RECOVERY PROGRAM Recovery Program Project Number: FR 165
FY 2014-2015 SCOPE OF WORK for:

Use of Stewart Lake Floodplain by Larval and Adult Endangered Fishes

Reclamation Agreement number: R12AP40033
Reclamation Agreement term: October 1, 2011 – November 30, 2013

Lead agency: Utah Division of Wildlife Resources

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Category:
X Ongoing project
__ Ongoing-revised project
__ Requested new project
__ Unsolicited proposal

Expected Funding Source:
X Annual funds
__ Capital funds
__ Other *[explain]*

I. Title of Proposal: Use of Stewart Lake Floodplain by Larval and Adult Endangered Fishes

II. Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

II.A.1. Conduct inventory of flooded bottomlands habitat for potential restoration.
V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).

GREEN RIVER ACTION PLAN

I.A.3.d.1. Conduct real-time larval razorback and Colorado pikeminnow sampling to guide Flaming Gorge operations.
I.D.1. Develop study plan to evaluate flow recommendations.
I.D.1.a. Evaluate survival of young and movement of sub-adult razorback suckers from floodplains into the mainstem in response to flows.
I.D.1.b.(4)(a) – Implement the Larval Trigger Study Plan
II.A.2. Acquire interest in high-priority flooded bottomland habitats between Ouray NWR and Jensen to benefit endangered fish.

II.A.2.a. Identify and evaluate sites.

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

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

III. Study Background/Rationale and Hypotheses:

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). However, it is unclear how long young razorback sucker stay in floodplains before moving into riverine habitats. In addition, other endangered fishes have been documented using floodplain habitat (e.g. Breen 2011), but enumeration is limited.

The Green River Floodplain Management Plan identifies the Stewart Lake wetland as a priority habitat for endangered fishes. Stewart Lake is the third largest of 16 identified priority wetlands, thus providing greater area and depth for potential nursery habitat for larval razorback sucker (i.e., overwinter survival) and other native and endangered fishes (Valdez and Nelson 2004). Additionally, it is approximately 11 miles downstream of a known razorback sucker spawning bar, allowing for potential entrainment (Valdez and Nelson 2004). In comparison to other floodplains, Stewart Lake is an ideal study area given that the structural design provides flexibility in water management; this feature allows for: (1) entrainment capabilities during all flow conditions, even dry hydrologic years, (2) management of inlet and outlet structures to maximize entrainment during floodplain connectivity, (3) timing and control of outlet releases to monitor escapement, and (4) complete draw down via a graded canal drainage system to control nonnative abundance and reset the system any given year. Moreover, previous findings show that entrainment greatly increases in this system when operated as a flow-thru wetland (Hedrick et al. 2009), which is something that can be manipulated to answer questions regarding wetland habitat use. Stewart Lake has never been adequately sampled to determine its use as larval or adult native fish habitat. However, 42 bonytail (*Gila elegans*) and three Colorado pikeminnow (*Ptychocheilus lucius*) were documented leaving the floodplain in August 2009 when a stationary PIT-antenna was installed at the outlet canal (UDWR, unpublished data).

Recent findings by Bestgen et al. (2011) indicate that further investigations are needed regarding the timing of Flaming Gorge Dam releases and larval razorback sucker entrainment. Therefore, a study plan to examine larval razorback sucker occurrence in the Green River as a trigger for Flaming Gorge operations was completed in 2012, known as the Larval Trigger Study Plan (LTSP; Larval Trigger Study Plan Ad Hoc Committee 2012). In the LTSP, several wetlands were identified as having the greatest ability to entrain larval razorback sucker during a range of flow conditions, specifically three under low flow years and during all study years.

