

**RECOVERY PROGRAM
FY 2016-17 PROPOSED SCOPE OF WORK for:**

Recovery Program Project Number: 160

Assessment of Stocked Razorback Sucker Reproduction in the Lower Green and Colorado Rivers

Reclamation Agreement number: R14AP00007
Reclamation Agreement term: 05/01/2014-09/30/2018

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.

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Category:

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

Expected Funding Sources:

- Annual funds
- Capital funds
- Other

- I. Title of Proposal: Assessment of Stocked Razorback Sucker Reproduction in the Lower Green and Colorado River via Larvae and Young of Year Collections.
- II. Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Measure and document population and habitat parameters to determine status and biological response to recovery actions.
- V.B.2. Conduct appropriate studies to provide needed life history information.

GREEN RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.
- V.D. Complete monitoring plan in FY 11 (based, in part, on recommendations from evaluation of stocked razorback report).

COLORADO RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions

III. Study Background/Rationale and Hypotheses:

This project is designed to determine the presence/absence of early life stages of endangered razorback sucker *Xyrauchen texanus* in the lower Green River and lower Colorado River. By the mid 1990's most wild riverine adult razorbacks in the Upper Colorado River basin were limited to one population in the middle Green River with an estimated size of about 500 adults (Modde et al. 1996). Green River sampling from 1993-1999 verified the presence of larval razorback in both the middle and lower Green River, however, it was believed that mortality rates of those larvae were very high and did not provide significant recruitment into the wild population (Muth et al. 1998). Stocking of hatchery reared razorback sucker in the Green River basin began in 1995 as a means to augment the population and continues through the present (US Fish and Wildlife Service 2002). By 2000, wild adult razorback suckers in the Green River Basin were very rare and the few remaining likely have perished (Bestgen et al. 2002). In the Colorado River, razorback populations suffered a similar fate as those in the Green River with the last wild razorback sucker captured near Grand Junction, Colorado in 1998 (Osmundson and Seal 2009). Stocking of hatchery reared razorback sucker in the upper Colorado River began in 1999 and continues into the present (Osmundson and Seal 2009).

In the lower Green River, during sampling for adult Colorado pikeminnow *Ptychocheilus lucius* (2001-2003, 2006-2008 and 2011-2012 ; UDWR unpublished data) the occurrence of adult razorback captures increased greatly from 9-10 individuals per trip in 2001-2003 to over 300 captures per trip in 2006-2008 and 2011-2012. In addition, congregations of ripe razorbacks displaying spawning behavior have been observed and many ripe individuals were captured during 2007-2008 and again in 2011-2012. In 2008, three age 1+ razorbacks were captured and in 2012 sampling for Project 138 resulted in the capture of three YOY razorback sucker within the lower Green River section (Creighton et al. 2012). The increase in adult razorback presence, the capture of age 1 and YOY fish, the capture of ripe adults and observations of spawning behavior suggests that stocked adult

razorback are persisting in large enough numbers within the lower Green River to facilitate successful spawning. Light trap sampling on the lower Green River in 2015 produced 81 samples, of those 62 were sent to the CSU Larval Fish Lab for identification and 74% contained larval razorbacks (UDWR unpublished data).

In the upper Colorado River, during Colorado pikeminnow sampling from 2005 and 2008, ripe female razorback were captured in the Colorado River between Loma, Colorado (RM 154) and Moab, Utah (RM 64) (Osmudson and Seal 2009). Similar sampling during 2009-2010 resulted in ripe females identified in areas between Moab, Utah (RM 66) downstream to Kane Springs Canyon (RM 58) (Travis Francis per. comm.) and sampling during 2013 resulted in ripe male razorback captured at Goose Island downstream of Negro Bill Canyon (RM 67.2) where previously ripe adult females were captured (Doug Osmundson per. comm.). Larval fish surveys by hand seine were completed in 2004-2007 by Osmundson and Seal (2009) in the Colorado River from just above Westwater Canyon (RM 124.8) upstream to the Price Stubb Diversion dam (RM 185.1) and larval razorback sucker were identified. Larval sampling in 2012 occurred between Goose Island (RM 65) and Mill Creek (RM 61.5). The sampling by Osmundson and Seal (2009) showed that although larval razorback abundance was low and widespread throughout the reach there was an increase in the abundance of larvae from approximately 2% of fish sampled in 2004 to approximately 13% of fish sampled in 2007. During sampling for Project 138 in 2012 two YOY razorback were captured in backwaters just downstream of Moab, UT (RM 66) (Creighton et al. 2012). Light trap sampling on the Colorado River in 2014 produced 84 samples. Fifty-nine were sent to the CSU Larval Fish Lab for identification and 97% contained larval razorbacks. In 2015 there were 77 samples collected; of those 65 were sent to CSU and 83% contained larval razorbacks (UDWR unpublished data).

