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October 3, 2011

Andrew Hummel, P.E.
City of Sparks Community Services Department
431 Prater Way
Sparks, Nevada 89431

RE: 2011 Rock Park Scope of Work and Cost Estimate

Dear Andy,

Per your request, JBR Environmental Consultants, Inc. (JBR) would like to provide you with a scope of work and a cost estimate for our staff to execute the services needed during the 2011 monitoring and reporting period. Please find this scope of work as an attachment to this letter.

In the event that you may have any questions or concerns following your evaluation of the attached scope of work and cost estimate, please contact us at your soonest convenience.

Sincerely,
JBR Environmental Consultants, Inc.

A handwritten signature in dark ink, appearing to read "T. Branzell", written over a horizontal line.

Travis Branzell
Environmental Analyst II/Biologist

A handwritten signature in dark ink, appearing to read "Benjamin Veach", written over a horizontal line.

Benjamin Veach, P.E.
Growth Center Manager

JBR Environmental Consultants, Inc.

595 Double Eagle Ct., Ste. 2000
Reno, Nevada 89521

[p] 775.747.5777

[f] 775.747.2177

www.jbrenv.com

Scope of Work and Cost Estimate 2011 Rock Park Monitoring Program

The following scope of work is intended to bring the City of Sparks (Sparks) into compliance with the U.S. Army Corps of Engineers (USACE) Section 404 Permit (SPK-2005-009). This permit authorized Sparks to construct the Rock Whitewater Park in the Truckee River. The following scope of work will provide for the ongoing monitoring efforts required by the associated Biological Opinion (BO) and Monitoring and Reporting Plan (MRP) elements of that permit.

Monitoring work will be conducted between October 1 and December 31, 2011. These efforts will document various aspects of the project for their impacts on; water quality, wildlife, aquatic ecology, riparian habitat, and fishery habitat usage and suitability. The scope of work to be executed by JBR staff includes the following:

Updating Sampling and Analysis Plan (SAP)

The Sampling and Analysis Plan (SAP) (JBR 2008) provides a detailed plan for the data collection methodology, parameter analysis and data management systems to be employed during the five year project duration. This SAP is intended to be a "living document," and as such, the document must be updated to incorporate all newly acquired data and to reflect any changes in methodology.

Monitoring Elements

The following monitoring elements align with the format of the Draft Mitigation and Monitoring Plan prepared for the City by ECORP Consulting, Inc.. It is proposed that each monitoring element function as a stand-alone assessment. Each of these elements will generate a document for inclusion into the Monitoring and Annual Project Reports. In addition to these annual reports, information from multiple tasks will be used to prepare the USACE 404 Annual Mitigation Monitoring Report.

Structural Stability

As conducted during the 2009 and 2010 monitoring periods, a structural stability survey will be conducted using an underwater camera and measurement rod for documentation. Each of the grouted areas will be visually inspected and survey points will be taken for areas that are deemed to pose potential instability. Measurements will be taken at the sediment rock/gout interface, undercuts, and cracks in the grout. Special attention will be paid to the "piping" of water through the grout area. Any adverse flow patterns causing scour under the grouted portions of the structure will be documented.

Aggradation of Bedload

The bedload elevations will be documented by survey and incorporated into a project topographic file. This file will be used to evaluate the elevation changes between the monitoring periods. The methodology presented in the MRP will be utilized to identify changes in bedload aggradations and an assessment of potential maintenance implications will be made as a result. The collected survey data will be analyzed and presented in the Annual Monitoring Report.

Water Quality

Water quality parameters will only be sampled when fish are collected for tagging and each day that macroinvertebrates are collected for habitat quality assessment purposes. These parameters will include; pH, dissolved oxygen (Do) concentrations, electrical conductivity (EC), total dissolved solids (TDS) concentrations, and temperature (C°). Water quality data at nearby

monitoring stations (Desert Research Institute [DRI] and Nevada Division of Environmental Protection [NDEP]) will be gathered and presented as background information for the 2011 year. This water quality data will be analyzed for potential correlations with river flows, precipitation and runoff events, and in-river construction activities.

Flood Flows

The flood flow analysis was completed in 2009, but not conducted in 2010. An assessment of the effects of channel sedimentation or aggradation will be provided as a discussion to potential impacts to flood flow performance.

