2017 Rainbow Trout Monitoring El Dorado Hydroelectric Project (FERC Project No. 184)

Prepared for:

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1.0 INTRODUCTION

The El Dorado Irrigation District (EID or District) owns and operates the El Dorado Hydroelectric Project (Project No. 184), which is licensed by the Federal Energy Regulatory Commission (FERC). The Project No. 184 Monitoring Program requires monitoring of Rainbow Trout populations in six stream reaches associated with Project No. 184 facilities. The specific monitoring requirements for Rainbow Trout are defined in the Project 184 Rainbow Trout Monitoring Plan (Plan; EID 2010).

Rainbow Trout (*Oncorhynchus mykiss*) surveys were conducted between 1998 and 2001 (ECORP 2002) as part of the FERC relicensing effort. Results from these surveys were used to develop the ecological resource objectives as identified in Appendix B, Section 1 of the El Dorado Relicensing Settlement Agreement. Biomass indices (pounds per surface acre) were developed to serve as a baseline for ecological resource objective monitoring.

Post-license monitoring for Rainbow Trout is required for two consecutive years at the beginning of each five-year period. The purpose of this monitoring is to evaluate the status of Rainbow Trout populations in comparison to the ecological resource objectives. The first of these paired monitoring efforts took place in 2011 and 2012. This report provides results of Rainbow Trout monitoring conducted in 2017 and compares 2016-2017 monitoring results to 2011-2012 monitoring results.

2.0 METHODS

2.1 Site Selection

The RBT Plan specifies monitoring at a total of six sites in Project-affected reaches. These reaches include the following:

- Lower Echo Creek (Site EC-1)
- Lower Pyramid Creek (Site PY-1)
- Caples Creek below Kirkwood (Site CA-3)
- Silver Fork American River at Forgotten Flat (Site SV-4)
- Lower Alder Creek (Site AR-1)
- South Fork American River below Carpenter Creek (Site SO-2)

Four sites (PY-1, CA-3, SV-4, and AR-1) are located on tributaries to the South Fork American River, one site (SO-2) is located on the South Fork American River, and one site (EC-1) is located on Echo Creek, a tributary to the Upper Truckee River. Site locations are provided in Figure 1. GPS coordinates for the upstream and downstream boundary of each sampling site is shown in Table 1. All sites sampled in 2017 were identical to those sampled in 2011, 2012, and 2016.





Table 2-1	. GPS c	oordinates	for sam	ple s	site l	boundaries
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Sompling Site	Upstream Bound	lary UTM (NAD 83)	Downstream Boundary UTM (NAD 83)		
Sampling Site	Easting Northing		Easting	Northing	
South Fork American River (SO-2) River Left Channel	731696	4293821	731619	4293831	
South Fork American River (SO-2) River Right Channel	731711	4293856	731654	4293877	
Lower Echo Creek (EC-1)	Ccho Creek (EC-1) 757989 4303817		758051	4303851	
Lower Pyramid Creek (PY-1)	749869	4299695	749807	4299675	
Silver Fork American River (SV-4)	746079	4285687	746025	4285771	
Lower Alder Creek (AR-1)	wer Alder Creek (AR-1) 727760		727704	4294001	
Caples Creek (CA-3)	754663	4288588	754590	4288559	

Source: FERC Project No. 184 Rainbow Trout Monitoring 2016 (AECOM, 2017)

2.2 Electrofishing Surveys

GANDA conducted trout population monitoring in September and October, 2017 following the methods detailed in the RBT Plan (EID 2010). A crew of 2–8 GANDA biologists fished each site from bottom to top using one to four backpack electrofishers (Smith Root Model 20B and Halltech HT-2000). Three passes were conducted at each site. One crew member was dedicated to moving fish between buckets and holding areas, caring for captured fish, and maintaining proper oxygenation of the holding water. Shocker settings (e.g., voltage and frequency) were kept the same for all passes, and shocking duration (or effort) for each pass was recorded as the number of seconds of operation for each unit. Salt was added at the following sites where conductivity was too low to allow for effective electrofishing: Pyramid Creek, Caples Creek, Forgotten Flat, and South Fork American River.

Fish collected during each pass were processed immediately upon completion of that pass. All specimens were identified to species, weighed to the nearest gram using an electronic balance, and measured to fork length (FL) using a metric fish board. Following each pass, processed fish were placed in a live car in an instream holding area located outside the site. After the completion of the survey, all collected fish were redistributed throughout the site.

2.3 Physical Habitat and Water Quality

Physical habitat and in situ water quality parameters were assessed concurrently with the electrofishing surveys. Physical habitat parameters included measures of site dimensions, flow, substrate composition, percent canopy cover, stream gradient, habitat types, cover type, and trout spawning habitat as defined on the standard field data form. All sites were re-located using GPS and documented with digital photographs. The YSI meter was photographed to capture a snapshot of the *in situ* water quality data (unfortunately many site photos and the *in situ* water quality results were lost due to a camera malfunction). Site dimensions were characterized along eleven transects set perpendicular to the flow and spaced equally along the length of the site. Using a stadia rod, stream depths were measured at one-quarter, one-half, and three-quarters stream width along each transect.

Other physical habitat parameters on the field data form were estimated visually over the total site area. These parameters included: percentage of the bed substrate composed of silt, clay, sand, gravel, cobble, boulder, and bedrock; percent gradient, riffle, run, and pool composition. Size classes for stream substrate material were as follows: sand= <1-2 mm, gravel= 2 mm-64 mm, cobble= 64 mm-25 cm, and boulder= >25 cm (bedrock was not defined by a dimensional

measurement). Water quality measurements included basic in situ parameters: water temperature, dissolved oxygen concentration, pH, and conductivity.

2.4 Data Analysis

Electrofishing data were compiled and analyzed using the MicroFish 3.0 software package, based on the removal-depletion model (Van Deventer and Platts 1989). Standing stock estimates for fish abundance and biomass were calculated for Rainbow Trout for each site. In cases where the lower 95 percent confidence limit for population estimates was lower than the total catch; this limit was set equal to the total catch. Biomass was calculated based on total weight measured per species and extrapolated to fit the population estimate for the whole site. Any specimens weighing less than one gram were assigned a weight of 0.5 grams. Biomass was standardized per unit area of stream surveyed (pounds per surface acre).

3.0 RESULTS

Generally, fish communities surveyed in the South Fork American River watershed were typical for west slope Sierra Nevada streams, and included Rainbow Trout (*Oncorhynchus mykiss*), Brown Trout (*Salmo trutta*), Brook Trout (*Salvelinus fontinalis*), Sacramento Sucker (*Catostomus occidentalis*), California Roach (*Hesperoleucus symmetricus*), Speckled Dace (*Rhinichthys osculus*) and Prickly Sculpin (*Cottus asper*). The fish community in Echo Creek in the adjacent the Lahontan Basin included Rainbow Trout (*Oncorhynchus mykiss*), Brown Trout (*Salmo trutta*), Lahontan Redside (Richardsonius egregious), Paiute Sculpin (*Cottus beldingi*), and Bluegill (*Lepomis macrochirus*).

Site descriptions are provided in Sections 3.1 through 3.6 below. Estimated Rainbow Trout densities and biomass are shown in Table 3-1 and in Figures 3-1 and 3-2. A summary of water quality parameters is shown in Table 3-2. A summary of habitat parameters and habitat composition is shown in Table 3-3 and Table 3-4, respectively. Available photographs of sample sites are provided in Appendix A. Copies of original 2017 electrofishing field notes and datasheets are provided in Appendix B.

3.1 Lower Echo Creek (EC-1)

Site EC-1 was sampled on 21 September, 2017. The site consists of single thread channel. One shocker and netter were used for this site. The site was 90 m long. Mean channel width was 5.3 meters. Fish captured included 15 Rainbow Trout, 116 Brown Trout, 35 Paiute Sculpin, 1

Lahontan Redside, and 5 Bluegill. Rainbow Trout density was estimated to be 268 fish per mile and the Rainbow Trout biomass was estimated to be 6.7 pounds per surface acre (Table 3-1).

3.2 Lower Pyramid Creek (PY-1)

Site PY-1 was sampled on 9 October, 2017. The site consists of single thread channel. Two pairs of shockers and netters were used for this site. The site was 100 m long. Mean channel width was 7.3 meters. Fish captured included 59 Rainbow Trout and 6 Brown Trout. Rainbow Trout density was estimated to be 1,400 fish per mile and Rainbow Trout biomass was estimated to be 26.7 pounds per surface acre (Table 3-1).

