

**RECOVERY PROGRAM
FY 2020-2021 SCOPE OF WORK for:**

Recovery Program Project Number: 178

Managing the Stirrup wetland for endangered fishes

Reclamation Agreement number: TBA
Reclamation Agreement term: pending

Note: Recovery Program FY20-21 scopes of work are drafted in May 2019. 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: Bureau of Land Management

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Date Last Modified: 8/12/2019 2:48:00 PM

Category:

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

Expected Funding Source:

- Annual funds
- Capital funds
- Other

I. Title of Proposal: Managing the Stirrup wetland for endangered fishes

II. Relationship to RIPRAP:
GREEN RIVER ACTION PLAN

- I.D.2.b.(5)(a)– Implement the Larval Trigger Study Plan
- II.A.5. Manage and/or modify priority floodplain sites for nursery habitat for endangered fish
- II.A.5.e. Stirrup

- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.

III. Study Background/Rationale and Hypotheses:

Floodplain wetlands are recognized as important habitats for early life-stages of razorback sucker (*Xyrauchen texanus*; Wydoski and Wick 1998; Muth et al. 1998; Lentsch et al. 1996; Modde 1996; Tyus and Karp 1990). Reproduction by razorback suckers occurs on the ascending limb of the spring hydrograph, allowing enough time between hatching and swim up for larvae to enter main channel drift when highly productive floodplain habitats are accessible (Muth et al. 1998). Seasonal timing of razorback sucker reproduction indicates possible adaptation for entrainment and use of floodplain habitats for rearing purposes (Muth et al. 1998).

Razorback sucker larvae have been successfully entrained and reared to juvenile size in the Stewart Lake wetland, and are PIT-tagged and released into the middle Green River in the fall (Project #FR-165). This is possible in large part due to the ability to exclude large-bodied non-native fish, maintain water levels and adequate water quality throughout the summer, and capture fish by draining the wetland in the fall. Stewart Lake provides a model of success that has been applied to other wetlands in the upper Colorado River basin such as Johnson Bottom (see Project #FR-164), as well as Shepherd Bottom and Old Charley Wash in the near future. Stewart Lake has produced more than 2,000 young of year (YOY) razorback sucker in a single year (Schelly et al. 2016), but recruitment beyond age-1 fish from such cohorts has yet to be observed. An important step in razorback sucker recovery, it is estimated that 1,740 fish must recruit into the adult population each year to maintain the population at recovery levels (Valdez and Nelson 2004). Therefore, it is crucial that successful recruitment occurs at numerous wetlands simultaneously to effectively bolster adult recruitment in the mainstem Green River.

With the above-mentioned model of success and with the need to increase YOY recruitment in mind, several Bureau of Land Management (BLM) managed wetlands were visited during March of 2017 by members of the Biology Committee and Program Director's Office from the Upper Colorado River Endangered Fish Recovery Program, engineers from the Bureau of Reclamation, and other Recovery Program partner subject matter experts (see BC Meeting notes 5-23-17). Sites were informally ranked based on a combination of potential factors including cost, simplicity, and suitability for fish; Stirrup wetland ranked the highest.

Stirrup wetland is located approximately 23 km downstream of the Highway 40 Bridge on BLM administered land. This is a single-breach floodplain that connects to the Green River at the downstream end when discharge measured at Jensen, Utah is approximately 13,000 cfs, resulting in 20 acres being inundated, and when flows are approximately 18,600 cfs 28 acres are inundated (Valdez and Nelson 2004). However, it has been determined that movement of adult fishes between the wetland and riverine habitats is limited until discharge is closer to the latter (Breen 2011; Hedrick et al. 2012). It is hypothesized that with water control, weir structures, and hands-on management this wetland can entrain and rear razorback sucker larvae, with the ability of releasing fish back into the Green River with a controlled draining. In addition, future operations at the Stirrup floodplain will likely have the flexibility to manage other endangered species such as bonytail. For example, adult hatchery-reared bonytail were stocked in 2011 and 2017 prior to spring peak flows to provide an

additional acclimation period prior to floodplain connection (Breen 2011; Jones et al. 2017).

