

RECOVERY PROGRAM
FY 2020-21 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: R19AP00059
Reclamation Agreement term: Oct. 1, 2018 – Sept. 30, 2023

Note: Recovery Program FY20-21 scopes of work are drafted in May 2020. 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: Utah Division of Wildlife Resources

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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.B. Conduct research to acquire needed life history information.
- 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.D.1. Implement razorback sucker monitoring plan.

COLORADO RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.E. Implement razorback sucker monitoring plan

III. Study Background/Rationale and Hypotheses:

This project will detect the presence of early life stage 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 sucker 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 sucker 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 Green River from 2006 to 2013 adult razorback sucker abundance has increased greatly; likely due to stocking (Zelasko et al. 2018). Congregations of ripe razorbacks displaying spawning behavior have been observed and many ripe individuals have been captured during sampling for other projects. In 2008, three age-1+ razorbacks were captured, and in 2012 Project 138 sampling resulted in the capture of three YOY razorback sucker within the lower Green River (Creighton et al. 2012). Light trap sampling from 2009 to 2016 for this project on the lower Green River has shown a continued presence and an increase in abundance of larvae. The increase in adult razorback abundance, the continued presence of larvae, and the capture of age-1 and YOY fish suggests that stocked adult razorback are successfully spawning in the lower Green River.

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 Grandstaff Canyon (RM 67.2) where previously ripe adult females were captured (Doug Osmundson per. comm.). Larval seining from 2004-2007 identified razorback sucker larvae in the Colorado River from just above Westwater Canyon (RM 124.8) upstream to the Price Stubb Diversion dam (RM 185.1) (Osmundson and Seal 2009). Larval sampling in 2012 occurred between Goose Island (RM 65) and Mill Creek (RM 61.5). Osmundson and Seal (2009) results 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. More recently, light trap sampling on the Colorado River in 2016 produced 91 samples and of those, 78 were sent to the CSU Larval Fish Lab for identification. Similar to 2015 (83%), 97% contained larval razorbacks. In 2018, young-of-year razorback suckers were documented for the first time during this study from river miles 54-32. Ten individuals with total lengths ranging from 45-81mm were collected. Young-of-year razorback suckers had not been encountered in this reach since 2012 when seining efforts under Project 138 documented three individuals from river miles 49.1-43.9 (Creighton 2012).

Spawning by stocked razorback sucker is an important component for recovery of the species. Monitoring the timing, location, and extent of larval occurrence in the system provides valuable information about the success of razorback spawning. Documenting YOY and age-1 razorbacks provides valuable information about recruitment of larvae to juvenile fish.

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 larval presence 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 by the Larval Fish Lab.

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 will 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 will 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.

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, and washes). Sampling will be conducted once per month from July through September (three 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 that are identifiable in the field will be counted and measured on site and released. Fish 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: Larval sampling via light trapping – Focus effort around flooded tributary mouths where larvae have been or are suspected of being detected. (May-June)

Task 2: Sample for young-of-year to age-1+ razorback sucker in flooded channels, side canyons, washes, etc., with seines. (June-October)

Task 3: 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	X	X	X	

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

	Deliverable	Due Date
FY 2020	Annual Report	November 2020
FY 2021	Annual Report	November 2021
FY 2022	Annual Report	November 2022
FY 2023	Annual Report	November 2023
FY 2024	Annual Report	November 2024

IX. Budget Summary

	UDWR-Moab
FY 2020	\$ 52,525
FY 2021	\$ 53,575
FY 2022	\$ 54,647
FY 2023	\$ 55,739
FY 2024	\$ 56,854
TOTAL	\$ 273,340

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 razorbacks 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.

Zelasko, K.A., K.R. Bestgen, and G.C. White. 2018. Abundance and survival rates of razorback suckers *Xyrauchen texanus* in the Green River, Utah, 2011-2013. Final Report of Larval Fish Laboratory, Colorado State University to Upper Colorado Endangered Fish Recovery Program, Denver, Colorado.

