

**RECOVERY PROGRAM
FY 2018-2019 SCOPE OF WORK for:**

Recovery Program Project Number: 131 (22a-3)

Black Rocks Humpback Chub Population Estimate

Reclamation Agreement number: R15PG00083
Reclamation Agreement term: October 1, 2014 – Sept. 30, 2019

Note: Recovery Program FY18-19 scopes of work are drafted in May 2017. They often are revised before final Program approval and may subsequently be revised again in response to changing Program needs. Program participants also recognize the need and allow for some flexibility in scopes of work to accommodate new information (especially in nonnative fish management projects) and changing hydrological conditions.

Lead agency: U.S. Fish and Wildlife Service
Grand Junction Fish and Wildlife Conservation Office
Submitted by: Travis Francis, Fishery Biologist
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Category:

- Ongoing project
 Ongoing-revised project
 Requested new project
 Unsolicited proposal

Expected Funding Source:

- Annual funds
 Capital funds
 Other [*explain*]

- I. Title of Proposal: **Population Estimate of Humpback Chub in Black Rocks.**
- II. Relationship to RIPRAP: Colorado River Action Plan: Mainstem
V. Monitor Populations.
VC.1. Estimate Humpback Chub Populations in Black Rocks.
- III. Study Background/Rationale and Hypotheses: Robust population estimates are now critical to monitor recovery of the humpback chub population (USFWS 2001). Recovery goals require estimates of population size at regular intervals to measure population response to management activities under the Recovery Program. A population estimate was made for the 1998-2000 time period (McAda 2002) a second estimate was made for 2003 - 2004 (McAda 2007) a third estimate was conducted 2007-2008 (Francis and McAda 2011), and a fourth estimate was conducted in 2011-2012 (Francis et al 2016). This scope of work identifies the work necessary to complete a fifth and sixth estimate of population size for humpback chub in Black Rocks in 2016-2017 and 2020-2021.

IV. Study Goals, Objectives, End Product(s):

A. Goals:

1. Estimate size and recruitment of the humpback chub population in Black Rocks.
2. Evaluate young-of-year (YOY) *Gila* year-class strength and determine what habitats and capture techniques are most productive for capturing YOY.

B. Objectives:

1. Use mark-recapture to estimate the population size (including adults ≥ 200 mm TL) and recruitment (i.e., juveniles 150-199 mm TL) of humpback chub in Black Rocks.
2. Describe population structure of humpback chub in Black Rocks by analyzing length-frequency distributions.
3. Monitor and describe relative condition of the chub populations.
4. Determine and describe YOY *Gila* hatch dates and year-class strength (densities) if the numbers of fish collected warrant such analysis.

C. End Products:

1. Complete final report describing population size and structure of humpback chub in Black Rocks; winter, spring, summer 2018. Draft report December 15, 2018. Final Report, March 15, 2019.

V. Study Area: Upper Colorado River Basin – Black Rocks area (RM 135.5-136.5).

VI. Study Methods/Approach:

The Recovery Program (2002) summarized population estimates conducted through 2001 and made recommendations for sampling methodologies for future work. The study methodology outlined here corresponds to those recommendations.

Conduct four intensive 4-day (3 nights) sampling efforts in Black Rocks between mid-September and late October in 2016 and 2017, and again in 2020 and 2021, with intervals of 1-2 weeks between samples. Capture as many adult-size chubs as possible using the most efficient gear for handling as many fish as possible for the effort expended. Sampling will encompass the entire length of Black Rocks occupied by humpback chub to ensure that all fish have an equal chance of being captured.

Based on previous field efforts the most effective gear is 1-in inner mesh trammel nets (McAda 2002; Chart and Lentsch 1999). However, there is some concern that trammel nets can produce injuries that might lead to delayed mortality if not used carefully (McAda 2002). To

reduce stress to humpback chub, sampling will be done in fall as temperatures are falling in the river (mid-September through October). Trammel nets will be run every hour to the extent possible, with 1.5 hr as the absolute maximum length of set. Fewer nets may be set than during the previous study to ensure that maximum length of set is not exceeded.