Fish Passage

JBR has updated the updated the fish passage monitoring plan as described in the letter addressed to the USFWS and the USACE on July 25, 2011, which includes both Rock Park and Pioneer diversion fish passage methods of approach.

In addition to the required fish passage monitoring associated with the Pioneer Diversion, Sparks is also required to monitor the Pioneer Ditch for the entrapment of LCT and other fish species by electrofishing the ditch three times per year for two years during the irrigation season. The irrigation season defined by the Nevada Division of Water Resources (NDWR) occurs between April 15th and October 15th. JBR will conduct the required electrofishing of the ditch three times between October 1 and December 31, 2011.

Aquatic Habitat

The data for the determination and evaluation of aquatic habitat will be collected concurrently with transect surveys performed in the bedload aggradation monitoring. Additional habitat metrics collected to assess habitat suitability, quality, quantity and trend will include; surface turbulence, bank undercut, substrate embeddedness, vegetation coverage and shading, submerged vegetation, and additional elements to qualify and quantify each metric.

Benthic Macroinvertebrates

Due to the existing supported benthic macroinvertebrate (BMI) sampling protocols applicability to the Tahoe and Truckee environments, the modified State Water Resource Control Board (SWAMP) (Ode 2007) protocol will be used to collect and evaluate the project reaches support of those communities. Every effort will be made to include the BMI information in the annual reports of the year the information is collected, however due to the long laboratory time required for identification this may not be possible, in such a case the information will be reflected in the following year report.

Riparian Vegetation

The riparian vegetation monitoring will be completed in compliance with the USACE 404 permit mitigation and monitoring requirements. Following this data collection protocol and reporting format, the riparian vegetation monitoring report will function as both a summary of the cumulative survival rate percentage for assessment of success and trending, as well as meet the submittal criteria for the USACE 404 permit annual monitoring submittal.

The vegetation monitoring has been completed for 2011 and charged to the 2010 Monitoring and Reporting budget, it will not be included in the 2011 cost estimate. However, the reporting associated with this monitoring element will be included in the 2011 cost estimate, along with any needed support associated with the improvements to the riparian planting areas or further mitigation associated with Rock Park.

Bank Erosion

Using a subset of the Pfrankuch Channel Assessment protocol, the banks will be evaluated for; stability, changes in bank conditions from year to year (migration), suitability for vegetation establishment, sediment composition, and cross sectional channel area. As set forth in the Plan, each transect will be surveyed and additional data will be collected 25 feet upstream and downstream of each transect extending from the waterline to upland habitat where present, or above the elevation of identified riparian vegetation. This will ensure evaluation of near channel stability as well as trending occurring in the upper portions of the associated riparian corridor.

Sediment and Debris Transport

The base data for analysis of sediment and debris transport will be collected during the aggradation of bedload surveys. Based on the initial evaluation of transect elevation changes and inter-transect substrate changes, additional survey data will be collected to establish channel substrate data suitable for year-to-year comparative analysis. The hydraulic modeling combined with sediment transport modeling elements will be used to estimate the sediment transport function at various levels of flow and channel energy.

Reporting

The Riparian Vegetation section of the annual report will be formatted per USACE submittal requirements set forth in the 404 permit. Document distribution to the regulatory agencies will be made in compliance with that permit. Prior to submittal to the USACE, a draft report will be provided to Sparks for review and comment by December 1, 2011. JBR expects to receive comments from Sparks within two weeks following submittal, and as a result, a final draft of the report will be produced and submitted to the regulatory agencies by January 1, 2012.

JBR will prepare a draft annual monitoring and compliance report of the remaining elements for review by the client (City of Sparks) by January 1, 2012. The report will include the 2011 monitoring results, analysis, and conclusions associated with the required compliance monitoring for Rock Park. JBR anticipates that the City of Sparks will provide review comments approximately two weeks after receiving the draft report which will provide guidance in completing the final draft, which will then be submitted to the Monitoring Oversight Group (MOG) for review no later than February 1, 2012.

Additionally, JBR will produce a draft report in letter format that will include the monitoring results and analysis and conclusions associated with the Pioneer Diversion fish passage and entrapment monitoring and will submit it to the City of Sparks by January 1, 2011. JBR expects the City of Sparks to provide review comments to JBR within two weeks following submittal, and upon receiving comments a final draft of the report will be completed and submitted to the regulatory agencies of interest (USACE and USFWS) by February 1, 2012.