Thus, we propose that the Stewart Lake wetland, one of the three floodplains that connects at low flows and has the ability to be managed with inlet and outlet control structures, is an ideal setting to conduct a comprehensive study of fishes that immigrate into the wetland habitat during floodplain connection, utilize the habitat post connection, and emigrate from the wetland during draw down. Using various sampling techniques, during different stages of floodplain use (i.e. entrainment, retention, escapement) we will greatly increase our chances of characterizing use of floodplain wetlands by wild-spawned razorback sucker, other endangered fishes and nonnatives.

Stewart Lake was one of only two wetlands in the middle Green River to entrain flows in 2012 due to drought conditions. Wild-spawned razorback suckers were successfully entrained by adaptive management of wetland floodgate control structures. However, due to limited flows and high levels of nonnatives, water quality and habitat conditions depreciated quickly preventing the survival of the 2012 cohort (Breen and Skorupski 2012). Therefore, additional techniques will be developed in the future to minimize the degradation of habitat by loss of water and the influence of nonnatives. Information from 2012 demonstrated the ability to entrain larvae under drought conditions and influenced management decisions to improve study design and potentially survival of larval razorback sucker. However, it demonstrates data compiled from a single sampling season may limit our ability to draw final conclusions due to confounding environmental factors (i.e., annual peak flows), thus a multi-year study will provide a more complete evaluation for guiding future floodplain management decisions.

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

Goal:

Characterize use of a controlled flow-through floodplain wetland by larval and adult endangered fishes, emphasizing razorback sucker.

Objectives:

1. Monitor entrainment of larval and adult endangered fishes during high-flow connection of riverine and wetland habitats.
2. Examine fish community composition and habitat characteristics in the Stewart Lake wetland following floodplain connection to assess summer survival of wild-spawned and stocked razorback sucker.
3. Examine capture efficiencies of stocked razorback sucker during wetland sampling.
4. Monitor escapement (fish moving out of the wetland) of native and nonnative fishes entrained in Stewart Lake during a controlled release, including a real-time survival estimate of stocked razorback sucker through physical capture using a fixed weir.
5. Determine the extent of nonnative fish colonization in wetland habitats.

End Products: An annual report describing how Stewart Lake functions as habitat for larval and adult endangered fishes. We will provide information on: (1) larval razorback sucker entrainment, (2) large-bodied native and nonnative fishes entering the floodplain during high-flow connection, (3) fish community composition, water quality parameters, and wetland

habitat characteristics through time following the connection period, (4) species-specific information on fishes emigrating from the floodplain during the draw down period, and (5) capture efficiencies and survival rates of various size classes of stocked razorback sucker, which will be verified through physical capture during the draw down period. In addition, multiple captures/detections of the same fish from more than one component of our study will allow us to investigate overall use, survival and capture efficiency during the course of a single season of entrainment.

V. Study Area:

Stewart Lake, which is located in the middle Green River at river mile 300, begins flooding at 7,500 cfs and inundates approximately 570 acres (Valdez and Nelson 2004). Low flow connection relative to other wetland habitats allows for research opportunities across a range of flow conditions. Water enters the wetland through a single breach inlet and exits through a single outlet canal. Timing and extent of floodplain inundation and draw down can be manipulated via floodgate operations which can be regulated to meet multiple research objectives. For example, the outlet control structure is two feet lower in elevation than the inlet structure and begins flooding at approximately 5,000 cfs (UDWR, unpublished data), thus it can be used to entrain water under low flow scenarios.

VI. Study Methods/Approach:

Topics of interest in the LTSP to assess Flaming Gorge Dam releases will be addressed in accordance with our proposed Stewart Lake study. Specifically, razorback sucker larval entrainment and nonnative fish diversity and abundance in floodplain wetlands. In addition to LTSP topics, information on adult endangered species (immigration, entrainment and emigration) using floodplain habitat will be evaluated. Below we have outlined our proposed plans to systematically examine the Stewart Lake wetland and outlet from the point of floodplain connection to draw-down. However, the LTSP highlights that various floodplains could be of high value to razorback sucker under different hydrologic conditions. Thus, under a variety of hydrologic years this project may be modified to focus on other wetlands such as Bonanza Bridge and the Stirrup floodplains, depending on Recovery Program guidance. Given that multiple study wetlands are identified in the LTSP, this scope of work will serve a similar function as Project #164 and we will share the workload with the U.S. Fish and Wildlife Service, Vernal–CRFP to adequately accomplish LTSP sampling. We have not specifically identified additional funds in this budget for expansion of this work to other wetlands, but will do so upon further guidance from the Recovery Program in anticipation of higher flow years.

