

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2022-23 SCOPE OF WORK

PROJECT: 130

Project Title

Monitoring of humpback chub in Cataract Canyon

Bureau of Reclamation Agreement Number:

R19AP00059

Reclamation Agreement Term

Oct. 1, 2019 – Sept. 30, 2024

Note: Recovery Program FY22-23 scopes of work are drafted in May 2021. 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

Principal Investigator:

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Category:

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

Expected Funding Source:

- Annual funds
- Capital funds
- Other [explain]

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).

COLORADO RIVER ACTION PLAN: MAINSTEM

V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).

V.C.3. Cataract Canyon

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Study Background/Rationale and Hypotheses:

Sampling in Cataract Canyon began in 1979 under the U.S. Fish & Wildlife Service's Colorado River Fishery Project (Valdez et al. 1982), and continued under the U.S. Bureau of Reclamation contracted studies with Bio/West (Valdez 1990). Between 1990 and 2000, sampling conducted intermittently by the Utah Division of Wildlife Resources (UDWR) included annual monitoring of the fish community in Cataract Canyon and was added to the Interagency Standardized Monitoring Program (ISMP) beginning in 1998. The catch rates observed during these studies were highly variable, and the population size could not be determined from these data.

Recovery goals for the four upper basin populations of the endangered humpback chub *Gila cypha* include a criterion of "no net loss" in abundance in the Cataract Canyon population of the Colorado River in Utah (USFWS 2002). Though few in number relative to other extant humpback chub populations, the Cataract Canyon population exists independent of potentially catastrophic threats to those populations by virtue of its spatial isolation and occurrence in a protected area. Thus, persistence of the Cataract Canyon population is integral to overall species redundancy (USFWS 2017). This project will continue biennial monitoring of adult and juvenile humpback chub and other *Gila* spp. in Cataract Canyon in the interest of tracking trends in this population to ensure maintenance of this redundancy.

Reservoir drawdown increases the quality and spatial extent of habitats in upstream inflow areas as previously inundated habitats return to riverine processes. The habitats were possibly used by imperiled native fishes prior to reservoir filling and their reemergence could be critical to future conservation. Increased abundance of native fishes has recently been observed in both western Grand Canyon and the San Juan arm of Lake Powell, giving credence that native fish may be using newly exposed portions of lower Cataract Canyon. Downstream of Glen Canyon Dam, warming hypolimnetic releases—resulting from decreasing reservoir elevation & volume—are hypothesized to play a beneficial role in the recently observed expansion of humpback chub *Gila cypha* into western Grand Canyon (Van Haverbeke et al. 2017). Upstream, ongoing physical processes reshape formerly-inundated river canyons in the San Juan arm of Lake Powell, with dramatic implications for native species (Cathcart et al. 2018).

In Cataract Canyon, Utah, similar physical processes have recently increased the nature and spatial extent of lotic habitat formerly occupied by the humpback chub (Returning Rapids Project, USFWS 2017), possibly allowing the species to expand its range in this reach. The Cataract Canyon population of humpback chub constitutes critical genetic redundancy for conservation of the species in the Upper Colorado River Basin. Expansion of the species' range in Cataract Canyon would likely result in a larger and more resilient population, thereby decreasing likelihood of extinction of the species in the Upper Basin. In order to assess potential response of HBC to ongoing changes in reaches of Cataract Canyon formerly inundated by the downstream reservoir, we propose expanding established monitoring to include areas recently exposed from receding lake levels in addition to established monitoring sites.

Study Goals, Objectives, End Product(s):

Goal: Provide measures of humpback chub catch-per-unit-effort (CPUE) comparable to previous years and other upper basin populations.

Objectives:

1. Complete biennially a single fall sampling pass of four long-term trend sites within Cataract Canyon (2023).

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2. Compare biennial adult and juvenile catch rates, population size structures and longitudinal distributions to past years.
3. Investigate possible use of lower Cataract Canyon by humpback chub and other *Gila spp.* in calendar year 2022.

End Products:

Annual reports summarizing catch rates, spatial distribution, and population size structures of humpback chub and other *Gila spp.* for each year sampling is conducted (2022, 2023).

