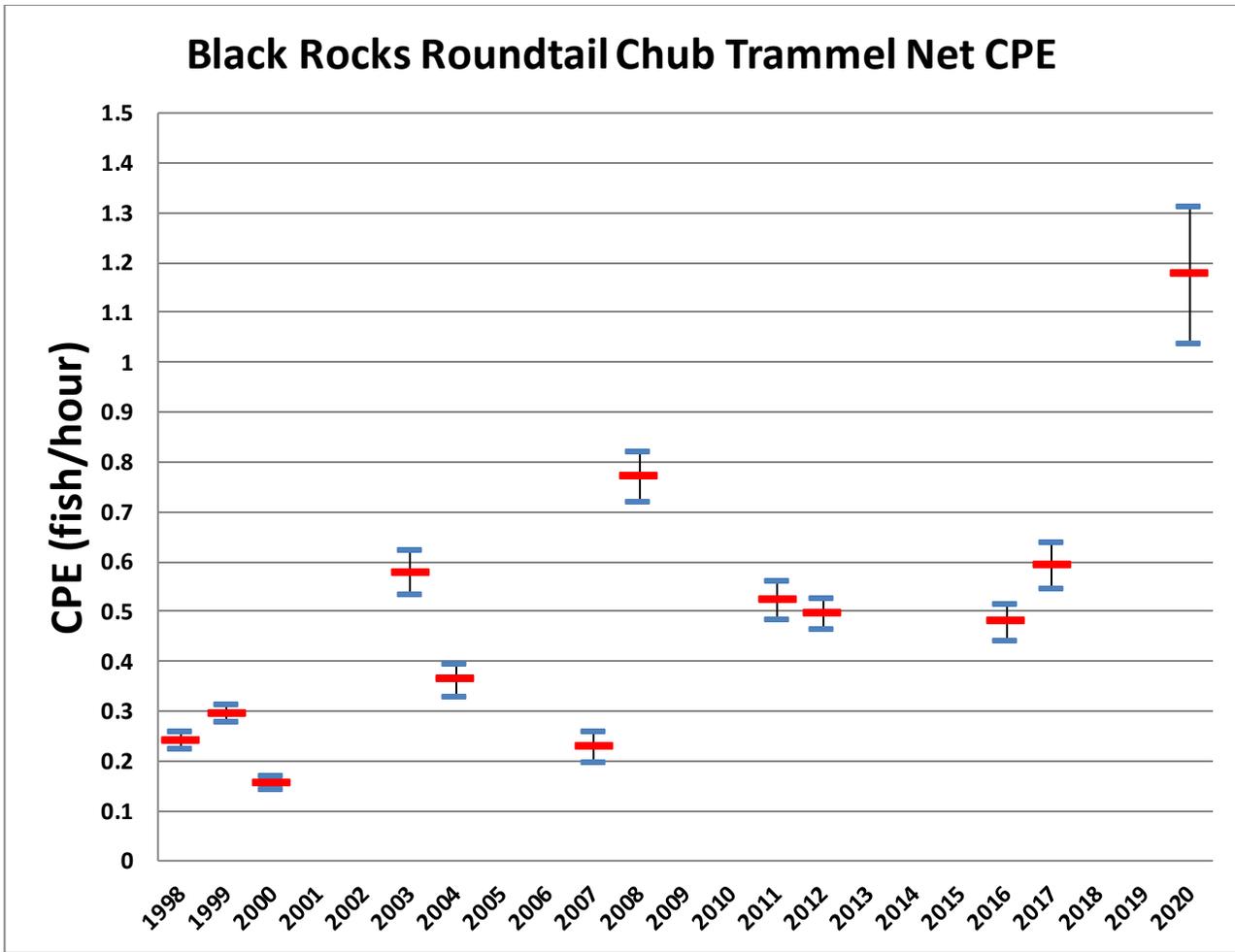
**Figure #2.**  
LN transformed mean CPE (fish/hr; 95% CI) for juvenile *Gila* spp. captured using hoop nets; 2012–2020.