To monitor larval and adult fishes entering the Stewart Lake wetland we will sample with a picket weir that we will install at the outlet structure and light traps within the wetland. Through continuous operation (24 hours/day), the weir will monitor fish movement for the entire duration that the floodplain is breached. A directional weir will be checked hourly or less frequently depending on volume of fish entrained to reduce stress to native fishes. Pickets will be spaced by 0.25 inches, which will capture the majority of fish entering the wetland, but will allow larval razorback sucker and small-bodied fishes to move into the wetland freely. This will determine if adult endangered fish are immigrating into Stewart Lake or only

utilizing the habitat for the duration of floodplain connection. It will also allow for monitoring and removal of large-bodied nonnatives during inundation, which will reduce competition and predation on larval razorback sucker within Stewart Lake. Native fishes will be allowed to move in the direction of choice (i.e., towards wetland or river), determined by capture in directional traps.

Twenty to 25 light traps will be positioned in the inlet and/or outlet canals 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 continue for the duration of larval drift (approximately 3-6 weeks) or conclude due to floodplain disconnection from the main channel. All larval fish present in light traps will be collected and preserved for later identification by the Larval Fish Lab (costs included in project #15 budget). Habitat parameters, mainly discharge measurements, will be recorded at the inlet and outlet structures during floodplain inundation (not feasible at extremely high flows).

We will utilize various sampling techniques to evaluate fish community composition. Two distinct size classes of razorback sucker (~3,000 of a 100-150 mm size class and ~2,000 of a 225 mm size class) will be stocked (FY 2014; early June) to monitor survival, sampling efficiencies and capture probabilities. To provide a large cost savings to the Recovery Program, stocked fish will not be PIT-tagged prior to release in Stewart Lake, therefore size classes of stocked fish will be selected with the specific intention that we can easily distinguish different size classes from one another, as well as from wild-spawned entrained razorbacks. Given that it is problematic when untagged hatchery fish are captured in the river during other field projects (i.e., unknown whether they are wild produced or hatchery-reared), our weir operations in 2013 will provide additional evidence of our capabilities to capture all large-bodied fish emigrating from the wetland during draw-down. When razorback sucker are stocked in Stewart Lake, they will be PIT-tagged upon recapture as they are leaving the wetland and processed through our fish traps. The number of PIT tags requested from the Recovery Program and associated funding will be determined upon further discussion and hatchery availability. We will also monitor water quality and habitat parameters in the Stewart Lake wetland following floodplain connection. Following floodplain inundation and disconnection, the wetland will be systematically sampled bi-weekly to evaluate fish community composition through time (until wetland is drained–7 sample periods). Once the wetland is completely drained (see below), we will conduct a final sweep to determine fishes that did not escape during water release. During bi-weekly fish sampling, cross-sectional profiles and area estimates will be conducted using a hand-held GPS, depth finder and range finder. We will also monitor water quality parameters (dissolved oxygen, pH, conductivity and temperature) during bi-weekly sampling.

The picket weir will monitor the escapement of native and nonnative fishes retained in the Stewart Lake wetland following high flow connection. Wetland draw down will be coordinated with the UDWR habitat manager in conjunction with selenium management strategies (timing and duration of release), to monitor fishes leaving the wetland. This will allow us to affectively sample fish leaving the wetland (tagged and untagged) to determine survival and growth of wild and stocked razorback suckers and provide information on capture

probabilities and sampling efficiencies of different gear types for razorback sucker within a floodplain.