Study Area:

Cataract Canyon is 46 miles in length, spanning from the confluence of the Green and Colorado rivers to the mouth of the Dirty Devil River. Inundation of riverine habitat by Lake Powell is thought to have limited distribution of humpback chub to the uppermost 17 miles of Cataract Canyon. We will continue to sample four long-term trend sites within this 17-mile reach (Figure 1) as identified by previous studies (Valdez 1990). Negative river miles indicate distance downstream from the confluence with the Green River:

Site 1: "Rapid 2" (RM -4.5 to -5)

Site 2: "Rapid 5" (RM -6 to -6.7)

Site 3: "Rapid 10" (RM -8.2 to -9.2)

Site 4: "Rapid 12" (RM -9.5 to -11)

Additionally, we will conduct exploratory sampling of emerging riverine habitats which were previously inundated by Lake Powell. Such habitats were once occupied by humpback chub (USFWS 2017), and the species may again occupy these reaches due to restored habitat suitability. In the interest of representing the varied riverine habitats of the transition zone between the Big Drop Rapids and the mouth of the Dirty Devil River, we will select sampling reaches between the upstream-most extent of Lake Powell (approx. RMI -14.4) and the Hite Crossing (approx. RMI -46). Reach selection will be conducted randomly and/or based on river navigability.

Study Methods/Approach:

Beginning in 2003, three pass mark/recapture sampling was conducted for three consecutive years. This sampling protocol was used to develop three annual point estimates for adult humpback in the canyon (Badame 2008). The estimates for the Cataract population ranged from 273 - 468 humpbacks within the canyon. Due to the small size of the population and probable violations of modeling assumptions, monitoring effort was reduced in scope to tracking potential trends in annual fall catch per unit effort (CPUE). In 2011, funding restrictions reduced sampling to the current biennial monitoring schedule.

During Fall in odd years (2023), we will conduct a single long-term monitoring trip. We will also complete one exploratory sampling trip in emerging riverine habitats in fall of 2022.

Adult sampling methods

Chart and Lentsch (1999) found that *Gila* 200 mm or greater in total length were better sampled with trammel nets than other methods (e.g., electrofishing) in Westwater Canyon. As a result of their efficacy, trammel nets remain the primary capture method for generating humpback chub population estimates in the upper basin. We will continue to use trammel net catch per unit effort (CPUE) as the

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primary metric of adult Gila abundance in Cataract Canyon. While a single pass cannot provide an estimate of population abundance, we will provide a metric comparable to previous years and other upper basin reaches by deploying identical gear and a similar sampling regime.

At each site, we will deploy multiple trammel nets from approximately 15:00 to 23:00 and 05:00 to 11:00 hours, checking nets every two hours to avoid fish mortality.

Juvenile sampling methods

In contrast to Westwater Canyon, electrofishing in Cataract Canyon has historically yielded relatively few Gila captures from any life stage. In 2017 concurrent use of scented hoop nets (see Stone 2005) and electrofishing demonstrated a considerable improvement in overall YOY and juvenile Gila captures by hoop net relative to electrofishing. Baited hoop nets continued to be effective in 2019. In light of these results, we believe use of baited hoop nets will provide the best metric for tracking reproduction and recruitment.

We will deploy approximately 25 baited hoop nets, checking contents twice daily. To maximize captures, we will include in each net a perforated bait container to broadcast scent and attract fish. We will target low and zero velocity shoreline and eddy habitats frequently used by YOY Gila, and also experiment with deeper sets with the goal of increasing adult captures.

During exploratory sampling, we may use seine nets as needed to sample small fishes in backwaters and other zero-velocity habitats.

Fish processing

We will measure (mm), weigh (g) and scan for a PIT tag all endangered species and roundtail chub *Gila robusta*. We will PIT-tag all individuals greater than or equal to 150 mm in total length (TL) that do not already contain a PIT tag. We will measure, weigh and euthanize black bullhead, walleye, striped bass, and other nonnative piscivores, while enumerating and releasing common and non-piscivorous nonnative fishes (e.g., common carp).

Data Analysis

As in past years, we will use simple linear regression to test for long-term population trends in canyon-wide mean CPUE.

Task Description, Deliverables and Schedule:

Task 1: We will complete one fall monitoring trip in Cataract Canyon according to the established biennial schedule (2023).

Task 2: Data entry, analysis, reporting: we will enter data and transfer to STReAMS by January 15 of each year following sampling. We will also provide an annual progress report summarizing 1) relative abundances & distributions of endangered species, 2) overall fish community composition and 3) comparisons with past monitoring efforts; to be submitted in November of each year of sampling (November).

