

**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 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.

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

- 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.

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) (Osmundson 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); samples are awaiting identification at the Colorado State University Larval Fish Lab (Doug Osmundson per. comm.). 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). Both Bestgen et al. 2012 and Osmundson and Seal (2009) recommend that larval sampling be initiated in the Colorado River and more specifically that light traps be used to sample in areas downstream of where ripe adult female razorback have been documented in the Colorado River including areas downstream of the Osmundson and Seal (2009) study reach. Similar recommendations were made by Creighton et al (2012) and Howard (2012) to expand razorback larval and YOY sampling into the Colorado River.

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.
2. To determine the presence/absence of young razorback sucker in inundated washes, side canyons, and other appropriate habitat.

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). Sampling will focus on areas near where ripe adult females have been documented which are associated with off channel habitats such as tributary streams, flooded washes or backwaters (Doug Osmundson per. comm.).

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 – Begin in mid May or when water temperatures reach 14 °C. Early effort will be concentrated at Green River Valley sites, with three sampling trips for the San Rafael River confluence and Millard Canyon sites. Light trap sampling will be concluded by June 30, 2016-17.

Task 2: Lower Green River: Sample for young of year to age-1+ razorback sucker in flooded channels, side canyons, washes, etc., with seines on three four-day trips from July through September 2016-17.

Task 3: Colorado River: Light trap sampling – Begin in mid May or when water temperatures reach 14 °C. Effort will focus on areas downstream of documented locations of ripe female razorback. Light trap sampling will be concluded by June 30, 2016-17.

- Task 4: Colorado River: Sample for young of year to age-1+ razorback sucker in flooded channels, side canyons, washes, etc., with seines on three four-day trips from July through September 2014-15. (new task)
- Task 5: Preliminary Sample Identification, Data Entry, Analysis, Reporting – Scheduled to begin July 1, 2016-17 with three weeks of lab time budgeted for identifying an estimated 120 samples. All native and larval fish ID will be completed by the CSU Larval Fish Laboratory under CRFP project 15. Annual report completed and submitted to PDO by November 14, 2016-17.

Schedule:

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

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

FY2016: Annual Report by November 2016.

FY 2016 Costs for UDWR- Moab			
Task 1. Larvae Collection: Green River			
<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$33.71	20	\$674
Biologist	\$30.76	80	\$2,461
Technician	\$16.77	350	\$5,870
		subtotal	\$9,004
<u>Food and Travel</u>			
	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 3% of total fleet costs)	\$40,800.00	0.03	\$1,224
Food (3 people, 15 days)	\$30.00	45	\$1,350
		subtotal	\$2,574
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$192
Sampling gear repair/replacement ^c :			\$1,017
Boating gear repair/replacement ^d :			\$250
Fuel for motors (80 gallons)	\$4.00	80	\$320
		subtotal	\$1,779
Task 1 subtotal			\$13,358

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$33.71	40	\$1,348
Biologist	\$30.76	80	\$2,461
Technician	\$16.77	280	\$4,696
		subtotal	\$8,505

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 3% of total fleet costs)	\$40,800.00	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 ^b :			\$228
Sampling gear repair/replacement ^c :			\$412
Boating gear repair/replacement ^d :			\$525
Fuel for motors (80 gallons)	\$4.00	80	\$320
		subtotal	\$1,485

Task 2 subtotal **\$12,293**

Task 3. Larvae Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$33.71	40	\$1,348
Biologist	\$30.76	50	\$1,538
Technician	\$16.77	350	\$5,870
		subtotal	\$8,756

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (2 trucks for 3% of total fleet costs)	\$40,800.00	0.02	\$816
Food (3 people, 15 days)	\$30.00	45	\$1,350
		subtotal	\$2,166

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$139
Sampling gear repair/replacement ^c :			\$717
Boating gear repair/replacement ^d :			\$250
Fuel for motors (30 gallons)	\$4.00	30	\$120
		subtotal	\$1,226

Task 3 subtotal **\$12,148**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$33.71	40	\$1,348
Biologist	\$30.76	80	\$2,461
Technician	\$16.77	240	\$4,025
		subtotal	\$7,834