3.3 Caples Creek below Kirkwood Creek (CA-3)

Site SV-4 was sampled on 29 September, 2017. The site consists of single thread channel. Two pairs of shockers and netters were used for this site. The site was 104 m long. Mean channel width was 8.1 meters. Fish captured included 56 Brook Trout and 3 Brown Trout. No Rainbow Trout were captured in 2017; therefore, Rainbow Trout density was zero fish per mile Rainbow Trout biomass was zero pounds per surface acre (Table 3-1).

3.4 Silver Fork American at Forgotten Flat (SV-4)

Site SV-4 was sampled on 10 October, 2017. The site consists of single thread channel. Two pairs of shockers and netters were used for this site. The site was 100 m long. Mean channel width was 11.3 meters. Fish captured included 64 Rainbow Trout and 10 brown trout. Rainbow Trout density was estimated to be 1,207 fish per mile and Rainbow Trout biomass was estimated to be 9.0 pounds per surface acre (Table 3-1).

3.5 Lower Alder Creek (AR-1)

Site AR-1 was sampled on 27 September, 2017. The site consists of single thread channel. Two pairs of shockers and netters were used for this site. The site was 109 m long. Mean channel width was 6.6 meters. Fish captured included 108 Rainbow Trout, 72 California Roach, and 15 Sacramento Sucker. Rainbow Trout density was estimated to be 1,810 fish per mile and Rainbow Trout biomass was estimated to be 7.5 pounds per surface acre (Table 3-1).

3.6 South Fork American River below Carpenter Creek (SO-2)

Site SO-2 was sampled on 28 September, 2017. The site consists of a main channel and a side channel. Four pairs of shockers and netters were used for the main channel, and two pairs in the side channel. The site was 100 m long. Mean width of the main channel was 18.2 meters, and the mean width of the side channel was 9.7 m. Fish captured included 198 Rainbow Trout, 2 Brown Trout, 41 Sacramento Sucker, and 4 Speckled Dace. Rainbow Trout density was estimated to be 3,589 fish per mile (Table 3.1) and Rainbow Trout biomass was estimated to be 7.1 pounds per surface acre.

Sampling Site	Depletion Pattern	Rainbow Trout captured (number)	Total Weight (grams)	Estimated Density (Rainbow Trout per mile)	Estimated Biomass in Reach (grams)	Estimated biomass in Reach (pounds)	Estimated Biomass (pounds per surface acre)	Biomass Objective (pounds per surface acre)
L. Echo (EC-1)	11, 4, 0	15	354	268	354	0.8	6.7	11.8
L. Pyramid (PY-1)	25, 22, 12	59	1,479	1,400	2,181	4.8	26.7	6.5
Caples (CA-3)	0, 0, 0	0	0	0	0	0	0	9.1
Silver Fork (SV-4)	34, 20, 10	64	972	1,207	1,139	2.5	9.0	19.7
L. Alder (AR-1)	59, 35, 14	108	539	1,810	614	1.4	7.5	74.6
SF American (SO-2)	117, 50, 31	198	1,982	3,589	2,232	4.9	7.1	33.9

Table 3-1. 2017 Rai	nbow Trout catch	, density, and	l biomass.
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Table 3-2. 2017 water quality parameters and streamflow.

Sampling Site	Temp (°C)	Sp. Cond (µS/cm ³)	DO (mg/l)	pH (units)	Streamflow (cubic feet per second)
L. Echo (EC-1)	7.07	42	9.13	7.2	0.1
L. Pyramid (PY-1)	7.37	27	9.3	7.8	15
Caples (CA-3) ¹	NA	NA	NA	NA	21
Silver Fork (SV-4) ¹	NA	NA	NA	NA	20
L. Alder (AR-1)	12.1	48	9.0	7.9	0.7
SF American (SO-2) ¹	NA	NA	NA	NA	56

¹YSI data were recorded on photographs which were lost at some sites.

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Sampling Site	Length (meters)	Mean Width (meters)	Area (meters ²)	Surface area (acres)	Max Depth (meters)	Mean Depth (meters)
L. Echo (EC-1)	90	5.3	477	0.12	0.54	0.16
L. Pyramid (PY-1)	100	7.3	730	0.18	0.76	0.30
Caples (CA-3)	104	8.1	845	0.21	1.35	0.33
Silver Fork (SV-4)	100	11.3	1126	0.28	1.22	0.42
L. Alder (AR-1)	109	6.6	726	0.18	1.42	0.48
SF American (SO-2)	100	27.9	2790		1.15	0.45
SF American (SO-2) Side channel	100	9.7	970	0.93	0.94	0.39

Table 3-3. 2017 Sample site dimensions and physical habitat characteristics

Table 3-4. 2017 Habitat parameters (percentages)

Sampling Site	Pool	Riffle	Run	Sand	Gravel	Cobble	Boulder	Bedrock
L. Echo (EC-1)	30	15	55	20	50	20	10	0
L. Pyramid (PY-1)	30	25	45	25	40	15	10	10
Caples (CA-3)	25	25	50	10	70	20	0	0
Silver Fork (SV-4)	40	50	10	20	40	20	20	0
L. Alder (AR-1)	30	20	50	25	5	30	35	5
SF American (SO-2)	50	30	20	15	40	25	15	5



Figure 3-1. Comparison of Rainbow Trout Density (fish per mile) in 2016 and 2017.



Figure 3-2. Comparison of Rainbow Trout Biomass (pounds per surface acre) in 2016 and 2017.

4.0 **DISCUSSION**

The Plan specifies biomass targets (pounds per surface acre) for Rainbow Trout as the objective metric for evaluating the health of the six project streams. Rainbow Trout were chosen as the indicator of habitat quality because Rainbow Trout are a Forest Management Indicator Species. The objective as specified by the Plan is that the means developed from sampling efforts conducted in 1998, 1999, 2000, 2001, and 2002 do not decrease by more than 20 percent. A comparison of 2011-2012 and 2016-2017 monitoring data relative to the ecological resource objectives are provided in Table 4-1. A comparison of the Rainbow Trout biomass through time is presented in Table 4-1. The first 5-year study period (Period 1) is represented by data from 2011 and 2012; the second 5-year study period (Period 2) is represented by data from 2016 and 2017.

Mean biomass was higher in 2016 than in 2017 at most sites. At most sites the biomass in 2017 was lower than in 2011, and slightly higher than in 2012. Rainbow Trout were not present at the Caples Creek site in 2011, 2016, or 2017. Mean Rainbow Trout biomass estimates for the second 5-year study period (Period 2) were less than the biomass objective at four sites: Lower Echo Creek (EC-1), Caples Creek below Kirkwood (CA-1), Lower Alder Creek (AR-1), and South Fork American River below Carpenter Creek (SO-2).

Sampling Site	Biomass Objective	∆20 % Threshold	2011 Biomass	2012 Biomass	Period 1 Mean	2016 Biomass	2017 Biomass	Period 2 Mean
L. Echo (EC-1)	11.8	9.4	3.5	2.4	2.9	4.3	6.7	5.7
L. Pyramid (PY-1)	6.5	5.2	38.8	8.7	23.7	29.9	26.7	28.3
Caples (CA-3)	9.1	7.3	0	0.1	0.1	0	0	0
Silver Fork (SV-4)	19.7	15.8	27.4	8.4	17.9	40.1	9.0	24.6
L. Alder (AR-1)	74.6	59.7	42.2	8.2	25.2	15.3	7.5	11.4
SF American (SO-2)	33.9	27.1	20.6	12	16.3	9.7	7.1	8.4

 Table 4-1. Comparison of Rainbow Trout biomass (pounds per surface acre) between study years/periods.

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Garcia and Associates (GANDA) February 2018 Mean Rainbow Trout biomass estimates for the second 5-year study period (Period 2) exceeded the biomass objective at two sites: Lower Pyramid Creek (PY-1) and Silver Fork American River at Forgotten Flat (SV-4). Similar results were observed in 2011 and 2012 (Period 1), in which the same four sites were below Plan objectives and the same two sites exceeded Plan objectives.