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

Goal:

Manage a controlled floodplain wetland to improve recruitment and survival of larval and adult endangered fishes, emphasizing razorback sucker.

Objectives:

1. Entrain larval endangered fishes during high-flow connection of riverine and wetland habitats.
2. Examine fish community composition and habitat characteristics in the Stirrup wetland following floodplain connection to assess summer survival of wild-spawned and potentially stocked razorback sucker and other endangered fishes.
3. Release juvenile native fishes back to the river during a controlled release, through physical capture.
4. Determine the extent of nonnative fish colonization in wetland habitats and remove nonnative species during draining

End Products:

An annual report describing how Stirrup wetland functions as habitat for larval and adult endangered fishes. We will provide information on: (1) larval razorback sucker entrainment, (2) fish community composition, water quality parameters, and wetland habitat characteristics through time following the connection period, and (3) species-specific information on fishes emigrating from the floodplain during the drawdown period.

V. Study Area:

Stirrup Wetland is located approximately 23 km downstream of the Highway 40 Bridge on BLM administered land. Water enters and exits the wetland through a single downstream breach that was created in the mid 1990's. If the water control structure is built as currently designed max water depth will be 8ft during years of maximum fill, with a total surface area approximately 22 acres.

VI. Study Methods/Approach:

During the high flow entrainment period, an exclusionary screen will be installed at the Stirrup wetland water control structure, and we will sample with light traps within the wetland to verify larval razorback sucker entrainment. The screen will exclude adult nonnative fishes from entering the wetland for the entire duration that the floodplain is connected. The exclusionary screen will consist of diamond shaped mesh (<1/2" opening), which will exclude large-bodied fishes (limiting competition and predation on larval native fishes) while allowing larval razorback sucker and small-bodied fishes to move into the wetland freely.

Approximately 10 light traps will be positioned in the outlet canal and in the main body of the wetland

at the point of floodplain connection. Daily sampling will initiate following larval detection in the Green River main channel (Project #22f), and conclude when the floodplain is disconnected from the main channel or when we have verification that razorback sucker larvae have reached the interior of the wetland. All larval fish present in light traps will be collected and preserved for later identification by the Colorado State University Larval Fish Lab.

Following floodplain inundation the wetland will be systematically sampled to evaluate fish community composition through time. Once entrainment of larval razorback suckers is confirmed with light traps, we will allow ample growing time and conduct surveys (e.g., fyke nets, seines) as needed to determine growth throughout the summer until draining. We will also monitor water quality parameters (dissolved oxygen, pH, conductivity and temperature) using continuous loggers. If needed work with USFWS and the Utah division of water rights to pump supplemental water from the river into the wetland

Wetland drawdown (timing and duration of release) will be coordinated with the Recovery Program. The fish kettle in the control structure will allow us to effectively sample fish leaving the wetland to determine survival and growth of wild-spawned razorback suckers and other native fishes. Fish will be collected from the kettle using seines, endangered fish will be weighed measured and implanted with a pit tag and released in the river. All non-native fish will be euthanized.

VII. Task Description and Schedule:

Task 1: Install, operate and maintain screen and gate in the Stirrup wetland control structure while filling the wetland.

Task 2: Sample the Stirrup wetland fish community and monitor post-connection water quality.

Task 3: Sample fishes exiting the Stirrup wetland control structure during drawdown using the built-in fish kettle.

Task 4: Data entry, analysis and reporting.

Task	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				X	X	X						
2						X	X	X	X			
3									X	X		
4										X	X	X

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

FY 2020-2024

Program annual reports due each November.

Project data will be submitted to the Recovery Program Database Manager by January.

IX. Budget Summary:

FY 2020 will be the first year of operating Stirrup wetland, operating costs may fluctuate in future years as we learn the intricacies of operating this control structure.