SUMMARY OF PROPOSED COSTS

Name of Servicing Agency:	Utah Division of Wildlife Services
Project Name:	Project 160 larval and YOY Razorback Monitoring Green and Colorado R. (Moab Field Office)

	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
	10/1/2019		9/30/2020		10/1/2021		10/1/2022		10/1/2023		
	Through		Through		Through		Through		Through		
	9/29/2020		9/30/2021		9/30/2022		9/30/2023		9/29/2024		
DIRECT LABOR AND FRINGE BENEFIT COSTS:	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
Direct Labor - Hourly	\$	28,767.20	\$	29,342.54	\$	29,929.39	\$	30,527.98	\$	31,138.54	\$ 149,705.66
Fringe Benefits - Hourly	\$	8,563.02	\$	8,734.28	\$	8,908.96	\$	9,087.14	\$	9,268.89	\$ 44,562.29
Subtotal of Direct Labor & Fringe Benefits:	\$	37,330.22	\$	38,076.82	\$	38,838.36	\$	39,615.13	\$	40,407.43	\$ 194,267.96
OTHER DIRECT COSTS:	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
Materials Supplies and Services	\$	10,154.33	\$	10,357.42	\$	10,564.56	\$	10,775.83	\$	10,991.39	\$ 52,843.53
Travel Costs	\$	5,040.00	\$	5,140.80	\$	5,243.62	\$	5,348.49	\$	5,455.46	\$ 26,228.36
Equipment	\$	-	\$	-	\$	-	\$	-	\$	-	\$ -
Contractors	\$	-	\$	-	\$	-	\$	-	\$	-	\$ -
Subtotal of Other Direct Costs:	\$	15,194.33	\$	15,498.22	\$	15,808.18	\$	16,124.32	\$	16,446.85	\$ 79,071.89
INDIRECT/OVERHEAD COSTS:	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
Subtotal of Labor and Other Direct Costs:	\$	52,524.55	\$	53,575.04	\$	54,646.54	\$	55,739.44	\$	56,854.28	
Total dollars exempt from indirect/overhead base:	\$	-	\$	-	\$	-	\$	-	\$	-	
<i>Indirect/Overhead not charged to UCRRP Programs</i>	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	\$ -
Total dollars exempt from indirect/overhead base:	\$	-	\$	-	\$	-	\$	-	\$	-	
<i>Indirect/Overhead not charged to UCRRP Programs</i>	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	\$ -
Subtotal of Indirect/Overhead Costs:	\$	-	\$	-	\$	-	\$	-	\$	-	\$ -
GRAND TOTAL:	\$	52,524.55	\$	53,575.04	\$	54,646.54	\$	55,739.44	\$	56,854.28	\$ 273,339.85

SUMMARY OF DIRECT LABOR & FRINGE BENEFIT

Enter Escalation Rates ----->	Yr 2 Escalation Rate	2.00%
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Task # or Description	Position Title	Current Hourly Rate	YEAR 1					YEAR 2					
			10/1/2019		Through	9/29/2020		9/30/2020		Through	9/30/2021		
			# of Hours	Hourly Rate	Salary Cost	Fringe Rate	Fringe Cost	# of Hours	Hourly Rate	Salary Cost	Fringe Rate	Fringe Cost	
1	1	Project Leader(1)	\$ 23.96	60.0	\$ 23.96	\$ 1,437.60	51.17%	\$ 735.62	60.0	\$ 24.44	\$ 1,466.35	51.17%	\$ 750.33
2	1	Biologist(4)	\$ 20.37	120.0	\$ 20.37	\$ 2,444.40	63.43%	\$ 1,550.48	120.0	\$ 20.78	\$ 2,493.29	63.43%	\$ 1,581.49
3	1	Technician(s)(12)	\$ 15.70	480.0	\$ 15.70	\$ 7,536.00	8.77%	\$ 660.91	480.0	\$ 16.01	\$ 7,686.72	8.77%	\$ 674.13
4	2	Project Leader(1)	\$ 23.96	60.0	\$ 23.96	\$ 1,437.60	51.17%	\$ 735.62	60.0	\$ 24.44	\$ 1,466.35	51.17%	\$ 750.33
5	2	Biologist(4)	\$ 20.37	120.0	\$ 20.37	\$ 2,444.40	63.43%	\$ 1,550.48	120.0	\$ 20.78	\$ 2,493.29	63.43%	\$ 1,581.49
6	2	Technician(s)(12)	\$ 15.70	480.0	\$ 15.70	\$ 7,536.00	8.77%	\$ 660.91	480.0	\$ 16.01	\$ 7,686.72	8.77%	\$ 674.13
7	3	Project Leader(1)	\$ 23.96	80.0	\$ 23.96	\$ 1,916.80	51.17%	\$ 980.83	80.0	\$ 24.44	\$ 1,955.14	51.17%	\$ 1,000.44
8	3	Biologist(4)	\$ 20.37	120.0	\$ 20.37	\$ 2,444.40	63.43%	\$ 1,550.48	120.0	\$ 20.78	\$ 2,493.29	63.43%	\$ 1,581.49
9	3	Technician(s)(12)	\$ 15.70	100.0	\$ 15.70	\$ 1,570.00	8.77%	\$ 137.69	100.0	\$ 16.01	\$ 1,601.40	8.77%	\$ 140.44
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SUMMARY OF DIRECT LABOR & F

