

**RECOVERY PROGRAM
FY 2016-2017 SCOPE OF WORK for:**

Black Rocks Humpback Chub Population Estimate

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

Reclamation Agreement number: R13PG40018
Reclamation Agreement term: June 3, 2013 – Sept. 30, 2017

Note: Recovery Program FY16-17 scopes of work are drafted in May 2015. 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: Fish and Wildlife Service
Colorado River Fishery Project – Grand Junction (CRFP-GJ)

Submitted by: Travis Francis, Fishery Biologist
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Date Last Modified: 6/17/2015 9:27:00 AM

<u>Category:</u>	<u>Expected Funding Source:</u>
<input type="checkbox"/> Ongoing project	<input checked="" type="checkbox"/> Annual funds
<input checked="" type="checkbox"/> Ongoing-revised project	<input type="checkbox"/> Capital funds
<input type="checkbox"/> Requested new project	<input type="checkbox"/> Other [<i>explain</i>]
<input type="checkbox"/> Unsolicited proposal	

- I. Title of Proposal: **Population Estimate of Humpback Chub in Black Rocks.**
- II. Relationship to RIPRAP: Colorado River Action Plan: Mainstem
 - V. Monitor Populations.
 - C.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, in prep). This scope of work identifies the work necessary to complete a fifth estimate of population size for humpback chub in Black Rocks in 2016-2017.
- 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, 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 and with baited hoop nets. 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 0.04-0.14 and coefficient of variation (CV) ranged from 0.13-

0.98 (Francis and McAda 2011). These parameters varied with catch rates and number of sampling trips, but the current study will attempt to produce $P^s > 0.07$ 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).
2. Sample YOY *Gila* from Mee Canyon to Westwater Wash; July and August 2016; and July and August 2017.
3. Compile data annually, prepare preliminary and annual reports.
4. Complete final report describing population size and structure of humpback chub in Black Rocks during winter, spring, and summer 2018. Estimates will include numbers of adults (≤ 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 2016

Tasks 1, 3 and 4

FY 2016									
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate			Total
	Project Leader GS-14		1	80	83.42	0	0		6673.6
	Administrative Officer GS-09		1	80	44.72	0	0		3577.6
	Fishery Biologist GS-11		1	280	49.36	0	0		13820.8
	Crew leader Tech. GS-07		1	220	33.7	64	50.54		10648.56
	Biological Tech. GS-05		2	220	24.96	64	37.44		15774.72
Labor Subtotal									50495.28
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	364.97	2			1459.88
	Field Equipment	Mileage	2000	miles	0.33	1			660
	Field Equipment	Boat Gasoline 91 octane	240	gallons	4.37	1			1048.8
	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	1,049	1			1049
									7455.68
Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips			Total
Camping	4	0	28	15	17	4			2864
Meetings/ Lakewood 2015 GSA Rate	2	163	66	15	3	1			1108
									3972
Grand Total									61923
USFWS Grand Jct.									61923
CSU Larval Fish Lab	Statistical Assistance								5000
									66923

Task 2

YOY Gila sampling									
	Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
		Project Leader GS-14		1	100	83.42	0	0	8342
		Administrative Officer GS-09		1	40	44.72	0	0	1788.8
		Fishery Biologist GS-11		1	140	49.36	0	0	6910.4
		Crew leader Tech. GS-07		1	140	33.7	0	50.54	4718
		Biological Tech. GS-05		1	64	24.96	0	37.44	1597.44
		Labor Subtotal							23356.64
	Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
		Office Supplies	Rite in the rain paper						50
		Office Supplies	Data clipboards						50
		Office Supplies	Ink Cartridges and paper						50
		Office Supplies	Cell, SAT, and Office phone service						100
		Field Equipment	GSA vehicle lease per month	2	each	364.97	2		1459.88
		Field Equipment	Mileage	2000	miles	0.33	1		660
		Field Equipment	Boat Gasoline 91 octane	160	gallons	4.37	1		699.2
		Field Equipment	Beach Seines	2	each	100	1		200
		Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	1,000	1		1000
		Field Equipment	*Misc. Field Supplies See Justification	1	see basis	1,000	1		1000
									5269.08
		Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		Camping	3	0	28	15	8	4	1212
									1212
									Grand Total
	USFWS Grand Jct.								29838
									29838

*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 pigtailes, 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 2017

