FINAL REPORT

PREDATORY FISH REMOVAL ANALYSIS
LOWER ST. JOE RIVER, IDAHO
2009 - 2011

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1.0 Introduction

This report summarizes a three-year (2009-2011) Predatory Fish Removal Analysis (PFRA) that was completed on the lower St. Joe River in Idaho, which is a tributary to Coeur d'Alene Lake (Figure 1). This study area was between river mile [RM] 15.5 upstream to RM 31 encompassing approximately 15 river miles within the operating project boundary of the Post Falls Hydroelectric Development (HED) which is part of the entire Spokane River Hydroelectric Project (FERC Project No. 2545) owned and operated by Avista Corporation (Avista). The Post Falls dam is located on the Spokane River downstream of Coeur d' Alene Lake and this dam can affect the lower 30 miles of the St. Joe River (Figures 1 and 2).

Bull trout (*Salvelinus confluentus*) are native to the St. Joe River and Coeur d'Alene Lake and are listed as a threatened species protected under terms of the Endangered Species Act (ESA). This PFRA was developed and implemented through the Federal Energy Regulatory Commission (FERC) relicensing process to protect bull trout by removing selected predatory fish from the lower St. Joe River, a known migratory corridor for juvenile, sub-adult and adult bull trout. The PFRA was developed by Avista, US Fish and Wildlife Service (USFWS) and Idaho Department of Fish and Game (IDFG) following guidelines in the USFWS draft recovery plan for bull trout as well as IDFG scientific collecting permits issued in 2009, 2010 and 2011. This Analysis partially satisfies Avista's ESA requirements for the continued operation of the Post Falls HED. This report was prepared to comply with the FERC Article No 407 of the Avista Project license and the requirements of the section 7 Endangered Species Act consultation for the Project. Normandeau Associates Inc. Environmental Consultants (Normandeau) was contracted by Avista through consultation with the USFWS to conduct the PFRA and the collaboratively prepared Scope of Work (SOW – Appendix A) in 2009, 2010 and 2011 on the lower St. Joe River through boat electrofishing and predatory fish stomach content analysis (Figure 2).

Normandeau completed an interim PFRA report from the first two years of sampling combined dated October 2010 that was distributed to Avista, the USFWS and IDFG showing results and conclusions of the 2009 and 2010 field work and stomach content analysis (Normandeau, 2010). The PFRA was originally scheduled for two years of sampling (2009 and 2010) a third year was added to the analysis based on agency coordination and consultation to help confirm if any bull trout are being consumed by non-native predatory fish. Following review, comments and suggestions regarding the 2010 interim report, Avista met with the USFWS and IDFG on December 9, 2010 to fulfill requirements of the January 28, 2009 SOW for Task 1 which required a coordination meeting prior to each year of sampling. Results and action items based on the outcome of that meeting were incorporated into the 2011 sampling scheme as follows:

1. A third year of sampling effort will occur in 2011 following the same sampling schedule as 2010 and will be at least six hours effort for each sampling event. Emphasize the need to focus on areas most likely to have northern pike, but still cover all three reaches of the study area.
2. Sampling schedule (per agency consultation) – Week of May 16, week of June 13, week of June 27 and week of July 11 (planned as a contingency date), 2011.

3. The agencies and Avista agreed that a day/night electrofishing comparison is no longer necessary. The reporting will be revised to include a qualitative discussion that night electrofishing is a more productive method.
4. Collection and analysis will be performed on northern pike only, eliminating smallmouth and largemouth bass from the analysis in 2011. Every effort will be made to obtain at least 30 additional stomach samples that the prey item can be identified to species. The group understands that there is a limited abundance of northern pike and that collecting at least 30 stomach samples may not occur.
5. Laboratory procedures will be refined to identify fish remains to species, if possible, using the accepted procedure of diagnostic bone methodology and to preserve stomach content samples in 100% denatured ethanol rather than 10% formalin for potential future genetic DNA analysis, if diagnostic bone methodology cannot identify a sample to species.
6. A more detailed explanation of the diagnostic lab method will be added to the report.

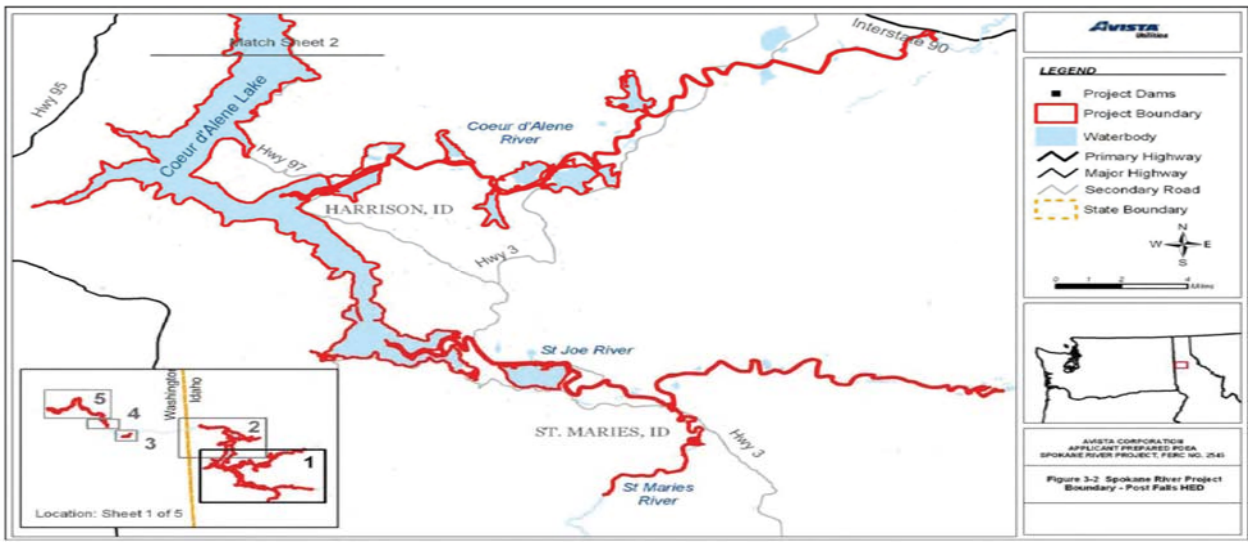

Figure 1. Post Falls Hydroelectric Development. Lower St. Joe River – Avista Predatory Fish Removal Analysis 2009-2011.

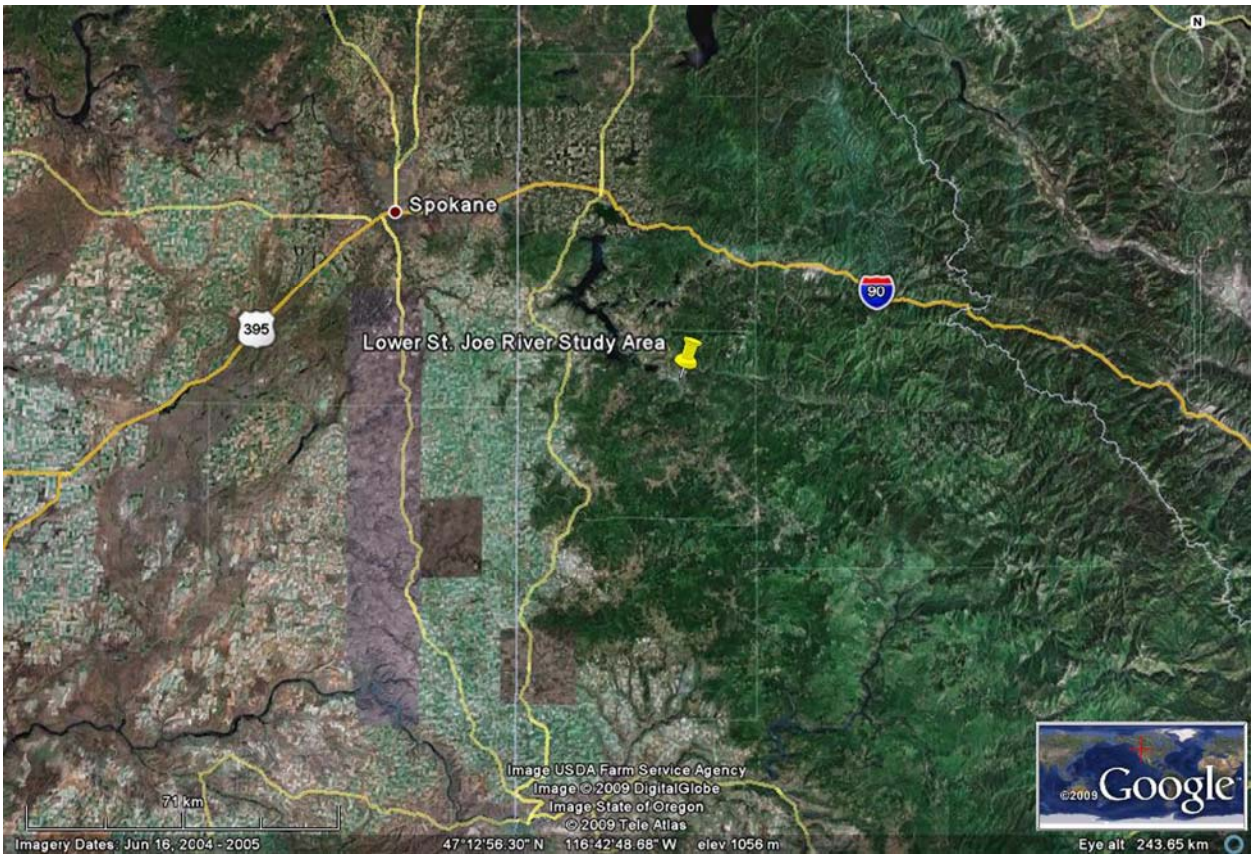

Figure 2. Lower St. Joe River, Idaho. Avista PFRA 2009-2011.