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (2 trucks for 2% of total fleet costs)	\$40,800.00	0.02	\$816
Food (3 people, 12 days)	\$30.00	36	\$1,080
		subtotal	\$1,896

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$614
Sampling gear repair/replacement ^c :			\$387
Boating gear repair/replacement ^d :			\$450
Fuel for motors (50 gallons)	\$4.00	50	\$200
		subtotal	\$1,651

Task 4 subtotal **\$11,381**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$33.71	120	\$4,045
Biologist	\$30.76	120	\$3,691
Technician	\$16.77	80	\$1,342
		subtotal	\$9,078

Task 5 subtotal **\$9,078**

Grand Total FY 2016	\$58,258
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^a The State of Utah uses Automotive Resources Inc. for motor pool operations. Rental is approximately \$6,800/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program.

^b Includes, but is not limited to, tents, sleeping pads, toilet system, cookware, stoves, propane, charcoal, satellite phone and service, drybags, coolers, first aid supplies.

^c Includes, but is not limited to, glow sticks, seines, tape measures, scales, GPS units, sample jars, data loggers.

^d Includes, but is not limited to, aluminum boat repair, outboard motor parts and maintenance, propellers, bilge pumps.

^{b,c,d} Estimated costs are based on actual costs from previous years plus an estimated 2% cost of living increase each year following.

FY2017: Annual Report by November 2017.

FY 2017 Costs for UDWR- Moab (2% increase from FY 16)
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Task 1. Larvae Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$34.38	20	\$688
Biologist	\$31.37	80	\$2,510
Technician	\$17.11	350	\$5,987
		subtotal	\$9,184

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 3% of total fleet costs)	\$41,616.00	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 ^b :			\$196
Sampling gear repair/replacement ^c :			\$1,037
Boating gear repair/replacement ^d :			\$255
Fuel for motors (80 gallons)	\$4.08	80	\$326
		subtotal	\$1,815

Task 1 subtotal **\$13,625**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$34.38	40	\$1,375
Biologist	\$31.37	80	\$2,510
Technician	\$17.11	280	\$4,790
		subtotal	\$8,675

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 3% of total fleet costs)	\$41,616.00	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 ^b :			\$232
Sampling gear repair/replacement ^c :			\$420
Boating gear repair/replacement ^d :			\$536
Fuel for motors (80 gallons)	\$4.08	80	\$326
		subtotal	\$1,514

Task 2 subtotal **\$12,539**

Task 3. Larvae Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$34.38	40	\$1,375
Biologist	\$31.37	50	\$1,569
Technician	\$17.11	350	\$5,987
		subtotal	\$8,931

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (2 trucks for 3% of total fleet costs)	\$41,616.00	0.02	\$832
Food (3 people, 15 days)	\$30.60	45	\$1,377
		subtotal	\$2,209

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$142
Sampling gear repair/replacement ^c :			\$731
Boating gear repair/replacement ^d :			\$255
Fuel for motors (30 gallons)	\$4.08	30	\$122
		subtotal	\$1,251

Task 3 subtotal **\$12,391**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$34.38	40	\$1,375
Biologist	\$31.37	80	\$2,510
Technician	\$17.11	240	\$4,105
		subtotal	\$7,991

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (2 trucks for 2% of total fleet costs)	\$41,616.00	0.02	\$832
Food (3 people, 12 days)	\$30.60	36	\$1,102
		subtotal	\$1,934

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$627
Sampling gear repair/replacement ^c :			\$395
Boating gear repair/replacement ^d :			\$459
Fuel for motors (50 gallons)	\$4.08	50	\$204
		subtotal	\$1,684

Task 4 subtotal **\$11,609**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$34.38	120	\$4,126
Biologist	\$31.37	120	\$3,765
Technician	\$17.11	80	\$1,368
		subtotal	\$9,259
Task 5 subtotal			\$9,259

Grand Total FY 2017	\$59,423
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FY2018: Annual Report by November 2018.