Tasks 1, 3 and 4

FY 2017								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	80	85.92	0	0		6873.6
	Administrative Officer GS-09	1	80	46.06	0	0		3684.8
	Fishery Biologist GS-11	1	280	50.84	0	0		14235.2
	Crew leader Tech. GS-07	1	220	34.71	64	52.06		10968.04
	Biological Tech. GS-05	2	220	25.7	64	38.55		16242.4
	Labor Subtotal							52004.04
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	375.92	2		1503.68
	Field Equipment	Mileage	2000	miles	0.34	1		680
	Field Equipment	Boat Gasoline 91 octane	240	gallons	4.5	1		1080
	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	1,049	1		1049
								7550.68
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
	Camping	4	0	28	15	17	4	2864
	Meetings/ Lakewood 2015 GSA Rat	2	163	66	15	3	1	1108
								3972
								Grand Total
	USFWS Grand Jct.							63527
	CSU Larval Fish Lab	Statistical Assistance						5000
								68527

Task 2

YOY Gila sampling									
	Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
		Project Leader GS-14		1	100	85.92	0	0	8592
		Administrative Officer GS-09		1	40	46.06	0	0	1842.4
		Fishery Biologist GS-11		1	140	50.84	0	0	7117.6
		Crew leader Tech. GS-07		1	140	34.71	0	52.06	4859.4
		Biological Tech. GS-05		1	64	25.7	0	37.44	1644.8
		Labor Subtotal							24056.2
	Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
		Office Supplies	Rite in the rain paper						50
		Office Supplies	Data clipboards						50
		Office Supplies	Ink Cartridges and paper						50
		Office Supplies	Cell, SAT, and Office phone service						100
		Field Equipment	GSA vehicle lease per month	2	each	375.92	2		1503.68
		Field Equipment	Mileage	2000	miles	0.34	1		680
		Field Equipment	Boat Gasoline 91 octane	160	gallons	4.5	1		720
		Field Equipment	Beach Seines	2	each	100	1		200
		Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	1,000	1		1000
		Field Equipment	*Misc. Field Supplies See Justification	1	see basis	1,000	1		1000
									5353.68
		Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		Camping	3	0	28	15	8	4	1212
									1212
									Grand Total
	USFWS Grand Jct.								30622
									30622

*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 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.

Out-year budgets for Black Rocks Humpback Chub Population Estimate: 2018-2020

**THESE BUDGETS ARE ESTIMATES ONLY AND MAY NOT REPRESENT
ACTUAL COSTS**

FY 2018

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

FY 2018								
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
	Project Leader GS-14	1	100	88.5	0	0		8850
	Administrative Officer GS-09	1	100	47.44	0	0		4744
	Fishery Biologist GS-11	1	280	52.37	0	0		14663.6
	Crew leader Tech. GS-07	1	160	35.75	48	53.62		8293.76
	Biological Tech. GS-05	2	120	26.48	48	39.72		10168.32
Labor Subtotal								
46719.68								
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	387.2	2		1548.8
	Field Equipment	Mileage	2000	miles	0.35	1		700
	Field Equipment	Boat Gasoline 91 octane	120	gallons	4.64	1		556.8
	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	1,049	1		1049
7092.6								
Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips		Total
Camping	4	0	28	15	9	2		1488
Meetings/ Lakewood 2015 GSA Rate	2	163	66	15	3	1		1108
2596								
Grand Total								
56408								
USFWS Grand Jct.								5000
CSU Larval Fish Lab	Statistical Assistance							61408

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	85.92	0	0		8592
	Administrative Officer GS-09	1	40	46.06	0	0		1842.4
	Fishery Biologist GS-11	1	100	50.84	0	0		5084
	Crew leader Tech. GS-07	1	100	34.71	0	52.06		3471
Labor Subtotal								
18989.4								
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	375.92	1		375.92
	Field Equipment	Mileage	500	miles	0.34	1		170
745.92								
Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips		Total
	0	0	28	15	0	0		0
0								
Grand Total								
19735								
USFWS Grand Jct.								19735

*Misc. Field Supplies

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- Breathable chest waders - 2 pair @ \$125/pair = \$250
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- Yeti 125-quart coolers – 1 @ \$500 each = \$500
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 - Carlisle 10-foot oar shafts – 2 @ \$90 each = \$180
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- River bags
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FY 2019

No work, off year \$0

FY 2020

Tasks 1, 3 and 4

FY 2020									
Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate			Total
	Project Leader GS-14		1	80	93.89	0	0		7511.2
	Administrative Officer GS-09		1	80	50.33	0	0		4026.4
	Fishery Biologist GS-11		1	280	55.56	0	0		15556.8
	Crew leader Tech. GS-07		1	220	37.93	64	56.89		11985.56
	Biological Tech. GS-05		2	220	28.09	64	42.14		17753.52
Labor Subtotal									56833.48
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	410.78	2			1643.12
	Field Equipment	Mileage	2000	miles	0.37	1			740
	Field Equipment	Boat Gasoline 91 octane	240	gallons	4.92	1			1180.8
	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	1,049	1			1049
									7850.92
	Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips		Total
	Camping	4	0	28	15	17	4		2864
	Meetings/ Lakewood 2015 GSA Rate	2	163	66	15	3	1		1108
									3972
									Grand Total
USFWS Grand Jct.									68656
CSU Larval Fish Lab	Statistical Assistance								5000
									73656