5.0 **RECOMENDATIONS**

Based on 2011, 2012, 2016, and 2017 Rainbow Trout surveys, the following recommendations may be considered in future monitoring efforts:

- 1. Evaluate biomass and fish density for all species of trout, rather than Rainbow Trout alone. For example, Rainbow Trout comprise only approximately 10 percent of the overall trout in Echo Creek, and were not present at the Caples Creek site in 3 of the four years. Since the composition of Rainbow Trout with respect to all trout varies between sites, basing the metrics on the total trout biomass and density would provide an better representation of the trout population and community structure in each stream reach and may be a better indicator of the overall health of the cold-water ecosystem.
- 2. Consider relocating the monitoring site for Caples Creek to a location further downstream where, based upon ongoing monitoring by CDFW, Rainbow Trout are anticipated to be present in greater numbers. To the extent that Rainbow Trout are the target species of the monitoring, they should be present in the sites monitored. Rainbow Trout were only present in Caples Creek at the current monitoring site in one of the four years surveyed.
- 3. Consider modifying the mainstem SFAR site in size by either reducing overall length or sampling the main channel only. The current SFAR site was established in 2011 because there were no records of the study site location used during previous monitoring efforts. Deep pools (> 6 feet) are common in the SFAR downstream of Carpenter Creek, which limits potential site locations due to restrictions inherent to backpack electrofishing. The current site consists of a main channel and side channel and was selected because it contained riffle, run, and pool habitats that could, for the most part, be effectively sampled by backpack electrofishing. However, even under the best field conditions, the current site is physically challenging and poses a safety risk to survey staff due to the large and slippery substrate, deep water, and the overall length of the survey site. When establishing the site in 2011, crews made the survey site approximately 100 meters long because that is a standard length typical of this sampling method. This resulted in two 100 meter survey reaches, one 100 meter reach on the main channel and one 100 meter reach on the side channel). Reducing the overall length of the site or eliminating the side channel from the sampling effort would reduce the effort to that equivalent to one large site, as compared to what are effectively two large sites that need to be sampled in a single day.

The District plans to develop a proposal to implement these recommendations in future Rainbow Trout monitoring efforts. The District plans to distribute the proposal for review and consideration of approval to the FS, SWRCB, and ERC well in advance of the next monitoring effort, which is scheduled for 2021.

6.0 **REFERENCES**

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Appendix A 2017 Site Photos



Echo Creek (EC-1). Top looking downstream



Echo Creek (EC-1). Bottom



Caples Creek (CA-3). Upstream net



Caples Creek (CA-3). Looking downstream from mid-site



Silver Fork (SV-4) Upstream net



Silver Fork (SV-4). Downstream net



Alder Creek (AR-1). Downstream net



South Fork American (SO-2). Looking upstream at the side channel.



South Fork American (SO-2). Looking upstream with side channel on the left and main channel on the right



Brook Trout from Caples Creek (CA-3)



Rainbow Trout from Silver Fork (SV-4)



Brown Trout from Silver Fork (SV-4)

Appendix B 2017 Field Datasheets

Page _____ of _____

2017 EID ELECTROFISHING DATASHEET
Project 184 DATE: <u>9/21</u>
SITE ID: FEC-) DESCRIPTION: FECho creek
UTM (BOTTOM): UTM (TOP):
PERSONNEL: ARAMAYS, Kryzer
START/END TIME: 8:30 START/END AIR TEMP: 32
IN SITU WATER QUALITY
INSTRUMENT TYPE: YSI TIME: 8:49
WATER TEMP: 7.07 SPP COND/COND: 42/28 SAL: 02 TDS: 0,028
DO (CONC): 75.4 DO(SAT): 9.13 pH: 7.16 pHmV: -10.6 ORP: 215.3
SHOCKER DATA
#UNITS USED: 1 TYPE(S): Sh ZOB SETTINGS: 500 V @ 35 F 3 0 dife
SHOCKER DURATION (seconds) PASS 1: 1180 PASS 2: 922 PASS 3: 648 PASS 4:
EFISHING NOTES:

SITE CHARACTERISTICS

POOL/RIFFLE/RUN (%): 30 15155 GRADIENT (%): 1076 CANOPY (%): 35%
CLAY: SILT: A SAND: 20 GRAV: 50 COBB: 20 BLDR: 10 BDRCK:
SHELTER/HABITAT RATINGS (0= no cover; 1= 1-10%, 2= 11-20%; 3= 21-30%etc8= 71-80%9= 81-90%; 10= 91-100%)
SURF TURB ¹ : OBJ COV ¹ : UND BANK ¹ : OVRHG VEG ¹ : SPAWN HAB ² :
¹ Estimated surface area providing cover for an 8" fish; ² Estimated surface area suitable for trout spawning (see ratings above)

X-SECTIONAL WIDTHS AND DEPTHS (11 transects evenly spaced) TOTAL SITE LENGTH (m):____

STATION (m)	B.	9	18	27	36	45	54	63	72	81	90
WIDTH (m)	3,8	-5.1	7.4	4.6	42	6.8	9.4	4,5	4,8	3.9	3.5
¼ DEPTH (m)	. 11	131	125	-13	.09	,23	.08	.13	121	.28	- 19
½ DEPTH (m)	106	151	127	.10	,07	.22	D	.13	,05	.06	-05
¾ DEPTH (m)	112	.54	,21	- 06	,08	.2	105	109	-2-	.05	02

FISH LENGTH/WEIGHT DATA PER PASS BY SPECIES:

									Р	age 2	of <u>3</u>	
FISH	LENGTH/WEI	GHT DA	TA PER P	ASS BY SPE	CIES:	SITE:7	EC-1	DATE	9	1/21/	17	
15+ PASTR6+	-	Bry		Gud	pur	Bu	e 6,11	Red	GIAC	BA	wn	15+ 01
15+ PHS PE6 147 155 48 93 44 167 167 167 167 168 163 105 58 105 58	LU 39 45 0.5 11 .5 46 18 48 18 13 3 3 48 13 3 48 13 48 13 3 48 13 48 13 13 13 13 13 13 13 13 13 14 15 11 13 13 14 15 11 13 13 14 15 11 13 13 14 15 11 15 11 15 11 15 11 15 11 15 11 15 11 15 11 15 18 18 18 18 18 18 18 18 18 18	Byg a_38 55 65 117 61 138 132 137 131 97 135 137 137 137 137 137 137 137 137 137 137 137 137 135 135 137 135 135 137 135 135 135 137 135 155 107 555 108 104 60 118 52		Sud L 82 87 77 60 46 51 83 62 53 68 70 53 68 70 53 55 68 70 53 55 68 70 53 55 68 70 53 55 68 70 53 55	1 8 9 6 3 1 6 7 3 6 7 1 3 6 7 1 1 3 6 7 1 1 1 1 1 1 1 1 1 1 1 1 1				25	BA 51 56 60 57 58 41 55 50 60 50 60 50 60 50 60 50 60 57 62 60 57 62 60 57 60 57 60 57 60 57 60 57 60 57 60 57 60 57 57 58 57 58 58 57 58 58 50 60 57 58 58 50 60 57 58 58 50 60 57 58 58 50 60 57 58 58 50 60 57 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 50 60 50 100 77 58 58 51 60 50 100 57 58 51 60 50 100 57 58 51 60 57 58 51 60 50 100 57 58 51 60 50 100 57 58 51 60 57 58 51 60 57 58 51 60 57 58 51 60 57 58 55 60 57 58 55 60 57 57 58 55 60 57 58 55 60 57 57 58 55 60 57 57 58 55 60 57 57 58 57 60 57 57 60 57 57 60 57 57 60 57 50 57 60 50 60 50 60 50 60 50 60 50 60 50 60 50 60 50 60 50 60 50 60 50 60 50 60 50 60 50 60 50 60 50 50 50 50 50 50 50 50 50 50 50 50 50	WI 2 2 2 2 1 2 2 2 2 1 2 2 2 2 2 2 2 2 2	
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		59 64 64	23345							59 60 60	622	
		50 57 60	222									

Page 3 of 3SITE: E(-1) DATE: 9-2(-17)

FISH LENGTH/WEIGHT DATA PER PASS BY SPECIES:

3V	P	PAGS										
	PAT		RRN		511	ezh)	nt	DUN	least)	-	
	121	10	1	14)	61	SA	00010	(con)	1		
	105	13	112	15	78	6	120	17				
	112	16	69	Y	75	5	15	3			1	
	112	16	64	23	80	6	65	3				
	172	68	60	2	20	30011	121	22				
			63	3	70	7	68	3				
			47	1	68	4	51	1				
	1.55.55		59	2	52	2	58	3				
			44	1	55	3	54	2				
			Sa		26	*	59	2				
			116	16	69	3	60	2				
			62	3		8	54	9				
			52									
			190	24								
			101	11							_	
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	9.10									4 · ·		
											1. 15%	
	RBT	m	BRI	TWN	51	vetr						
-*	RBT	W	BRI	7WN	50 L	vietr						
	RBT	W	BR1 209	2WN 12 96	50 L 67	wleth W						
*	RGT	W	BR1 209 150	1001 10 10 10	50 L 67 45	W W H						
	RBT	W	BRI 209 150 61	101 10 10 2	50 L 67 45 63	UP#						
	RGT	W	BRI 209 150 61	101/ 12 140 14 14	50 L 67 45 63 69	UPH W H 1. 3 4						
*	RGT		BRI 209 150 61 108 108	141 13	50 L 67 45 63 69 71	VIEH W H 1 3 4 4						
	RGT		BR1 209 150 61 108 105 56	7WN V 96 40 2 14 13 2	50 L 67 45 63 69 71 75	UPH W H 1 3 4 4 4						
	RGT		BRI 209 150 61 108 105 56 56	141 140 14 14 13 2 2 14 13 2 2 2	50 L 67 45 63 69 71 75 58	UPH W H 1 3 4 4 4 4 4 4 6 3 3						
	RBT		BRI 209 150 61 108 105 56 56 58	141 13 2 2 14 13 2 2 14 13 2 2 2 2 14 13 2 2 2	50 L 67 45 63 69 71 75 58	UPH W H 1 3 4 4 4 4 4 4 4 4 4 6 3						
	RGT		BR1 209 150 61 108 105 56 56 56 58 134	141 13 2 2 14 13 2 2 14 13 2 2 2 2 40 2 14 13 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	50 L 67 45 63 63 69 71 75 58	UPH W H 1 3 4 4 4 4 4 6 3 3						
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	RBT		BRI L 209 150 61 108 105 56 58 134 61 130	101/ 296 40 240 240 13 24 13 24 13 24 24 24 25	50 L 67 45 63 63 69 71 75 58	UPH W H 1 3 4 4 4 4 4 6 3 3						
	RGT		BRI 209 150 61 108 105 56 56 58 134 61 130 125	141 13 2 2 14 13 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	50 L 67 45 63 69 71 75 58	UPH W H I 3 4 4 4 4 4 6 8 3						
	RGT		BRI L 209 150 61 105 56 56 56 58 134 61 130 125	141 13 2 2 14 13 2 14 13 2 2 2 3 5 22 2 2 2 2 2 2 2 2 2 2 2 2 2	50 L 67 45 63 69 71 75 58	VIEH W H I 3 4 4 4 4 4 6 3 3						
	RGT		BRI L 209 150 61 108 105 56 56 58 134 61 130 125	141 13 2 2 14 13 2 2 2 3 5 22 2 2 2 2 2 2 2 2 2 2 2 2 2	50 L 67 45 63 69 71 75 58	UPH W H I 3 4 4 4 4 4 4 6 8 3						
	RGT		BRI L 209 150 61 105 56 56 56 56 58 134 61 130 125	141 13 2 2 14 13 2 2 14 13 2 2 2 3 5 2 2 2 2 2 2 2 2 2 2 2 3 5 2 2 2	50 L 67 45 63 69 71 75 58	VIEH W H I 3 4 4 4 4 4 4 6 23						

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Page /	of	<

2017 EID ELECTROFISHING DATASHEET	
Project 184	DATE: 01 004 20/-
SITE ID: Pyramid Creek DESC	CRIPTION: P4-1
UTM (BOTTOM):	UTM (TOP):
PERSONNEL: RA, CB,	
START/END TIME:	START/END AIR TEMP:
IN SITU WATER QUALITY	
INSTRUMENT TYPE: 451	TIME: 10:00
WATER TEMP: 7.37 C SPP COND/COND:	SAL: TDS:
DO (CONC): 74.7	D pH: 7.79 pHmV: ORP:
SHOCKER DATA	
#UNITS USED: TYPE(S): Smith Que	SETTINGS:
SHOCKER DURATION (seconds) PASS 1:	94 PASS 2: 620 PASS 3: 499 PASS 4:
EFISHING NOTES:	
SITE CHARACTERISTICS	같은 것은 물건이 안 난 것을 물질렀다. 같은 것을 받았다.
POOL/RIFFLE/RUN (%): 30 / 25 /	45 GRADIENT (%): 20% CANOPY (%): 35%
CLAY: D SILT: D SAND:25 0	GRAV: 40 COBB:15 BLDR:10 BDRCK:10
SHELTER/HABITAT RATINGS (0= no cover; 1= 1-10	0%, 2= 11-20%; 3= 21-30%etc8= 71-80%9= 81-90%; 10= 91-100%)
SURF TURB ¹ : OBJ COV ¹ : UND	BANK ¹ : OVRHG VEG ¹ : SPAWN HAB ² :
¹ Estimated surface area providing cover for an 8" fish;	; ² Estimated surface area suitable for trout spawning (see ratings above)
X-SECTIONAL WIDTHS AND DEPTHS (11 trans	sects evenly spaced) TOTAL SITE LENGTH (m):
STATION (m) 0 1 2 3	4567890
WIDTH (m) 92 55 80	7569 7.6 5.7 5.5 4.6 7.8 10.05
1/2 DEPTH (m) 21 26	11 119 46 ,02,15 35 03,23 R
1/2 DEPTH (m) 46.08 16	4 0 28 35 20 61 12 28
34 DEPTH (m)	2 11 52 75 22 29 16 28
16 14 110	

V

FISH LENGTH/WEIGHT DATA PER PASS BY SPECIES:

Page Z of Z SITE: Pyramid DATE: 9 Oct 2012

PA	23	(Pass	2					Pas	53		
,		1										anerealmanereal			
Rbt	-	-	Bru	5		Rbt			BRN		Rbt			BRN	
4	li		L	41		L	W		L	W	L	W		L	w
ILD	524		145	399		125	22		121	21	235	130		126	24
125	250		190	73		127	25				132	29			
183	70%		154	41		79	5				124	19			an nine and a state of the stat
155	4D'		130	22		1420	31			1	124	22			
211	98					116	14				140	33			and tro wat in a second in the second of
133	27					150	34				110	20			
145	33					138	31				78	7			
100	12					165	42				103	13			
177	66					83	7 the	55			112	16.			
157	4D					78	3				95	9.			
81	5					144	31				148	26			
162	48					124	22				82	6			
90	5					85	8								
78	4					99	9		1						
84	6					124	22								
123	17					124	20								
105	12					120	20								
84	6					1710	22								
117	19					137	28								
135	25					130	23							1.1	
97	9					.150	34								
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136	27														
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	roject 184				DATE:	9/29/17			
SI	TEID: ALAR	162	Crock 0	DESCRIPTION:					
יט	TM (BOTTOM):	<u> </u>		UT	M (TOP):				
PE	ERSONNEL: AV	con	Rya C. B.	reen, Br.	Lew13,	Rinde	unesh,		
ST	TART/END TIME	: 1053	8	STAR	T/END AIF	R TEMP:			
IN	N SITU WATER C	QUALITY	(
IN	STRUMENT TY	PE: 50	hill			TIME:			
W	ATER TEMP:		SPP COND/CO	ND:		SAL:	TDS:_		
D	O (CONC):	1	DO(SAT):	рН	·	pHmV:	ORP:		
Sł	HOCKER DATA								
* #I	UNITS USED:	2 т	YPE(S): Smith	Rost 20.	BSETT	INGS:	62	~	
Sł	HOCKER DURAT	ГІОN (se	conds) PASS	8/7 1: 774 PAS	S 2: 63	2 PASS 3:	543 PASS	4:	
EF	FISHING NOTES	:							
		A Read Provide Links in which the read of the links in th	and the second designed and the second designed and the second designed and the second designed and the second	the second se					
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_									1
SI	ITE CHARACTER	RISTICS							1
SI P(ITE CHARACTER OOL/RIFFLE/RU	RISTICS	25125	/ GR	ADIENT (%	6): <u> 07</u>	CANOPY (%):	0	,
– SI P(ITE CHARACTER OOL/RIFFLE/RU	RISTICS JN (%):	25 125 SAND: (0	/ GRAV: 70	ADIENT (% COBB:	6): <u> 77</u> <u>70</u> BLDR	CANOPY (%): : BDR	<u>о</u> ск:	,
SI P(Cl	ITE CHARACTER OOL/RIFFLE/RU CLAY:	RISTICS JN (%): LT: AT RATIN	25 / 25 SAND: NGS (0= no cover; 1:	/ GRAV: 70 GRAV: 70 = 1-10%, 2= 11-209	ADIENT (% COBB:_ 6; 3= 21-30%	6): BLDR 6etc8= 71-809	CANOPY (%): : BDR %9= 81-90%; 10=	CK: 91-100%)	,
- Pi Cl Sł	ITE CHARACTER OOL/RIFFLE/RU CLAY:	RISTICS JN (%): LT: AT RATIN OB	25 / 25 SAND: NGS (0= no cover; 1: J COV ¹ :	/ GRAV: GRAV: = 1-10%, 2= 11-209 JND BANK ¹ :	ADIENT (% COBB: %; 3= 21-30% OVRF	6): / 7/ 70 BLDR 6etc8= 71-809 HG VEG ¹ : _ 1	CANOPY (%): :: BDR %9= 81-90%; 10= SPAWN HA	СК: <u></u> 91-100%) в ² :_ <u>З</u> У	,
SI PI SI SI	ITE CHARACTER OOL/RIFFLE/RU CLAY:SI HELTER/HABITA URF TURB ¹ : Estimated surface	RISTICS JN (%): LT: AT RATIN OB area prov	25 / 25 SAND: <u></u> NGS (0= no cover; 1: J COV ¹ : L iding cover for an 8"	/ GRAV: 70 GRAV: 70 = 1-10%, 2= 11-209 JND BANK ¹ : 7 fish; ² Estimated so	ADIENT (% COBB: &; 3= 21-30% OVRH urface area s	6): _/ BLDR 6etc8= 71-809 HG VEG ¹ : suitable for trout	CANOPY (%): :: BDR %9= 81-90%; 10= SPAWN HA spawning (see ra	CK: 91-100%) B ² : tings above)	,
SI SI SI 1	ITE CHARACTER OOL/RIFFLE/RU CLAY:SI HELTER/HABITA URF TURB ¹ : Estimated surface of	RISTICS JN (%): LT: AT RATIN OB area prov	25 / 25 SAND: NGS (0= no cover; 1: J COV ¹ : U iding cover for an 8"	/ GRAV: 70 GRAV: 70 = 1-10%, 2= 11-209 JND BANK ¹ : 7 fish; ² Estimated so	ADIENT (% COBB: &; 3= 21-30% OVRH urface area	6): / 7/2 7:0 BLDR 6etc8= 71-809 HG VEG ¹ : suitable for trout	CANOPY (%): :: BDR %9= 81-90%; 10= SPAWN HA spawning (see ra	CK: 91-100%) 1B ² : tings above)	,
SI SI SI 1 X	ITE CHARACTER OOL/RIFFLE/RU CLAY:SI HELTER/HABITA URF TURB ¹ : Estimated surface	RISTICS JN (%): LT: AT RATIN OB area prov	25 / 25 SAND: <u></u> NGS (0= no cover; 1= J COV ¹ : U iding cover for an 8" ND DEPTHS (11 t	/ GRAV: GRAV: = 1-10%, 2= 11-209 JND BANK ¹ : fish; ² Estimated so ransects evenly	ADIENT (% COBB:_ %; 3= 21-30% OVRH urface area s	6): _/ 7 BLDR 6etc8= 71-809 HG VEG ¹ : suitable for trout TOTAL SITE L	CANOPY (%): :: BDR %9= 81-90%; 10= SPAWN HA spawning (see ra ENGTH (m):_[CK: 91-100%) B ² : <u>\$ 4</u> tings above)	,
SI SI SI 1 X	ITE CHARACTER OOL/RIFFLE/RU CLAY: SI HELTER/HABITA URF TURB ¹ : Estimated surface of C-SECTIONAL WI	RISTICS JN (%): LT: AT RATIN OB area prov IDTHS A	25 / 25 SAND: <u>(0</u> NGS (0= no cover; 1= J COV ¹ : 7 U iding cover for an 8" ND DEPTHS (11 t	$\int _ 50 GR.$ $= GRAV: 70$ $= 1-10\%, 2= 11-209$ $JND BANK^{1}: 7$ $fish; ^{2} Estimated so that the sector evenly of the sector evenly$	ADIENT (% COBB:_ 6; 3= 21-30% OVRF urface area s v spaced)	6): <u> 7</u> <u>7</u> BLDR 6etc8= 71-809 HG VEG ¹ : <u> </u> suitable for trout TOTAL SITE LI 7 \$	CANOPY (%): :: BDR %9= 81-90%; 10= SPAWN HA spawning (see ra ENGTH (m):_[(/ c	CK: 91-100%) 1B ² : <u>\$ 4</u> tings above)	
SI SI SI X	ITE CHARACTER OOL/RIFFLE/RU CLAY: SI HELTER/HABITA URF TURB ¹ : Estimated surface of C-SECTIONAL WI STATION (m) WIDTH (m)	RISTICS JN (%): LT: AT RATIN area prov IDTHS A	$\frac{25}{25} \frac{25}{25}$ SAND: <u>(0</u> NGS (0= no cover; 1: J COV ¹ : <u>7</u> U iding cover for an 8" ND DEPTHS (11 t 2 3 23' $\frac{1}{25}$	$J_{0} = 50$ GR. _ GRAV: 70 = 1-10%, 2= 11-209 JND BANK ¹ : 7 fish; ² Estimated so ransects evenly f = 5 $3J_{1}^{1}J_{1}^{1}J_{3}^{2}G$	ADIENT (% COBB:_ 6; 3= 21-30% OVRF urface area : 7 spaced) 6 7 (3 7	6): / 7/2 20 BLDR 6etc8= 71-809 HG VEG ¹ : _ / suitable for trout TOTAL SITE LI 7 \$ 2 Y, 3 7 Y	CANOPY (%): :: BDR %9= 81-90%; 10= SPAWN HA spawning (see ra ENGTH (m): [(/ 23, 8, 70)	CK: 91-100%) B ² : <u>B</u> 4 tings above) D 4 3 75. 8	6
SI PI CI SI 1 X	ITE CHARACTER OOL/RIFFLE/RU CLAY: SI HELTER/HABITA URF TURB ¹ : Estimated surface of C-SECTIONAL WI STATION (m) WIDTH (m) ¼ DEPTH (m)	RISTICS JN (%): LT: AT RATIN OB area prov IDTHS A U UTHS A U U U U U U U U U U U U	$\frac{25}{25} \frac{25}{25}$ SAND: <u>(0</u> NGS (0= no cover; 1: J COV ¹ : <u>7</u> U iding cover for an 8" ND DEPTHS (11 t 2 3 23' $\frac{1}{35}$, 14	$J_{0} = 50$ GR. _ GRAV: 70 = 1-10%, 2= 11-209 JND BANK ¹ : 7 fish; ² Estimated so ransects evenly f = 5 $3J_{1}^{1}J_{1}^{1}J_{3}^{2}G$ 725 , 6	ADIENT (% COBB: 6; 3= 21-30% 2 OVRF urface area = 35 r spaced) 6 7(37) 159	6): <u>77</u> <u>70</u> BLDR 6etc8= 71-809 HG VEG ¹ : <u>7</u> suitable for trout TOTAL SITE LI <u>7</u> <u>8</u> 27, <u>3</u> 27, <u>3</u> <u>7</u> <u>8</u> 27, <u>3</u> <u>7</u> <u>8</u> 27, <u>3</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>7</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>7</u> <u>7</u> <u>7</u> <u>7</u> <u>7</u> <u>7</u>	CANOPY (%): :: \bigcirc BDR %9= 81-90%; 10= SPAWN HA spawning (see ra ENGTH (m): $\lfloor (C_{1}, C_{2}, C_{2$	CK: 91-100%) B ² : <u>B</u> 4 tings above) D 4 3 75. 8 3 .25	6
SI SI SI L X	ITE CHARACTER OOL/RIFFLE/RU CLAY: SI HELTER/HABITA URF TURB ¹ : Estimated surface of C-SECTIONAL WI STATION (m) WIDTH (m) ½ DEPTH (m)	RISTICS JN (%): LT: AT RATIN area prov IDTHS A L U 1 ' dry O.06	$\frac{25}{25} \frac{25}{25}$ SAND: <u>(0</u> NGS (0= no cover; 1: J COV ¹ : <u>7</u> U iding cover for an 8" ND DEPTHS (11 t 2 3 23' $\frac{1}{35}$, <u>14</u> 1,35 , <u>14</u>	J_{0} GRAV: $\overline{70}$ GRAV: $\overline{70}$ = 1-10%, 2= 11-209 JND BANK ¹ : $\overline{7}$ fish; ² Estimated so ransects evenly f 5 31_{11}^{11} 13, 6 725 . 6 125 . 6 148	ADIENT (% COBB: 6; 3= 21-30% 2 OVRF arface area s $arspaced$) 6 7(37) 159 159 2%	6): <u>/ 7/</u> <u>70</u> BLDR 6etc8= 71-809 HG VEG ¹ : <u>/</u> suitable for trout TOTAL SITE L <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u> <u>7</u> <u>7</u> <u>8</u> <u>7</u>	CANOPY (%): :: \bigcirc BDR %9= 81-90%; 10= SPAWN HA spawning (see ra ENGTH (m): $\lfloor (C_{1}, C_{2}, C_{2$	CK: 91-100%) B ² : <u>8</u> 4 tings above) D4 3 15. 8 3 .25 5 .36	6