	BLM
FY 2020	\$38,670
FY 2021	\$12,316
FY 2022	\$14,006
FY 2023	\$13,356
FY 2024	\$14,675
TOTAL	\$93,024

X. Reviewers: Tildon Jones

XI. References:

Bestgen, K.R., R.C. Schelly, R.R. Staffeldt, M.J. Breen, D.E. Snyder, and M.T.

Jones. 2017. First reproduction by stocked bonytail in the upper Colorado River basin. *North American Journal of Fisheries Management* 37:2:445-455.

Breen, M. J. 2011. Razorback emigration from the Stirrup floodplain. Annual Report submitted to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO.

Hedrick, T.N., Breton, A.R., and S.P. Keddy, S.P. 2012. Razorback sucker survival and emigration from the Stirrup floodplain, middle Green River, Utah 2007-2010. Publication Number 12-10, Final Report of the Utah Division of Wildlife Resources to the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Jones, T., C. Smith, and D. Beers. 2017. Middle Green River floodplain sampling. Project FR-164 annual report submitted to the Upper Colorado River Endangered Fish Recovery Program, U.S. Fish and Wildlife Service, Denver, CO.

Lentsch, L., T. Crawl, P. Nelson, and T. Modde. 1996. Levee removal strategic plan. Utah Division of Wildlife Resources, Salt Lake City, UT. 21 pp.

Modde, T. 1996. Juvenile razorback sucker (*Xyrauchen texanus*) in a managed wetland adjacent of the Green River. *Great Basin Naturalist* 56:375-376.6

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 submitted to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO. 62 pp.

Schelly, R.C., R.R. Staffeldt, and M.J. Breen. 2016. Use of Stewart Lake floodplain by larval and

adult endangered fishes. Annual Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Tyus, H.M. and C.A. Karp. 1990. Spawning and movements of razorback sucker, *Xyrauchen texanus*, in the Green River basin of Colorado and Utah. *Southwestern Naturalist* 35:427-433.

Wydoski, R.S. and E.J. Wick. 1998. Ecological value of floodplain habitats to razorback suckers in the Upper Colorado River Basin. Final Report submitted to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO. 55 pp.

Valdez, R.A. and P. Nelson. 2004. Green River subbasin floodplain management plan. Upper Colorado River Endangered Fish Recovery Program, Project Number C-6, Denver, Colorado.

SUMMARY OF PROPOSED COSTS

Name of Servicing Agency:	Bureau of Land Management--Vernal Field Office
Project Name:	Stirrup wetland

	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
	10/1/2019		10/1/2020		10/1/2021		10/1/2022		10/1/2023		
	Through	9/30/2020	Through	9/30/2021	Through	9/30/2022	Through	9/30/2023	Through	9/30/2024	
Enter the BEGINNING dates for each year ----->											
Enter the ENDING dates for each year ----->											
DIRECT LABOR AND FRINGE BENEFIT COSTS:	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
Direct Labor - Hourly	\$	6,508.00	\$	5,310.53	\$	5,416.74	\$	5,525.07	\$	5,635.57	\$ 28,395.91
Fringe Benefits - Hourly	\$	1,822.24	\$	1,486.95	\$	1,516.69	\$	1,547.02	\$	1,577.96	\$ 7,950.86
Subtotal of Direct Labor & Fringe Benefits:	\$	8,330.24	\$	6,797.48	\$	6,933.43	\$	7,072.09	\$	7,213.54	\$ 36,346.77
OTHER DIRECT COSTS:	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
Materials and Supplies	\$	10,402.00	\$	2,499.00	\$	3,733.48	\$	2,638.32	\$	3,980.08	\$ 23,252.88
Travel Costs	\$	-	\$	-	\$	-	\$	-	\$	-	\$ -
Equipment	\$	13,069.00	\$	832.32	\$	851.05	\$	1,273.44	\$	874.60	\$ 16,900.41
Contractors	\$	-	\$	-	\$	-	\$	-	\$	-	\$ -
Subtotal of Other Direct Costs:	\$	23,471.00	\$	3,331.32	\$	4,584.53	\$	3,911.76	\$	4,854.68	\$ 40,153.29
INDIRECT/OVERHEAD COSTS:	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
Subtotal of Labor and Other Direct Costs:	\$	31,801.24	\$	10,128.80	\$	11,517.95	\$	10,983.86	\$	12,068.22	
Total dollars exempt from indirect/overhead base:											
<Enter Description of Indirect/OH Cost #1>	21.60%	\$ 6,869.07	21.60%	\$ 2,187.82	21.60%	\$ 2,487.88	21.60%	\$ 2,372.51	21.60%	\$ 2,606.73	\$ 16,524.01
Total dollars exempt from indirect/overhead base:		\$ -		\$ -		\$ -		\$ -		\$ -	
<Enter Description of Indirect/OH Cost #2>	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	\$ -
Subtotal of Indirect/Overhead Costs:		\$ 6,869.07		\$ 2,187.82		\$ 2,487.88		\$ 2,372.51		\$ 2,606.73	\$ 16,524.01
GRAND TOTAL:		\$ 38,670.31		\$ 12,316.62		\$ 14,005.83		\$ 13,356.37		\$ 14,674.95	\$ 93,024.07