VII. Task Description and Schedule:

Timeline is subject to change for tasks 1-2 based on the timing and duration of peak flows.

Task 1: Install, operate and maintain a picket weir in the Stewart Lake outlet (entrainment and draw down period combined)

Task 2: Sample the fish community, including stocked razorback suckers, in the Stewart Lake wetland and monitor post-connection water quality and habitat parameters

Task 3: Sample fishes exiting the Stewart Lake outlet during draw down with a picket weir

Task 4: Data entry, analysis and reporting

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

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

FY 2014

Task 1: Install, operate and maintain a picket weir in the Stewart Lake outlet (entrainment and draw down period combined)

	Rate	Hours/Units	Cost
Labor			
Project Leader	31.95	30	958
Biologist II	32.70	140	4578
Journey Maintenance/Construction Specialist	25.92	80	2074
Technician II (Field Supervisor)	22.24	30	667
Technician II (Assistant Crew Leader)	17.14	200	3428
Technician I	15.91	300	4774
		Subtotal	**$16,479**
Travel[a]			
2 trucks @ 12.5% of annual use	13600.00	0.125	1700
Per diem (6 day trips and 2 overnights x 4 people)	19.24	32	616
		Subtotal	**$2,316**
Equipment			
Floating dock supplies			400
Camping supplies			100
Weir repair supplies			1300
Sampling equipment			600
		Subtotal	**$2,400**
		Task 1 Total	**$21,194**

Task 2: Sample the fish community, including stocked razorback suckers, in the Stewart Lake wetland and monitor post-connection water quality and habitat parameters

	Rate	Hours/Units	Cost
Labor			
Project Leader	31.95	80	2556
Biologist II	32.70	240	7847
Technician II (Field Supervisor)	22.24	80	1779
Technician II (Assistant Crew Leader)	17.14	280	4799
Technician I	15.91	420	6683
		Subtotal	**$23,665**
Travel[a]			
2 trucks @ 12.5% of annual use	13600.00	0.125	1700
Per diem (28 day trips x 3 people)	13.00	84	1092
		Subtotal	**$2,792**
Equipment			
Boat fuel (gallons)	4.00	168	672
Boar oil (quarts)	11.00	6	66
Prop	150.00	1	150
Gillnets	600.00	3	1800
Fyke nets	900.00	3	2700
Seines	150.00	3	450
Ethanol (20 L)	70.00	3	210
Sample vials	3.50	150	525
Sampling equipment			200
		Subtotal	**$6,773**
		Task 2 Total	**$33,230**

Task 3: Sample fishes exiting the Stewart Lake outlet during draw down with a picket weir

	Rate	Hours/Units	Cost
Labor			
Project Leader	31.95	20	639
Biologist II	32.70	80	2616
Technician II (Field Supervisor)	22.24	20	445
Technician II (Assistant Crew Leader)	17.14	80	1371
Technician I	15.91	160	2546
		Subtotal	**$7,617**
Travel[a]			
2 trucks @ 2% of annual use	13600.00	0.02	272
Per diem (8 day trips x 3 people)	13.00	24	312
		Subtotal	**$584**
		Task 3 Total	**$8,201**

Task 4: Data entry, analysis and reporting

	Rate	Hours/Units	Cost
Labor			
Project Leader	31.95	20	639
Biologist II	32.70	80	2616
Technician II	22.24	80	1779
		Task 4 Total	**$5,034**
		FY 2014 Total	**$67,659**

FY 2015

Task 1: Install, operate and maintain a picket weir in the Stewart Lake outlet (entrainment and draw down period combined)

	Rate	Hours/Units	Cost
Labor			
Project Leader	32.58	40	1303
Biologist II	33.35	140	4669
Journey Maintenance/Construction Specialist	26.44	80	2115
Technician II (Field Supervisor)	22.68	40	907
Technician II (Assistant Crew Leader)	17.48	200	3497