Goal and Objective

Based on available literature from within the Coeur d'Alene Lake basin and from other areas, predation on salmonid species by introduced, non-native species is known to occur and may have population limiting consequences. The goal of the PFRA is to reduce the number of predators in the lower St. Joe River and assess if predation on bull trout by introduced species may have population limiting consequences. Originally, the PFRA was a two-year study intended to assess whether predation on juvenile/sub-adult bull trout is occurring by removing smallmouth bass (*Micropterus dolomieui*), largemouth bass (*M. salmoides*) and northern pike (*Esox lucius*) using electrofishing techniques. Through consultation with the USFWS and IDFG, it was determined that the 2009 field sampling and fish collection using electrofishing was an efficient means of collecting predatory fish and a second year of collection and analysis was completed in 2010 by Normandeau. A third year of sampling was agreed to by Avista and performed by Normandeau based on agency comments and concerns that not enough predatory fish stomach contents had been analyzed to develop a conclusion if bull trout are being consumed by non native predatory fish. The third year of sampling also eliminated collection of smallmouth bass and largemouth bass as enough of these predatory fish were not present in the study area to collect adequate stomach content samples for analysis.

A defined objective of the PFRA was to determine if predation on bull trout is occurring by obtaining an adequate number of key predator species stomach content samples for dietary analysis. A goal contained in the PFRA was to collect 30 diagnostic stomach samples, an adequate number determined through consultation, per predator species and that goal was not met in 2009 or 2010 sampling. Additionally, the diagnostic method was unable to identify stomach contents to fish species on all the samples collected. As agreed by the parties, a third year of sampling was scheduled to make every effort to obtain at least 30 stomach samples from northern pike for analysis.

Study Area

The study area for the PFRA was the lower St. Joe River beginning at the confluence of the St. Maries River at about river mile (RM) 15.5 upstream to the St. Joe City Bridge at RM 31, which is upstream of the Coeur d'Alene Tribe Reservation (Figure 3). The river was mapped and global positioning system (GPS) readings were taken at every site electrofished. Images of the study reach were produced from Google Earth™ creating map plates showing adequate detail of all habitats sampled. The study reach was partitioned into three segments deemed the lower, middle and upper sections, with specific side-channel or back-water habitats identified within each reach (Figure 3). The lower section began at the confluence of the St. Maries River and St. Joe River at RM 15.5 upstream approximately 5.5 miles to a sharp bend in the river immediately west of a large pond or permanent wetland at RM 21 (Figure 3). The middle section continued upstream to RM 26 approximately 1 ½ river miles upstream of the Rochat Creek culvert backwater (Figure 3). The upper section of the study reach ended at the St. Joe City Bridge at RM 31 where free-flowing conditions are present leading downstream into the inundated reach (Figure 3).

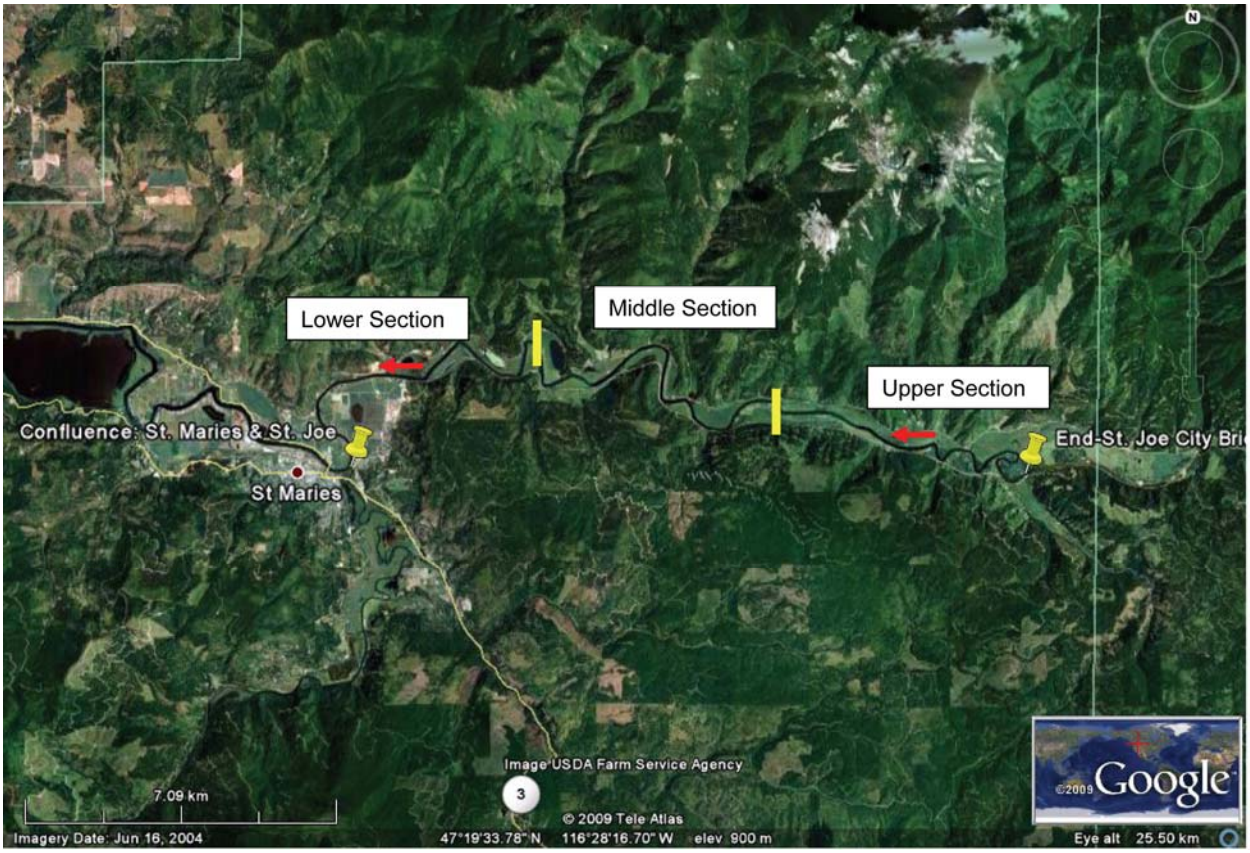

Figure 3. Lower St. Joe River Study Area Showing Lower, Middle, and Upper Sections 2009 - 2011 (Red Arrows Indicate Flow Direction).

The lower section of the study area had the most homogeneous habitat dominated by rip-rap or riparian vegetation shoreline with developments, houses, recreation and commercial properties and roads more prevalent along the shoreline. The middle and upper section is where backwater habitats are most present and appear to be inundated all year with adequate flow, and cover (Figure 4). This section also has the most meandering character of a lower river with remnants of oxbow lake formation, tributary delta ponds and sharp bends in the river channel. The upper section had a combination of habitats with some backwater areas, rip-rap and riparian shoreline as well as a few sandy beaches and the most recreation properties present (Figure 5). Recreation properties typically were altered habitats with little riparian vegetation present dominated by grass/lawn leading up to the shoreline and overwater structures (docks) and boat-houses common.

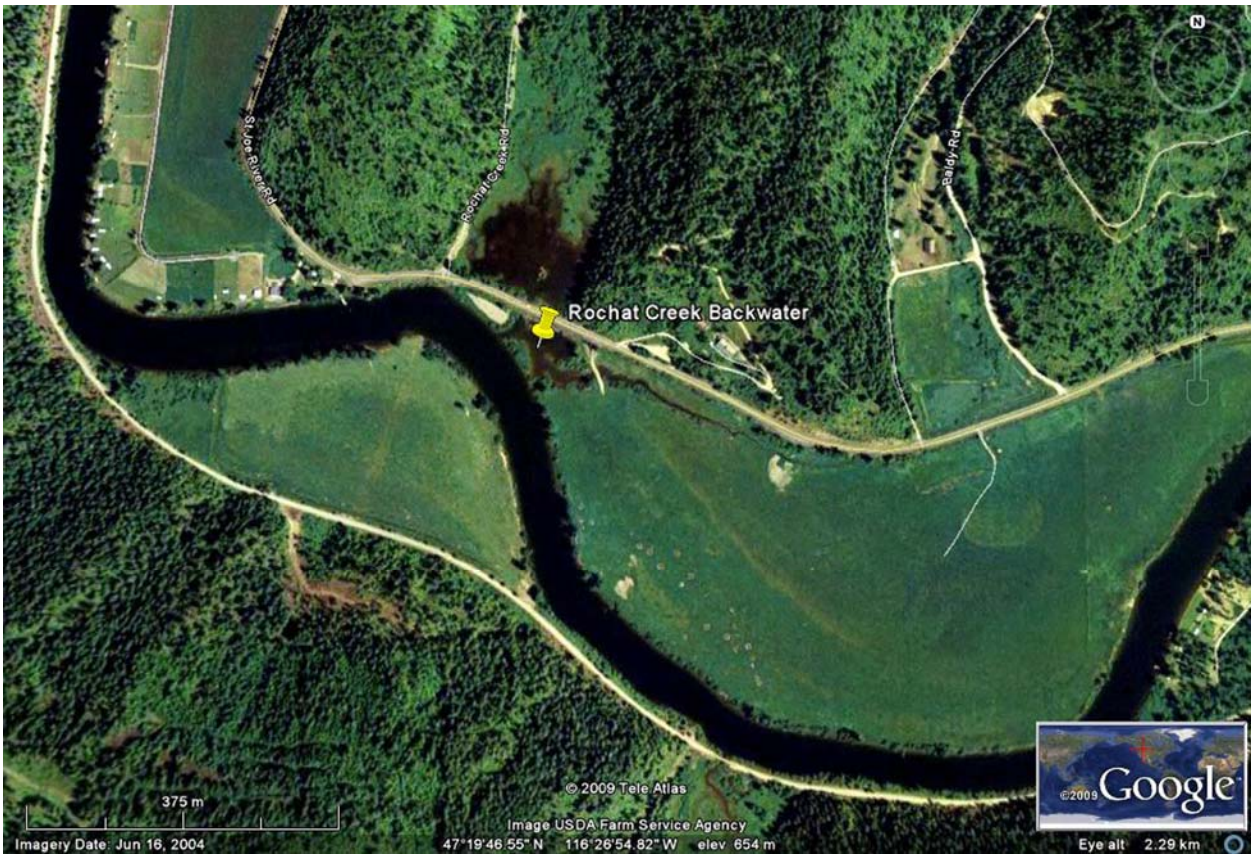

Figure 4. Rochat Creek and Other Backwater Habitat; Middle Section Lower St. Joe River PFRA 2009 - 2011.