Task 3: We will complete one exploratory sampling trip in emerging riverine habitats in fall of 2022.

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Schedule:

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

Budget Summary:

FY Year	UDWR-Moab
2022	\$35,663
2023	\$40,469
2024	\$0
2025	\$42,104
2026	\$0
Total	\$118,237

Reviewers:

References:

- Badame, P. V. (2008). Population estimates for humpback chub (*Gila cypha*) in cataract canyon, Colorado River, Utah, 2003–2005. Utah Division of Wildlife Resources—Moab Field Station, Moab, UT.
- Cathcart, C. N., Pennock, C. A., Cheek, C. A., McKinstry, M. C., MacKinnon, P. D., Conner, M. M., & Gido, K. B. (2018). Waterfall formation at a desert river–reservoir delta isolates endangered fishes. *River Research and Applications*, 34(8), 948-956.
- Hunt TA, Ward DL, Propper CR, Gibb AC. 2012. Effects of capture by trammel net on Colorado River native fishes. *Journal of Fish and Wildlife Management* 3(1):133– 141; e1944–687X. doi: 10.3996/122011-JFWM-070
- Stone, Dennis M. 2005. Effect of Baiting on Hoop Net Catch Rates of Endangered Humpback Chub. *North American Journal of Fisheries Management* 25:640–645, 2005. doi: 10.1577/M04-091.1
- U.S. Fish and Wildlife Service. 2001. Recovery goals for the humpback chub (*Gila cypha*) of the Colorado River Basin; A supplement and amendment to the Humpback Chub Recovery Plan. U.S. Fish and Wildlife Service, Region 6, Denver, CO.
- U.S. Fish and Wildlife Service. 2017. Species status assessment for the Humpback Chub (*Gila cypha*). U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, CO.
- Valdez, R.A., P. Mangan, R. Smith, B. Nilson. 1982. Upper Colorado River investigation (Rifle, Colorado to Lake Powell, Utah). Pages 100–279 in U.S. Fish and Wildlife Service. Colorado River Fishery Project, Final Report, Part 2: Field Investigations. U.S. Fish and Wildlife Service, Salt Lake City, Utah.

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Valdez, R.A. 1990. The endangered fish of Cataract Canyon. Bio/West Report No. 134-3 to Bureau of Reclamation, Salt Lake City, UT.

Van Haverbeke, D. R., Stone, D. M., Dodrill, M. J., Young, K. L., & Pillow, M. J. (2017). Population expansion of humpback chub in western Grand Canyon and hypothesized mechanisms. *The Southwestern Naturalist*, 62(4), 285-292.