**Figure #3.**  
LN transformed mean CPE (fish/hr; 95% CI) for roundtail chub captured using hoop nets; 2012–2020.



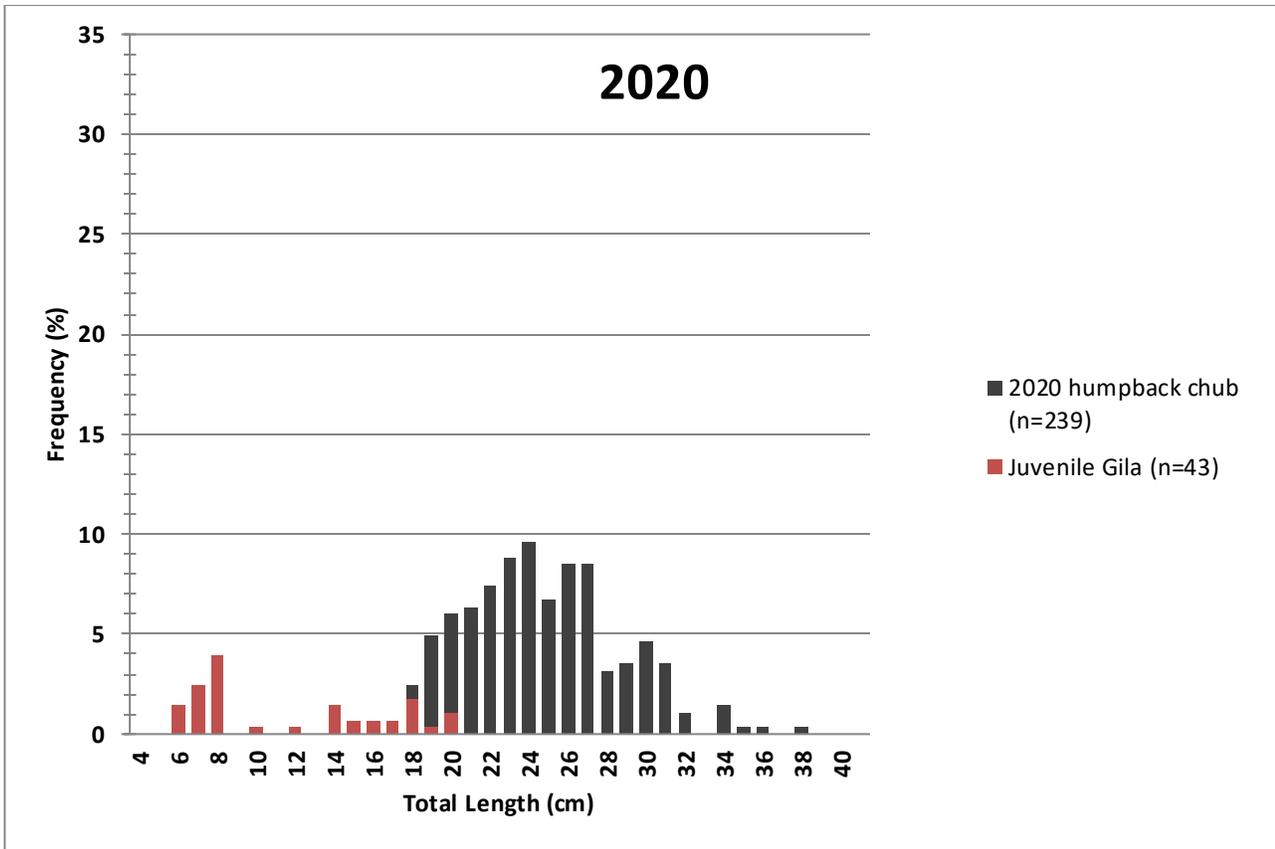
**Figure #4.**  
LN transformed mean CPE (fish/hr; 95% CI) for humpback chub captured using trammel nets; 1998–2020.



**Figure #5.**

LN transformed mean CPE (fish/hr; 95% CI) for roundtail chub captured using trammel nets; 1998–2020.