Extensive sampling will also be done with electrofishing, seining, baited hoop nets and submersible PIT tag antenna. The extra sampling will especially target chubs < 200 mm TL to estimate population size of fish about to recruit into the adult population. Recapture rates for fish this size are low, so catch per effort may have to be relied on to estimate recruitment rates. The extra sampling will also be used to evaluate techniques that might supplement or replace (if deemed necessary) trammel netting and reduce potential stress to the fish.

YOY *Gila* will be collected during four overnight trips in late July and August using the methods described in the Interagency Standardized Monitoring Program Handbook (ISMP, USFWS 1987). Sample sites will include the Colorado River above Black Rocks proper (as far upstream as Mee Canyon, RM 138.3), sites within Black Rocks and sites below Black Rocks extending downstream as far as Westwater Wash (RM 124.8). Larval and YOY fish will be collected with a beach seine (4.6 m in length, 1.5 mm mesh) or a one-man seine (1 m in length, 0.8 mm mesh). Physical data (site length and width, depth, temperature, and secchi measurements) will be collected at each collection site. Spawning date (subtract 6 days from hatch date, Muth et al 1985, Marsh 1985) will be calculated from a back calculated hatch date (Muth 1990) that will be generated from YOY total lengths (collected in the field) which will be converted to standard lengths (SL, required to calculate days after hatch) by using the following regression:

$$SL = 2.02 + .7205(TL)$$

This YOY *Gila* work should provide insight on where and how to proceed with future investigations into environmental variables (abiotic and biotic) that may limit or promote these species ability to successfully produce YOY and recruit fish into the adult life stage.

All specimens captured will be identified to species using criteria described by Douglas et al. (1989, 1998). Careful examination and use of specific criteria will be especially important for fish < 200 mm which can be difficult to distinguish to species. After handling, all chubs will be treated in a salt dip (1.5%, ~20 min) before release. In addition, treatment with a commercial fungicide (200 ppm, ~1 hr) will be explored. However, use of the fungicide will require holding the fish in a tank with aeration for about one hour before release.

All Colorado pikeminnow, humpback chub, and roundtail chub captured will have their total length (mm) and weight (g) measured. All Colorado pikeminnow, humpback chub and roundtail chub, greater than 160 mm total length, will be PIT tagged. All sympatric fishes collected during all sampling efforts will be identified and enumerated.

Capture-recapture data for humpback chub will be placed into a matrix and run through program MARK. A population estimate will be calculated using the model most suitable for the sampling methods used. Survival rates may also be estimated. Population trends and population size structure will be determined using standard techniques described in Recovery Program (2002). Analysis of similar data collected during 1998 to 2008 indicated that capture

probabilities (P^{\wedge}) ranged from 0.09-0.30 and coefficient of variation (CV) ranged from 0.11-0.29 (Francis et al 2016). These parameters varied with catch rates and number of sampling trips, but the current study will attempt to produce P^{\wedge} s $>$ 0.07 and CVs of 0.25.

VII. Task Description and Schedule

1. Sample humpback chubs in Black Rocks; fall 2016 (spanning FY 2016 and FY 2017); and fall 2017 (spanning FY 2017 and FY 2018); and again in fall 2020 (spanning FY 2020 and FY 2021); and fall 2021 (spanning FY 2021 and FY 2022).
2. Sample YOY *Gila* from Mee Canyon to Westwater Wash; July and August 2016; July and August 2017; July and August 2020; and July and August 2021.
3. Compile data annually, prepare preliminary and annual reports.
4. Complete final report describing population size and structure of humpback chub in Black Rocks 2016-2017 during winter, spring, and summer 2018. Estimates will include numbers of adults (\leq 200 mm TL) in the population, as well as recruitment by juveniles (150-199 mm TL) and young-of-year class strength. Draft report by December 15, 2018. Final report by March 15, 2019.