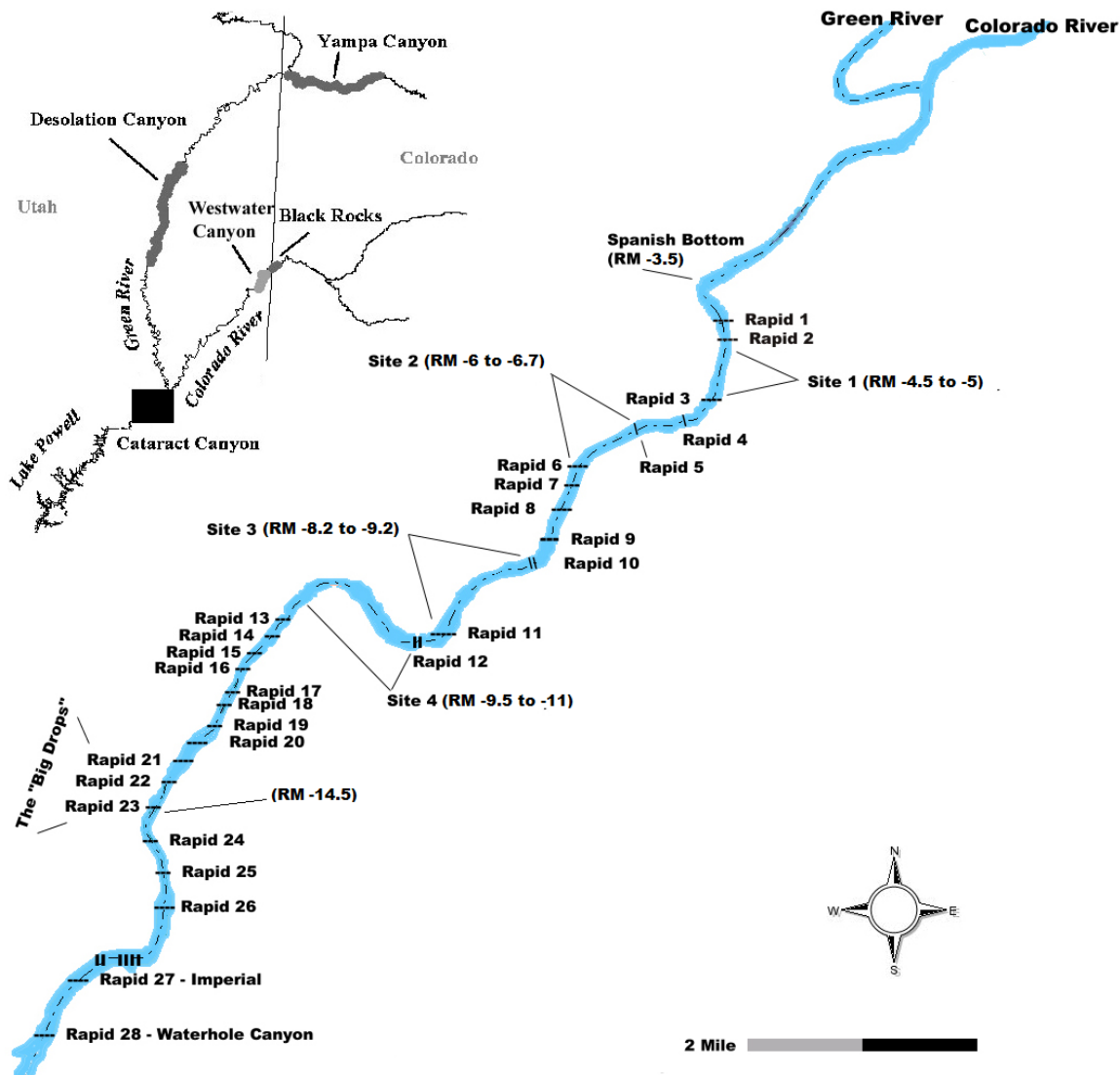


Figure 1. Established sampling locations and selected extant rapids within Cataract Canyon on the Colorado River.

SUMMARY OF PROPOSED COSTS

Name of Servicing Agency:	Utah Division of Wildlife Resources
Project Name:	Project 130 Humpback chub monitoring in Cataract Canyon

	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
	Enter the BEGINNING dates for each year ----->		Enter the BEGINNING dates for each year ----->		Enter the BEGINNING dates for each year ----->		Enter the BEGINNING dates for each year ----->		Enter the BEGINNING dates for each year ----->		
	10/1/2021	10/1/2022	10/2/2023	10/1/2024	10/1/2025	Through	Through	Through	Through	Through	
	Enter the ENDING dates for each year ----->		Enter the ENDING dates for each year ----->		Enter the ENDING dates for each year ----->		Enter the ENDING dates for each year ----->		Enter the ENDING dates for each year ----->		
	9/30/2022	10/1/2023	9/30/2024	9/30/2025	9/30/2026						
DIRECT LABOR AND FRINGE BENEFIT COSTS:		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL				
Direct Labor - Hourly		\$ 18,073.27	\$ 21,607.16	\$ -	\$ 22,480.09	\$ -	\$ 62,160.53				
Fringe Benefits - Hourly		\$ 7,445.66	\$ 8,298.30	\$ -	\$ 8,633.55	\$ -	\$ 24,377.51				
Subtotal of Direct Labor & Fringe Benefits:		\$ 25,518.93	\$ 29,905.46	\$ -	\$ 31,113.64	\$ -	\$ 86,538.04				
OTHER DIRECT COSTS:		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL				
Materials and Supplies		\$ 8,464.00	\$ 8,464.00	\$ -	\$ 8,805.95	\$ -	\$ 25,733.95				
Travel Costs		\$ 1,680.00	\$ 2,100.00	\$ -	\$ 2,184.84	\$ -	\$ 5,964.84				
Equipment		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -				
Contractors		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -				
Subtotal of Other Direct Costs:		\$ 10,144.00	\$ 10,564.00	\$ -	\$ 10,990.79	\$ -	\$ 31,698.79				
INDIRECT/OVERHEAD COSTS:		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL				
Subtotal of Labor and Other Direct Costs:		\$ 35,662.93	\$ 40,469.46	\$ -	\$ 42,104.43	\$ -	\$ -				
Total dollars exempt from indirect/overhead base:		\$ 35,662.93	\$ 40,469.46	\$ -	\$ 42,104.43	\$ -	\$ -				
<Enter Description of Indirect/OH Cost #1>	0.00%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -				
Total dollars exempt from indirect/overhead base:		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -				
<Enter Description of Indirect/OH Cost #2>	0.00%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -				
Subtotal of Indirect/Overhead Costs:		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -				
GRAND TOTAL:		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL				
		\$ 35,662.93	\$ 40,469.46	\$ -	\$ 42,104.43	\$ -	\$ 118,236.83				