Technician I	16.23	300	4869
		Subtotal	**$17,361**
Travel[a]			
2 trucks @ 12.5% of annual use	13872.00	0.125	1734
Per diem (6 day trips and 2 overnights x 4 people)	19.62	32	628
		Subtotal	**$2,362**
Equipment			
Floating dock supplies			408
Camping supplies			102
Weir repair supplies			1326
Sampling equipment			612
		Subtotal	**$2,448**
		Task 1 Total	**$22,171**

Task 2: Sample the fish community, including stocked razorback suckers, in the Stewart Lake wetland and monitor post-connection water quality and habitat parameters

	Rate	Hours/Units	Cost
Labor			
Project Leader	32.58	80	2607
Biologist II	33.35	240	8004
Technician II (Field Supervisor)	22.68	80	1815
Technician II (Assistant Crew Leader)	17.48	280	4895
Technician I	16.23	420	6817
		Subtotal	**$24,138**
Travel[a]			
2 trucks @ 12.5% of annual use	13872.00	0.1	1387
Per diem (28 day trips x 3 people)	13.26	96	1273
		Subtotal	**$2,660**
Equipment			
Boat fuel (gallons)	4.08	168	685
Boar oil (quarts)	11.22	6	67
Prop	153.00	1	153
Gillnets	612.00	3	1836
Fyke nets	918.00	3	2754
Seines	153.00	3	459
Ethanol (20 L)	71.40	3	214
Sample vials	3.57	150	536
Sampling equipment			204
		Subtotal	**$6,908**
		Task 2 Total	**$33,706**

Task 3: Sample fishes exiting the Stewart Lake outlet during draw down with a picket weir

	Rate	Hours/Units	Cost
Labor			
Project Leader	32.58	20	652
Biologist II	33.35	80	2668
Technician II (Field Supervisor)	22.68	20	454
Technician II (Assistant Crew Leader)	17.48	80	1399
Technician I	16.23	160	2597
		Subtotal	**$7,769**
Travel[a]			
2 trucks @ 2% of annual use	13872.00	0.02	277
Per diem (8 day trips x 3 people)	13.26	24	318
		Subtotal	**$596**
		Task 3 Total	**$8,365**

Task 4: Data entry, analysis and reporting

	Rate	Hours/Units	Cost
Labor			
Project Leader	32.58	20	652
Biologist II	33.35	80	2668
Technician II	22.68	80	1815

	Task 4 Total	**$5,135**
	FY 2015 Total	**$69,377**

FY 2016

Task 1: Install, operate and maintain a picket weir in the Stewart Lake outlet (entrainment and draw down period combined)

	Rate	Hours/Units	Cost
Labor			
Project Leader	33.24	40	1329
Biologist II	34.02	140	4763
Journey Maintenance/Construction Specialist	26.97	80	2158
Technician II (Field Supervisor)	23.14	40	926
Technician II (Assistant Crew Leader)	17.83	200	3566
Technician I	16.55	300	4966
		Subtotal	**$17,708**
Travel[a]			
2 trucks @ 12.5% of annual use	14149.44	0.125	1769
Per diem (6 day trips and 2 overnights x 4 people)	20.02	32	641
		Subtotal	**$2,409**
Equipment			
Floating dock supplies			416
Camping supplies			104
Weir repair supplies			1353
Sampling equipment			624
		Subtotal	**$2,497**
		Task 1 Total	**$22,614**

Task 2: Sample the fish community, including stocked razorback suckers, in the Stewart Lake wetland and monitor post-connection water quality and habitat parameters