VIII. Deliverables, Due Dates, and Budget by Fiscal Year:

FY 2018

Tasks 1, 3 and 4. Final Draft Report to Coordinator by December 15, 2018

Pop Est. Work								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	100	80.95	0	0		8095
	Administrative Officer GS-09	1	100	42.14	0	0		4214
	Fishery Biologist GS-11	1	280	52.8	0	0		14784
	Crew leader Tech. GS-07	1	160	31.82	48	47.73		7382.24
	Biological Tech. GS-05	2	120	22.94	48	34.41		8808.96
Labor Subtotal								43284.2
Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
	Office Supplies	FEDEX charges for Biological samples						100
	Office Supplies	Rite in the rain paper						50
	Office Supplies	Data clipboards						50
	Office Supplies	Ink Cartridges and paper						200
	Office Supplies	Cell, SAT, and Office phone service						200
	Field Equipment	GSA vehicle lease per month	2	each	365	2		1460
	Field Equipment	Mileage	2000	miles	0.42	1		840
	Field Equipment	Boat Gasoline 91 octane	120	gallons	4	1		480
	Field Equipment	Trammel Nets	6	each	223	1		1338
	Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	1,300	1		1300
	Field Equipment	*Misc. Field Supplies See Justification	1	see basis	1,050	1		1050
Equipment Subtotal								7068
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
	Camping	4	0	28	14.75	9	2	1480

	Meetings/ Lakewood 2017 GSA Rates	2	178	69	14.75	3	1	1185
Travel Subtotal								2665
								Grand Total
USFWS Grand Jct.								53017
CSU Larval Fish Lab	Statistical Assistance							7500
								60517

Task 2 and 4

YOY Gila sampling								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	100	80.95	0	0		8095
	Administrative Officer GS-09	1	40	42.14	0	0		1685.6
	Fishery Biologist GS-11	1	100	52.8	0	0		5280
	Crew leader Tech. GS-07	1	100	31.82	0	47.73		3182
Labor Subtotal								18242.6
Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
	Office Supplies	Rite in the rain paper						50
	Office Supplies	Ink Cartridges and paper						50
	Office Supplies	Cell, SAT, and Office phone service						100
	Field Equipment	GSA vehicle lease per month	1	each	365	1		365
	Field Equipment	Mileage	500	miles	0.42	1		210
Equipment Subtotal								775
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		0	0	28	14.75	0	0	0
Travel Subtotal								0
								Grand Total
USFWS Grand Jct.								19018

*Misc. Field Supplies

Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but use of these funds for a “typical” field season for one study would include the following:

- Spark plugs for generators – 5 at \$7 each = \$35
- Synthetic oil for generators - 5 quarts at \$7 each = \$35
- Generator repair/tune-up - 5 hrs @ \$75/hr = \$375
- 2 stroke Optimax Oil – 20 gallons @ \$38/Gallon = \$760
- Hip boots – 2 pair at \$50/pair = \$100
- Breathable chest waders - 2 pair @ \$125/pair = \$250
- Stearns Type III life jackets – 3 @ \$70 each = \$210
- Electrical Gloves - 3 pairs @ \$65/pair = \$195
- Dura-Frame electrofishing dip nets – 2 @ \$300 each = \$600
- Boat trailer maintenance
 - Signal light pigtail adapters – 2 @ \$30 each = \$60
- Replace any missing NRS HD-brand tie-down straps:
 - Ten 2-ft straps @ \$4.20 each = \$42
 - Five 3-ft straps @ \$4.30 each = \$21.50
 - Ten 4-ft straps @ \$4.70 each = \$47
 - Five 6-ft straps @ \$5.05 each = \$25.25
 - Five 9-ft straps @ \$5.7 each = \$28.50
 - Five 12-ft straps @ \$6.15 each = \$30.75
- Replace any missing D-style carabiners, each boat needs:
 - 10 @ \$7.50 each = \$75
- Mesh rig bag – 1 @ \$50 each = \$50
- Yeti 125-quart coolers – 1 @ \$500 each = \$500
- Rafting oars, oar blades, and oar rowing sleeves
 - Carlisle 10-foot oar shafts – 2 @ \$90 each = \$180
 - Carlisle Oars blades – 4 @ \$65 each = \$260
 - Oar sleeves – 4 @ \$12 each = \$48
- 5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100
- River bags
 - NRS 3.8 heavy-duty Bill’s Bag – 1 @ \$100 each = \$100
 - Clavey (green 7 X 17) dry bag – 3 @ \$22 each = \$66
 - Clavey (blue 10 X 24) dry bag) – 4 @ \$26 each = \$104
- 20 lb. propane tanks – 3 @ \$20 each = \$60