SUMMARY OF DIRECT LABOR & FRINGE BENEFITS

Enter Escalation Rates ----->	Yr 2 Escalation Rate	0.00%
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	Task # or Description	Position Title	Current Hourly Rate	YEAR 1					YEAR 2				
				10/1/2021		Through	9/30/2022		10/1/2022		Through	10/1/2023	
				# 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)	\$ 27.66		\$ 27.66	\$ -	48.00%	\$ -	120.0	\$ 27.66	\$ 3,318.66	48.00%	\$ 1,592.96
2	1	Biologist(4)	\$ 22.91		\$ 22.91	\$ -	68.00%	\$ -	240.0	\$ 22.91	\$ 5,497.73	68.00%	\$ 3,738.46
3	1	Technician(s)(12)	\$ 16.36		\$ 16.36	\$ -	8.77%	\$ -	560.0	\$ 16.36	\$ 9,161.60	8.77%	\$ 803.47
4	2	Project Leader(1)	\$ 27.66	20.0	\$ 27.66	\$ 553.11	48.00%	\$ 265.49	20.0	\$ 27.66	\$ 553.11	48.00%	\$ 265.49
5	2	Biologist(4)	\$ 22.91	120.0	\$ 22.91	\$ 2,748.86	68.00%	\$ 1,869.23	120.0	\$ 22.91	\$ 2,748.86	68.00%	\$ 1,869.23
6	2	Technician(s)(12)	\$ 16.36	20.0	\$ 16.36	\$ 327.20	8.77%	\$ 28.70	20.0	\$ 16.36	\$ 327.20	8.77%	\$ 28.70
7	3	Project Leader(1)	\$ 27.66	120.0	\$ 27.66	\$ 3,318.66	48.00%	\$ 1,592.96		\$ 27.66	\$ -	48.00%	\$ -
8	3	Biologist(4)	\$ 22.91	200.0	\$ 22.91	\$ 4,581.44	68.00%	\$ 3,115.38		\$ 22.91	\$ -	68.00%	\$ -
9	3	Technician(s)(12)	\$ 16.36	400.0	\$ 16.36	\$ 6,544.00	8.77%	\$ 573.91	-	\$ 16.36	\$ -	8.77%	\$ -
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SUMMARY OF DIRECT LABOR & FRINGE BENEFITS

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				
				10/2/2023		Through	9/30/2024		10/1/2024		Through	9/30/2025	
				# 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)	\$ 27.66		\$ 28.21	\$ -	48.00%	\$ -	120.0	\$ 28.77	\$ 3,452.73	48.00%	\$ 1,657.31
2	1	Biologist(4)	\$ 22.91		\$ 23.37	\$ -	68.00%	\$ -	240.0	\$ 23.83	\$ 5,719.84	68.00%	\$ 3,889.49
3	1	Technician(s)(12)	\$ 16.36		\$ 16.69	\$ -	8.77%	\$ -	560.0	\$ 17.02	\$ 9,531.73	8.77%	\$ 835.93
4	2	Project Leader(1)	\$ 27.66		\$ 28.21	\$ -	48.00%	\$ -	20.0	\$ 28.77	\$ 575.46	48.00%	\$ 276.22
5	2	Biologist(4)	\$ 22.91		\$ 23.37	\$ -	68.00%	\$ -	120.0	\$ 23.83	\$ 2,859.92	68.00%	\$ 1,944.74
6	2	Technician(s)(12)	\$ 16.36		\$ 16.69	\$ -	8.77%	\$ -	20.0	\$ 17.02	\$ 340.42	8.77%	\$ 29.85
7	3	Project Leader(1)	\$ 27.66		\$ 28.21	\$ -	48.00%	\$ -		\$ 28.77	\$ -	48.00%	\$ -
8	3	Biologist(4)	\$ 22.91		\$ 23.37	\$ -	68.00%	\$ -		\$ 23.83	\$ -	68.00%	\$ -
9	3	Technician(s)(12)	\$ 16.36		\$ 16.69	\$ -	8.77%	\$ -		\$ 17.02	\$ -	8.77%	\$ -
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SUMMARY OF DIRECT LABOR & FRINGE BENEFITS