	Rate	Hours/Units	Cost
Labor			
Project Leader	33.24	80	2659
Biologist II	34.02	240	8165
Technician II (Field Supervisor)	23.14	80	1851
Technician II (Assistant Crew Leader)	17.83	280	4993
Technician I	16.55	420	6953
		Subtotal	**$24,621**
Travel[a]			
2 trucks @ 12.5% of annual use	14149.44	0.1	1415
Per diem (28 day trips x 3 people)	13.53	96	1298
		Subtotal	**$2,713**
Equipment			
Boat fuel (gallons)	4.16	168	699
Boar oil (quarts)	11.44	6	69
Prop	156.06	1	156
Gillnets	624.24	3	1873
Fyke nets	936.36	3	2809
Seines	156.06	3	468
Ethanol (20 L)	72.83	3	218
Sample vials	3.64	150	546
Sampling equipment			208
		Subtotal	**$7,047**
		Task 2 Total	**$34,381**

Task 3: Sample fishes exiting the Stewart Lake outlet during draw down with a picket weir

	Rate	Hours/Units	Cost
Labor			
Project Leader	33.24	20	665
Biologist II	34.02	80	2722
Technician II (Field Supervisor)	23.14	20	463

Technician II (Assistant Crew Leader)	17.83	80	1427
Technician I	16.55	160	2649
		Subtotal	**$7,924**
Travel[a]			
2 trucks @ 2% of annual use	14149.44	0.02	283
Per diem (8 day trips x 3 people)	13.53	24	325
		Subtotal	**$608**
		Task 3 Total	**$8,532**

Task 4: Data entry, analysis and reporting

	Rate	Hours/Units	Cost
Labor			
Project Leader	33.24	20	665
Biologist II	34.02	80	2722
Technician II	23.14	80	1851
		Task 4 Total	**$5,237**
		FY 2016 Total	**$70,764**

FY 2017

Task 1: Install, operate and maintain a picket weir in the Stewart Lake outlet (entrainment and draw down period combined)

	Rate	Hours/Units	Cost
Labor			
Project Leader	33.90	40	1356
Biologist II	34.70	140	4858
Journey Maintenance/Construction Specialist	27.51	80	2201
Technician II (Field Supervisor)	23.60	40	944
Technician II (Assistant Crew Leader)	18.19	200	3638
Technician I	16.89	300	5066
		Subtotal	**$18,062**
Travel[a]			
2 trucks @ 12.5% of annual use	14432.43	0.125	1804
Per diem (6 day trips and 2 overnights x 4 people)	20.42	32	653
		Subtotal	**$2,457**
Equipment			
Floating dock supplies			424
Camping supplies			106
Weir repair supplies			1380
Sampling equipment			637
		Subtotal	**$2,547**
		Task 1 Total	**$23,067**

Task 2: Sample the fish community, including stocked razorback suckers, in the Stewart Lake wetland and monitor post-connection water quality and habitat parameters

	Rate	Hours/Units	Cost
Labor			
Project Leader	33.90	80	2712
Biologist II	34.70	240	8328
Technician II (Field Supervisor)	23.60	80	1888
Technician II (Assistant Crew Leader)	18.19	280	5093
Technician I	16.89	420	7092
		Subtotal	**$25,113**
Travel[a]			
2 trucks @ 12.5% of annual use	14432.43	0.1	1443
Per diem (28 day trips x 3 people)	13.80	96	1324
		Subtotal	**$2,768**
Equipment			
Boat fuel (gallons)	4.24	168	713
Boar oil (quarts)	11.67	6	70

Prop	159.18	1	159
Gillnets	636.72	3	1910
Fyke nets	955.09	3	2865
Seines	159.18	3	478
Ethanol (20 L)	74.28	3	223
Sample vials	3.71	150	557
Sampling equipment			212
		Subtotal	**$7,188**
		Task 2 Total	**$35,068**

Task 3: Sample fishes exiting the Stewart Lake outlet during draw down with a picket weir