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), camp stoves, lanterns, lantern mantles, small “pony” propane bottles for lanterns, Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtails, new electrofishing spheres, wire rope for replacing electrofishing “witches brooms,” 2-man dome tents, NRS Canyon Box for dry storage, camping kitchen gear (roll-up camp tables, anodized dutch ovens, plates, bowls, cups, silverware), pencils, repair/replace river maps, etc.

FY 2019

No work, off year

\$0

Out-year budgets for Black Rocks Humpback Chub Population Estimate: 2020-2022

THESE BUDGETS ARE ESTIMATES ONLY AND MAY NOT REPRESENT ACTUAL COSTS

FY 2020
Tasks 1, 3 and 4

Pop Est. Work								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	80	84.22	0	0		6737.6
	Administrative Officer GS-09	1	80	43.84	0	0		3507.2
	Fishery Biologist GS-11	1	280	54.92	0	0		15377.6
	Crew leader Tech. GS-07	1	220	33.11	64	49.66		10462.44
	Biological Tech. GS-05	2	220	23.87	64	35.8		15085.2
Labor Subtotal								51170.04
Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
	Office Supplies	FEDEX charges for Biological samples						104
	Office Supplies	Rite in the rain paper						52
	Office Supplies	Data clipboards						52
	Office Supplies	Ink Cartridges and paper						208
	Office Supplies	Cell, SAT, and Office phone service						208
	Field Equipment	GSA vehicle lease per month	2	each	379.75	2		1519
	Field Equipment	Mileage	2000	miles	0.44	1		880
	Field Equipment	Boat Gasoline 91 octane	120	gallons	4.16	1		499.2
	Field Equipment	Trammel Nets	6	each	232	1		1392
	Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	1,352	1		1352
	Field Equipment	*Misc. Field Supplies See Justification	1	see basis	1,092	1		1092
Equipment Subtotal								7358.2
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
	Camping	4	0	28	14.75	17	4	2848

	Meetings/ Lakewood 2017 GSA Rates	2	185.19	71.79	14.75	3	1	1230.5
Travel Subtotal								4078.5
								Grand Total
USFWS Grand Jct.								62607
CSU Larval Fish Lab	Statistical Assistance							7500
								70107

Task 2 and 4

YOY Gila sampling								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	100	84.22	0	0		8422
	Administrative Officer GS-09	1	40	43.84	0	0		1753.6
	Fishery Biologist GS-11	1	140	54.92	0	0		7688.8
	Crew leader Tech. GS-07	1	140	33.11	0	49.66		4635.4
	Biological Tech. GS-05	1	64	23.87	0	35.8		1527.68
Labor Subtotal								24027.48
Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
	Office Supplies	Rite in the rain paper						52
	Office Supplies	Data clipboards						52
	Office Supplies	Ink Cartridges and paper						52
	Office Supplies	Cell, SAT, and Office phone service						104
	Field Equipment	GSA vehicle lease per month	1	each	379.75	1		379.75
	Field Equipment	Mileage	500	miles	0.44	1		220
	Field Equipment	Boat Gasoline 91 octane	160	gallons	4.16	1		665.6
	Field Equipment	Beach Seines	2	each	104	1		208
	Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	1,040	1		1040

