

**RECOVERY PROGRAM
FY 2014-2015 SCOPE OF WORK for:**

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

Black Rocks Humpback Chub Population Estimate

Reclamation Agreement number: R10PG40052
Reclamation Agreement term: *Oct. 1, 2014 – Sep. 30, 2018*

Lead agency: Fish and Wildlife Service
Colorado River Fishery Project – Grand Junction (CRFP-GJ)

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.
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.
- IV. Study Goals, Objectives, End Product(s):
 - A. Goal:
Estimate size and recruitment of the humpback chub population in Black Rocks

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.

C. End Products:

1. Complete final report describing population size and structure of humpback chub in Black Rocks; winter, spring, summer 2017. Draft report August 1, 2017. Final Report, November 1, 2017.

V. Study Area: Upper Colorado River Basin – Black Rocks area (RM 135.5-136.5) and one test sample at Mee Canyon (False Black Rocks RM 138.2).

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 2015 and 2016, 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 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.

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%, ~1 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^{\wedge} s > 0.07 and CVs of 0.25.

VII. Task Description and Schedule:

1. Sample humpback chubs in Black Rocks; fall 2015 (spanning FY 2015 and FY 2016); and fall 2016 (spanning FY 2016 and FY 2017).
2. Compile data annually, prepare preliminary and annual reports.
3. Complete final report describing population size and structure of humpback chub in Black Rocks during winter, spring, and summer 2017. Estimates will include numbers of adults (□200 mm TL) in the population, as well as recruitment by juveniles (150-199 mm TL). Draft report by August 1, 2017. Final report by November 1, 2017.

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

FY 2014

No work, off year \$0

FY 2015

Deliverables: *Tasks 1 and 2*

FY 2015									
	Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
		Project Leader GS-14		1	80	80.99	0	0	6479.2
		Administrative Officer GS-09		1	80	43.41	0	0	3472.8
		Fishery Biologist GS-11		1	280	47.93	0	0	13420.4
		Crew leader Tech. GS-06		1	220	31.81	64	47.71	10051.64
		Biological Tech. GS-05		2	220	18.94	64	28.41	11970.08
	Labor Subtotal								45394.12
	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	354.34	2		1417.36
		Field Equipment	Mileage	2000	miles	0.32	1		640
		Field Equipment	Boat Gasoline 91 octane	240	gallons	4.24	1		1017.6
		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
									7361.96
		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 2013 GSA Rates	2	149	66	15	3	1	1052
									3916
									Grand Total
	USFWS Grand Jct.								56672
	CSU Larval Fish Lab	Statistical Assistance							5000
									61672

*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
- 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. .

Out-year budgets for Black Rocks Humpback Chub Population Estimate: 2016-2018

THESE BUDGETS ARE ESTIMATES ONLY AND MAY NOT REPRESENT ACTUAL COSTS

FY 2016

Deliverables: *Tasks 1 and 2*

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-06	1	220	32.76	64	49.14		10352.16
		Biological Tech. GS-05	2	220	19.51	64	29.26		12329.68
	Labor Subtotal								46753.84
	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	828	1		828
									7234.68
		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 2013 GSA Rate	2	149	66	15	3	1	1052
									3916
									Grand Total
	USFWS Grand Jct.								57905
	CSU Larval Fish Lab	Statistical Assistance							5000
									62905

*Misc. Field Supplies

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- Synthetic oil for generators - 5 quarts at \$7 each = \$35
- Generator repair/tune-up - 5 hrs @ \$75/hr = \$375
- 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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 - Five 3-ft straps @ \$4.30 each = \$21.50
 - Ten 4-ft straps @ \$4.70 each = \$47
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 - 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
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FY 2017

Deliverables: *Tasks 1, 2, and 3*

FY 2017								
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	100	46.06	0	0	4606
	Fishery Biologist GS-11		1	280	50.84	0	0	14235.2
	Crew leader Tech. GS-06		1	160	33.74	48	50.62	7828.16
	Biological Tech. GS-05		2	120	20.09	48	30.14	7715.04
Labor Subtotal								42976.4
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	120	gallons	4.5	1		540
	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
								7010.68
	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 2013 GSA Rate	2	149	66	15	3	1	1052
								2540
Grand Total								
USFWS Grand Jct.								52527
CSU Larval Fish Lab	Statistical Assistance							5000
								57527

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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

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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

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Oar sleeves – 4 @ \$12 each = \$48

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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

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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 2018

No work, off year \$0

IX. Budget Summary:

FY2014

USFWS-GJ	\$ 0
CSU LFL	<u>\$ 0</u>
2014 Total	\$ 0

FY2015

USFWS-GJ	\$56,672
CSU LFL	<u>\$ 5,000</u>
2015 Total	\$61,672

2014-2015 Total = \$61,672

Estimated Budget Summary for Fiscal Years 2016-2018:

FY2016

USFWS-GJ	\$57,905
CSU LFL	<u>\$ 5,000</u>
2016 Total	\$62,905

FY2017

USFWS-GJ	\$52,527
CSU LFL	<u>\$ 5,000</u>
2017 Total	\$57,527

FY2018

USFWS-GJ	\$ 0
CSU LFL	<u>\$ 0</u>
2018 Total	\$ 0

2016-2018 Total = \$120,432

5-Year Total = \$182,104

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.

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.

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.