	Rate	Hours/Units	Cost
Labor			
Project Leader	33.90	20	678
Biologist II	34.70	80	2776
Technician II (Field Supervisor)	23.60	20	472
Technician II (Assistant Crew Leader)	18.19	80	1455
Technician I	16.89	160	2702
		Subtotal	**$8,083**
Travel[a]			
2 trucks @ 2% of annual use	14432.43	0.02	289
Per diem (8 day trips x 3 people)	13.80	24	331
		Subtotal	**$620**
		Task 3 Total	**$8,703**

Task 4: Data entry, analysis and reporting

	Rate	Hours/Units	Cost
Labor			
Project Leader	33.90	20	678
Biologist II	34.70	80	2776
Technician II	23.60	80	1888
		Task 4 Total	**$5,342**
		FY 2017 Total	**$72,180**

FY 2018

Task 1: Install, operate and maintain a picket weir in the Stewart Lake outlet (entrainment and draw down period combined)

	Rate	Hours/Units	Cost
Labor			
Project Leader	34.58	40	1383
Biologist II	35.39	140	4955
Journey Maintenance/Construction Specialist	28.06	80	2245
Technician II (Field Supervisor)	24.07	40	963
Technician II (Assistant Crew Leader)	18.55	200	3711
Technician I	17.22	300	5167
		Subtotal	**$18,424**
Travel[a]			
2 trucks @ 12.5% of annual use	14721.08	0.125	1840
Per diem (6 day trips and 2 overnights x 4 people)	20.83	32	666
		Subtotal	**$2,507**
Equipment			
Floating dock supplies			433
Camping supplies			108
Weir repair supplies			1407
Sampling equipment			649
		Subtotal	**$2,598**
		Task 1 Total	**$23,528**

Task 2: Sample the fish community, including stocked razorback suckers, in the Stewart Lake wetland and monitor post-connection water quality and habitat parameters

	Rate	Hours/Units	Cost
Labor			
Project Leader	34.58	80	2766
Biologist II	35.39	240	8494
Technician II (Field Supervisor)	24.07	80	1926
Technician II (Assistant Crew Leader)	18.55	280	5195
Technician I	17.22	420	7234
		Subtotal	**$25,615**
Travel[a]			
2 trucks @ 12.5% of annual use	14721.08	0.1	1472
Per diem (28 day trips x 3 people)	14.07	96	1351
		Subtotal	**$2,823**
Equipment			
Boat fuel (gallons)	4.33	168	727
Boar oil (quarts)	11.91	6	71
Prop	162.36	1	162
Gillnets	649.46	3	1948
Fyke nets	974.19	3	2923
Seines	162.36	3	487
Ethanol (20 L)	75.77	3	227
Sample vials	3.79	150	568
Sampling equipment			216
		Subtotal	**$7,331**
		Task 2 Total	**$35,770**

Task 3: Sample fishes exiting the Stewart Lake outlet during draw down with a picket weir

	Rate	Hours/Units	Cost
Labor			
Project Leader	34.58	20	692
Biologist II	35.39	80	2831
Technician II (Field Supervisor)	24.07	20	481
Technician II (Assistant Crew Leader)	18.55	80	1484
Technician I	17.22	160	2756
		Subtotal	**$8,245**
Travel[a]			
2 trucks @ 2% of annual use	14721.08	0.02	294
Per diem (8 day trips x 3 people)	14.07	24	338
		Subtotal	**$632**
		Task 3 Total	**$8,877**

Task 4: Data entry, analysis and reporting

	Rate	Hours/Units	Cost
Labor			
Project Leader	34.58	20	692
Biologist II	35.39	80	2831
Technician II	24.07	80	1926
		Task 4 Total	**$5,449**
		FY 2018 Total	**$73,623**

IX. Budget Summary:

FY 2014	$67,659
FY 2015	$69,377

FY 2016	$70,764
FY 2017	$72,179
FY 2018	$73,623
TOTAL	**$353,602**

X. Reviewers:

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