Page 2 of 2

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	Brock	1 Wait	annonsemmentersenentsele	0	entites	2	Riga	A.	1 Pm	pass	2	RVO	ol
stourn 1 rout	L(mm)	W (g	Dinates		N		CHO.	W	1	W		120	N
(mm) W (g)	-Fð	3	1.01	222	1119		733	149	265	236		212	10
0 157	741	162	3	215	112		III	64				153	40
	81	6		1-10		172	197	70				141	31
	62	3.		1		11-	188	79.				142	3
	164	48		1			168	61				86	1
	6)	2		1		ana any "r" dagan shu ana biba w	142	31				69	2
	42	41.			-		61	2				61	2
	157	48	N. 1			an phanana in panan an a sa in in inana an	49	2				49	4
	120	21		an an Al			76	5					
	52	1					60	3.					
	61	2					71	3					
	57	1	Dead				74	4.	1				
	1.5	3	dead		14 1	······ ···· ···· ····	53	2	1				-
	70	4	V M MM				68	3					
	65	3					73	2					1
	52	2					68	7_					
	7)	3					70	4					
	70	4					63	3.					
	68	3											
	48	41.									æ		
	156	41.				and the second		han o'r offenning failt angelander i fan					
	125	27	1										
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	58	2	DEAD	. 653									
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2017 EID ELECTROFISHING DATASHEET	DATE: 10-10-17	
Project 184	DATE:	- w.,
SITE ID: DESCRIPTIO	DN: Silver Fork - Forg	othen Alat
ИТМ (ВОТТОМ):	_ UTM (TOP):	
PERSONNEL: TAC, KOW, BJK, KRM, RAA, CB		
START/END TIME:	START/END AIR TEMP:	
IN SITU WATER QUALITY		
INSTRUMENT TYPE: 451	TIME:	
WATER TEMP: SPP COND/COND:	SAL:	_ TDS:
DO (CONC): DO(SAT):	pH: pHmV:	ORP:
SHOCKER DATA #UNITS USED: _ 2 TYPE(S): Smith Roof	205 settings:	
SHOCKER DURATION (seconds) PASS 1: 1412 EFISHING NOTES:	PASS 2: 1131 PASS 3: 822 921 937	PASS 4:
SITE CHARACTERISTICS		
POOL/RIFFLE/RUN (%): 40 1 50 1 10	GRADIENT (%): Z CANC	DPY (%):5
CLAY: O SILT: O SAND: 20 GRAV:	TO COBB: 20 BLDR: 20	BDRCK: O
SHELTER/HABITAT RATINGS (0= no cover; 1= 1-10%, 2=	11-20%; 3= 21-30%etc8= 71-80%9= 81-	90%; 10= 91-100%)
SURF TURB ¹ : OBJ COV ¹ : UND BANK	SP/	AWN HAB ² :

¹ Estimated surface area providing cover for an 8" fish; ² Estimated surface area suitable for trout spawning (see ratings above)

X-SECTIONAL WIDTHS AND DEPTHS (11 transects evenly spaced) TOTAL SITE LENGTH (m): ///

STATION (m)	0	10	20	30	40	50	60	70.	80	90	100
WIDTH (m)	10.4	6.2	8.4	9.4	9.5	15.4	18.3	15.9	10.8	9.9	10.0
¼ DEPTH (m)	42	62	31	11	20	34	50	.52	78	91	19
½ DEPTH (m)	49	61	35	31	25	30	-23	65	65	122	35-
¾ DEPTH (m)	39	29	16	35	38	21	DRY	DRY	39	91	32