Cost Estimate

To perform the monitoring and reporting elements described above, JBR estimates a total cost of \$146,230.00 (Attachment 1). The scope of services and cost estimate provided by the USFWS for the construction of the antennas and additional fish monitoring equipment is provided in Attachment 2. These projected costs estimated on a time and materials basis. In the event that it takes less time and/or fewer materials to complete the services described above, the cost would be less. For example, approximately \$30,000.00 of the 2010 Monitoring and Reporting budget remains, but may be utilized upon approval from the City of Sparks during 2011 for materials, monitoring, reporting, and/or riparian habitat improvement costs.

Attachment 1

Estimate of Probable Costs - City of Sparks Rock Park Monitoring and Mitigation Program 2011



JBR Environmental Consultants, Inc.

October 3, 2011		Professional Time (hours)															
		a	c		d	f		g	h	j	k						
Task	Senior QA/QC	PM Enviro	Hydrologist	Biologist 1	Biologist 2	Botanist/ Soils	GIS/CAD	Admin	Travel	ODC ⁽¹⁾	Equip. Lab ⁽²⁾	Reprod/ Shipping	Total				
Project Management / Monitoring Plan Updates Monitoring Elements		4	24				12		\$100				\$3,796				
		4	24				12						\$3,796				
	Structure Stability ⁽³⁾	2		16			16	2	\$50				\$3,068				
	Aggradation of Bedload ⁽⁴⁾	16	16					16	\$60	\$2,240			\$7,364				
	Flood Flows ⁽⁵⁾	2	2	32			32	32					\$8,008				
	Fish Passage ⁽⁶⁾	4	20	40	20	90		4	\$1,000	\$3,200	\$47,762		\$67,116				
	Aquatic Habitat	8		8				4	\$50				\$2,190				
	Benthic Macroinvertebrates ⁽⁷⁾	5			24	24		2	\$100		\$4,600		\$10,105				
	Bank Erosion ⁽⁸⁾	1		10				4	\$50				\$1,243				
	Sediment and Debris Transport ⁽⁹⁾	2		8				12					\$1,810				
Meetings and Coordination	24	30											\$6,378				
Subtotal =	72	116	114	44	114	72	76	0	\$1,410	\$5,440	\$52,362	\$0	\$ 107,342				
Reporting																	
Annual Compliance & Monitoring Report																	
Subtotal =	16	32	40	40	24	40	16	8	\$25			\$180	\$19,723				
	16		40	40	24	40	16	8	\$25	\$0	\$0	\$180	\$ 19,723				
Pioneer Dam BO Assessment	2		55		55		4	2					\$9,695				
Meetings and Reporting													\$0				
Project Meetings	4	10							\$25			\$280	\$1,513				
Annual Compliance & Monitoring Meeting	6	6							\$25				\$1,759				
Reporting and Project Completion Meeting	2	4			20			2					\$2,402				
Subtotal =	14	20	55	0	75	0	4	2	\$50	\$0	\$0	\$280	\$ 15,369				
Subtotal (hours)	98	144	209	84	213	100	96	10	1,585	\$5,440	\$52,362	\$460	\$146,230				
Rate	\$157	\$87	\$76	\$101	\$87	\$85	\$74	\$60	\$0.60								
Subtotal (costs)	\$15,386	\$12,528	\$15,884	\$8,484	\$18,531	\$8,500	\$7,104	\$600	\$951	\$5,440	\$52,362	\$460	\$146,230				

(1) ODC include direct cost of third party services; rental charges for fish telemetry equipment; safety equipment.
(2) Equipment and Laboratory costs include the costs associated with subcontracting the USFWS to construct the PIT tag antennas (\$48,000)
(3) Structure Stability evaluated 1 time per year.
(4) Aggradation of Bedload monitoring has the bulk of survey time included. Data processing for hydraulic modeling; velocity profiling
(5) Flood flows to be modeled using data collected through the aggradation of bedload monitoring; assume one (1) model iteration.
(6) Fish passage survey to occur each year.
(7) BML sampling to occur every other year (including 2011 - year 3); assume a sample site collection of pool; riffle; run x 2 each, plus 2 multi-habitat sites = 8 tot
(8) Majority of data collected during the aggradation of bedload monitoring; field data sheets and write-up.
(9) Sediment transport work is non-field labor; analysis and write-up.