	Field Equipment	*Misc. Field Supplies See Justification	1	see basis	1,040	1		1040
Equipment Subtotal								3813.35
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		3	0	28	14.75	8	4	1203
Travel Subtotal								1203
								Grand Total
USFWS Grand Jct.								29044

***Misc. Field Supplies**

Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but use of these funds for a "typical" field season for one study would include the following:

- Spark plugs for generators – 5 at \$7 each = \$35
- Synthetic oil for generators - 5 quarts at \$7 each = \$35
- Generator repair/tune-up - 5 hrs @ \$75/hr = \$375
- 2 stroke Optimax Oil – 20 gallons @ \$38/Gallon = \$760
- Hip boots – 2 pair at \$50/pair = \$100
- Breathable chest waders - 2 pair @ \$125/pair = \$250
- Stearns Type III life jackets – 3 @ \$70 each = \$210
- Electrical Gloves - 3 pairs @ \$65/pair = \$195
- Dura-Frame electrofishing dip nets – 2 @ \$300 each = \$600
- Boat trailer maintenance
 - Signal light pigtail adapters – 2 @ \$30 each = \$60
- Replace any missing NRS HD-brand tie-down straps:
 - Ten 2-ft straps @ \$4.20 each = \$42
 - Five 3-ft straps @ \$4.30 each = \$21.50
 - Ten 4-ft straps @ \$4.70 each = \$47
 - Five 6-ft straps @ \$5.05 each = \$25.25
 - Five 9-ft straps @ \$5.7 each = \$28.50
 - Five 12-ft straps @ \$6.15 each = \$30.75
- Replace any missing D-style carabiners, each boat needs:
 - 10 @ \$7.50 each = \$75
- Mesh rig bag – 1 @ \$50 each = \$50
- Yeti 125-quart coolers – 1 @ \$500 each = \$500
- Rafting oars, oar blades, and oar rowing sleeves
 - Carlisle 10-foot oar shafts – 2 @ \$90 each = \$180
 - Carlisle Oars blades – 4 @ \$65 each = \$260
 - Oar sleeves – 4 @ \$12 each = \$48
- 5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100
- River bags
 - NRS 3.8 heavy-duty Bill's Bag – 1 @ \$100 each = \$100

Clavey (green 7 X 17) dry bag – 3 @ \$22 each = \$66

Clavey (blue 10 X 24) dry bag) – 4 @ \$26 each = \$104

20 lb. propane tanks – 3 @ \$20 each = \$60

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), camp stoves, lanterns, lantern mantles, small “pony” propane bottles for lanterns, Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtails, new electrofishing spheres, wire rope for replacing electrofishing “witches brooms,” 2-man dome tents, NRS Canyon Box for dry storage, camping kitchen gear (roll-up camp tables, anodized dutch ovens, plates, bowls, cups, silverware), pencils, repair/replace river maps, etc.

FY 2021

Tasks 1, 3 and 4

Pop Est. Work								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	80	85.9	0	0		6872
	Administrative Officer GS-09	1	80	44.72	0	0		3577.6
	Fishery Biologist GS-11	1	280	56.02	0	0		15685.6
	Crew leader Tech. GS-07	1	220	33.77	64	50.65		10671
	Biological Tech. GS-05	2	220	24.35	64	36.52		15388.56
Labor Subtotal								52194.76
Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
	Office Supplies	FEDEX charges for Biological samples						106
	Office Supplies	Rite in the rain paper						53
	Office Supplies	Data clipboards						53
	Office Supplies	Ink Cartridges and paper						212
	Office Supplies	Cell, SAT, and Office phone service						212
	Field Equipment	GSA vehicle lease per month	2	each	387.35	2		1549.4
	Field Equipment	Mileage	2000	miles	0.45	1		900
	Field Equipment	Boat Gasoline 91 octane	120	gallons	4.24	1		508.8
	Field Equipment	Trammel Nets	6	each	237	1		1422

	Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	1,379	1		1379
	Field Equipment	*Misc. Field Supplies See Justification	1	see basis	1,114	1		1114
Equipment Subtotal								7509.2
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
	Camping	4	0	28	14.75	17	4	2848
	Meetings/ Lakewood 2017 GSA Rates	2	188.89	73.23	14.75	3	1	1253.94
Travel Subtotal								4101.94
								Grand Total
USFWS Grand Jct.								63806
CSU Larval Fish Lab	Statistical Assistance							7500
								71306

Task 2 and 4

YOY Gila sampling								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	100	85.9	0	0		8590
	Administrative Officer GS-09	1	40	44.72	0	0		1788.8
	Fishery Biologist GS-11	1	140	56.02	0	0		7842.8
	Crew leader Tech. GS-07	1	140	33.77	0	50.65		4727.8
	Biological Tech. GS-05	1	64	24.35	0	36.52		1558.4
Labor Subtotal								24507.8
Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
	Office Supplies	Rite in the rain paper						53
	Office Supplies	Data clipboards						53
	Office Supplies	Ink Cartridges and paper						53
	Office Supplies	Cell, SAT, and Office phone service						106

	Field Equipment	GSA vehicle lease per month	1	each	387.35	1		387.35
	Field Equipment	Mileage	500	miles	0.45	1		225
	Field Equipment	Boat Gasoline 91 octane	160	gallons	4.24	1		678.4
	Field Equipment	Beach Seines	2	each	106	1		212
	Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	1,061	1		1061
	Field Equipment	*Misc. Field Supplies See Justification	1	see basis	1,061	1		1061
	Equipment Subtotal							3889.75
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		3	0	28	14.75	8	4	1203
	Travel Subtotal							1203
								Grand Total
	USFWS Grand Jct.							29601

***Misc. Field Supplies**

Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but use of these funds for a "typical" field season for one study would include the following:

- Spark plugs for generators – 5 at \$7 each = \$35
- Synthetic oil for generators - 5 quarts at \$7 each = \$35
- Generator repair/tune-up - 5 hrs @ \$75/hr = \$375
- 2 stroke Optimax Oil – 20 gallons @ \$38/Gallon = \$760
- Hip boots – 2 pair at \$50/pair = \$100
- Breathable chest waders - 2 pair @ \$125/pair = \$250
- Stearns Type III life jackets – 3 @ \$70 each = \$210
- Electrical Gloves - 3 pairs @ \$65/pair = \$195
- Dura-Frame electrofishing dip nets – 2 @ \$300 each = \$600
- Boat trailer maintenance
 - Signal light pigtail adapters – 2 @ \$30 each = \$60
- Replace any missing NRS HD-brand tie-down straps:
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 - Ten 4-ft straps @ \$4.70 each = \$47
 - Five 6-ft straps @ \$5.05 each = \$25.25
 - Five 9-ft straps @ \$5.7 each = \$28.50
 - Five 12-ft straps @ \$6.15 each = \$30.75
- Replace any missing D-style carabiners, each boat needs:
 - 10 @ \$7.50 each = \$75

Mesh rig bag – 1 @ \$50 each = \$50
 Yeti 125-quart coolers – 1 @ \$500 each = \$500
 Rafting oars, oar blades, and oar rowing sleeves
 Carlisle 10-foot oar shafts – 2 @ \$90 each = \$180
 Carlisle Oars blades – 4 @ \$65 each = \$260
 Oar sleeves – 4 @ \$12 each = \$48
 5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100
 River bags
 NRS 3.8 heavy-duty Bill's Bag – 1 @ \$100 each = \$100
 Clavey (green 7 X 17) dry bag – 3 @ \$22 each = \$66
 Clavey (blue 10 X 24) dry bag – 4 @ \$26 each = \$104
 20 lb. propane tanks – 3 @ \$20 each = \$60

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), camp stoves, lanterns, lantern mantles, small "pony" propane bottles for lanterns, Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtailed, new electrofishing spheres, wire rope for replacing electrofishing "witches brooms," 2-man dome tents, NRS Canyon Box for dry storage, camping kitchen gear (roll-up camp tables, anodized dutch ovens, plates, bowls, cups, silverware), pencils, repair/replace river maps, etc.