Determining the reproductive success of stocked fish in the Green and Colorado Rivers is important for understanding whether they are able to maintain a viable self-sustaining population, an important requirement for the recovery of this species. Larval and young-of-year (YOY) or age 1 fish surveys are valuable tools for determining reproductive success. Surveys for razorback sucker should focus on preferred habitats identified by Muth et al. (2000) and include ephemeral shoreline, ponded lower portions of flooded tributary streams, side canyons, washes, canals, and channels. Surveys in the lower Green River should include the historic collections sites for larvae: Millard Canyon, the confluence of the San Rafael River, and Green River Valley area as well as other areas with available habitat. As few surveys for larval, YOY or age 1 fish have been completed in recent years on the Colorado River downstream of Westwater Canyon (RM 124.8) sampling should focus on appropriate habitat downstream of areas where ripe females have been documented.

Successful spawning among stocked razorback is an important component of a viable recovery for the species. Determining the timing, locations, and relative extent of larval recruitment will help define the success of the species. Sampling focused on year one survival of larvae will provide information about potential road blocks to recruitment of

young suckers into the adult population and sampling for YOY and age 1 fish will help determine if recruitment is occurring.

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

Goals: The goals of this project are to determine presence of larvae and their relative abundance in historic collection sites in the lower Green River and Colorado river systems; and collect young razorback sucker (young of year to age-1+) in flooded channels, side canyons, etc. of those systems. Sampling protocol and effort from this study may be utilized in the implementation of a basin-wide razorback sucker monitoring program.

Objectives:

1. To determine timing and duration of presence and abundance of larvae in the system measured by the capture of larvae in light traps in appropriate habitat and historic sampling sites. (May-June)
2. To determine the presence/absence of young razorback sucker in inundated washes, side canyons, and other appropriate habitat. (June-October)

End Products: Data collected for the duration of the study will be crucial for implementation of a basin-wide razorback monitoring plan. Annual reports will be submitted in November following sampling and revised upon completion of sample identification.

V. Study Area:

The study area on the lower Green River for larval razorback sucker sampling is from Green River State Park, Utah (RM 120) downstream to Anderson Bottom (RM 31). Three specific sampling areas within the reach were chosen due to documented presence of larval razorback sucker in the past. The sample areas are the Green River Valley area near RM 120, the San Rafael River Confluence (RM 97) and Millard Canyon (RM 33.5). These sites are associated with off-channel habitats such as tributary streams, flooded washes, or backwaters. Additional sampling will be conducted at Tenmile Canyon (RM 80.5), Keg Spring Canyon (RM 79.9) and other locations within the lower Green River when suitable habitat is encountered. Field crews have flexibility to change sites or sample additional sites based on discharge, accessibility, and habitat conditions at each location.

The study area on the Colorado River for larval razorback sucker sampling is upstream of the landing at Cisco, UT (RM 110.5) to the confluence with the Green River (RM 0.0). Monitoring sites for larval light trapping have been established near the town of Moab (RM 63.8 to 52.5), below the Potash boat ramp (RM 44 to 42), and near Buck Canyon (RM 23 to 21.2). Field crews have flexibility to change sites or sample additional sites based on discharge, accessibility, and habitat conditions at each location.

VI. Study Methods/Approach:

Approaches for sampling razorback sucker larvae were outlined in recommendations by Muth (1998), which were based on comprehensive literature and data reviews. Areas with high captures of larval razorback sucker historically as well as other available habitat (ponded lower portions of flooded tributary streams, side canyons, and washes) will be targeted for sampling. Light trap sampling will occur at night in low-velocity nursery habitats. The light traps will be a floating, quadrafoil design. Sampling trips will consist of four nights of light trapping. Light trap sampling trips will be conducted during mid May and June. The sampling period will be adjusted based on timing and duration of spring flows, onset of main channel water temperatures of 14°C, and temporal occurrence of larvae. Each habitat at each sampling occasion will be sampled with at least three light traps (number of collections will depend on size and complexity of habitats). If possible, light traps will be set in or near emergent vegetation at dusk and retrieved before sunrise. Unit of effort will be number of hours each light trap is set during darkness.