Task 2

YOY Gila sampling									
	Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
		Project Leader GS-14		1	100	93.89	0	0	9389
		Administrative Officer GS-09		1	40	50.33	0	0	2013.2
		Fishery Biologist GS-11		1	140	55.56	0	0	7778.4
		Crew leader Tech. GS-07		1	140	37.93	0	56.89	5310.2
		Biological Tech. GS-05		1	64	28.09	0	42.14	1797.76
		Labor Subtotal							26288.56
	Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
		Office Supplies	Rite in the rain paper						50
		Office Supplies	Data clipboards						50
		Office Supplies	Ink Cartridges and paper						50
		Office Supplies	Cell, SAT, and Office phone service						100
		Field Equipment	GSA vehicle lease per month	2	each	410.78	2		1643.12
		Field Equipment	Mileage	2000	miles	0.37	1		740
		Field Equipment	Boat Gasoline 91 octane	160	gallons	4.92	1		787.2
		Field Equipment	Beach Seines	2	each	100	1		200
		Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	1,000	1		1000
		Field Equipment	*Misc. Field Supplies See Justification	1	see basis	1,000	1		1000
									5620.32
		Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		Camping	3	0	28	15	8	4	1212
									1212
									Grand Total
	USFWS Grand Jct.								33121
									33121

*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 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.

IX. Budget Summary:

FY2016	
USFWS-GJ	\$ 66,923
USFWS-GJ YOY Gila	\$ 29,838
CSU LFL	\$ 5,000
Grand Total	\$101,761
FY2017	
USFWS-GJ	\$ 68,527
USFWS-GJ YOY Gila	\$ 30,622
CSU LFL	\$ 5,000
Grand Total	\$104,149

2016-2017 Total = \$205,910

Estimated Budget Summary for Fiscal Years 2018-2020:

FY2018	
USFWS-GJ	\$ 61,408
USFWS-GJ YOY Gila	\$ 19,735
CSU LFL	\$ 5,000
Grand Total	\$ 86,143
FY2019	
USFWS-GJ	\$ 0
USFWS-GJ YOY Gila	\$ 0
CSU LFL	\$ 0
Grand Total	\$ 0
FY2020	
USFWS-GJ	\$ 73,656
USFWS-GJ YOY Gila	\$ 33,121

CSU LFL	\$ 5,000
Grand Total	\$111,777

2018-2020 Total = \$197,920

5-Year Total USFWS GJ = \$403,830

5-Year Total CSU LFL = \$ 20,000

X. Reviewers: Program Staff and Biology Committee

XI. References:

Chart, T.E., and L.D. Lentsch. 1999. Flow effects on humpback chub (*Gila cypha*) in Westwater Canyon. Final Report to Upper Colorado River Endangered Fish Recovery Program, Project Number 39. Utah Wildlife Resources, Moab and Salt Lake City, Utah.

Douglas, M.E., R.R. Miller, and W.L. Minckley. 1998. Multivariate discrimination of Colorado Plateau *Gila* spp.: The “art of seeing well” revisited. *Transactions of the American Fisheries Society* 127:163-173.

Douglas, M.E., W.L. Minckley, and H.M. Tyus. 1989. Qualitative characters, identification of Colorado River chubs (Cyprinidae: genus *Gila*) and the “art of seeing well.” *Copeia* 1989:653–662.

Francis, T.A., and C.W. McAda, 2011. Population size and structure of humpback and roundtail chub in Black Rocks, Colorado River, Colorado, 2007-2008. 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.

Marsh, P.C. 1985. Effects of incubation temperature on survival of embryos of native Colorado River fishes. *The Southwestern Naturalist* 30: 129-140.

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.

Muth, R. 1990. Ontogeny and taxonomy of humpback chub, bonytail, and roundtail chub larvae and early juveniles. Dissertation. Colorado State University, Fort Collins, CO. 262p.

Muth, R.T., C.M. Haynes and C.A. Carlson. 1985. Culture of roundtail chub, *Gila robusta* (Cyprinidae), through the larval period. *The Southwestern Naturalist* 30:152-154.

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.

USFWS (U. S. Fish and Wildlife Service). 2002. Recovery goals for the endangered fishes of the upper Colorado River Basin. Draft Report, U. S. Fish and Wildlife Service, Denver, Colorado.

USFWS (U.S. Fish and Wildlife Service). 1987. Interagency Standardized Monitoring Program Handbook. U.S. Fish and Wildlife Service, Grand Junction, Colorado.