Yr 5 Escalation Rate	2.00%
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				YEAR 5							
				10/1/2025		Through	9/30/2026		Total Salary Cost	Total Fringe Cost	Total Labor Cost
Task # or Description	Position Title	Current Hourly Rate	# of Hours	Hourly Rate	Salary Cost	Fringe Rate	Fringe Cost				
1	1	Project Leader(1)	\$ 27.66		\$ 29.35	\$ -	48.00%	\$ -	\$ 6,771.39	\$ 3,250.27	\$ 10,021.66
2	1	Biologist(4)	\$ 22.91		\$ 24.31	\$ -	68.00%	\$ -	\$ 11,217.56	\$ 7,627.94	\$ 18,845.51
3	1	Technician(s)(12)	\$ 16.36		\$ 17.36	\$ -	8.77%	\$ -	\$ 18,693.33	\$ 1,639.40	\$ 20,332.73
4	2	Project Leader(1)	\$ 27.66		\$ 29.35	\$ -	48.00%	\$ -	\$ 1,681.68	\$ 807.20	\$ 2,488.88
5	2	Biologist(4)	\$ 22.91		\$ 24.31	\$ -	68.00%	\$ -	\$ 8,357.65	\$ 5,683.20	\$ 14,040.85
6	2	Technician(s)(12)	\$ 16.36		\$ 17.36	\$ -	8.77%	\$ -	\$ 994.82	\$ 87.25	\$ 1,082.06
7	3	Project Leader(1)	\$ 27.66	-	\$ 29.35	\$ -	48.00%	\$ -	\$ 3,318.66	\$ 1,592.96	\$ 4,911.62
8	3	Biologist(4)	\$ 22.91	-	\$ 24.31	\$ -	68.00%	\$ -	\$ 4,581.44	\$ 3,115.38	\$ 7,696.82
9	3	Technician(s)(12)	\$ 16.36	-	\$ 17.36	\$ -	8.77%	\$ -	\$ 6,544.00	\$ 573.91	\$ 7,117.91
10			\$ -	-	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	\$ -
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%	\$ -	\$ -	\$ -	\$ -