Page 2 of 2

FISH LENGTH/WEIGHT DATA PER PASS BY SPECIES: SITE: SV-4 DATE: 10-10-17

DA		Q.Q.	1.1	DA. 10	11/10	BPro	lal .	PAIN	Brid (-			
KHINK	2010	Inni	UN -	KATINE	111-	1 cert	Nor	T. Gold	ILLAT						
171	WAL	117IM	- Tally	LATH	Way	12/	non 10	La	1001						
115	01	124	70	140	12	105	90	10	2						
198	20	150	04	00	4	155	LT	1 40	4						
175	20	149	34	50	1	10	T	110	. /				· · · ·		
125	10	00	9	125	23	79	5	117	10						
11d	19	130	25	109	17			107	15						
50	3	85	8	120	21			120	10						
Idi	015			134	2)			154	TY						
196	40			118	14			1 100	50						
55	1			60	2			122	19					_	
158	48			141	25			DAR	0 4 2				•		
60	0			100	15			PAS	CARG						
101	dt			04	2			· · · · ·							
100	19			122	22										
54	0			82	2									,	
104	12			Ch	'n										
104	n			200	3										
55	12			100	3										
105	110			Gen	3										
110	20			53	5			1							
10	2			122	20	-									
60	2			1.00 2	- 20										
63	2				PAGG	#2	and a first of the Lord Dominan Boards	+							
114	19			1	1 11 9 3)			
115	110										1.1				
57	2									1					
57	2									1.1.1.1					
65	3					- N - 1			1						
77	5			1				1							
48	1			1			• • •	9	1						
52	2	1.		1								2			
103	12														
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	PASS	#1	Ballan appoint whose sparses and		e.										
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Project 184						DATE:	1/LT	//+			
SITE ID: AR-	-1			DESCRIP	TION:	Alde	r Cru	ek			
UTM (BOTTOM)	:					M (TOP)					
PERSONNEL:	Lob A	van	layo,	Cynt	miar	Breen	ny -	BAD	n D.	ecton	
START/END TIM	E:	0	0		STAR	T/END A):			
IN SITU WATER	QUALITY	(
INSTRUMENT TY	'PE:	SI	552	0			TIME:	112	5		
WATER TEMP:	12.1°C	SPP CO	OND/CO	ND:	18 m.	Scm ³	SAL	:		TDS:	
DO (CONC):	.0 mg/L	_ DO(9	SAT):		pH:	7.9	_ pHm	V:		ORP:	
				- 1 M # 1		11 11		0			1 1
SHOCKER DURA EFISHING NOTE:	TION (se 5:	conds) . No	PASS Salt	1: 125 Was	PAS USE	s 2: ^w	PA	SS 3: <u>(</u>	<u>,29 </u> F	PASS 4:	NA
SHOCKER DURA EFISHING NOTE: SITE CHARACTE	TION (se	konds)	PASS Salt	1: JAS	V Se	s 2: <u>"46</u>	(1) PA	SS 3:	<u>,29</u> F	PASS 4:	NA T
SHOCKER DURA EFISHING NOTE: SITE CHARACTE POOL/RIFFLE/RU	TION (se 5: RISTICS JN (%):	conds) No	PASS Salt	1: 12; was	PAS	S 2:	%):_/	.SS 3: <u>(</u>	CANOPY	PASS 4:	5
SHOCKER DURA EFISHING NOTES SITE CHARACTE POOL/RIFFLE/RU CLAY:S	TION (se 5: RISTICS JN (%): ILT:	conds) <u>No</u> うろ SAN	PASS Salt D:20	1: 175 Was	PAS USC CGRA V:	ADIENT (%):/	SS 3: (24 F	PASS 4: 7 (%):/ BDRCK:	NA 5
SHOCKER DURA EFISHING NOTES SITE CHARACTE POOL/RIFFLE/RU CLAY:	TION (se 5: RISTICS JN (%): ILT: AT RATIN	conds) <u>No</u> SAN NGS (0= n	PASS Salt D: 20 D: 23 o cover; 1	1: <u>175</u> <u>was</u> <u>GRA</u> <i>= 1-10%, .</i>	PAS USC CGRA V: 2= 11-20%	S 2: ADIENT (_ COBB ; 3= 21-30	%):/ %):/ %etc8	BLDR: = 71-80%	CANOPY 35 9= 81-90%	PASS 4: (%):/ BDRCK: 5; 10= 91-1	<u>NA</u> <u>5</u> 100%)
SHOCKER DURA EFISHING NOTES SITE CHARACTE POOL/RIFFLE/RU CLAY:S SHELTER/HABIT SURF TURB ¹ :1	TION (se 5: JN (%): ILT: AT RATIN OB.	Conds) <u>Nの</u> SAN NGS (0= n J COV ¹ :	PASS Salt D: 20 D: 25 o cover; 1 Z. 1	1: 125 Was GRA = 1-10%, JND BAI	PAS USC CGRA V: 2= 11-20% NK ¹ :	ADIENT (COBB ; 3= 21-30 OVF	%):/ %):/ %etc8 RHG VEG	BLDR: = 71-80%	CANOPY 35 9= 81-90% _ SPAW	PASS 4: g (%):/ BDRCK: 5; 10= 91-1 N HAB ² :	NA 5 5 100%) 1
SHOCKER DURA EFISHING NOTES SITE CHARACTE POOL/RIFFLE/RU CLAY:S SHELTER/HABIT SURF TURB ¹ : ¹ Estimated surface	TION (se S: RISTICS JN (%): ILT: AT RATIN OB. area prov. IDTHS A	LOOV ¹ :	PASS <u>Salt</u> <u>20</u> D: <u>25</u> o cover; 1 <u>7</u> tr for an 8'	1: <u>1</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u>	PAS U Se CGRA V: 2= 11-20% NK ¹ : timated su	ADIENT (COBB ; 3= 21-30 OVF rface area	%): %): %etc8 RHG VEG a suitable j	BLDR: = 71-80% for trout sj	CANOPY 35 9= 81-90% _ SPAW pawning (PASS 4: (%):/ BDRCK: 5; 10= 91-1 N HAB ² : see rating. 5). 35°	$\frac{5}{100\%}$ $\frac{1}{1}$ \frac
SHOCKER DURA EFISHING NOTES SITE CHARACTE POOL/RIFFLE/RU CLAY:S SHELTER/HABIT. SURF TURB ¹ : ¹ Estimated surface X-SECTIONAL W	TION (se S: RISTICS JN (%): ILT: AT RATIN OB. area prov. IDTHS A	LOV ¹ : J COV ¹ : I COV ¹ : MD DEPT	PASS <u>Salt</u> <u>20</u> D: <u>25</u> o cover; 1 <u>7</u> tr for an 8' THS (11 t	1: <u>1</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u>	PAS U Se PGRA V: 2= 11-20% NK ¹ : timated su s evenly	ADIENT (COBB ; 3= 21-30 rface area spaced)	%): %): %etc8 RHG VEG a suitable j TOTAL	BLDR: = 71-80%: for trout sp SITE LEI	CANOPY 35 9= 81-90% _ SPAW pawning (NGTH (#	PASS 4: BDRCK: 5; 10= 91-1 N HAB ² : see rating. a):_ <u>35</u>	NA 5 100%) 1 s above) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
SHOCKER DURA EFISHING NOTES SITE CHARACTE POOL/RIFFLE/RU CLAY:	TION (se S: RISTICS JN (%): ILT: AT RATIN OB. area prov. IDTHS AI	Conds) NO SAN NGS (0= n J COV ¹ : iding cove ND DEPT 2	PASS <u>Salt</u> <u>20</u> D: <u>25</u> o cover; 1 <u>7</u> tr for an 8' THS (11 tr <u>3</u>	1: <u>1</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u> <u>0</u>	PAS PAS PAS PAS PAS PAS PAS PAS	ADIENT (COBB ; 3= 21-30 OVF rface area spaced)	%):/ %):/ %etc8 RHG VEG a suitable j TOTAL	SS 3: BLDR: = 71-80%: ¹ :7 for trout s _i SITE LEI	CANOPY 35 9= 81-90% 2 SPAW 2 S	PASS 4: (%): BDRCK: $(i; 10= 91-1)N HAB2:see rating.(\phi):35^{}(0)$	$\frac{5}{100\%}$ $\frac{5}{1}$ $\frac{5}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$
SHOCKER DURA EFISHING NOTES SITE CHARACTE POOL/RIFFLE/RU CLAY:	TION (se S: RISTICS JN (%): ILT: AT RATIN OB. area prov. IDTHS AI \$FH	Conds) NO SAN SAN NGS (0= n J COV ¹ : iding cove ND DEPT 2 11144''	PASS Salt D: 20 D:	1: $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$ $\sqrt{3}$	PAS PAS PAS PAS PAS PAS PAS PAS	S 2: V_{4} ADIENT (COBB ; 3= 21-30 rface area spaced) G 33'7"	%):/ ::_/ ::	SS 3: BLDR: = 71-80%! ¹ :7 for trout s _i SITE LEI & ZO' Z''	CANOPY 35 9= 81-90% 2 SPAW poawning (NGTH (# 9 NGTH (#	PASS 4: BDRCK: (%):BDRCK: $(j; 10= 91-1)N HAB2:see rating:see rating:(j; 35^{\circ})10(5' 7'')$	$\frac{5}{1}$ $\frac{5}{1}$ $\frac{1}{1}$ $\frac{1}{22}$
SHOCKER DURA EFISHING NOTES SITE CHARACTE POOL/RIFFLE/RU CLAY:	TION (se S: RISTICS JN (%): JN	conds) $N \odot$ $N \odot$ SAN NGS (0= n) $J COV^1:$ iding cove ND DEPT $21 1 + 4 11,09 m$	PASS <u>Salt</u> <u>20</u> D: <u>20</u> o cover; 1 <u>7</u> (1) r for an 8' THS (11 t <u>3</u> 27A 1.5~	1: $\sqrt{3}$ \sqrt	PAS PAS PAS PAS PAS PAS PAS PAS	S 2: V_{4} ADIENT (COBB ; 3= 21-30 (ovr rface area spaced) (33'7" 0.12m	%):/ %:/ %:/ %etc8 RHG VEG a suitable j TOTAL 7 31'9'' 0.12m	SS 3: BLDR: = 71-80%! ¹ : _7 for trout s ₁ SITE LEI & ZO' Z'' 0. ZZm	CANOPY 35 9= 81-90% 2 SPAW 2 S	PASS 4: BDRCK: <i>i; 10= 91-1</i> N HAB ² : see rating: x): <u>35</u> ° <u>10</u> 10 13' 7'' 0, 15 m	$\frac{5}{100\%}$ $\frac{5}{1}$ $\frac{5}{1}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{1}$ $\frac{1}{2}$
SHOCKER DURA EFISHING NOTES SITE CHARACTE POOL/RIFFLE/RU CLAY:	TION (se S: RISTICS JN (%): JN	conds) NO NO SAN NGS (0= n) $J COV^1:$ $I COV^1:$ $I COV^1:_$ $I COV^1:_$ $I COV^1:_$ $I OV^1:_$ $I OV^1:_$ I OV	PASS <u>Salt</u> <u>20</u> D: <u>25</u> o cover; 1 <u>7</u> (1) THS (11 t <u>3</u> 27A 1.5m 1.5m	1: $\sqrt{35}$	PAS PAS PAS PAS PAS PAS PAS PAS	S 2: $\frac{1}{2}$ ADIENT (COBB ; 3= 21-30 (orface area spaced) (33'7" 0.12m 0.01m	%): %): %etc8 RHG VEG a suitable j TOTAL J1' 9'' 0.12m 0.00m	BLDR: BLDR: = 71-80%! 1:7 For trout si SITE LEI & ZO' Z'' 0. ZZm 0. ZZm 0. ZSm	CANOPY 35 9= 81-90% 2 SPAW 2 S	2 (%): // BDRCK: BDRCK: 5; 10= 91-1 N HAB ² : see rating. x): 35° 10 13' 7'' 0, 15 m 0.09 m	$\frac{5}{100\%}$ $\frac{5}{1}$ $\frac{5}{1}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

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Page 2 of 3

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Page 3 of 3 SITE: Alder DATE: 27 Sept 2012