Sampling for YOY and age 1 razorback will be accomplished by seining available habitats (ephemeral shorelines, ponded lower portions of flooded tributary streams, side canyons, washes canals, and channels). Sampling will be conducted once per month from July through September (3 trips). Each trip will require four days to complete sampling for both systems. Low velocity habitats will be sampled using 1.2 m x 4 m seines with 3 mm mesh. The number of collections per habitat area will be determined by the size and complexity of each area. Unit of effort will be the area sampled by each seine haul.

Larger fish identifiable in the field will be counted and measured on site and released. Fishes not identifiable in the field will be euthanized, preserved in 100% ethanol, and sent to the CSU Larval Fish Lab for identification. UDWR will be responsible for sample processing and drafting the annual report.

VII. Task Description and Schedule:

- Task 1: Lower Green River: Light trap sampling – Focus effort around flooded tributary mouths where larvae have been or are suspected of being detected. (May-June)
- Task 2: Lower Green River: Sample for young of year to age-1+ razorback sucker in flooded channels, side canyons, washes, etc., with seines. (June-October)
- Task 3: Colorado River: Focus effort around flooded tributary mouths where larvae have been or are suspected of being detected. (May-June)
- Task 4: Colorado River: Sample for young of year to age-1+ razorback sucker in flooded channels, side canyons, washes, etc., with seines. (June-October)
- Task 5: Preliminary Sample Identification, Data Entry, Analysis, Reporting –Annual report completed and submitted to PDO by November and revised pending sample identification from CSU Larval Fish Lab. (November)

Task Schedule:

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1					X	X						
2							X	X	X	X		
3					X	X						
4							X	X	X	X		
5							X	X	X	X	X	

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

UDWR Moab costs are based on previous year’s actual costs (when applicable) plus a 2% increase. Personnel rates reflect previous year’s hourly rates and fringe costs. Vehicle rental is approximately \$8,000/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program. Vehicle costs for this budget are an estimated percentage of this total based on previous year’s usage. Equipment costs are based on previous year costs and rates with a 2% increase on all line items for each year following. Equipment includes but is not limited to seines, jon boat repair, outboard motor repair, raft repair, oars, dry boxes, tents, sleeping pads, coolers, PFDs, first aid supplies, satellite phone services, fuel, etc...

FY2018: Annual Report by November 2018.

FY 2018 Costs for UDWR- Moab

Task 1. Larvae Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.07	40	\$1,403
Biologist	\$32.32	80	\$2,585
Technician	\$16.96	350	\$5,936
		subtotal	\$9,924

Food and Travel

	Rate	Quantity	Cost
	\$40,800.0		
Fleet Costs (3 trucks for 3% of total fleet costs)	0	0.03	\$1,224
Food (3 people, 15 days)	\$30.00	45	\$1,350
		subtotal	\$2,574

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$252
Sampling gear repair/replacement:			\$717
Boating gear repair/replacement:			\$125
Fuel for motors (80 gallons)	\$4.00	80	\$320
		subtotal	\$1,414

Task 1 subtotal **\$13,912**

Task 2. YOY-Age 1+ Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.07	40	\$1,403
Biologist	\$32.32	80	\$2,585
Technician	\$16.96	280	\$4,749
		subtotal	\$8,737

Food and Travel

	Rate	Quantity	Cost
	\$40,800.0		
Fleet Costs (3 trucks for 3% of total fleet costs)	0	0.03	\$1,224
Food (3 people, 12 days)	\$30.00	36	\$1,080
		subtotal	\$2,304

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$108
Sampling gear repair/replacement:			\$387
Boating gear repair/replacement:			\$325
Fuel for motors (80 gallons)	\$4.00	80	\$320
		subtotal	\$1,140

Task 2 subtotal **\$12,181**

Task 3. Larvae Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.07	40	\$1,403
Biologist	\$32.32	80	\$2,585
Technician	\$16.96	350	\$5,936
		subtotal	\$9,924