SUMMARY OF MATERIALS AND SUPPLIES

SUMMARY OF MATERIALS, SUPPLIES, AND SERVICES

Yr 2 Escalation Rate	0.00%
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	Task # or Description	Item Description	Rationale for Proposed Cost	Year 1			Year 2		
				Unit Price	Unit Quantity	Subtotal	Unit Price	Unit Quantity	Subtotal
1	1	Monthly fleet rental (3 trucks, 1 month)	Based on previous experience & SOWs	\$ 500.00		\$ -	\$ 500.00	3.00	\$ 1,500.00
2	1	Mileage costs (1600 miles)	Based on previous experience & SOWs	\$ 0.40		\$ -	\$ 0.40	1660.00	\$ 664.00
3	1	Shuttle costs (3)	Based on previous experience & SOWs	\$ 200.00		\$ -	\$ 200.00	3.00	\$ 600.00
4	1	Camping materials and gear	Based on previous experience & SOWs	\$ 1,000.00		\$ -	\$ 1,000.00	1.00	\$ 1,000.00
5	1	Sampling materials and gear	Based on previous experience & SOWs	\$ 1,000.00		\$ -	\$ 1,000.00	2.00	\$ 2,000.00
6	1	Boating materials, gear and fuel	Based on previous experience & SOWs	\$ 1,000.00		\$ -	\$ 1,000.00	2.00	\$ 2,000.00
7	2	Monthly fleet rental (1 truck, 1 month)	Based on previous experience & SOWs	\$ 500.00	1.00	\$ 500.00	\$ 500.00	1.00	\$ 500.00
8	2	Mileage costs (500 miles)	Based on previous experience & SOWs	\$ 0.40	500.00	\$ 200.00	\$ 0.40	500.00	\$ 200.00
9	3	Monthly fleet rental (3 trucks, 1 month)	Based on previous experience & SOWs	\$ 500.00	3.00	\$ 1,500.00	\$ 500.00		\$ -
10	3	Mileage costs (1600 miles)	Based on previous experience & SOWs	\$ 0.40	1660.00	\$ 664.00	\$ 0.40		\$ -
11	3	Shuttle costs (3)	Based on previous experience & SOWs	\$ 200.00	3.00	\$ 600.00	\$ 200.00		\$ -
12	3	Camping materials and gear	Based on previous experience & SOWs	\$ 1,000.00	1.00	\$ 1,000.00	\$ 1,000.00		\$ -
13	3	Sampling materials and gear	Based on previous experience & SOWs	\$ 1,000.00	2.00	\$ 2,000.00	\$ 1,000.00		\$ -
14	3	Boating materials, gear and fuel	Based on previous experience & SOWs	\$ 1,000.00	2.00	\$ 2,000.00	\$ 1,000.00		\$ -
15				\$ -	0	\$ -	\$ -	0	\$ -
16				\$ -	0	\$ -	\$ -	0	\$ -
17				\$ -	0	\$ -	\$ -	0	\$ -
18				\$ -	0	\$ -	\$ -	0	\$ -
19				\$ -	0	\$ -	\$ -	0	\$ -
20				\$ -	0	\$ -	\$ -	0	\$ -
21				\$ -	0	\$ -	\$ -	0	\$ -
22				\$ -	0	\$ -	\$ -	0	\$ -
TOTAL:						\$ 8,464.00			\$ 8,464.00

SUMMARY OF MATERIALS AND SUPPLIES

SUMMARY OF MATERIALS, SUPPLIES, AND SERVICES	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	Monthly fleet rental (3 trucks, 1 month)	\$ 510.00		\$ -	\$ 520.20	3.00	\$ 1,560.60
2	1	Mileage costs (1600 miles)	\$ 0.41		\$ -	\$ 0.42	1660.00	\$ 690.83
3	1	Shuttle costs (3)	\$ 204.00		\$ -	\$ 208.08	3.00	\$ 624.24
4	1	Camping materials and gear	\$ 1,020.00		\$ -	\$ 1,040.40	1.00	\$ 1,040.40
5	1	Sampling materials and gear	\$ 1,020.00		\$ -	\$ 1,040.40	2.00	\$ 2,080.80
6	1	Boating materials, gear and fuel	\$ 1,020.00		\$ -	\$ 1,040.40	2.00	\$ 2,080.80
7	2	Monthly fleet rental (1 truck, 1 month)	\$ 510.00		\$ -	\$ 520.20	1.00	\$ 520.20
8	2	Mileage costs (500 miles)	\$ 0.41		\$ -	\$ 0.42	500.00	\$ 208.08
9	3	Monthly fleet rental (3 trucks, 1 month)	\$ 510.00		\$ -	\$ 520.20		\$ -
10	3	Mileage costs (1600 miles)	\$ 0.41		\$ -	\$ 0.42		\$ -
11	3	Shuttle costs (3)	\$ 204.00		\$ -	\$ 208.08		\$ -
12	3	Camping materials and gear	\$ 1,020.00		\$ -	\$ 1,040.40		\$ -
13	3	Sampling materials and gear	\$ 1,020.00		\$ -	\$ 1,040.40		\$ -
14	3	Boating materials, gear and fuel	\$ 1,020.00		\$ -	\$ 1,040.40		\$ -
15			\$ -		\$ -	\$ -		\$ -
16			\$ -	0	\$ -	\$ -	0	\$ -
17			\$ -	0	\$ -	\$ -	0	\$ -
18			\$ -	0	\$ -	\$ -	0	\$ -
19			\$ -	0	\$ -	\$ -	0	\$ -
20			\$ -	0	\$ -	\$ -	0	\$ -
21			\$ -	0	\$ -	\$ -	0	\$ -
22			\$ -	0	\$ -	\$ -	0	\$ -
					\$ -	\$ 8,805.95		