SUMMARY OF DIRECT LABOR & FRINGE BENEFITS

Enter Escalation Rates ----->	Yr 2 Escalation Rate	2.00%
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TASK # or Description	Position Title	GS/WG Grade	GS/WG Step	OPM Pay Location	Current Hourly Rate	YEAR 1					YEAR 2				
						10/1/2019		Through	9/30/2020		10/1/2020		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	Fish Technician	5	1	Rest of US	\$ 16.27	120.0	\$ 16.27	\$ 1,952.40	28.00%	\$ 546.67	120.0	\$ 16.60	\$ 1,991.45	28.00%	\$ 557.61
2	Fish Technician	5	1	Rest of US	\$ 16.27	120.0	\$ 16.27	\$ 1,952.40	28.00%	\$ 546.67	40.0	\$ 16.60	\$ 663.82	28.00%	\$ 185.87
3	Fish Technician	5	1	Rest of US	\$ 16.27	120.0	\$ 16.27	\$ 1,952.40	28.00%	\$ 546.67	120.0	\$ 16.60	\$ 1,991.45	28.00%	\$ 557.61
4	Fish Technician	5	1	Rest of US	\$ 16.27	40.0	\$ 16.27	\$ 650.80	28.00%	\$ 182.22	40.0	\$ 16.60	\$ 663.82	28.00%	\$ 185.87
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SUMMARY OF DIRECT LABOR & FRINGE E

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Yr 4 Escalation Rate 2.00%

Task # or Description	Position Title	GS/WG Grade	GS/WG Step	OPM Pay Location	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	1	Fish Technician	5	1	Rest of US	\$ 16.27	120.0	\$ 16.93	\$ 2,031.28	28.00%	\$ 568.76	120.0	\$ 17.27	\$ 2,071.90	28.00%	\$ 580.13
2	2	Fish Technician	5	1	Rest of US	\$ 16.27	40.0	\$ 16.93	\$ 677.09	28.00%	\$ 189.59	40.0	\$ 17.27	\$ 690.63	28.00%	\$ 193.38
3	3	Fish Technician	5	1	Rest of US	\$ 16.27	120.0	\$ 16.93	\$ 2,031.28	28.00%	\$ 568.76	120.0	\$ 17.27	\$ 2,071.90	28.00%	\$ 580.13
4	4	Fish Technician	5	1	Rest of US	\$ 16.27	40.0	\$ 16.93	\$ 677.09	28.00%	\$ 189.59	40.0	\$ 17.27	\$ 690.63	28.00%	\$ 193.38
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SUMMARY OF DIRECT LABOR & FRINGE E