Food and Travel

	Rate	Quantity	Cost
	\$40,800.0		
Fleet Costs (2 trucks for 3% of total fleet costs)	0	0.02	\$816
Food (3 people, 15 days)	\$30.00	45	\$1,350
		subtotal	\$2,166

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$130
Sampling gear repair/replacement:			\$717
Boating gear repair/replacement:			\$250
Fuel for motors (30 gallons)	\$4.00	30	\$120
		subtotal	\$1,217

Task 3 subtotal **\$13,307**

Task 4. YOY-Age 1+ Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.07	40	\$1,403
Biologist	\$32.32	80	\$2,585
Technician	\$16.96	260	\$4,410
		subtotal	\$8,398

Food and Travel

	Rate	Quantity	Cost
	\$40,800.0		
Fleet Costs (2 trucks for 2% of total fleet costs)	0	0.02	\$816
Food (3 people, 12 days)	\$30.00	36	\$1,080
		subtotal	\$1,896

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$125
Sampling gear repair/replacement:			\$362
Boating gear repair/replacement:			\$450
Fuel for motors (50 gallons)	\$4.00	50	\$200
		subtotal	\$1,137

Task 4 subtotal **\$11,430****Task 5. Preliminary Sample Identification, Data Entry, Analysis, and Reporting**

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.07	120	\$4,208
Biologist	\$32.32	120	\$3,878
Technician	\$16.96	100	\$1,696
		subtotal	\$9,782

Task 5 subtotal **\$9,782**

Grand Total FY 2018	\$60,611
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FY2019: Annual Report by November 2019.

FY 2019 Costs for UDWR- Moab (2% increase from FY 18)
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Task 1. Larvae Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.77	40	\$1,431
Biologist	\$32.96	80	\$2,637
Technician	\$17.30	350	\$6,055
		subtotal	\$10,122

Food and Travel

	Rate	Quantity	Cost
	\$41,616.0		
Fleet Costs (3 trucks for 3% of total fleet costs)	0	0.03	\$1,248
Food (3 people, 15 days)	\$30.60	45	\$1,377
		subtotal	\$2,625

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$257
Sampling gear repair/replacement:			\$731
Boating gear repair/replacement:			\$128
Fuel for motors (80 gallons)	\$4.08	0	\$326
		subtotal	\$1,442

Task 1 subtotal **\$14,190**

Task 2. YOY-Age 1+ Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.77	40	\$1,431
Biologist	\$32.96	80	\$2,637
Technician	\$17.30	280	\$4,844
		subtotal	\$8,911

Food and Travel

	Rate	Quantity	Cost
	\$41,616.0		
Fleet Costs (3 trucks for 3% of total fleet costs)	0	0.03	\$1,248
Food (3 people, 12 days)	\$30.60	36	\$1,102
		subtotal	\$2,350

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$111
Sampling gear repair/replacement:			\$395
Boating gear repair/replacement:			\$332
Fuel for motors (80 gallons)	\$4.08	0	\$326
		subtotal	\$1,163

Task 2 subtotal **\$12,425**

Task 3. Larvae Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.77	40	\$1,431
Biologist	\$32.96	80	\$2,637
Technician	\$17.30	350	\$6,055
		subtotal	\$10,122

Food and Travel

Rate	Quantity	Cost
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	\$41,616.0		
Fleet Costs (2 trucks for 3% of total fleet costs)	0	0.02	\$832
Food (3 people, 15 days)	\$30.60	45	\$1,377
		subtotal	\$2,209

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$132
Sampling gear repair/replacement:			\$731
Boating gear repair/replacement:			\$255
Fuel for motors (30 gallons)	\$4.08	0	\$122
		subtotal	\$1,241

Task 3 subtotal **\$13,573**

Task 4. YOY-Age 1+ Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.77	40	\$1,431
Biologist	\$32.96	80	\$2,637
Technician	\$17.30	260	\$4,498
		subtotal	\$8,565

Food and Travel

	Rate	Quantity	Cost
	\$41,616.0		
Fleet Costs (2 trucks for 2% of total fleet costs)	0	0.02	\$832
Food (3 people, 12 days)	\$30.60	36	\$1,102
		subtotal	\$1,934

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$127
Sampling gear repair/replacement:			\$369
Boating gear repair/replacement:			\$459
Fuel for motors (50 gallons)	\$4.08	0	\$204
		subtotal	\$1,159

Task 4 subtotal **\$11,659**

Task 5. Preliminary Sample Identification, Data Entry, Analysis, and Reporting

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.77	120	\$4,292
Biologist	\$32.96	120	\$3,955
Technician	\$17.30	100	\$1,730
		subtotal	\$9,978

Task 5 subtotal **\$9,978**

Grand Total FY 2019	\$61,823
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FY2020: Annual Report by November 2020.