Yr 3 Escalation Rate	2.00%
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Yr 4 Escalation Rate	2.00%
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Task # or Description	Position Title	Current Hourly Rate	YEAR 3					YEAR 4				
			10/1/2021		Through	9/30/2022		10/1/2022		Through	9/30/2023	
			# of Hours	Hourly Rate	Salary Cost	Fringe Rate	Fringe Cost	# of Hours	Hourly Rate	Salary Cost	Fringe Rate	Fringe Cost
1	Project Leader(1)	\$ 23.96	60.0	\$ 24.93	\$ 1,495.68	51.17%	\$ 765.34	60.0	\$ 25.43	\$ 1,525.59	51.17%	\$ 780.65
2	Biologist(4)	\$ 20.37	120.0	\$ 21.19	\$ 2,543.15	63.43%	\$ 1,613.12	120.0	\$ 21.62	\$ 2,594.02	63.43%	\$ 1,645.38
3	Technician(s)(12)	\$ 15.70	480.0	\$ 16.33	\$ 7,840.45	8.77%	\$ 687.61	480.0	\$ 16.66	\$ 7,997.26	8.77%	\$ 701.36
4	Project Leader(1)	\$ 23.96	60.0	\$ 24.93	\$ 1,495.68	51.17%	\$ 765.34	60.0	\$ 25.43	\$ 1,525.59	51.17%	\$ 780.65
5	Biologist(4)	\$ 20.37	120.0	\$ 21.19	\$ 2,543.15	63.43%	\$ 1,613.12	120.0	\$ 21.62	\$ 2,594.02	63.43%	\$ 1,645.38
6	Technician(s)(12)	\$ 15.70	480.0	\$ 16.33	\$ 7,840.45	8.77%	\$ 687.61	480.0	\$ 16.66	\$ 7,997.26	8.77%	\$ 701.36
7	Project Leader(1)	\$ 23.96	80.0	\$ 24.93	\$ 1,994.24	51.17%	\$ 1,020.45	80.0	\$ 25.43	\$ 2,034.12	51.17%	\$ 1,040.86
8	Biologist(4)	\$ 20.37	120.0	\$ 21.19	\$ 2,543.15	63.43%	\$ 1,613.12	120.0	\$ 21.62	\$ 2,594.02	63.43%	\$ 1,645.38
9	Technician(s)(12)	\$ 15.70	100.0	\$ 16.33	\$ 1,633.43	8.77%	\$ 143.25	100.0	\$ 16.66	\$ 1,666.10	8.77%	\$ 146.12
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SUMMARY OF DIRECT LABOR & F