FY 2018 Costs for UDWR- Moab (2% increase from FY 17)
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Task 1. Larvae Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.07	20	\$701
Biologist	\$32.00	80	\$2,560
Technician	\$17.45	350	\$6,107
		subtotal	\$9,368

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 3% of total fleet costs)	\$42,448.32	0.03	\$1,273
Food (3 people, 15 days)	\$31.21	45	\$1,405
		subtotal	\$2,678

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$200
Sampling gear repair/replacement ^c :			\$1,058
Boating gear repair/replacement ^d :			\$260
Fuel for motors (80 gallons)	\$4.16	80	\$333
		subtotal	\$1,851

Task 1 subtotal	\$13,897
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Task 2. YOY-Age 1+ Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.07	40	\$1,403
Biologist	\$32.00	80	\$2,560
Technician	\$17.45	280	\$4,885
		subtotal	\$8,848

Food and Travel

Rate	Quantity	Cost
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Fleet Costs ^a (3 trucks for 3% of total fleet costs)	\$42,448.32	0.03	\$1,273
Food (3 people, 12 days)	\$31.21	36	\$1,124
		subtotal	\$2,397

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$237
Sampling gear repair/replacement ^c :			\$429
Boating gear repair/replacement ^d :			\$546
Fuel for motors (80 gallons)	\$4.16	80	\$333
		subtotal	\$1,544

Task 2 subtotal **\$12,790**

Task 3. Larvae Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.07	40	\$1,403
Biologist	\$32.00	50	\$1,600
Technician	\$17.45	350	\$6,107
		subtotal	\$9,110

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (2 trucks for 3% of total fleet costs)	\$42,448.32	0.02	\$849
Food (3 people, 15 days)	\$31.21	45	\$1,405
		subtotal	\$2,254

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$145
Sampling gear repair/replacement ^c :			\$746
Boating gear repair/replacement ^d :			\$260
Fuel for motors (30 gallons)	\$4.16	30	\$125
		subtotal	\$1,276

Task 3 subtotal **\$12,639**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.07	40	\$1,403
Biologist	\$32.00	80	\$2,560
Technician	\$17.45	240	\$4,187
		subtotal	\$8,150

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (2 trucks for 2% of total fleet costs)	\$42,448.32	0.02	\$849
Food (3 people, 12 days)	\$31.21	36	\$1,124

		subtotal	\$1,973
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$639
Sampling gear repair/replacement ^c :			\$403
Boating gear repair/replacement ^d :			\$468
Fuel for motors (50 gallons)	\$4.16	50	\$208
		subtotal	\$1,718
Task 4 subtotal			\$11,841

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

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$35.07	120	\$4,208
Biologist	\$32.00	120	\$3,840
Technician	\$17.45	80	\$1,396
		subtotal	\$9,444
Task 5 subtotal			\$9,444

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 FY18)

Task 1. Larvae Collection: Green River

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$35.77	20	\$715
Biologist	\$32.64	80	\$2,611
Technician	\$17.80	350	\$6,229
		subtotal	\$9,556

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 3% of total fleet costs)	\$43,297.29	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 ^b :			\$204
Sampling gear repair/replacement ^c :			\$1,079
Boating gear repair/replacement ^d :			\$265
Fuel for motors (80 gallons)	\$4.24	80	\$340
		subtotal	\$1,888

Task 1 subtotal **\$14,175**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.77	40	\$1,431
Biologist	\$32.64	80	\$2,611
Technician	\$17.80	280	\$4,983
		subtotal	\$9,025

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 3% of total fleet costs)	\$43,297.29	0.03	\$1,299
Food (3 people, 12 days)	\$31.84	36	\$1,146
		subtotal	\$2,445

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$241
Sampling gear repair/replacement ^c :			\$437
Boating gear repair/replacement ^d :			\$557
Fuel for motors (80 gallons)	\$4.24	80	\$340
		subtotal	\$1,575

Task 2 subtotal **\$13,046**

Task 3. Larvae Collection: Colorado River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.77	40	\$1,431
Biologist	\$32.64	50	\$1,632
Technician	\$17.80	350	\$6,229
		subtotal	\$9,292