Yr 5 Escalation Rate	2.00%
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							YEAR 5								
							10/1/2023		Through	9/30/2024					
Task # or Description	Position Title	GS/WG Grade	GS/WG Step	OPM Pay Location	Current Hourly Rate		# of Hours	Hourly Rate	Salary Cost	Fringe Rate	Fringe Cost	Total Salary Cost	Total Fringe Cost	Total Labor Cost	
1	1	Fish Technician	5	1	Rest of US	\$ 16.27	120.0	\$ 17.61	\$ 2,113.34	28.00%	\$ 591.74	\$ 10,160.37	\$ 2,844.90	\$ 13,005.27	
2	2	Fish Technician	5	1	Rest of US	\$ 16.27	40.0	\$ 17.61	\$ 704.45	28.00%	\$ 197.25	\$ 4,688.39	\$ 1,312.75	\$ 6,001.14	
3	3	Fish Technician	5	1	Rest of US	\$ 16.27	120.0	\$ 17.61	\$ 2,113.34	28.00%	\$ 591.74	\$ 10,160.37	\$ 2,844.90	\$ 13,005.27	
4	4	Fish Technician	5	1	Rest of US	\$ 16.27	40.0	\$ 17.61	\$ 704.45	28.00%	\$ 197.25	\$ 3,386.79	\$ 948.30	\$ 4,335.09	
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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%	\$ -	\$ -	\$ -	\$ -	
							320.00		\$ 5,635.57		\$ 1,577.96	\$ 28,395.91	\$ 7,950.86	\$ 36,346.77	

SUMMARY OF MATERIALS AND SUPPLIES

SUMMARY OF MATERIALS, SUPPLIES, AND SERVICES

Yr 2 Escalation Rate	2.00%
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	Task #	Item Description	Rationale for Proposed Cost	Year 1			Year 2		
				Unit Price	Unit Quantity	Subtotal	Unit Price	Unit Quantity	Subtotal
1	2	Fyke nets	Price on duluthfishnets.com	\$ 759.00	10	\$ 7,590.00	\$ 774.18	0	\$ -
2	3	Misc. Sampling Gear	Total of measuring boards, ethanol, etc.	\$ 1,400.00	1	\$ 1,400.00	\$ 1,428.00	1	\$ 1,428.00
3	3	seines	Price on Memphis nets	\$ 181.00	2	\$ 362.00	\$ 184.62	0	\$ -
5	3	fuel for pumping wetland 10 days	price of diesel in Vernal, UT higher than aver	\$ 3.50	300	\$ 1,050.00	\$ 3.57	300	\$ 1,071.00
6				\$ -	0	\$ -	\$ -	0	\$ -
7				\$ -	0	\$ -	\$ -	0	\$ -
8				\$ -	0	\$ -	\$ -	0	\$ -
9				\$ -	0	\$ -	\$ -	0	\$ -
10				\$ -	0	\$ -	\$ -	0	\$ -
11				\$ -	0	\$ -	\$ -	0	\$ -
12				\$ -	0	\$ -	\$ -	0	\$ -
13				\$ -	0	\$ -	\$ -	0	\$ -
14				\$ -	0	\$ -	\$ -	0	\$ -
15				\$ -	0	\$ -	\$ -	0	\$ -
16				\$ -	0	\$ -	\$ -	0	\$ -
17				\$ -	0	\$ -	\$ -	0	\$ -
18				\$ -	0	\$ -	\$ -	0	\$ -
19				\$ -	0	\$ -	\$ -	0	\$ -
20				\$ -	0	\$ -	\$ -	0	\$ -
21				\$ -	0	\$ -	\$ -	0	\$ -
22				\$ -	0	\$ -	\$ -	0	\$ -
23				\$ -	0	\$ -	\$ -	0	\$ -
24				\$ -	0	\$ -	\$ -	0	\$ -
25				\$ -	0	\$ -	\$ -	0	\$ -
26				\$ -	0	\$ -	\$ -	0	\$ -
27				\$ -	0	\$ -	\$ -	0	\$ -
28				\$ -	0	\$ -	\$ -	0	\$ -
29				\$ -	0	\$ -	\$ -	0	\$ -
30				\$ -	0	\$ -	\$ -	0	\$ -
TOTAL:						\$ 10,402.00			\$ 2,499.00