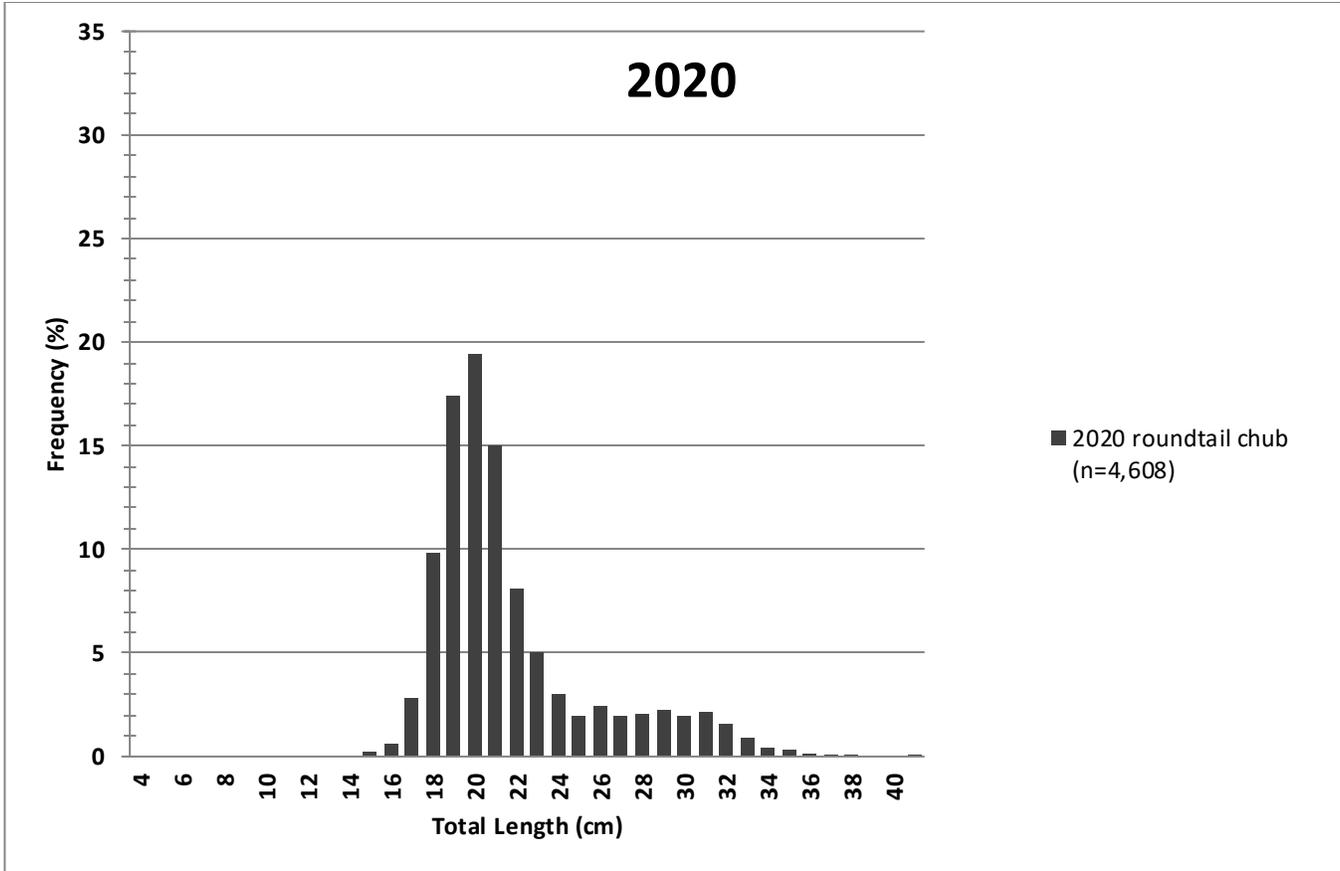
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**Figure #6.**

Size structure of humpback chub in Black Rocks, 2020. Red bars represent juvenile *Gila* spp. which couldn't be morphologically confirmed to species; black bars represent morphologically confirmed humpback chub.

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**Figure #7.**  
Size structure of roundtail chub in Black Rocks, 2020.

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### Literature Cited

Francis, T.A., and C.W. McAda. 2011. Population size and structure of humpback chub, *Gila cypha* and roundtail chub, *G. robusta*, in Black Rocks, Colorado River, Colorado, 2007–2008. Final Report from the U.S. Fish and Wildlife Service to the Upper Colorado River Endangered Fish Recovery Program, Project Number 131. Grand Junction, Colorado.

Francis, T.A., K.R. Bestgen, and G.C. White. 2016. Population status of humpback chub, *Gila cypha*, and catch indices and population structure of sympatric roundtail chub, *Gila robusta*, in Black Rocks, Colorado River, Colorado, 1998–2012. Larval Fish Laboratory Contribution 199. Final Report from the U.S. Fish and Wildlife Service to the Upper Colorado River Endangered Fish Recovery Program, Project Number 131. Grand Junction, Colorado.

Francis, T.A., K.R. Bestgen, and G.C. White. *In prep.* Population status of humpback chub, *Gila cypha*, and catch indices and population structure of sympatric roundtail chub, *Gila robusta*, in Black Rocks, Colorado River, Colorado, 1998–2017. Larval Fish Laboratory Contribution 222. Final Report from the U.S. Fish and Wildlife Service to the Upper Colorado River Endangered Fish Recovery Program, Project Number 131. Grand Junction, Colorado.

McAda, C. W. 2002. Population size and structure of humpback chub in Black Rocks, 1998–2000. Final report to the Upper Colorado River Fish Recovery Program, Project Number 22a3. U. S. Fish and Wildlife Service, Grand Junction, Colorado.

McAda, C. W. 2007. Population size and structure of humpback chub in Black Rocks, 2003–2004. Final report to the Upper Colorado River Fish Recovery Program, Project Number 22a3. U. S. Fish and Wildlife Service, Grand Junction, Colorado.