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (2 trucks for 3% of total fleet costs)	\$43,297.29	0.02	\$866
Food (3 people, 15 days)	\$31.84	45	\$1,433
		subtotal	\$2,299

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$148
Sampling gear repair/replacement ^c :			\$761
Boating gear repair/replacement ^d :			\$265
Fuel for motors (30 gallons)	\$4.24	30	\$127
		subtotal	\$1,301

Task 3 subtotal **\$12,892**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.77	40	\$1,431
Biologist	\$32.64	80	\$2,611
Technician	\$17.80	240	\$4,271
		subtotal	\$8,313

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (2 trucks for 2% of total fleet costs)	\$43,297.29	0.02	\$866
Food (3 people, 12 days)	\$31.84	36	\$1,146
		subtotal	\$2,012

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$652
Sampling gear repair/replacement ^c :			\$411
Boating gear repair/replacement ^d :			\$478
Fuel for motors (50 gallons)	\$4.24	50	\$212
		subtotal	\$1,752

Task 4 subtotal **\$12,078****Task 5. Preliminary Sample Identification, Data Entry, Analysis, and Reporting**

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$35.77	120	\$4,293
Biologist	\$32.64	120	\$3,917
Technician	\$17.80	80	\$1,424
		subtotal	\$9,633

Task 5 subtotal **\$9,633**

Grand Total FY 2019	\$61,824
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FY2020: Annual Report by November 2020.

FY 2020 Costs for UDWR- Moab (2% increase from FY19)

Task 1. Larvae Collection: Green River

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$36.49	20	\$730
Biologist	\$33.29	80	\$2,664
Technician	\$18.15	350	\$6,353

		subtotal	\$9,747
<u>Food and Travel</u>			
	Rate	Quantity	Cost
Fleet Costs ^a (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
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$208
Sampling gear repair/replacement ^c :			\$1,101
Boating gear repair/replacement ^d :			\$271
Fuel for motors (80 gallons)	\$4.33	80	\$346
		subtotal	\$1,926
Task 1 subtotal			\$14,459

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

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$36.49	40	\$1,459
Biologist	\$33.29	80	\$2,664
Technician	\$18.15	280	\$5,083
		subtotal	\$9,206
<u>Food and Travel</u>			
	Rate	Quantity	Cost
Fleet Costs ^a (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
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$246
Sampling gear repair/replacement ^c :			\$446
Boating gear repair/replacement ^d :			\$568
Fuel for motors (80 gallons)	\$4.33	80	\$346
		subtotal	\$1,607
Task 2 subtotal			\$13,307

Task 3. Larvae Collection: Colorado River

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$36.49	40	\$1,459
Biologist	\$33.29	50	\$1,665
Technician	\$18.15	350	\$6,353
		subtotal	\$9,478
<u>Food and Travel</u>			

	Rate	Quantity	Cost
Fleet Costs ^a (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 ^b :			\$151
Sampling gear repair/replacement ^c :			\$776
Boating gear repair/replacement ^d :			\$271
Fuel for motors (30 gallons)	\$4.33	30	\$130
		subtotal	\$1,327

Task 3 subtotal **\$13,149**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$36.49	40	\$1,459
Biologist	\$33.29	80	\$2,664
Technician	\$18.15	240	\$4,357
		subtotal	\$8,480

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (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 ^b :			\$665
Sampling gear repair/replacement ^c :			\$419
Boating gear repair/replacement ^d :			\$487
Fuel for motors (50 gallons)	\$4.33	50	\$216
		subtotal	\$1,787

Task 4 subtotal **\$12,319**

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

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$36.49	120	\$4,378
Biologist	\$33.29	120	\$3,995
Technician	\$18.15	80	\$1,452
		subtotal	\$9,826

Task 5 subtotal **\$9,826**

Grand Total FY 2020	\$63,060
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IX. Program Budget Summary:

	UDWR-Moab
FY16	\$58,258
FY17	\$59,423
FY18	\$60,611
FY19	\$61,824
FY20	\$63,060
total:	\$303,176

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. Meismer, 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.