Yr 5 Escalation Rate	2.00%
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				YEAR 5							
				10/1/2023	Through	9/29/2024					
Task # or Description	Position Title	Current Hourly Rate		# of Hours	Hourly Rate	Salary Cost	Fringe Rate	Fringe Cost	Total Salary Cost	Total Fringe Cost	Total Labor Cost
1	1	Project Leader(1)	\$ 23.96	60.0	\$ 25.94	\$ 1,556.10	51.17%	\$ 796.26	\$ 7,481.33	\$ 3,828.20	\$ 11,309.52
2	1	Biologist(4)	\$ 20.37	120.0	\$ 22.05	\$ 2,645.90	63.43%	\$ 1,678.29	\$ 12,720.76	\$ 8,068.78	\$ 20,789.53
3	1	Technician(s)(12)	\$ 15.70	480.0	\$ 16.99	\$ 8,157.21	8.77%	\$ 715.39	\$ 39,217.65	\$ 3,439.39	\$ 42,657.03
4	2	Project Leader(1)	\$ 23.96	60.0	\$ 25.94	\$ 1,556.10	51.17%	\$ 796.26	\$ 7,481.33	\$ 3,828.20	\$ 11,309.52
5	2	Biologist(4)	\$ 20.37	120.0	\$ 22.05	\$ 2,645.90	63.43%	\$ 1,678.29	\$ 12,720.76	\$ 8,068.78	\$ 20,789.53
6	2	Technician(s)(12)	\$ 15.70	480.0	\$ 16.99	\$ 8,157.21	8.77%	\$ 715.39	\$ 39,217.65	\$ 3,439.39	\$ 42,657.03
7	3	Project Leader(1)	\$ 23.96	80.0	\$ 25.94	\$ 2,074.81	51.17%	\$ 1,061.68	\$ 9,975.10	\$ 5,104.26	\$ 15,079.36
8	3	Biologist(4)	\$ 20.37	120.0	\$ 22.05	\$ 2,645.90	63.43%	\$ 1,678.29	\$ 12,720.76	\$ 8,068.78	\$ 20,789.53
9	3	Technician(s)(12)	\$ 15.70	100.0	\$ 16.99	\$ 1,699.42	8.77%	\$ 149.04	\$ 8,170.34	\$ 716.54	\$ 8,886.88
10			\$ -	-	\$ -	\$ -	51.17%	\$ -	\$ -	\$ -	\$ -
11			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
12			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
13			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
14			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
15			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
16			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
17			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
18			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
19			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
20			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
21			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
22			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
23			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
24			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
25			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
26			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
27			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
28			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
29			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
30			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
31			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
				1,620.00		\$ 31,138.54		\$ 9,268.89	\$ 149,705.66	\$ 44,562.29	\$ 194,267.96

SUMMARY OF MATERIALS AND SUPPLIES

SUMMARY OF MATERIALS, SUPPLIES, AND SERVICES

Yr 2 Escalation Rate	2.00%
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	Task # or Description	Item Description	rationale for Proposed Co	Year 1			Year 2		
				Unit Price	Unit Quantity	Subtotal	Unit Price	Unit Quantity	Subtotal
1	1	Montly fleet rental (3 trucks, 2 months)	Based on previous experience & SOWs	\$ 199.37	4.00	\$ 797.48	\$ 203.36	4.00	\$ 813.43
2	1	Mileage costs (1500 miles)	Based on previous experience & SOWs	\$ 0.40	1200.00	\$ 480.00	\$ 0.41	1200.00	\$ 489.60
3	1	Shuttle costs (6)	Based on previous experience & SOWs	\$ 200.00	3.00	\$ 600.00	\$ 204.00	3.00	\$ 612.00
4	1	Camping materials and gear	Based on previous experience & SOWs	\$ 1,000.00	0.50	\$ 500.00	\$ 1,020.00	0.50	\$ 510.00
5	1	Sampling materials and gear	Based on previous experience & SOWs	\$ 1,000.00	1.50	\$ 1,500.00	\$ 1,020.00	1.50	\$ 1,530.00
6	1	Boating matierials, gear and fuel	Based on previous experience & SOWs	\$ 1,000.00	1.00	\$ 1,000.00	\$ 1,020.00	1.00	\$ 1,020.00
7	2	Montly fleet rental (2 trucks, 2 months)	Based on previous experience & SOWs	\$ 199.37	4.00	\$ 797.48	\$ 203.36	4.00	\$ 813.43
8	2	Mileage costs (1500 miles)	Based on previous experience & SOWs	\$ 0.40	1200.00	\$ 480.00	\$ 0.41	1200.00	\$ 489.60
9	2	Shuttle costs (6)	Based on previous experience & SOWs	\$ 200.00	3.00	\$ 600.00	\$ 204.00	3.00	\$ 612.00
10	2	Camping materials and gear	Based on previous experienc	\$ 1,000.00	0.50	\$ 500.00	\$ 1,020.00	0.50	\$ 510.00
11	2	Sampling materials and gear	Based on previous experience & SOWs	\$ 1,000.00	1.50	\$ 1,500.00	\$ 1,020.00	1.50	\$ 1,530.00
12	2	Boating matierials, gear and fuel	Based on previous experience & SOWs	\$ 1,000.00	1.00	\$ 1,000.00	\$ 1,020.00	1.00	\$ 1,020.00
13	3	Montly fleet rental (1 trucks, 1 month)	Based on previous experience & SOWs	\$ 199.37	1.00	\$ 199.37	\$ 203.36	1.00	\$ 203.36
14	3	Mileage costs (500 miles)	Based on previous experience & SOWs	\$ 0.40	500.00	\$ 200.00	\$ 0.41	500.00	\$ 204.00
				\$ -	0	\$ -	\$ -	0	\$ -
				\$ -	0	\$ -	\$ -	0	\$ -
TOTAL:						\$ 10,154.33			\$ 10,357.42