Timing of Sampling

Sampling was planned for and conducted during the spring and early summer period (late April through early-July) each of the three years per the January 28, 2009 SOW(Appendix A) issued by Avista. This PFRA effort was collaboratively agreed to be best conducted in that time most probable that juvenile bull trout would be migrating through the study reach and predatory fish would be feeding. This sampling timing was during the specific time-frame that encompasses the spring and early summer when water temperature is still cool enough for juvenile bull trout presence yet not cold enough to preclude piscivorous activity by non-native fishes in the area. The PFRA was developed with the intension of conducting a majority of sampling during the descending phase of the St. Joe River hydrograph, primarily in May, June and July of each year.

2.0 Methods and Materials

This boat electrofishing effort followed the Washington Department of Fish and Wildlife (WDFW) electrofishing guidelines (Bonar *et al.* 2000) and the Avista SOW. Predatory fish were collected using boat electrofishing and stomach contents of three target species (northern pike, largemouth and smallmouth bass) were collected and sent for laboratory analysis for presence of bull trout in 2009, 2010. Through agency coordination and consultation, in 2011, smallmouth

and largemouth bass were removed as target species with northern pike being the only species targeted for collection. Water temperatures were continuously recorded throughout the study periods and day time electrofishing was qualitatively compared to night electrofishing only in 2009 with night electrofishing conducted exclusively in 2010 and 2011. All predatory fish target species over 300 millimeters (mm) fork length collected for stomach content analysis were euthanized, stomach contents examined and collected (if present), then sealed in plastic bags and kept on ice on the boat. Viable stomach content sample bags were later frozen solid for shipment to the Normandeau biological laboratory for analysis. Per the IDFG scientific collectors permit instructions, fillets from predatory game fish were donated to the Idaho Food Bank each year in St. Maries, Idaho.

Electrofishing

An 18-foot Smith-Root electrofishing boat equipped with a gas powered pulsator (GPP) generator and associated electrofishing components was used exclusively throughout the study for fish collections. The boat has a near flat-bottom keel with a 100 horsepower propeller-drive outboard with power trim to allow access into back-water shallow areas and shoreline habitats as well as the main river channel. A minimum crew of three was deployed for each sampling event with a boat operator who also ran the GPP and two netters on the bow of the boat. The majority of sampling was conducted with the GPP on the low setting, 50% pulse, 60 volts DC with each electrofishing event timed for 600 seconds (10 minutes). GPP settings were adjusted slightly during each trip to obtain optimal shocking efficiency. A two-chamber ambient water live-well was used when shocking to separate any predatory fish from native fish or species of concern such as bull trout and westslope cutthroat trout (*Oncorhynchus clarki lewisi*).

All three segments of the river study area (lower, middle and upper, see Figure 3) were electrofished during each week of sampling. Areas with moderate to low water velocities and depths of less than 10 feet were electrofished sampling littoral riparian, exposed banks and rip-rap shoreline habitats as well as backwaters or tributary delta ponds and some side-channel habitats.

Netters selected for the three target species (only northern pike in 2011) at or above 300 mm fork length, but also were targeting bull trout, other native fish species and incidental collections of interest. Sampling occurred for a minimum of six hours per night with night electrofishing beginning around 8:30pm and ending around 4 am.

Electrofishing catch per unit effort (CPUE) was used as an index of sampling efficiency and was calculated as the number of fish collected divided by the amount of time electrofishing occurred. Electrofishing time was recorded with the Smith-Root GPP seconds meter on the boat. Each sampling event was timed with a goal for 600 seconds, which is the equivalent to approximately a 0.25 mile section of river being shocked for electrofishing. Some electrofishing sites had an effort longer than 600 seconds, in particular, backwater habitats where much more area was covered and a pulsed approach was used instead of steady and constant electrofishing used more for shoreline habitats.

Each sampling date encompassed a number of sites electrofished throughout the study reach. Electrofishing time was recorded and summed up for each date sampling occurred combining all sites on a single sampling date to determine effort. To get CPUE for a specific date of sampling,

the sum of the catch (target species of bass and pike) was divided by the electrofishing time (effort in seconds).

e.g. June 9, 2009 night electrofishing:

8 sites electrofished, total seconds shocked = 5,857, or 1.63 hours.
Total catch of target species = 7 fish.

CPUE = 7 fish/1.63 hours of electrofishing = 4.3 fish/hour.

Per the Avista 2009 SOW (Appendix A), a length to weight ratio was developed for northern pike with 77 specimens used from 2009-2011 sampling to provide data in developing this target species length/weight correlation. Length and weight were plotted and tested using a simple linear regression to show the strength of the relationship as expressed in a R^2 value. For smallmouth bass, a length to weight correlation was also developed with a sample size of only six fish that were measured and weighed during the field sampling in 2009 and 2010 combined.

Stomach Content Analysis Field Collection

A Stomach Content Sampling Plan dated June 9, 2009 (Appendix C) was developed through consultation and coordination with the agencies and Avista prior to field work beginning in 2009. There were no changes to the Stomach Content Sampling Plan for 2009 and 2010 sampling; however, in 2011, northern pike were the only target species based on an interim coordination meeting in 2010 between Avista and the agencies. This plan established a minimum length of 300 mm for target species to be considered viable predatory fish suitable for stomach content analysis. The plan, developed through consultation and with guidance from Normandeau Associates called for lethal collection per each of the three target species in 2009 and 2010 and one target species of northern pike in 2011 with a goal to collect up to 30 stomach samples per species.

Target species meeting the size criteria (300 mm) collected for stomach content analysis were euthanized by mechanical means, measured to fork length, weighed using Pesola spring-loaded scales and then dissected to examine stomach contents. Any unidentifiable or identifiable fish parts or undigested material were removed from the stomach and transferred directly to a labeled plastic sample bag that also contained a waterproof-paper label inside the sample bag with all pertinent information. The sealed stomach content bags were immediately placed on ice in a cooler on board the boat. A target species with an empty stomach was noted as such, weighed and measured with no laboratory analysis necessary. If any identifiable fish or fish parts were observed in stomachs while in the field, notes were made on sample bags to indicate field identification of consumed prey to assist laboratory identification checks.

When returning from the field, all bagged stomach content samples were frozen solid and shipped with dry ice to the Normandeau Laboratory in Falmouth, Massachusetts for analysis looking for presence of bull trout. Per the IDFG scientific collectors permit each year, all predatory game fish euthanized for stomach content sampling were cleaned and filleted, placed in sealed plastic bags and immediately put on ice into a specific cooler on board the boat for later donation to the Idaho Food Bank in Coeur d' Alene or St. Maries, Idaho.

Stomach Content Analysis Laboratory Methods

In the laboratory the frozen predator stomach content samples were thawed at room temperature, removed from the sample bag and opened over a 0.5 mm sieve and rinsed in fresh water. All contents were identified to the lowest possible taxon. The target species for this study is the bull trout (*Salvelinus confluentus*), which is most reliably differentiated from other *Salvelinus* species by head morphology, including a variety of diagnostic bony structures of the head and jaw. In those cases where a prey item lacks sufficient surviving structure to reliably "rule out" identification as *Salvelinus confluentus* the prey item was labeled and immediately refrozen and preserved. Some samples contained enough intact body parts, fins or other distinguishing morphology to identify to family or genus level; however, if the head and jaw bones were not available due to being digested, identification to species level was sometimes not be possible. The entire contents of each stomach sample were examined using a binocular dissecting microscope when necessary and identified to the lowest possible taxonomic level. All prey items were counted, blotted to damp-dry, and weighed. Pisces (fish) prey items were measured (total length) if possible. An estimated length was recorded for partial pisces remains whenever possible. Following analysis of stomach contents, the samples were fixed in 10% Formalin for the 2009 and 2010 analysis. In 2011, samples were preserved in 100% denatured ethanol instead of Formalin. All samples have been archived at the Normandeau lab and will be kept for a minimum of two years.

Primary reference material used included Freshwater Fishes of Canada (Scott and Crossman 1973) and several taxonomic references particular to morphologic and osteologic differentiation of bull trout (*Salvelinus confluentus*) from other Salmonids of the genus *Salvelinus* (i.e. Cavender 1978, 1980, and 1997).

Water Temperature and River Flow

In 2009, two continuously recording water temperature monitoring devices were placed in the St. Joe River study reach, one in the lower section and one in the middle section. A third temperature recorder was not deployed in 2009 as a suitable location could not be secured in the upper section. Recorders were deployed and launched in the field on May 14, checked in early June and removed on June 24. In 2010, temperature monitoring devices were placed in all three sections of the study area, as called for in the SOW. The probes were launched in the field on May 18, data was downloaded and the probes checked on June 23 and 24 and the probes were removed July 8 and 9, 2010. Again in 2011 temperature recorders were placed in all three sections of the study area being launched on June 13-15, downloaded on June 27-29 and removed on July 11-13, 2011.