FY 2020 Costs for UDWR- Moab (2% increase from FY 19)
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Task 1. Larvae Collection: Green River

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$36.48	40	\$1,459
Biologist	\$33.62	80	\$2,690
Technician	\$17.65	350	\$6,176
		subtotal	\$10,325
<u>Food and Travel</u>			
	Rate	Quantity	Cost
	\$42,448.3		
Fleet Costs (3 trucks for 3% of total fleet costs)	2	0.03	\$1,273
Food (3 people, 15 days)	\$31.21	45	\$1,405
		subtotal	\$2,678
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement:			\$262
Sampling gear repair/replacement:			\$746
Boating gear repair/replacement:			\$130
Fuel for motors (80 gallons)	\$4.16	0	\$333
		subtotal	\$1,471
Task 1 subtotal			\$14,474

Task 2. YOY-Age 1+ Collection: Green River

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$36.48	40	\$1,459
Biologist	\$33.62	80	\$2,690
Technician	\$17.65	280	\$4,941
		subtotal	\$9,090
<u>Food and Travel</u>			
	Rate	Quantity	Cost
	\$42,448.3		
Fleet Costs (3 trucks for 3% of total fleet costs)	2	0.03	\$1,273
Food (3 people, 12 days)	\$31.21	36	\$1,124
		subtotal	\$2,397
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement:			\$113
Sampling gear repair/replacement:			\$403
Boating gear repair/replacement:			\$338
Fuel for motors (80 gallons)	\$4.16	0	\$333
		subtotal	\$1,186

Task 2 subtotal **\$12,673**

Task 3. Larvae Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$36.48	40	\$1,459
Biologist	\$33.62	80	\$2,690
Technician	\$17.65	350	\$6,176
		subtotal	\$10,325

Food and Travel

	Rate	Quantity	Cost
	\$42,448.3		
Fleet Costs (2 trucks for 3% of total fleet costs)	2	0.02	\$849
Food (3 people, 15 days)	\$31.21	45	\$1,405
		subtotal	\$2,254

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$135
Sampling gear repair/replacement:			\$746
Boating gear repair/replacement:			\$260
Fuel for motors (30 gallons)	\$4.16	0	\$125
		subtotal	\$1,266

Task 3 subtotal **\$13,844**

Task 4. YOY-Age 1+ Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$36.48	40	\$1,459
Biologist	\$33.62	80	\$2,690
Technician	\$17.65	260	\$4,588
		subtotal	\$8,737

Food and Travel

	Rate	Quantity	Cost
	\$42,448.3		
Fleet Costs (2 trucks for 2% of total fleet costs)	2	0.02	\$849
Food (3 people, 12 days)	\$31.21	36	\$1,124
		subtotal	\$1,973

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$130
Sampling gear repair/replacement:			\$377
Boating gear repair/replacement:			\$468
Fuel for motors (50 gallons)	\$4.16	0	\$208
		subtotal	\$1,183

Task 4 subtotal **\$11,892**

Task 5. Preliminary Sample Identification, Data Entry, Analysis, and Reporting

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$36.48	120	\$4,378
Biologist	\$33.62	120	\$4,035
Technician	\$17.65	100	\$1,765
		subtotal	\$10,177
Task 5 subtotal			\$10,177

Grand Total FY 2020	\$63,060
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FY2021: Annual Report by November 2021.