SUMMARY OF MATERIALS AND SUPPLIES

SUMMARY OF MATERIALS, SUPPLIES	Yr 3 Escalation Rate	2.00%	Yr 4 Escalation Rate	2.00%
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	Task # or Description	Item Description	Year 3			Year 4		
			Unit Price	Unit Quantity	Subtotal	Unit Price	Unit Quantity	Subtotal
1	1	Montly fleet rental (3 trucks, 2 months)	\$ 207.42	4.00	\$ 829.70	\$ 211.57	4.00	\$ 846.29
2	1	Mileage costs (1500 miles)	\$ 0.42	1200.00	\$ 499.39	\$ 0.42	1200.00	\$ 509.38
3	1	Shuttle costs (6)	\$ 208.08	3.00	\$ 624.24	\$ 212.24	3.00	\$ 636.72
4	1	Camping materials and gear	\$ 1,040.40	0.50	\$ 520.20	\$ 1,061.21	0.50	\$ 530.60
5	1	Sampling materials and gear	\$ 1,040.40	1.50	\$ 1,560.60	\$ 1,061.21	1.50	\$ 1,591.81
6	1	Boating matierials, gear and fuel	\$ 1,040.40	1.00	\$ 1,040.40	\$ 1,061.21	1.00	\$ 1,061.21
7	2	Montly fleet rental (2 trucks, 2 months)	\$ 207.42	4.00	\$ 829.70	\$ 211.57	4.00	\$ 846.29
8	2	Mileage costs (1500 miles)	\$ 0.42	1200.00	\$ 499.39	\$ 0.42	1200.00	\$ 509.38
9	2	Shuttle costs (6)	\$ 208.08	3.00	\$ 624.24	\$ 212.24	3.00	\$ 636.72
10	2	Camping materials and gear	\$ 1,040.40	0.50	\$ 520.20	\$ 1,061.21	0.50	\$ 530.60
11	2	Sampling materials and gear	\$ 1,040.40	1.50	\$ 1,560.60	\$ 1,061.21	1.50	\$ 1,591.81
12	2	Boating matierials, gear and fuel	\$ 1,040.40	1.00	\$ 1,040.40	\$ 1,061.21	1.00	\$ 1,061.21
13	3	Montly fleet rental (1 trucks, 1 month)	\$ 207.42	1.00	\$ 207.42	\$ 211.57	1.00	\$ 211.57
14	3	Mileage costs (500 miles)	\$ 0.42	500.00	\$ 208.08	\$ 0.42	500.00	\$ 212.24
			\$ -	0	\$ -	\$ -	0	\$ -
			\$ -	0	\$ -	\$ -	0	\$ -
					\$ 10,564.56			\$ 10,775.83