The temperature recorders used were HOBO-Onset Water Temp Pro v2 data loggers along with a HOBO Waterproof Shuttle for downloading and resetting data loggers in the field. Data loggers have a reported accuracy of 0.2 degrees Celsius (Onset 2009). The probes were hung approximately two feet below the water surface via a cable attachment to shoreline structures or a tree. Downloaded data was plotted and displayed graphically in degrees Celsius (C) over time of deployment. In addition to the continuously recording probes, a hand-held thermometer reading was obtained at the beginning and end of each sampling day/night to note ambient water temperature and was not compared to continuous recorders. .

River flow for the study reach of the lower St. Joe is best represented at the US Geological Survey (USGS) gage at Calder, Idaho; gage number 124145000; located at river mile 42.9 approximately 125 feet downstream of the bridge at Calder. Hourly flow volume of cubic feet per second (CFS) was obtained from the USGS gage for each date of sampling. Flow volume for each day was represented by consistently using the 8am reading.

Mean daily flow during the sampling periods was plotted for each year and mean monthly flows were compiled over select years of data that represent variation in conditions as a general comparison to average flow during the spring and early summer.

3.0 Results

Per the SOW(Appendix A), electrofishing collections occurred when juvenile bull trout were most likely present in the descending phase of the St. Joe River hydrograph while water temperature remained cool enough (~ 10^{o}C) for bull trout. Per the SOW and agency coordination, sampling was not to extend past mid-July. Sampling occurred for a minimum of six hours per night with two day-time electrofishing events and five night electrofishing events completed in 2009, six nights of electrofishing were completed in 2010, and nine nights of sampling occurred in 2011 (Table 1). On average, a total of nine 0.25 mile-long, 600 second effort sites were electrofished each night of sampling. The last night of sampling in 2009 occurred on June 24 with a hand-held surface water temperature of 12^{o} C and in 2010 the last night of electrofishing was on July 8 at 16^{o} C surface temperature. Field sampling occurred later into the season during 2011 based on consultation with the agencies and a cool, moist spring that resulted in higher flows and cooler water temperatures that persisted into early July. The first scheduled sampling week of May 16, 2011 was cancelled as the St. Joe River was at flood stage with all access to the river unavailable (Figure 5). The final night of electrofishing in 2011 was on July 13 with a surface water temperature reading of 16^{o}C.

Figure 5. Lower St. Joe River May 2011 High Water and Flood Stage.

Boat electrofishing was an effective method for collecting non-native predatory fish in the lower St. Joe River from 2009-2011. Boat electrofishing occurred throughout the river study reach each year with the most productive habitats sampled being back-water or side channel areas (Figures 4 and 5). Fish of all species were stunned and made available for netting and collection on the St. Joe River with few escaping the electric field. During the collection periods, netters were successful at capturing target predatory fish species, in particular, northern pike. Only one largemouth bass was observed but not collected over the three years of sampling and a total of 23 smallmouth bass were collected from 2009 through 2011.

2009 Electrofishing: Two day-time and five night-time electrofishing events were completed in 2009 with many species observed and northern pike (NP) being the most abundant of the three target species encountered. A total of 20 viable predator size (300 mm or greater) northern pike were collected with 19 having stomach content analysis completed. Three smallmouth bass (SMB) were collected with one large enough (300 mm or greater) for stomach content analysis in 2009 (Table 1). A detailed summary of 2009 electrofishing data is provided in Appendix B. No largemouth bass (LMB) were collected in 2009. The most abundant fish present, of any age/size class were suckers (*Catostomus spp.*) and northern pikeminnow (*Ptychocheilus oregonensis*) consistently throughout the sampling period. One juvenile bull trout (Appendix E, Plate 1) and 11 westslope cutthroat trout were observed and collected during sampling in 2009. No native salmonids were killed or injured during this sampling in 2009. Other incidental species collected were three brook trout (*Salvelinus fontinalis*), nine kokanee salmon (*Oncorhynchus nerka*), two rainbow trout (*Oncorhynchus mykiss*), several tench (*Tinca tinca*) and yellow perch (*Perca flavenscens*).

2010 Electrofishing: A total of six full nights of electrofishing were completed in 2010 with 30 NP collected and 13 of those having stomach content sent for laboratory analysis (Table 1). On average, 11 individual sites were electrofished per sampling date/event in 2010 with at least six hours time on the water. A detailed summary of 2010 electrofishing data is provided in Appendix B. In 2010, there were 16 SMB collected with four fish having stomach content samples sent in for analysis (Table 1). No LMB were observed during electrofishing in 2010. Noteworthy incidental fish collections were two sub-adult/juvenile bull trout (220mm & 165mm) and 16 westslope cutthroat trout ranging in size from 120mm to 455mm (Appendix E, Plate 2). As with the prior year, in 2010, the most abundant fish present, of any age/size class were suckers and northern pikeminnow consistently throughout the sampling period. No native salmonids were killed or injured during 2010 sampling. Other incidental species collected were one brook trout, 34 kokanee salmon, three rainbow trout, several tench and yellow perch.

2011 Electrofishing: In 2011, effort was expanded to nine full nights of electrofishing compared to six nights completed in 2010 with 40 NP collected and 28 of those having stomach content sent for laboratory analysis (Table 1). On average, 10 individual sites were electrofished per sampling date/event in 2011 with at least six hours time on the water. Catch of other species were very similar to efforts in 2009 and 2010; therefore, a detailed summary of all fish collections was not provided for 2011 as was done in 2009 and 2010. During the June 13 through 15 sampling event several other species, but no target species, were collected. There were four SMB collected in 2011, one on June 28 and one each on July 11, 12 and 13. There were four westslope cutthroat trout collected in 2011and the most abundant fishes present, of any age/size class were suckers and northern pikeminnow consistently throughout the sampling period. No native salmonids were killed or injured during any sampling.

Table 1. Electrofishing Results Avista PFRA: Lower St. Joe River 2009 through 2011.

Date	Time of Day & Hours Sampled	River Section	Catch (Target Spp.)	CPUE (fish/Hr)	Surface Temp (^{o}C)
2009 Electrofishing					
5-14-09	10:30 – 16:30 – 6 Hrs.	Low/Mid	2 NP	1.1	7
5-15-09	09:30 – 11:30 – 2 Hrs.*	Low/Mid	0	0	7
6-9-09	20:15 – 01:25 – 6 Hrs.	Mid/Up	7 NP	4.3	8
6-10-09	20:30 – 21:30 – 1 Hr.*	Mid/Up	0	0	8
6-22-09	20:45 – 24:45 – 4 Hrs.	Low/Mid	1 NP, 1 SMB	1.5	12
6-23-09	20:25 – 24:50 – 4 Hrs.	Mid/Up	1 NP, 1 SMB	1.1	12
6-24-09	20:45 – 24:45 – 4 Hrs.	Mid/Up	9 NP, 1 SMB	6.7	12
			Total: 20 northern pike, 3 smallmouth bass		
2010 Electrofishing					
5-18-10	20:30 – 02:30 – 6 Hrs.	Low/Mid	4 NP, 2 SMB	3.1	8
5-19-10	20:30 – 22:30 – 2 Hrs.*	Low/Mid	0	0	10
5-27-10	20:30 – 02:30 – 6 Hrs.	Mid/Up	6 NP	3.3	9
6-23-10	20:30 – 02:30 – 6 Hrs.	Low/Mid	2 NP, 1 SMB	1.2	12
6-24-10	20:30 – 02:30 – 6 Hrs.	Mid/Up	1 NP, 1 SMB	0.92	13
7-7-10	20:30 – 02:30 – 6 Hrs.	Low/Mid	14 NP, 9 SMB	11.1	15
7-8-10	20:30 – 02:30 – 6 Hrs.	Mid/Up	3 NP, 3 SMB	3.1	16
			Total: 30 northern pike, 16 smallmouth bass		
2011 Electrofishing					
6-13-11	20:30 – 02:30 – 6 Hrs.	Low	0	0	9
6-14-11	20:30 – 02:30 – 6 Hrs.	Mid	0	0	10
6-15-11	20:30 – 02:30 – 6 Hrs.	Up	0	0	10
6-27-11	20:30 – 02:30 – 6 Hrs.	Low	3 NP	1.7	12
6-28-11	20:30 – 02:30 – 6 Hrs.	Mid	3 NP, 1 SMB	1.6	12
6-29-11	20:30 – 02:30 – 6 Hrs.	Up	0 NP	0	11
7-11-11	20:30 – 02:30 – 6 Hrs.	Low	4 NP, 1 SMB	1.8	14
7-12-11	20:30 – 02:30 – 6 Hrs.	Mid	20 NP, 1 SMB	14.3	15
7-13-11	20:30 – 02:30 – 6 Hrs.	Up	10 NP, 1 SMB	5.0	16
			Total: 40 northern pike, 4 smallmouth bass		
Total Target Species Collected 2009-2011: 90 northern pike & 23 smallmouth bass.					
* Reduced sampling due to boat malfunction					

Catch per River Section

Combined catch of target species for 2009 through 2011, per river study section is presented below by lower, middle and upper sections as defined earlier (Figure 3).

Lower Section:	northern pike = 12
	smallmouth bass = 8
	Total = 12
Middle Section:	northern pike = 59
	smallmouth bass = 9
	Total = 43
Upper Section:	northern pike = 19
	smallmouth bass = 6
	Total = 14
Total; All Sections 2009 -2011:	northern pike = 90
	smallmouth bass = 23

Day and Night Sampling Comparison

A qualitative comparison between day-time electrofishing and night-time electrofishing was conducted per the SOW in 2009 from data obtained on May 14 (day-time sampling), and June 9, 2009 (night-time sampling). From this comparison day-time electrofishing was not as efficient or productive compared to night electrofishing. Other research also has showed that night electrofishing is more effective than during the day with a significantly higher CPUE resulting (Paragamian, 1989). Results based on the 2009 effort and consultation with the USFWS and IDFG on March 16, 2010 concluded that day time electrofishing not be continued in 2010 and 2011 with no further comparison between day and night electrofishing necessary.