Attachment 2

PROPOSAL

FISHERIES MONITORING SYSTEM: TRUCKEE RIVER, ROCK PARK IN RENO NEVADA

Kurt E. Steinke, Jerone Anderson, and Kyle C. Hanson*

U.S. Fish & Wildlife Service
Abernathy Fish Technology Center
1440 Abernathy Creek Road
Longview, WA 98632
Phone: 360-425-6072, x 319; Fax: 360-636-1855

“The findings and conclusions in the report are those of the author and do not necessarily represent the views of the U.S. Fish and Wildlife Service.”

(October 3, 2011)

** Corresponding Author*

This document is a proposal for the USFWS's Abernathy Fish Technology Center (AFTC) to construct passive integrated transponder (PIT) tag interrogation arrays for JBR Environmental Consultants, Inc., Reno, NV. The PIT arrays are designed to be deployed within the Truckee River at Rock Park near Sparks, NV (see Attachment 1 – Site Pictures). The goal of these systems is to provide at least a 90% detection/recognition rate for PIT-tagged ESA listed salmonids moving within this reach of the river.

Rock Park:

Through consultation with JBR Environmental Consultants, Inc., Ecological Physiology Program staff at AFTC evaluated the site. At each site, a PIT array will consist of a series of three antennas upstream and three antennas downstream of each drop structure connected via 100 feet of cabling to a receiving station. Multiplexors (FS1001 Multiplexing Receiver) and associated electrical equipment (e.g., power supply, battery backup) will be located within a waterproof NEMA box that is supplied with electrical service from a local utility. JBR Environmental Consultants, Inc. has requested that all antennas be configured to lie against the streambed substrate (i.e. flat-plate antennas). Multiple antennas placed in a parallel row along the substrate are recommended to provide the greatest probability of detecting PIT tagged fish as they pass through the array. The PIT array for Site 1 is designed to be able to be moved from drop structure S4 to S5 dependant on monitoring needs. The PIT array for Site 2 is designed to be a permanent installation at drop structure S3. Three antennas would be placed end to end to span the wetted width of the river upstream of each drop structure, and three antennas would be similarly placed in a parallel line downstream of each drop structure. Under most circumstances, a single antenna line will provide a detection rate of at least 70%, and, under ideal conditions, sometimes more than 90%. A sequence of two parallel antenna lines will greatly increase detection rates (ideally to at or above 90%) as well as allow for directionality of fish movement to be determined. However, detection rate can be reduced in a relatively random manner by influences such as high water velocity, high density of tagged fish, the presence of conductive or magnetic materials in the vicinity of the antenna, and ambient electrical and/or magnetic noise. Because these variables remain unknown currently, detection rates cannot be accurately determined until after the system is installed.

Responsibilities:

AFTC will:

- a. Construct a PIT antenna array system for deployment within the Truckee River at Rock Park.
- b. Test all components to verify performance prior to receipt by JBR Environmental Consultants, Inc.
- c. Assumes no responsibility once the PIT antenna array system has been accepted for pick up by JBR Environmental Consultants, Inc.

JBR Environmental Consultants, Inc. will:

- a. Arrange all transportation of PIT array equipment from AFTC to the Truckee River at Rock Park.

- b. Install all PIT array equipment within the Truckee River at Rock Park, and provide all necessary hardware for securing antennas and cables to the substrate of the Truckee River at all sites and installation of NEMA boxes for each receiver station.
- c. Provide any required electrical wiring from existing AC power sources at Project facilities, if needed, to power any PIT tag detection equipment installed by JBR Environmental Consultants, Inc.
- d. Provide O&M of the PIT tag antennas of ancillary equipment after pick up from AFTC.
- e. Provide electrical service for operating this equipment such as with the local utility company.
- f. Provide security at all facility monitoring sites in order to deter possible theft and vandalism of equipment.
- g. Provide staff to coordinate data downloading, monitoring, and evaluation at the site.
- h. Provide any needed materials for maintaining and repairing PIT-tag interrogation systems, due to damage or other unforeseen circumstances (e.g. flood damage, vandalism) after the original receipt from AFTC staff.