SUMMARY OF MATERIALS AND SUPPLIES

SUMMARY OF MATERIALS, SUPPLIES	Yr 5 Escalation Rate	2.00%
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			Year 5			
	Task # or Description	Item Description	Unit Price	Unit Quantity	Subtotal	TOTAL
1	1	Montly fleet rental (3 trucks, 2 months)	\$ 215.80	4.00	\$ 863.22	\$ 4,150.12
2	1	Mileage costs (1500 miles)	\$ 0.43	1200.00	\$ 519.57	\$ 2,497.94
3	1	Shuttle costs (6)	\$ 216.49	3.00	\$ 649.46	\$ 3,122.42
4	1	Camping materials and gear	\$ 1,082.43	0.50	\$ 541.22	\$ 2,602.02
5	1	Sampling materials and gear	\$ 1,082.43	1.50	\$ 1,623.65	\$ 7,806.06
6	1	Boating matierials, gear and fuel	\$ 1,082.43	1.00	\$ 1,082.43	\$ 5,204.04
7	2	Montly fleet rental (2 trucks, 2 months)	\$ 215.80	4.00	\$ 863.22	\$ 4,150.12
8	2	Mileage costs (1500 miles)	\$ 0.43	1200.00	\$ 519.57	\$ 2,497.94
9	2	Shuttle costs (6)	\$ 216.49	3.00	\$ 649.46	\$ 3,122.42
10	2	Camping materials and gear	\$ 1,082.43	0.50	\$ 541.22	\$ 2,602.02
11	2	Sampling materials and gear	\$ 1,082.43	1.50	\$ 1,623.65	\$ 7,806.06
12	2	Boating matierials, gear and fuel	\$ 1,082.43	1.00	\$ 1,082.43	\$ 5,204.04
13	3	Montly fleet rental (1 trucks, 1 month)	\$ 215.80	1.00	\$ 215.80	\$ 1,037.52
14	3	Mileage costs (500 miles)	\$ 0.43	500.00	\$ 216.49	\$ 1,040.81
			\$ -	0	\$ -	\$ -
			\$ -	0	\$ -	\$ -
					\$ 10,991.39	\$ 52,843.53

SUMMARY OF TRAVEL COSTS

Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Task #	1	1	1	1	1	
From-To	Task 1- Larval Sampling	Task 1- Larval Sampling	Task 1- Larval Sampling	Task 1- Larval Sampling	Task 1- Larval Sampling	
Reason	Field Work	Field Work	Field Work	Field Work	Field Work	
# of Days per trip	4	4	4	4	4	
Airfare	\$ -	\$ -	\$ -	\$ -	\$ -	
Lodging (Per Night)	\$ -	\$ -	\$ -	\$ -	\$ -	
MI&E Per Day	\$ 35.00	\$ 35.70	\$ 36.41	\$ 37.14	\$ 37.89	
Auto Rental Per Day	\$ -	\$ -	\$ -	\$ -	\$ -	
Misc Costs/Adjustments/Trip	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Per Trip	\$ 140.00	\$ 142.80	\$ 145.66	\$ 148.57	\$ 151.54	
No. of persons	3	3	3	3	3	
Mileage rate	\$ -	\$ -	\$ -	\$ -	\$ -	
Total miles	0	0	0	0	0	
# of trips	6	6	6	6	6	
SUBTOTAL =	\$ 2,520.00	\$ 2,570.40	\$ 2,621.81	\$ 2,674.24	\$ 2,727.73	\$ 13,114.18

Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Task #	2	2	2	2	2	
From-To	Task 2 - YOY/Juv Sampling	Task 2 - YOY/Juv	Task 2 - YOY/Juv	Task 2 - YOY/Juv	Task 2 - YOY/Juv Sampling	
Reason	Field Work	Field Work	Field Work	Field Work	Field Work	
# of Days (include travel days)	4	4	4	4	4	
Airfare	\$ -					
Lodging (Per Night)	\$ -					
MI&E Per Day	\$ 35.00	\$ 35.70	\$ 36.41	\$ 37.14	\$ 37.89	
Auto Rental Per Day	\$ -					
Misc Costs/Adjustments/Trip	\$ -					
Total Per Trip	\$ 140.00	\$ 142.80	\$ 145.66	\$ 148.57	\$ 151.54	
No. of persons	3	3	3	3	3	
Mileage rate	\$ -					
Total miles	0					
# of trips	6	6	6	6	6	
SUBTOTAL =	\$ 2,520.00	\$ 2,570.40	\$ 2,621.81	\$ 2,674.24	\$ 2,727.73	\$ 13,114.18