FISH LENGTH/WEIGHT DATA PER PASS BY SPECIES:

A	1					1		10	20	2	2				
1267		\$20120			Sieke			Rb	+	roach			Succe		
bet	41	L	las		1-	W		L	V		L	W		1	W
60	2(9)	90	111		114	20		45	1	Dead	36	21		140	35
42		26	41		30	41		54	2		43	21		55	2
64	2	39	21		50	2	DEAO	146	36		32	41			
3	2	38	<1		68	4		55	2		35	<1			
5	1	29	<		50	3	-	55	2		32	21			
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56	2	40	4	PEAD				58	2		39	41			
70	5	40	41					65	2		36	11			1
65	3	37.	<1		1			57	2		30	21			
60	3	35.	<1					41	4		47	2			
63	3	28	4	-				47	2		45	41			
49	2	29	41					65	2					400M	
60	2	25	21					59	2						
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Page 10

Page <u>/</u> of <u>3</u>

2017 EID ELECT	ROFISH	ING DA	TASHEE	Т	D	ATE:	9-28-17				
SITE ID:	2-2	_	D	DESCRIPT	ION:	SF	Amer	TAN	Pive	nel	en Arlenta Maria
					UTN	1 (TOP):					- Cr Cpu
	KAS	tu	n. KI	12. 12	A BT). (+)	1.07	3			
START/END TIME		1	1	wpie	START	/END A	IR TEMP	:			
START/END TIME	·				-	,		1			
IN SITU WATER (QUALITY	·									
INSTRUMENT TY	PE:						TIME:_		- ² - 1		
WATER TEMP:		SPP CC	DND/CO	ND:			SAL		1	rds:	
DO (CONC):		_ DO(S	AT):		pH:_		pHm	V:	(ORP:	
SHOCKER DATA							1 2	nh			
#UNITS USED:	-/ T	YPE(S):	HANTS	en ut	Tern Cri	NHARE	COP CI		22.22		
SHOCKER DURAT	FION (se	conds)	PASS	1:917	M PASS	1 SIDE	L PA	SS 3:	U KIN P	3 ASS 4:	857 REI
FFISHING NOTES	5:	,		1321	(E) BD	1023	S REI	SIDEWW	WEZ)		812 KAW
				NORE	AD BUL PASS	2 203	30 ILDW 73 BD	1368	{		
						(85	S REJ RAND (TL)		
SITE CHARACTE	RISTICS					- 110	ing) in a				
POOL/RIFFLE/RU	JN (%):	50 1	30	120	GRA	DIENT (%):	20	CANOPY	(%):	5%
CLAY: A SI	ILT: <u> </u>	🛃 SAN	D: 15	GRAN	1:40	СОВВ	:25	BLDR:	15.	BDRCK:	C.
SHELTER/HABIT	AT RATIN	NGS (0= n	o cover; 1	= 1-10%, 2	2= 11-20%,	; 3= 21-30	%etc8	= 71-80%	9= 81-90%	; 10= 91-1	00%)
SURF TURB ¹ :	OB.	J COV ¹ :	21	JND BAN	NK ¹ :		HG VEG	¹ :	_ SPAW	N HAB ² :	1
¹ Estimated surface	area prov	iding cove	r for an 8"	' fish; ² Est	imated su	rface arec	suitable j	for trout s	pawning (see rating:	s above)
VESSIONALIN					avanlır	(magad)	τοται			n. 100	
X-SECTIONAL W	IDTHS A	ND DEPI	HS (11 t	ransects	seveniy	spaced	TOTAL	. SITE LEI	NOTH (II	1). <u></u>	
STATION (m)	0	10	20	30	40	50	60	70	80	90	100
WIDTH (m)	21.0	23.7	21.9	18.2	20.1	16.4	17.3	14.6	13.7	15.2	11.8
¼ DEPTH (m)	25	27	29	36	62	72	63	64	31	36	40
½ DEPTH (m)	48	42	DRY	43	61	60	60	104	55	72	56
¾ DEPTH (m)	115	78	38	55	38	13	72	57	41	50	58
SIDECHANNEL	8.2	9,1	7.3	6.8	9.8	10.0	11.8	14.6	11.8	9,1	8.0
	21	27	45	39	46	49	25	19	35	60	94
	40	21	28	52	22	23	25	40	60 En	22	10
	30	29	45	70	41	cho	03	10	20	J	10

101.4 99.7 MAIN

Page 2 of 3

FISH LENGTH/WEIGHT DATA PER PASS BY SPECIES: x

SITE:___

DATE: 9-28-17

-	Sector States and a sector states in	-
21	DAA	C

	LSUCK	#R	RAIN	600)	BRO	(I) A)	RAIN	600)	RAINBO	W	SUN	the	RAINE	aut	DAC	E
	LGTH	WGT	LOTH	WGT	LOTH	WAT	1 cml	WET	LYTH	WGT	LATH	WOT	1614	WGT	1 GATY	WIT
	167	53	65	3	165	51	120	22	73	6	175	67	183	63	91	14
	110	17	58	2	VSIDEC	Indinal	170	56	65	3	190	95	194	76	IN SIDE	Allandord
	81	9	52	1	Ger	3	120	18	67	5	161	57	168	49	VOIDE	CHIMMELD
	150	43	305	110			45	1	190	79	192	91	180	57		
	165	70	115	19	,		128	26	78	6	218	120	80	5		
	228	154	143	38	DACI	E (MAIN)	67	5	58	2	190	89	132	24	PAIN	BOW)
	195	106	170	49	Land	WGT	lon	2 Mine	- 175	56	M	68	45	1	1 born	WLAT
	150	44	52	4	89	12	51	2	52	1	171	74	121	23	1 SIDE	CLANNEL.
	125	28	76	5	75	5	120	18	58	3	121	34	59	3	74	6
	155	410	132	29			80	2	178	63	Mal	58	120	23	30	21
	135	32	7\$	10			174	4	170	24	10	45	78	1	Su	7
	170	47	122	22			95	12	24	5	HO	19	79	7	1.9	4
	85	9	137	25			50	1	68	3	JU SIDE	Mumber 1	102	3	50	2
	210	105	51	1			56	1	185	67	168	52	60	2	15	2
	205	117	118	110		ere ante-de es anna denses	14	4	42	1	136	33	74	5	51	2
167	175	59	140	29			170	53	122	20			139	26	65	2
63 (80	VSIDECI	HANNEL V	170	64			45	1	70	5			201	87	41	3
15	140	41	49	1			55	2	53	1			124	22	132	210
	50	3	148	38			175	6	62	3			60	1	100	<u> </u>
			113	16			49	2	78	5			55	1		
			145	36			61	3	70	4			49	1.		
			170	67			64	3	185	67			80	3		
			67	5			GIDEC	HANNEL	56	2	-		54	2		
			160	54			52	2	200	81			70	5		
			175	59			55	2	81	7			40	1		
			68	5			70	5	200	79		arraying were read a local	146	35		
			135	34			73	5	70	5			V SIDE	HAdale	4	
			170	46			48	1	86	6			56	1 md	r i	
. ~			67	7			52	2	115	16-			138	32		
			155	47			50	2	175	60			79	6		
			61	2			180	70	95	7			122	18		
			68	4		5.1%	48	5	67	4			77	5		
1			62	3		1.54	120	21	48	1			56	2		
			62	3			75	5	78	7			131	27		
			48	1			59	2	78	5		1 A.	55	2		
			175	65			78	5	45	1			68	4		
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			, 53	1 .	2		48	1	. 17				47	1		
			60	3			63	3				•	80	6		
	-	•	133	28			74	6					49	1		
	and the factor of the second state		75	5			120	13					71	4		

PASS #1

PASS #2

Page 3_ of _3 SITE:_____ DATE:____9-28

FISH LENGTH/WEIGHT DATA PER PASS BY SPECIES:

	RAIN	BOW	SUM	ERS												
	LGTU	WAT	1.GTN	611+7							· · ·					
	240	189	211	1310	•											
	118	20	Lin	128			. P.10									
Milor	110	2	158	54												
	70	10	125	20				1.1								
	70	1	121	27												
	til	17	144	UI												
	60	2	100	51												
	100	2	101	22												
	80	1.	101	1.2												
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	T.PAN	BOUL	TRAINE	C			·									
	1 Dull	0000	1 Crow	HAT												
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	102	22														
	100	205														
	T0 -19	10		1												
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