FY 2021 Costs for UDWR- Moab (2% increase from FY20)

Task 1. Larvae Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$37.21	40	\$1,489
Biologist	\$34.29	80	\$2,744
Technician	\$18.00	350	\$6,299
		subtotal	\$10,531

Food and Travel

	Rate	Quantity	Cost
	\$43,297.2		
Fleet Costs (3 trucks for 3% of total fleet costs)	9	0.03	\$1,299
Food (3 people, 15 days)	\$31.84	45	\$1,433
		subtotal	\$2,732

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$267
Sampling gear repair/replacement:			\$761
Boating gear repair/replacement:			\$133
Fuel for motors (80 gallons)	\$4.24	0	\$340
		subtotal	\$1,500

Task 1 subtotal	\$14,763
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Task 2. YOY-Age 1+ Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$37.21	40	\$1,489
Biologist	\$34.29	80	\$2,744
Technician	\$18.00	280	\$5,039

		subtotal	\$9,271
<u>Food and Travel</u>			
	Rate	Quantity	Cost
	\$43,297.2		
Fleet Costs (3 trucks for 3% of total fleet costs)	9	0.03	\$1,299
Food (3 people, 12 days)	\$31.84	36	\$1,146
		subtotal	\$2,445
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement:			\$115
Sampling gear repair/replacement:			\$411
Boating gear repair/replacement:			\$345
Fuel for motors (80 gallons)	\$4.24	0	\$340
		subtotal	\$1,210
Task 2 subtotal			\$12,927

Task 3. Larvae Collection: Colorado River

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$37.21	40	\$1,489
Biologist	\$34.29	80	\$2,744
Technician	\$18.00	350	\$6,299
		subtotal	\$10,531
<u>Food and Travel</u>			
	Rate	Quantity	Cost
	\$43,297.2		
Fleet Costs (2 trucks for 3% of total fleet costs)	9	0.02	\$866
Food (3 people, 15 days)	\$31.84	45	\$1,433
		subtotal	\$2,299
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement:			\$138
Sampling gear repair/replacement:			\$761
Boating gear repair/replacement:			\$265
Fuel for motors (30 gallons)	\$4.24	0	\$127
		subtotal	\$1,291
Task 3 subtotal			\$14,121

Task 4. YOY-Age 1+ Collection: Colorado River

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$37.21	40	\$1,489
Biologist	\$34.29	80	\$2,744
Technician	\$18.00	260	\$4,680
		subtotal	\$8,912
<u>Food and Travel</u>			

	Rate	Quantity	Cost
	\$43,297.2		
Fleet Costs (2 trucks for 2% of total fleet costs)	9	0.02	\$866
Food (3 people, 12 days)	\$31.84	36	\$1,146
		subtotal	\$2,012

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$132
Sampling gear repair/replacement:			\$384
Boating gear repair/replacement:			\$478
Fuel for motors (50 gallons)	\$4.24	0	\$212
		subtotal	\$1,206

Task 4 subtotal **\$12,130**

Task 5. Preliminary Sample Identification, Data Entry, Analysis, and Reporting

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$37.21	120	\$4,466
Biologist	\$34.29	120	\$4,115
Technician	\$18.00	100	\$1,800
		subtotal	\$10,381

Task 5 subtotal **\$10,381**

Grand Total FY 2021	\$64,321
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FY2022: Annual Report by November 2022.

FY 2022 Costs for UDWR- Moab (2% increase from FY21)

Task 1. Larvae Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$37.96	40	\$1,518
Biologist	\$34.98	80	\$2,798
Technician	\$18.36	350	\$6,425
		subtotal	\$10,742

Food and Travel

	Rate	Quantity	Cost
Fleet Costs (3 trucks for 3% of total fleet costs)	\$44,163.23	0.03	\$1,325
Food (3 people, 15 days)	\$32.47	45	\$1,461
		subtotal	\$2,786

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$272
Sampling gear repair/replacement:			\$776

Boating gear repair/replacement:			\$135
Fuel for motors (80 gallons)	\$4.33	0	\$346
		subtotal	\$1,530

Task 1 subtotal **\$15,058**

Task 2. YOY-Age 1+ Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$37.96	40	\$1,518
Biologist	\$34.98	80	\$2,798
Technician	\$18.36	280	\$5,140
		subtotal	\$9,457

Food and Travel

	Rate	Quantity	Cost
Fleet Costs (3 trucks for 3% of total fleet costs)	\$44,163.23	0.03	\$1,325
Food (3 people, 12 days)	\$32.47	36	\$1,169
		subtotal	\$2,494