SUMMARY OF MATERIALS AND SUPPLIES

SUMMARY OF MATERIAL	Yr 3 Escalation Rate	2.50%	Yr 4 Escalation Rate	3.00%
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	Task #	Item Description	Year 3			Year 4		
			Unit Price	Unit Quantity	Subtotal	Unit Price	Unit Quantity	Subtotal
1	2	Fyke nets	\$ 793.53	1	\$ 793.53	\$ 817.34	0	\$ -
2	3	Misc. Sampling Gear	\$ 1,463.70	1	\$ 1,463.70	\$ 1,507.61	1	\$ 1,507.61
3	3	seines	\$ 189.24	2	\$ 378.47	\$ 194.91	0	\$ -
5	3	fuel for pumping wetland 10 days	\$ 3.66	300	\$ 1,097.78	\$ 3.77	300	\$ 1,130.71
6			\$ -	0	\$ -	\$ -	0	\$ -
7			\$ -	0	\$ -	\$ -	0	\$ -
8			\$ -	0	\$ -	\$ -	0	\$ -
9			\$ -	0	\$ -	\$ -	0	\$ -
10			\$ -	0	\$ -	\$ -	0	\$ -
11			\$ -	0	\$ -	\$ -	0	\$ -
12			\$ -	0	\$ -	\$ -	0	\$ -
13			\$ -	0	\$ -	\$ -	0	\$ -
14			\$ -	0	\$ -	\$ -	0	\$ -
15			\$ -	0	\$ -	\$ -	0	\$ -
16			\$ -	0	\$ -	\$ -	0	\$ -
17			\$ -	0	\$ -	\$ -	0	\$ -
18			\$ -	0	\$ -	\$ -	0	\$ -
19			\$ -	0	\$ -	\$ -	0	\$ -
20			\$ -	0	\$ -	\$ -	0	\$ -
21			\$ -	0	\$ -	\$ -	0	\$ -
22			\$ -	0	\$ -	\$ -	0	\$ -
23			\$ -	0	\$ -	\$ -	0	\$ -
24			\$ -	0	\$ -	\$ -	0	\$ -
25			\$ -	0	\$ -	\$ -	0	\$ -
26			\$ -	0	\$ -	\$ -	0	\$ -
27			\$ -	0	\$ -	\$ -	0	\$ -
28			\$ -	0	\$ -	\$ -	0	\$ -
29			\$ -	0	\$ -	\$ -	0	\$ -
30			\$ -	0	\$ -	\$ -	0	\$ -
					\$ 3,733.48			
								\$ 2,638.32

SUMMARY OF MATERIALS AND SUPPLIES

SUMMARY OF MATERIAL	Yr 5 Escalation Rate	3.50%
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		Year 5				
	Task #	Item Description	Unit Price	Unit Quantity	Subtotal	TOTAL
1	2	Fyke nets	\$ 845.95	1	\$ 845.95	\$ 9,229.48
2	3	Misc. Sampling Gear	\$ 1,560.38	1	\$ 1,560.38	\$ 7,359.69
3	3	seines	\$ 201.73	2	\$ 403.47	\$ 1,143.94
5	3	fuel for pumping wetland 10 days	\$ 3.90	300	\$ 1,170.28	\$ 5,519.77
6			\$ -	0	\$ -	\$ -
7			\$ -	0	\$ -	\$ -
8			\$ -	0	\$ -	\$ -
9			\$ -	0	\$ -	\$ -
10			\$ -	0	\$ -	\$ -
11			\$ -	0	\$ -	\$ -
12			\$ -	0	\$ -	\$ -
13			\$ -	0	\$ -	\$ -
14			\$ -	0	\$ -	\$ -
15			\$ -	0	\$ -	\$ -
16			\$ -	0	\$ -	\$ -
17			\$ -	0	\$ -	\$ -
18			\$ -	0	\$ -	\$ -
19			\$ -	0	\$ -	\$ -
20			\$ -	0	\$ -	\$ -
21			\$ -	0	\$ -	\$ -
22			\$ -	0	\$ -	\$ -
23			\$ -	0	\$ -	\$ -
24			\$ -	0	\$ -	\$ -
25			\$ -	0	\$ -	\$ -
26			\$ -	0	\$ -	\$ -
27			\$ -	0	\$ -	\$ -
28			\$ -	0	\$ -	\$ -
29			\$ -	0	\$ -	\$ -
30			\$ -	0	\$ -	\$ -
					\$ 3,980.08	\$ 23,252.88