Length to Weight Relationship

Per the SOW, a length to weight ratio for northern pike (n = 77) is shown in Figure 6 combining all pike collected in 2009 through 2011. Length and weight were plotted and tested using a power regression that showed an R^2 value of 0.968 representing a good relationship and correlation between length and weight for northern pike. A length to weight relationship was also performed on smallmouth bass with six specimens that were weighed and measured in 2009 and 2010 to provide data (Figure 7). This regression also proved to be a good correlation for smallmouth bass length to weight with an R^2 value of 0.977 with a small sample size.

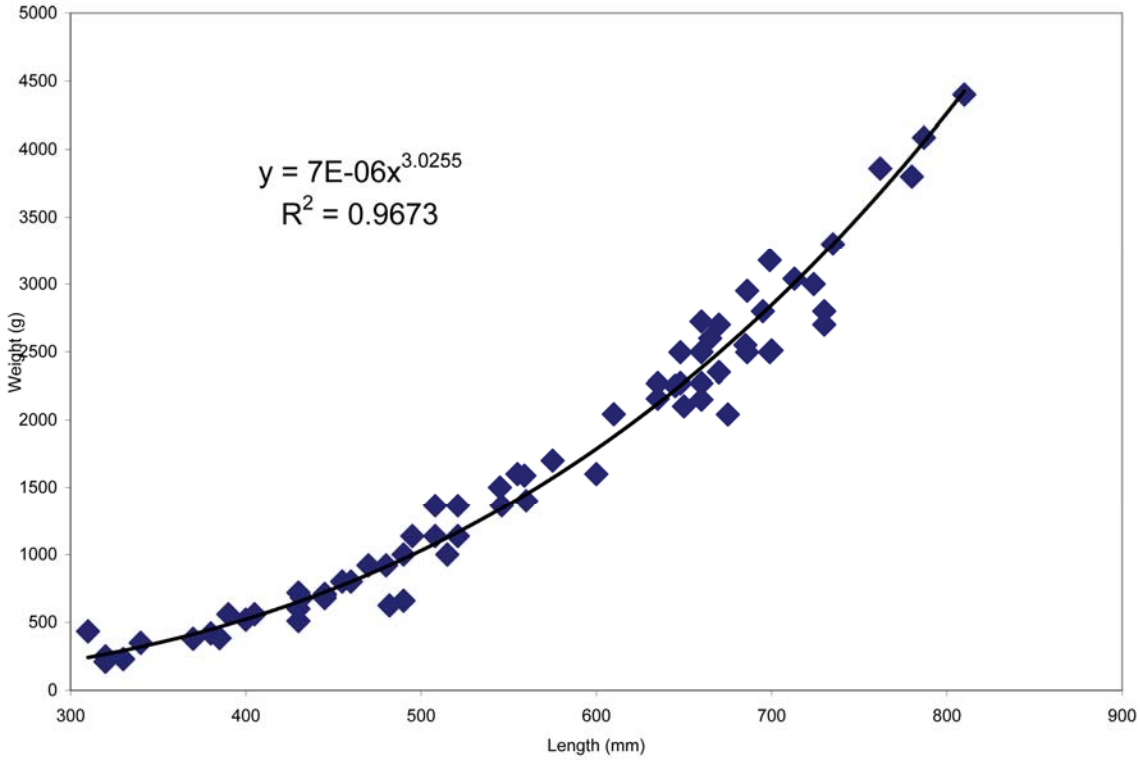

Figure 6. Length to Weight Ratio for northern pike (n=77), Avista PFRA - St. Joe River, Idaho; 2009-2011.

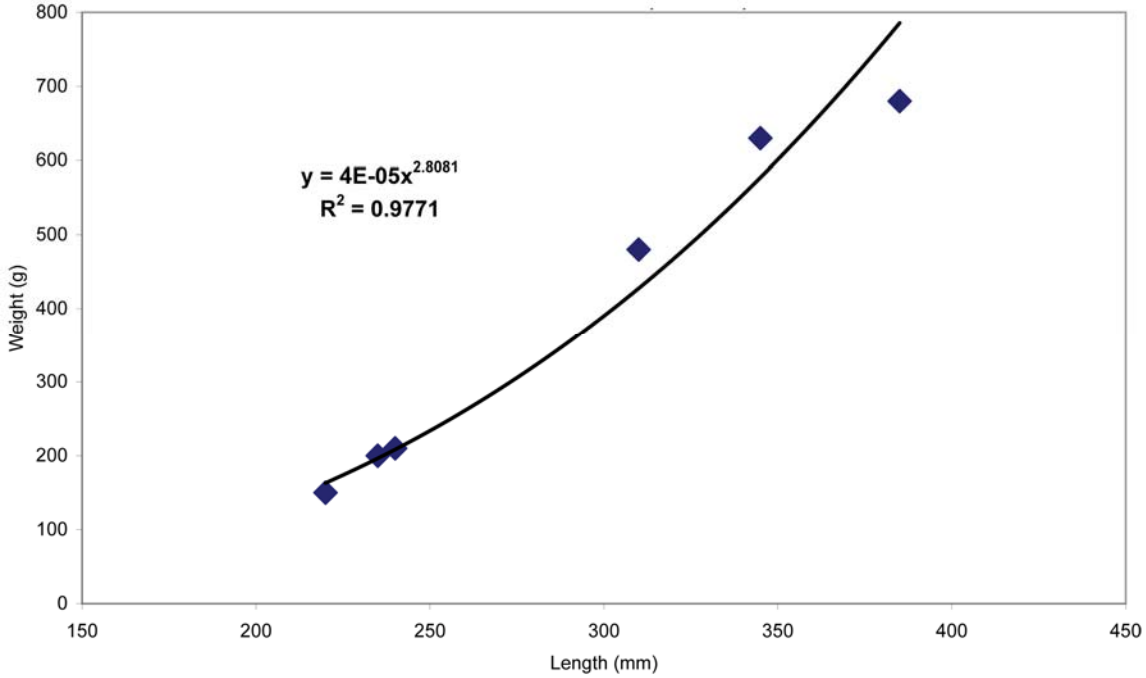

Figure 7. Length to Weight Ratio for smallmouth bass (n=6), Avista PFRA - St. Joe River, Idaho; 2009-2010.

Water Temperature and River Flow

Water temperature in the lower St. Joe River study area was monitored continuously using two HOBO data loggers in 2009 and three data loggers in 2010 and 2011. The 2009 temperature recorders were deployed on May 14 and were removed on June 24, 2009; however, due to an error during launch of the loggers, they stopped recording June 1, 2009 and data is available only up to June 1 for 2009. This error was corrected in 2010 and 2011 with three loggers deployed, one in each of the three sections of the study area all having continuous recording throughout the study periods.

Figure 8 graphically shows daily 2009 water temperature fluctuations of the two recorders and the corresponding table below denotes the high (9.6^{o}C on May-31), low (5.5^{o}C on May-20) and average (7.9 and 8.0 ^{o}C) readings for each logger throughout its deployment.

2009	Lower Probe	Middle Probe
Max ^{o}C	9.5 on 6/1	9.6 on 5/31
Min. ^{o}C	5.5 on 5/20	5.7 on 5/20
Ave. ^{o}C	7.9	8

Figure 8. Avista PFRA – Water Temperature Lower St. Joe River 2009

Water temperature data from 2010 is presented graphically in Figure 9 and showing a minimum reading of 5.9 ^{o}C on May 21 at the upper probe located at the upstream terminus of the study area and this location also having a maximum reading of 16.0 ^{o}C on July 7, 2010 with the average temperature also shown on the table below.

2010	Lower Probe	Middle Probe	Upper Probe
Max ^{o}C	15.8 on 7/1	15.4 on 6/30	16.0 on 7/7
Min. ^{o}C	6.7 on 5/22	6.3 on 5/21	5.9 on 5/21
Ave. ^{o}C	10.3	10.0	9.9