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$117
Sampling gear repair/replacement:			\$419
Boating gear repair/replacement:			\$352
Fuel for motors (80 gallons)	\$4.33	0	\$346
		subtotal	\$1,234

Task 2 subtotal **\$13,185**

Task 3. Larvae Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$37.96	40	\$1,518
Biologist	\$34.98	80	\$2,798
Technician	\$18.36	350	\$6,425
		subtotal	\$10,742

Food and Travel

	Rate	Quantity	Cost
Fleet Costs (2 trucks for 3% of total fleet costs)	\$44,163.23	0.02	\$883
Food (3 people, 15 days)	\$32.47	45	\$1,461
		subtotal	\$2,345

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$140
Sampling gear repair/replacement:			\$776
Boating gear repair/replacement:			\$271
Fuel for motors (30 gallons)	\$4.33	0	\$130
		subtotal	\$1,317

Task 3 subtotal				\$14,403
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Task 4. YOY-Age 1+ Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$37.96	40	\$1,518
Biologist	\$34.98	80	\$2,798
Technician	\$18.36	260	\$4,773
		subtotal	\$9,090

Food and Travel

	Rate	Quantity	Cost
Fleet Costs (2 trucks for 2% of total fleet costs)	\$44,163.23	0.02	\$883
Food (3 people, 12 days)	\$32.47	36	\$1,169
		subtotal	\$2,052

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$135
Sampling gear repair/replacement:			\$392
Boating gear repair/replacement:			\$487
Fuel for motors (50 gallons)	\$4.33	0	\$216
		subtotal	\$1,230

Task 4 subtotal				\$12,372
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Task 5. Preliminary Sample Identification, Data Entry, Analysis, and Reporting

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$37.96	120	\$4,555
Biologist	\$34.98	120	\$4,198
Technician	\$18.36	100	\$1,836
		subtotal	\$10,588

Task 5 subtotal				\$10,588
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Grand Total FY 2022				\$65,608
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X. Reviewers:

XI. References:

Bestgen, K. R., G. B. Haines, R. Brunson, T. Chart, M. Trammell, G. Birchell, and K. Christopherson. 2002. Decline of the razorback sucker in the Green River Basin, Utah and Colorado. Report submitted to the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin. Larval Fish Laboratory Contribution 126.

- Bestgen, K.R., K.A. Zalasko and G.C. White. 2012. Monitoring Reproduction, Recruitment, and Population Status of Razorback Suckers in the Upper Colorado River Basin. Report submitted to the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin. Larval Fish Laboratory Contribution 170.
- Creighton, K., J.A. Scorupski, M.J. Breen, B. P. Kiefer. 2012. Young-of-year Colorado pikeminnow monitoring, Annual Report. Upper Colorado River Endangered Fish Recovery Program Project 138.
- Howard, J. 2012. Lower Green River razorback sucker larval and young-of-year monitoring pilot study, Annual Report. Upper Colorado River Endangered Fish Recovery Program Project 160.
- Moode, T., K.P. Burnham, and E.J. Wick. 1996. Population status of the razorback sucker in the middle Green River. *Conservation Biology* 10:110-119.
- Muth, R.T., L.W. Crist, K.E. LaGory, J.W. Hayse, K.R. Bestgen, J.K. Lyons, T.P. Ryan, and R.A. Valdez. 2000. Flow Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam, Final Report, Upper Colorado River Endangered Fish Recovery Program Project FG-53.
- Muth, R. T., G. B. Haines, S. M. Meisner, E. J. Wick, T. E. Chart, D. E. Snyder, and J. M. Bundy. 1998. Reproduction and early life history of razorback sucker in the Green River, Utah and Colorado, 1992–1996. Final Report of Colorado State University Larval Fish Laboratory to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado. 62 pp.
- Osmundson, D. B. and S. C. Seal. 2009. Successful spawning by stocked razorback suckers in the Gunnison and Colorado rivers, as evidenced by larval fish collections, 2002-2007. Final Report. Upper Colorado River Endangered Fish Recovery Program Project 121.
- US Fish and Wildlife Service. 2002. Razorback sucker (*Xyrauchen texanus*) Recovery Goals: amendment and supplement to the Razorback Sucker Recovery Plan. US Fish and Wildlife Service, Mountain-Prairie Region(6), Denver, Colorado.