FY 2022

Tasks 1, 3 and 4. Final Draft Report to Coordinator by December 15, 2022

Pop Est. Work								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	100	87.62	0	0		8762
	Administrative Officer GS-09	1	100	45.61	0	0		4561
	Fishery Biologist GS-11	1	280	57.14	0	0		15999.2
	Crew leader Tech. GS-07	1	160	34.45	48	51.66		7991.68
	Biological Tech. GS-05	2	120	24.84	48	37.25		9537.6
Labor Subtotal								46851.48
Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
	Office Supplies	FEDEX charges for Biological samples						108
	Office Supplies	Rite in the rain paper						54
	Office Supplies	Data clipboards						54
	Office Supplies	Ink Cartridges and paper						216
	Office Supplies	Cell, SAT, and Office phone service						216

	Field Equipment	GSA vehicle lease per month	2	each	395.1	2		1580.4
	Field Equipment	Mileage	2000	miles	0.46	1		920
	Field Equipment	Boat Gasoline 91 octane	120	gallons	4.32	1		518.4
	Field Equipment	Trammel Nets	6	each	242	1		1452
	Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	1,407	1		1407
	Field Equipment	*Misc. Field Supplies See Justification	1	see basis	1,136	1		1136
	Equipment Subtotal							7661.8
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
	Camping	4	0	28	14.75	9	2	1480
	Meetings/ Lakewood 2017 GSA Rates	2	192.67	74.7	14.75	3	1	1277.88
	Travel Subtotal							2757.88
								Grand Total
	USFWS Grand Jct.							57271
	CSU Larval Fish Lab	Statistical Assistance						7500
								64771

Task 2 and 4

YOY Gila sampling								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	100	87.62	0	0		8762
	Administrative Officer GS-09	1	40	45.61	0	0		1824.4
	Fishery Biologist GS-11	1	100	57.14	0	0		5714
	Crew leader Tech. GS-07	1	100	34.45	0	51.66		3445
	Labor Subtotal							19745.4
Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
	Office Supplies	Rite in the rain paper						54
	Office Supplies	Ink Cartridges and paper						54

	Office Supplies	Cell, SAT, and Office phone service						108
	Field Equipment	GSA vehicle lease per month	1	each	395.1	1		395.1
	Field Equipment	Mileage	500	miles	0.46	1		230
Equipment Subtotal								841.1
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		0	0	28	14.75	0	0	0
Travel Subtotal								0
								Grand Total
USFWS Grand Jct.								20587

***Misc. Field Supplies**

Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but use of these funds for a “typical” field season for one study would include the following:

- Spark plugs for generators – 5 at \$7 each = \$35
- Synthetic oil for generators - 5 quarts at \$7 each = \$35
- Generator repair/tune-up - 5 hrs @ \$75/hr = \$375
- 2 stroke Optimax Oil – 20 gallons @ \$38/Gallon = \$760
- Hip boots – 2 pair at \$50/pair = \$100
- Breathable chest waders - 2 pair @ \$125/pair = \$250
- Stearns Type III life jackets – 3 @ \$70 each = \$210
- Electrical Gloves - 3 pairs @ \$65/pair = \$195
- Dura-Frame electrofishing dip nets – 2 @ \$300 each = \$600
- Boat trailer maintenance
 - Signal light pigtail adapters – 2 @ \$30 each = \$60
- Replace any missing NRS HD-brand tie-down straps:
 - Ten 2-ft straps @ \$4.20 each = \$42
 - Five 3-ft straps @ \$4.30 each = \$21.50
 - Ten 4-ft straps @ \$4.70 each = \$47
 - Five 6-ft straps @ \$5.05 each = \$25.25
 - Five 9-ft straps @ \$5.7 each = \$28.50
 - Five 12-ft straps @ \$6.15 each = \$30.75
- Replace any missing D-style carabiners, each boat needs:
 - 10 @ \$7.50 each = \$75
- Mesh rig bag – 1 @ \$50 each = \$50
- Yeti 125-quart coolers – 1 @ \$500 each = \$500
- Rafting oars, oar blades, and oar rowing sleeves
 - Carlisle 10-foot oar shafts – 2 @ \$90 each = \$180
 - Carlisle Oars blades – 4 @ \$65 each = \$260
 - Oar sleeves – 4 @ \$12 each = \$48

5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100

River bags

NRS 3.8 heavy-duty Bill's Bag – 1 @ \$100 each = \$100

Clavey (green 7 X 17) dry bag – 3 @ \$22 each = \$66

Clavey (blue 10 X 24) dry bag) – 4 @ \$26 each = \$104

20 lb. propane tanks – 3 @ \$20 each = \$60

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), camp stoves, lanterns, lantern mantles, small “pony” propane bottles for lanterns, Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtails, new electrofishing spheres, wire rope for replacing electrofishing “witches brooms,” 2-man dome tents, NRS Canyon Box for dry storage, camping kitchen gear (roll-up camp tables, anodized dutch ovens, plates, bowls, cups, silverware), pencils, repair/replace river maps, etc.

IX. Budget Summary: FY2018

USFWS-GJ	\$ 53,017
USFWS-GJ YOY Gila	\$ 19,018
CSU LFL	\$ 7,500
Grand Total	\$ 79,535

FY2019

USFWS-GJ	\$ 0
USFWS-GJ YOY Gila	\$ 0
CSU LFL	\$ 0
Grand Total	\$ 0

2018-2019 Total = \$ 79,535

Estimated Budget Summary for Fiscal Years 2020-2022:

FY2020

USFWS-GJ	\$ 62,607
USFWS-GJ YOY Gila	\$ 29,044
CSU LFL	\$ 7,500
Grand Total	\$ 99,151

FY2021

USFWS-GJ	\$ 63,806
USFWS-GJ YOY Gila	\$ 29,601
CSU LFL	\$ 7,500
Grand Total	\$100,907

FY2022

USFWS-GJ	\$ 57,271
USFWS-GJ YOY Gila	\$ 20,587
CSU LFL	\$ 7,500
Grand Total	\$ 85,358

2020-2022 Total = \$285,416

5-Year Total USFWS GJ = \$334,951

5-Year Total CSU LFL = \$ 30,000

X. Reviewers: Program Staff and Biology Committee

XI. References:

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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.

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McAda, C. W. 2007. Population size and structure of humpback chub in Black Rocks, Colorado River, Colorado, 2003-2004. Final report to Upper Colorado River Endangered Fish Recovery Program, Project Number 131 (22-a-3). U.S. Fish and Wildlife Service, Grand Junction, Colorado.

McAda, C. W. 2002. Population size and structure of humpback chub in Black Rocks, Colorado River, Colorado, 1998-2000. Final report to Upper Colorado River Endangered Fish Recovery Program, Project Number 22-a-3. U.S. Fish and Wildlife Service, Grand Junction, Colorado.

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Recovery Program (Program Director’s Office, Upper Colorado River Endangered Fish Recovery Program). 2002. Protocols for Colorado pikeminnow and humpback chub population estimates. Draft Final Report to Upper Colorado River Endangered Fish Recovery Program. U. S. Fish and Wildlife Service, Denver, Colorado.

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