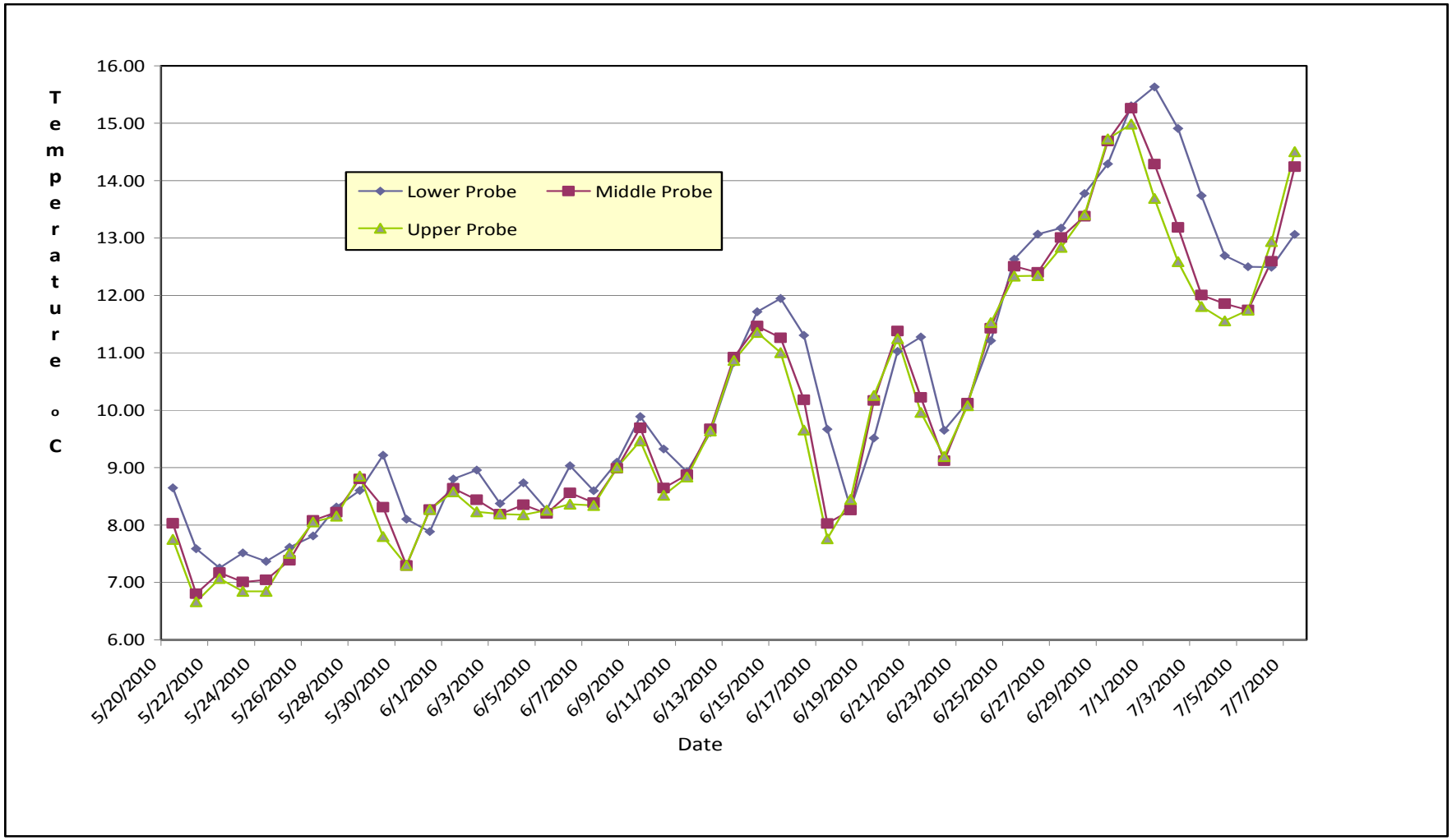

Figure 9. Avista PFRA – Water Temperature Lower St. Joe River 2010

For 2011, water temperature data is graphed in Figure 10 with the associated table below showing a minimum reading of 5.8 ^{o}C on June 17 at the upper probe, a maximum reading of 11.8 ^{o}C on July 7 at the lower temperature probe location and average temperature for each probe. The probes were not deployed on the scheduled May 16, 2011 sampling period because of inaccessibility from flood-stage flows.

2011	Lower Probe	Middle Probe	Upper Probe
Max ^{o}C	11.8 on 7/7	11.3 on 7/7	11.1 on 7/7
Min ^{o}C	6.3 on 6/17	6.0 on 6/17	5.8 on 6/17
Ave ^{o}C	9.1	8.8	8.5

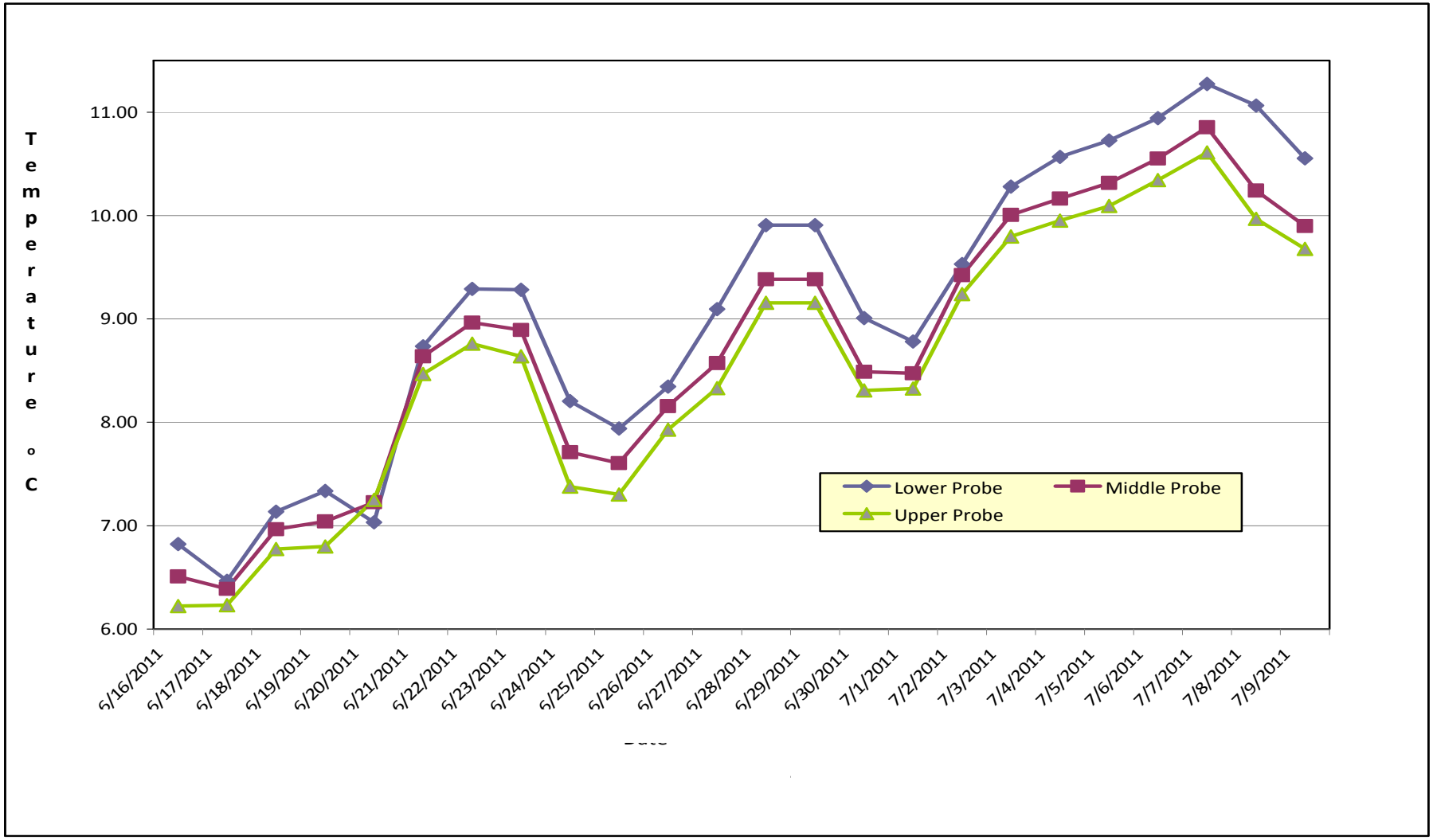

Figure 10. Avista PFRA – Water Temperature Lower St. Joe River 2011

St. Joe River Flow was monitored and plotted for each year of field sampling that was conducted during the spring and early summer throughout the descending phase of the hydrograph of the St. Joe River as defined in the SOW. Flow was monitored and reported during the agreed upon study periods and not the entire year. The descending phase of the hydrograph is illustrated using representative USGS mean monthly flow data from high, low and moderate flow years (Figure 11) for the period March to August which is pertinent to this study. Electrofishing was conducted in 2009 through 2011 primarily through the descending phase of the St. Joe River hydrograph during the spring and early summer sampling periods as outlined in the SOW (Figure 12).

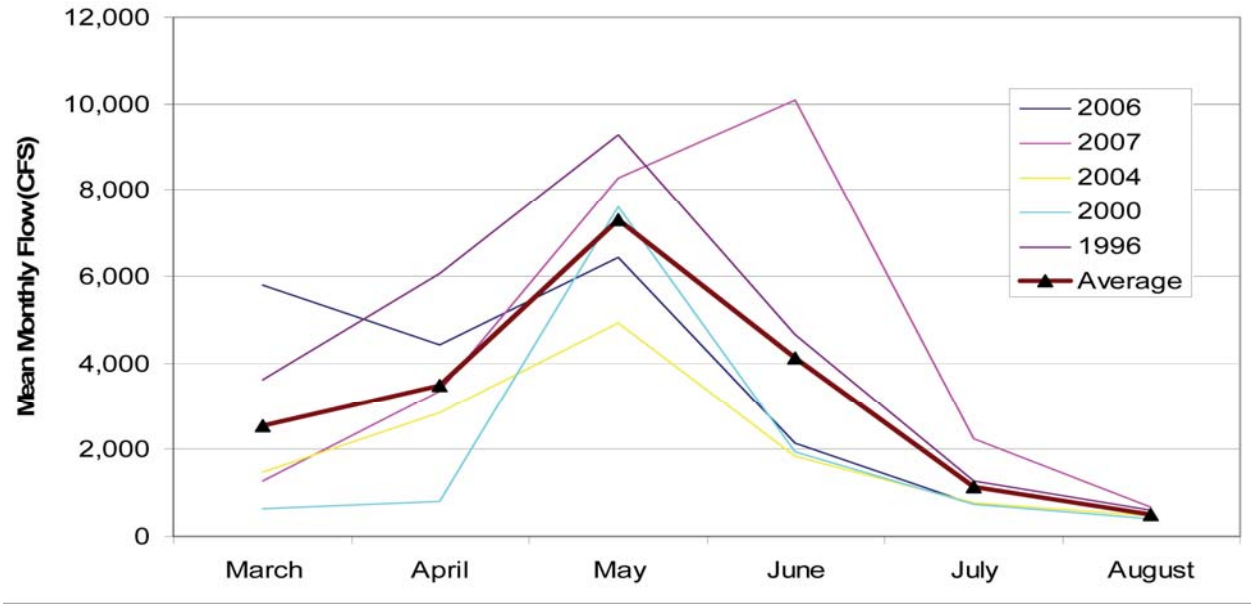

Figure 11. St Joe River Flow at Calder, ID (USGS Gage 12414500)