SUMMARY OF EQUIPMENT COSTS

SUMMARY OF EQUIPMENT

Enter Escalation Rates ----->

Yr 2 Escalation Rate	2.00%	Yr 3 Escalation Rate	2.25%
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	Task #	Item Description	Rationale for Proposed Cost	Year 1			Year 2			Year 3		
				Unit Price	Unit Quantity	Subtotal	Unit Price	Unit Quantity	Subtotal	Unit Price	Unit Quantity	Subtotal
1	1	Light Traps	https://www.forestry-suppliers.com/product_pages/products	\$ 408.00	10	\$ 4,080.00	\$ 416.16	2	\$ 832.32	\$ 425.52	2	\$ 851.05
2	2	continues dissolved oxygen and temperature sensors	Based on my last purchase	\$ 1,200.00	4	\$ 4,800.00	\$ 1,224.00	0	\$ -	\$ 1,251.54	0	\$ -
3	2	YSI Multimeter, and sensors	Priced on YSI website	\$ 3,900.00	1	\$ 3,900.00	\$ 3,978.00	0	\$ -	\$ 4,067.51	0	\$ -
4	3	Scale for weighing fish	Online quote	\$ 289.00	1	\$ 289.00	\$ 294.78	0	\$ -	\$ 301.41	0	\$ -
5				\$ -	1	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
6				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
7				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
8				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
9				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
10				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
11				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
12				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
13				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
14				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
15				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
16				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
17				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
18				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
19				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
20				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
21				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
22				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
23				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
24				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
25				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
26				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
27				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
28				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
29				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
30				\$ -	0	\$ -	\$ -	0	\$ -	\$ -	0	\$ -
TOTAL:						\$ 13,069.00			\$ 832.32			\$ 851.05

SUMMARY OF EQUIPMENT COSTS

SUMMARY OF E	Yr 4 Escalation Rate	1.75%	Yr 5 Escalation Rate	1.00%
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	Task #	Item Description	Year 4			Year 5			TOTAL	
			Unit Price	Unit Quantity	Subtotal	Unit Price	Unit Quantity	Subtotal		
1	1	Light Traps	\$ 432.97	0	\$ -	\$ 437.30	2	\$ 874.60	\$ 6,637.97	
2	2	continues dissolved oxygen and temperature sensors	\$ 1,273.44	1	\$ 1,273.44	\$ 1,286.18	0	\$ -	\$ 6,073.44	
3	2	YSI Multimeter, and sensors	\$ 4,138.69	0	\$ -	\$ 4,180.07	0	\$ -	\$ 3,900.00	
4	3	Scale for weighing fish	\$ 306.69	0	\$ -	\$ 309.75	0	\$ -	\$ 289.00	
5			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
6			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
7			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
8			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
9			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
10			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
11			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
12			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
13			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
14			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
15			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
16			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
17			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
18			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
19			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
20			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
21			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
22			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
23			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
24			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
25			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
26			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
27			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
28			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
29			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
30			\$ -	0	\$ -	\$ -	0	\$ -	\$ -	
					\$ 1,273.44				\$ 874.60	\$ 16,900.41