Recommendations/Considerations:

- 1) In order to have a high probability that the 90% detection rate goal will be achieved, it is recommended that JBR Environmental Consultants, Inc. install the PIT arrays so that two sequential antennas rows comprised of three antennas upstream and downstream of a focal drop structure are placed at each site (N = 12 antennas in total) with antennas positioned to lie flat on the streambed.
- 2) AFTC staff will construct antennas from 3" schedule 80 PVC pipe.
- 3) It is recommended that JBR Environmental Consultants, Inc. secure the antennas in place using rebar or anchors in the concrete or bedrock substrate.
- 4) JBR Environmental Consultants, Inc. requests that the antennas for Site 1 be movable between drop structure S4 and S5. As the width of the river at these drop structures is significantly different, antennas have been designed to maximally cover the wetted width of the river at each site. Antenna positioning will need to be modified by JBR Environmental Consultants, Inc. in the field to ensure complete coverage of the wetted width of the river when moving antennas between drop structures.
- 5) Automatic data collection is suggested, and it is recommended that JBR Environmental Consultants, Inc., permanently devote a computer to each site to avoid potential data loss.
- 6) Grid power installation to a NEMA box, provided vendor selected and contracted with by JBR Environmental Consultants, is assumed in Total Cost estimate.
- 7) Installation and occasional maintenance, to be provided by JBR Environmental Consultants, will be dependent upon dewatering schedules.

Site Details:*Site #1 (S4/S5 drop structures)**Power source: Grid**Number of Antennas: 6**Outside to outside antenna width: 3 @ 228 inches, 3 @ 192 inches**Outside to outside antenna height: 3 @ 48 inches, 3 @ 48 inches**Antenna Shape: Double loop**Pipe size: 3 inch Schedule 80**Cable length furthest from antenna: 60 feet**Site #2 (S3 drop structure)**Power source: Grid**Number of Antennas: 6**Outside to outside antenna width: 156 inches**Outside to outside antenna height: 48 inches**Antenna Shape: Double loop**Pipe size: 3 inch Schedule 80**Cable length furthest from antenna: 60 feet*

	Quantity	Unit	Unit Cost	Cost (dollars)
Proposed Budget: Truckee Creek Biological Monitoring				
A. USFWS Personnel - Salaries and Benefits				\$ 9,361.98
Supervisory Fish Biologist - ecology (GS 13/1)	40	hrs	\$ 39.21	\$ 1,568.40
Electrical Engineer (GS 11/3)	80	hrs	\$ 29.34	\$ 2,347.20
Electronics Technician (GS 9/1)	80	hrs	\$ 22.74	\$ 1,819.20
Fish Biologist - ecology (GS 5/1)	80	hrs	\$ 15.00	\$ 1,200.00
	Subtotal			
		regular		\$ 6,934.80
		Benefits @	35%	\$ 2,427.18
B. Equipment and Supplies - Site 1				\$ 13,161.55
FS1001 Multiplexing Transceiver	1	ea	\$ 8,500.00	\$ 8,500.00
9-Pin circular connector	6	ea	\$ 3.82	\$ 22.92
Cable gland	6	ea	\$ 3.84	\$ 23.04
Connector pins	18	ea	\$ 0.73	\$ 13.14
3' DB9 M-F serial cable	1	ea	\$ 2.14	\$ 2.14
Capacitor, 10nF 2000V, ±5% polypropylene or COG	12	ea	\$ 0.97	\$ 11.66
Capacitor, 4.7nF 2000V, ±5% polypropylene or COG	6	ea	\$ 0.48	\$ 2.86
Capacitor, 3.3nF 2000V, ±5% polypropylene	6	ea	\$ 0.48	\$ 2.86
Capacitor, 1000pF 2000V, ±5% polypropylene	6	ea	\$ 0.34	\$ 2.04
Perf board (capacitor packs)	1	sht	\$ 24.51	\$ 24.51
NEMA 4 enclosure, 36x24x8 with hasp	1	ea	\$ 358.59	\$ 358.59