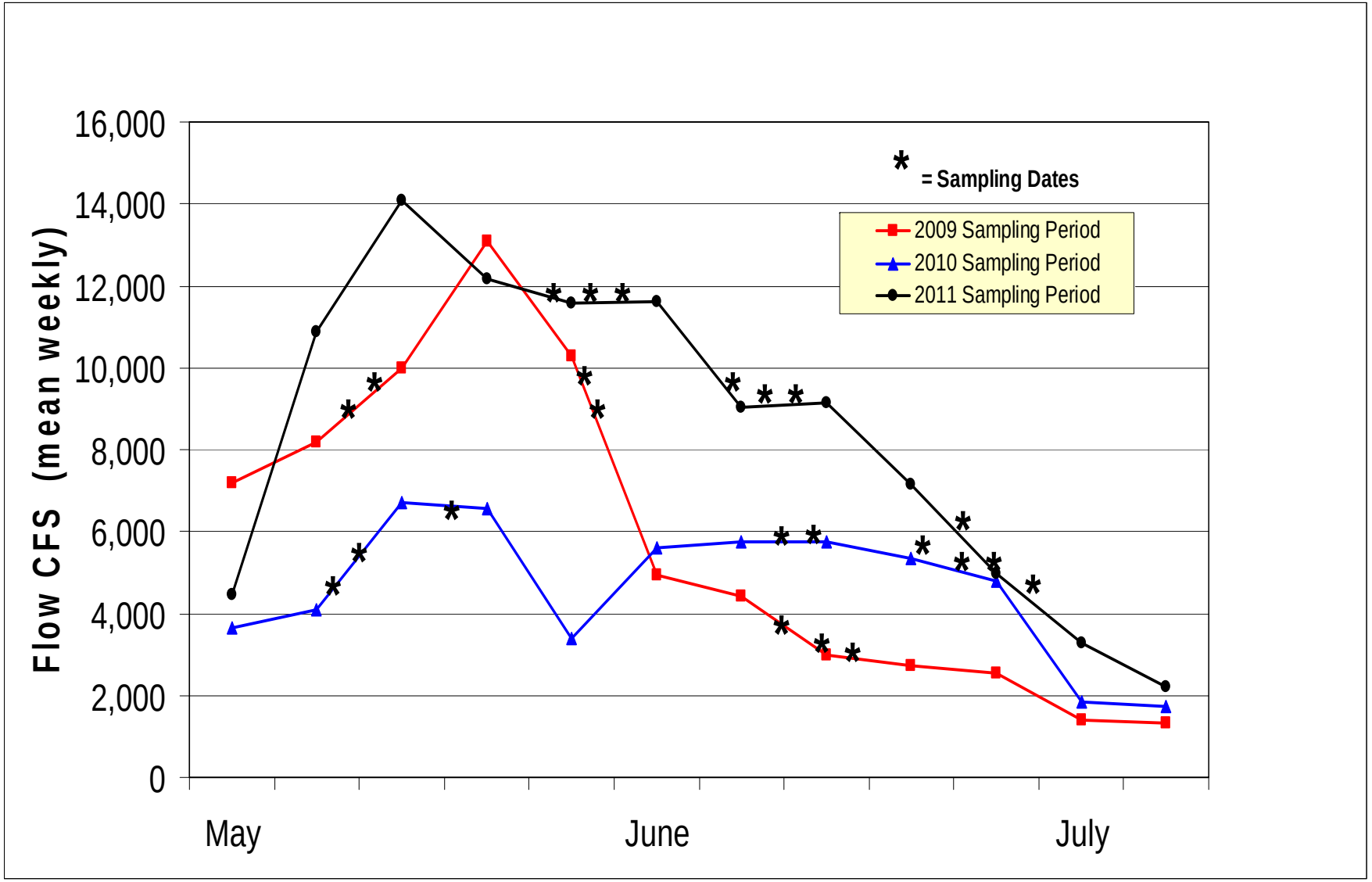

Figure 12. Avista PFRA, Lower St. Joe River, Idaho Flow 2009-2011.

Stomach Content Analysis

Stomach contents of 60 northern pike and five smallmouth bass collected from all three years of sampling were analyzed showing prey items identified as other salmonids, northern pikeminnow, largescale suckers, pike and minnow remains (Tables 2, 3 and 4). Readily identifiable stomach content prey species was made, when possible, in the field after opening a stomach for sampling and noted on samples. As an example, this occurred on June 9, 2009 with a 567 mm long northern pike weighing 3,250 grams (Appendix E, Plate 5) with a whole cutthroat trout identified in the field contained in its stomach and another pike (700 mm x 2,510 grams) with many small tench in its gut (Appendix E, Plate 4).

Through field identification and laboratory analysis, no bull trout remains were confirmed in any stomach samples collected in 2009, 2010 or 2011 (Tables 2, 3 and 4). Of the 60 northern pike stomach samples analyzed, 31 were identified to the fish species level, 12 were identified to the family and genus level, and 17 samples were either unidentifiable pisces remains or other prey including insects, animal remains, and plant debris. For the three year sampling effort, 46 northern pike stomach samples (31 identified to species and 12 to family and genus level, and three insect, animal or plant) were confirmed not to contain bull trout as prey. The remaining 14 pisces samples were digested beyond identification of the analysis to make an identification to the species level.

Of the five smallmouth bass stomach samples analyzed two were identified to northern pikeminnow (Tables 2, 3 and 4). The remaining samples were insect, crayfish or unidentifiable. No bull trout were confirmed consumed by smallmouth bass.

Table 2. Avista PFRA Stomach Contents Analysis 2009.

Predatory Species				
Species Sample #	**Date**	**Fork Length (mm)**	**Weight (g)**	**Stomach Content (Prey Items)**
smallmouth bass				
SMB-1	6/23/2009	310	480	unid. 2x insects
n = 1				
northern pike				
NP-1	5/14/2009	330	230	animal remains, pisces bones
NP-2	5/14/2009	650	2100	digested animal remains
NP-3	6/9/2009	567	3250	westslope cutthroat (Oncorhynchus clarki lewisi)
NP-4	6/9/2009	724	3000	unid. salmon spp. lower jaw (Oncorhynchus spp.)
NP-5	6/9/2009	430	720	unidentified pisces remains
NP-6	6/9/2009	575	1700	unid. salmon spp. caudal ped. (Oncorhynchus spp.)
NP-7	6/9/2009	700	2510	tench (Tinca tinca) 18x
NP-8	6/9/2009	670	2350	tench (Tinca tinca) 22x
NP-9	6/9/2009	660	2500	kokanee salmon (Oncorhynchus nerka)
NP-10	6/22/2009	482	625	bullhead spp. bones & spines (Ictaluridae)
NP-11	6/23/2009	665	2600	unidentified digested pisces remains
NP-12	6/24/2009	685	2550	unidentified pisces remains
NP-13	6/24/2009	555	1600	westslope cutthroat (Oncorhynchus clarki lewisi)
NP-14	6/24/2009	735	3300	unidentified pisces bones and remains
NP-15	6/24/2009	645	2250	unidentified pisces remains
NP-16	6/24/2009	670	2700	unidentified digested pisces remains
NP-17	6/24/2009	460	800	brook trout (Salvelinus fontinalis)
NP-18	6/24/2009	545	1500	unid. salmon spp. (Oncorhynchus spp.)
NP-19	6/24/2009	430	600	plant debris & insect larve
n = 19	**Average**	**588**	**1941**	

Table 3. Avista PFRA Stomach Contents Analysis 2010.

Predatory Species				
Species Sample #	**Date**	**Fork Length (mm)**	**Weight (g)**	**Stomach Content (Prey Items)**
smallmouth bass				
SMB-1	5/18/2010	345	630	unidentified pisces remains
SMB-2	6/24/2010	385	680	northern pikeminnow (Ptychocheilus oregonensis)
SMB-3	7/7/2010	220	150	northern pikeminnow (Ptychocheilus oregonensis)
SMB-4	7/7/2010	235	200	unid. pisces remains, 1 crayfish (Orconectes spp.)
n = 4	**Average**	**296**	**415**	
northern pike				
NP-1	5/18/2010	340	350	unid. salmon & minnow (Oncorhynchus & Cyprinidae)
NP-2	5/18/2010	490	660	northern pikeminnow (Ptychocheilus oregonensis)
NP-3	5/27/2010	320	210	minnow (Cyprinidae)
NP-4	5/27/2010	370	380	sculpin (Cottus spp.)
NP-5	5/27/2010	385	385	unidentified pisces remains
NP-6	5/27/2010	320	250	dace & sculpin (Chrosomus & Cottus spp.)
NP-7	6/23/2010	480	920	minnow bones (Cyprinidae)
NP-8	7/7/2010	695	2800	rainbow trout (Oncorhynchus mykiss)
NP-9	6/24/2010	445	700	northern pikeminnow (Ptychocheilus oregonensis)
NP-10	7/7/2010	490	1000	northern pikeminnow (Ptychocheilus oregonensis)
NP-11	7/7/2010	600	1600	unidentified pisces remains
NP-12	7/7/2010	730	2700	unidentified pisces remains
NP-14	7/8/2010	470	920	westslope cutthroat (O. clarki lewisi) & (Cyprinid)
n = 13	**Average**	**472**	**990**	

Table 4. Avista PFRA Stomach Contents Analysis 2011.