SUMMARY OF MATERIALS AND SUPPLIES

SUMMARY OF MATERIALS, SUPPLIES, AND SERVICES

Yr 5 Escalation Rate

2.00%

			Year 5			
Task # or Description	Item Description	Unit Price	Unit Quantity	Subtotal	TOTAL	
1	1	Monthly fleet rental (3 trucks, 1 month)	\$ 530.60		\$ -	\$ 3,060.60
2	1	Mileage costs (1600 miles)	\$ 0.42		\$ -	\$ 1,354.83
3	1	Shuttle costs (3)	\$ 212.24		\$ -	\$ 1,224.24
4	1	Camping materials and gear	\$ 1,061.21		\$ -	\$ 2,040.40
5	1	Sampling materials and gear	\$ 1,061.21		\$ -	\$ 4,080.80
6	1	Boating materials, gear and fuel	\$ 1,061.21		\$ -	\$ 4,080.80
7	2	Monthly fleet rental (1 truck, 1 month)	\$ 530.60		\$ -	\$ 1,520.20
8	2	Mileage costs (500 miles)	\$ 0.42		\$ -	\$ 608.08
9	3	Monthly fleet rental (3 trucks, 1 month)	\$ 530.60		\$ -	\$ 1,500.00
10	3	Mileage costs (1600 miles)	\$ 0.42		\$ -	\$ 664.00
11	3	Shuttle costs (3)	\$ 212.24		\$ -	\$ 600.00
12	3	Camping materials and gear	\$ 1,061.21		\$ -	\$ 1,000.00
13	3	Sampling materials and gear	\$ 1,061.21		\$ -	\$ 2,000.00
14	3	Boating materials, gear and fuel	\$ 1,061.21		\$ -	\$ 2,000.00
15			\$ -	0	\$ -	\$ -
16			\$ -	0	\$ -	\$ -
17			\$ -	0	\$ -	\$ -
18			\$ -	0	\$ -	\$ -
19			\$ -	0	\$ -	\$ -
20			\$ -	0	\$ -	\$ -
21			\$ -	0	\$ -	\$ -
22			\$ -	0	\$ -	\$ -
				\$ -	\$ -	\$ 25,733.95

SUMMARY OF TRAVEL COSTS

Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Trip #	1	1	1	1	1	
From-To	Task 1. Sampling Cat	Task 1. Sampling Cat	Task 1. Sampling Cat	Task 1. Sampling Cat	Task 1. Sampling Cat	
Reason	Field Work	Field Work	Field Work	Field Work	Field Work	
# of Days (include travel days)		10		10		
Airfare	\$ -	\$ -	\$ -	\$ -	\$ -	
Lodging (Per Night)	\$ -	\$ -	\$ -	\$ -	\$ -	
MI&E Per Day	\$ 35.00	\$ 35.00	\$ 35.70	\$ 36.41	\$ 37.14	
Auto Rental Per Day	\$ -	\$ -	\$ -	\$ -	\$ -	
Misc Costs/Adjustments/Trip	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Per Trip	\$ -	\$ 350.00	\$ -	\$ 364.14	\$ -	
No. of persons		6		6		
No. of trips		1		1		
SUBTOTAL =	\$ -	\$ 2,100.00	\$ -	\$ 2,184.84	\$ -	\$ 4,284.84

Cost Element	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Trip #	2	2	2	2	2	
From-To	Task 3. Sampling Lower Cat	Task 3. Sampling Lower Cat	Task 3. Sampling Lower Cat	Task 3. Sampling Lower Cat	Task 3. Sampling Lower Cat	
Reason	Field Work	Field Work	Field Work	Field Work	Field Work	
# of Days (include travel days)	8					
Airfare	\$ -	\$ -	\$ -	\$ -	\$ -	
Lodging (Per Night)	\$ -	\$ -	\$ -	\$ -	\$ -	
MI&E Per Day	\$ 35.00	\$ 35.00	\$ 35.70	\$ 36.41	\$ 37.14	
Auto Rental Per Day	\$ -	\$ -	\$ -	\$ -	\$ -	
Misc Costs/Adjustments/Trip	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Per Trip	\$ 280.00	\$ -	\$ -	\$ -	\$ -	
No. of persons	6					
No. of trips	1					
Total miles						
SUBTOTAL =	\$ 1,680.00	\$ -	\$ -	\$ -	\$ -	\$ 1,680.00

	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
TOTAL COST BY PERIOD =	\$ 1,680.00	\$ 2,100.00		\$ 2,184.84		\$ 5,964.84