500VA, 120V UPS	1	ea	\$ 106.99	\$ 106.99
24V AC/DC linear power supply	1	ea	\$ 98.41	\$ 98.41
CAT6 Ethernet Cable	912	p /ft	\$ 0.13	\$ 118.56
Polystyrene foam sheet, 4'x8'x1" thick	11	sht	\$ 13.85	\$ 152.35
Waterproof Antenna Connector (Male)	6	ea	\$ 33.48	\$ 200.88
Aquarium grade silicone adhesive	2	ctg	\$ 7.03	\$ 14.06
PVC pipe - 3" schedule 80 (20' sections)	17	pc	\$ 56.54	\$ 961.18
PVC schedule 80 elbows - 3"	24	ea	\$ 11.87	\$ 284.88
PVC schedule 80 T - 3"	30	ea	\$ 16.64	\$ 499.20
PVC schedule 80 Cross - 3"	6	ea	\$ 44.06	\$ 264.38
PVC connector schedule 80 - 3"	12	ea	\$ 7.30	\$ 87.60
PVC schedule 40 caps - 3"	6	ea	\$ 1.23	\$ 7.39
Antenna cable	360	ft	\$ 2.38	\$ 856.80
Waterproof Cable Connector, Female	6	ea	\$ 24.20	\$ 145.20
Liquid-tight cordgrip, 0.590" to 1.000"	6	ea	\$ 3.15	\$ 18.90
Misc. supplies	1	lot	\$ 381.00	\$ 381.00

C. Equipment and Supplies - Site 2				\$ 12,569.42
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FS1001 Multiplexing Transceiver	1	ea	\$ 8,500.00	\$ 8,500.00
9-Pin circular connector	6	ea	\$ 3.82	\$ 22.92
Cable gland	6	ea	\$ 3.84	\$ 23.04
Connector pins	18	ea	\$ 0.73	\$ 13.14
3' DB9 M-F serial cable	1	ea	\$ 2.14	\$ 2.14
Capacitor, 10nF 2000V, ±5% polypropylene or COG	12	ea	\$ 0.97	\$ 11.66
Capacitor, 4.7nF 2000V, ±5% polypropylene or COG	6	ea	\$ 0.48	\$ 2.86
Capacitor, 3.3nF 2000V, ±5% polypropylene	6	ea	\$ 0.48	\$ 2.86
Capacitor, 1000pF 2000V, ±5% polypropylene	6	ea	\$ 0.34	\$ 2.04
NEMA 4 enclosure, 36x24x8 with hasp	1	ea	\$ 358.59	\$ 358.59
500VA, 120V UPS	1	ea	\$ 106.99	\$ 106.99
24V AC/DC linear power supply	1	ea	\$ 98.41	\$ 98.41
Liquid-tight cordgrip, 0.590" to 1.000"	6	ea	\$ 3.15	\$ 18.90
CAT6 Ethernet Cable	678	p /ft	\$ 0.13	\$ 88.14
Polystyrene foam sheet, 4'x8'x1" thick	10	sht	\$ 13.85	\$ 138.50
Waterproof Antenna Connector (Male)	6	ea	\$ 33.48	\$ 200.88
Aquarium grade silicone adhesive	2	ctg	\$ 7.03	\$ 14.06
PVC pipe - 3" schedule 80 (20' sections)	13	pc	\$ 56.24	\$ 731.12
PVC schedule 80 elbows - 3"	24	ea	\$ 6.19	\$ 148.49
PVC schedule 80 T - 3"	30	ea	\$ 11.38	\$ 341.40
PVC schedule 80 Cross - 3"	6	ea	\$ 44.06	\$ 264.38
PVC connector schedule 80 - 3"	12	ea	\$ 7.30	\$ 87.60
PVC schedule 40 caps - 3"	6	ea	\$ 1.23	\$ 7.39
Antenna cable	360	ft	\$ 2.38	\$ 856.80
Waterproof Cable Connector, Female	6	ea	\$ 24.20	\$ 145.20

Liquid-tight cordgrip, 0.590" to 1.000"	6 ea	\$ 3.15	\$ 18.90
Misc. supplies	1 lot	\$ 363.00	\$ 363.00

D. Administration/Indirect Costs	\$ 12,668.56
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AFTC administrative support @ 10%	\$ 3,509.30
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US Fish & Wildlife indirect costs @ 26.1%	\$ 9,159.26
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E. Total budget for biological monitoring	\$ 47,761.51
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