Predatory Species				
Species Sample #	**Date**	**Fork Length (mm)**	**Weight (g)**	**Stomach Content (Prey Items)**
northern pike				
NP 1-11	6/27/11	648	2270	Sunfish or pumpkinseed (Lepomis spp.)
NP 2-11	7/11/11	686	2497	northern pikeminnow (Ptychocheilus oregonensis)
NP 3-11	7/11/11	635	2157	northern pike (Esox lucius)
NP 4-11	7/12/11	660	2270	northern pike (Esox lucius)
NP 5-11	7/12/11	648	2497	northern pike (Esox lucius)
NP 6-11	7/12/11	699	3178	northern pikeminnow (Ptychocheilus oregonensis)
NP 7-11	7/12/11	686	2951	Unidentified pisces (shallow forked tail, scales & skin)
NP 8-11	7/12/11	521	1135	northern pikeminnow (Ptychocheilus oregonensis)
NP 9-11	7/12/11	660	2497	Unidentified pisces (a few vertebrae)
NP 10-11	7/12/11	762	3859	northern pikeminnow (Ptychocheilus oregonensis)
NP 11-11	7/12/11	546	1362	northern pike (Esox lucius)
NP 12-11	7/12/11	495	1135	northern pike (Esox lucius)
NP 13-11	7/12/11	508	1362	northern pike (Esox lucius)
NP 14-11	7/12/11	521	1362	northern pike (Esox lucius)
NP 15-11	7/12/11	559	1589	northern pike (Esox lucius)
NP 16-11	7/12/11	508	1362	Cyprinidae (well digested bones, muscle, small piece of jaw)
NP 17-11	7/12/11	432	681	Cyprinidae (well digested vertebrae, jaw bones, caudal pieces)
NP 18-11	7/13/11	635	2270	northern pikeminnow (Ptychocheilus oregonensis)
NP 19-11	7/13/11	610	2043	northern pike (Esox lucius)
NP 20-11	7/13/11	648	2497	Unidentified pisces (piece of vertebral column)
NP 21-11	7/13/11	508	1135	Unidentified pisces (well digested piece of vertebral column)
NP 22-11	7/13/11	648	2270	Unidentified pisces (well digested pieces of vertebral column)
NP 23-11	7/13/11	660	2724	northern pikeminnow (Ptychocheilus oregonensis)
NP 24-11	7/13/11	521	1362	northern pikeminnow (Ptychocheilus oregonensis)
NP 25-11	7/13/11	635	2270	northern pikeminnow (Ptychocheilus oregonensis)
NP 26-11	7/13/11	787	4086	northern pikeminnow (Ptychocheilus oregonensis)
NP 27-11	7/13/11	648	2497	northern pikeminnow (Ptychocheilus oregonensis)
NP 28-11	7/13/11	699	2497	northern pikeminnow (Ptychocheilus oregonensis)
n=28	**Average**	**613**	**2136**	

4.0 Discussion

The purpose of the PFRA, as defined in the 2009 SOW (Appendix A), is to protect bull trout by removing non-native predatory fish species (northern pike, smallmouth bass and largemouth bass) whenever feasible and biologically supportable, and to evaluate the effectiveness of using electrofishing to perform the removal. The 2009 SOW also outlined goals and objectives for the PFRA with a specific goal of assessing if predation by non-native species is occurring on bull trout, through diagnostic stomach content analyses.

Boat electrofishing proved to be an effective method in collecting and removing non-native predatory fish in the lower St. Joe River. Over the three-year study period, 90 northern pike and 23 smallmouth bass were removed from the study area. The electrofishing worked well to stun all fish species for potential collection, and netters were successful at capturing target predatory fish species. Largemouth bass were simply not present (except for one individual) in the sampling area and smallmouth bass were present, but in limited numbers to be considered a viable predatory species. A total of 23 smallmouth bass were collected for all years, with only seven of size (300 mm+) determined viable for predation on juvenile bull trout and five having stomach contents for analysis. In contrast, there were a total of 60 northern pike stomach samples analyzed for this study. Based on findings in this PFRA three-year analysis, smallmouth bass were not present in sufficient numbers, or of size, to be a predator species of concern of bull trout in the 15 river miles of study area of the lower St. Joe River during the spring sampling when river flow is in a decreasing phase toward summer low flows. The limited abundance of bass was discussed with the USFWS and IDFG after the second year of sampling and agreed that no further collection of smallmouth or largemouth bass was warranted.

The collection of northern pike did prove effective in this study with netters successfully collecting stunned pike, with few escaping the electric field. Ninety northern pike were collected primarily from the back-water and tributary delta pond habitats using a pulsed electrofishing approach to isolate fish into coves, corners or shallow areas. Northern pike have been characterized as a mesothermal coolwater species that is best adapted for shallow, moderately productive, mesothrophic-eutrophic envinronments (Casselman 1996). Pike optimum growth occurs at 19^{o} to 25^{o} C (Casselman, 1978) with consumption rates varying depending on latitude and water temperature with maximum rates usually occurring in the spring or early summer (Diana, 1979 and Casselman, 1978). These environmental conditions that affect pike behavior and physiology support the timing of sampling conducted throughout the PFRA. Northern pike spawn in spring, at times, shortly after ice-out, and can initiate feeding at water temperatures of 8^{o} to 12^{o} C (Diana, 1979 and Casselman, 1978). They are not adapted for life in strong currents and more frequently occur in lakes than in rivers where they inhabit backwaters and pools (Diana, 1979 and Casselman, 1978). The back-water habitats located in the middle and upper section of the study area are connected, but somewhat isolated from the channelized, deep, faster water currents in the mainstem St. Joe River. These isolated back-waters and tributary delta ponds are suited for pike to feed. Of the 90 northern pike collected 78 (87%) were obtained in back-water habitats in the middle and upper sections of the study area.

Maximum water temperature is strongly associated with the distribution of bull trout where the probability of the occurrence exceeded 50% when the maximum daily temperature was less than

14-16^{o}C (Dunham et al. 2003). This information was used to help guide the project goals of sampling during times of the year when juvenile/sub adult bull trout and predators likely occupy the same habitats at the greatest frequency. The study area that consisted of approximately 15 river miles of the lower St. Joe River was considered a migratory corridor for juvenile bull trout more so than a rearing area for these fish. Three juvenile/sub-adult bull trout were collected during this study, one in May of 2009 and two in May, 2010 when water temperature was 7^{o}C and 9^{o}C respectively. Collection of non-native predatory fish was the goal of this study sampling riverine, shoreline and backwater or side channel pond habitats of the study area using boat electrofishing. Nineteen northern pike were collected in water temperatures between 7^{o}C and 9^{o}C in May and early June in 2009 and 2010 (Table 2). In 2011 no northern pike were collected until the end of June which we expect was a result of the very high water year. This data indicates that bull trout could be present in habitats during times when northern pike could be in similar habitats and be actively feeding. The USFWS and IDFG approved sampling schedule included sampling during late spring and early summer and was conducted in the riverine portions of the study area to attempt to collect predator species when when juvenile/ sub-adult bull trout likely use the deeper river channel to migrate. No bull trout were collected in June or July during this study. Most northern pike however, were collected in June and July during this study.

A secondary objective of the PFRA was to determine through diagnostic stomach content analyses if predation on bull trout is occurring by the non-native target species of northern pike and bass. The SOW called for collection of up to 30 stomach samples per target species, which was redefined for the 2011 sampling to 30 total samples for northern pike. Over the three years of study, that goal was met for northern pike (n= 60) but not for the other target species due to limited presence or abundance and collection in the project area during sampling. Of the 90 total northern pike collected, 60 (67%) had prey items in their stomach content and 46 (77%) of those were confirmed to be void of bull trout. Of the five smallmouth bass with stomach contents in 2009 through 2011, none contained bull trout as well. The stomach content analysis conducted through this study revealed many prey items present in the diet of northern pike and smallmouth bass, but no evidence of bull trout being consumed by non-native predatory fish during the time-period sampled and within the specific study area. Results and conclusions of this three-year study should not imply or speculate on conditions elsewhere in the St. Joe River or lake environments in the region.

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Appendix A

Scope of Work

Predatory Fish Removal and Analysis
Lower St. Joe River
(2009-2010)

Spokane River Hydroelectric Project

FERC Project No. 2545, Avista Corporation

Avista

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PURPOSE

The purpose of this Predatory Fish Removal and Analysis (PFRA) is to protect bull trout, a threatened species, by removing selected predatory fish from the St. Joe River, a known migratory corridor for juvenile, sub-adult, and adult bull trout. Species such as northern pike and bass are major predators and competitors of bull trout (ALJ 2007, USFWS 2002). The Unites States Fish and Wildlife Service ("USFWS") draft recovery plan calls for an effort to "*[i]mplement removal of or reduction efforts for non-native species (northern pike, largemouth bass, smallmouth bass, Chinook salmon) wherever feasible and biologically, economically, and socially supportable in Coeur d'Alene Lake and migratory corridors"* (USFWS 2002 Chapter 15). This PFRA is intended to investigate the efficacy of removing smallmouth bass, largemouth bass and northern pike from the inundated reach of the St. Joe River, where young bull trout on their downstream migration, are likely to first encounter these potential predators. This PFRA is designed to evaluate the effectiveness of using electroshocking techniques to remove non-native predator fish species that potentially prey upon bull trout within the inundated reach of the lower St. Joe River, primarily to support migrating and foraging habitat for bull trout.

GOALS AND OBJECTIVES

Based on available literature from within the Coeur d'Alene Lake basin and from other areas, predation on salmonid species by introduced non-native species is known to occur and may have population limiting consequences. It can then be assumed that predation may be occurring on young bull trout by non-native predators within this basin. Therefore, the goal of this PFRA is to confirm this assumption and if occurring, determine the most effective means to reduce predation

on juvenile/sub-adult bull trout in targeted locations during times of the year when smaller bull trout and predators likely occupy the same habitats at the greatest frequency.

The objective of this PFRA initially will be to determine the effectiveness of using electrofishing techniques at capturing non-native predators in different portions of the inundated reach of the St. Joe River at numerous times during the spring and early summer. This reach of the St Joe River is a known migratory corridor for juvenile/sub-adult bull trout, and constitutes an area where these species are expected to overlap at a higher frequency. Secondarily, will be to determine through stomach content analyses or other accepted technique, if predation on bull trout is occurring. Adaptive management will be utilized as the project progresses to optimize decisions in the face of many uncertainties.

TASK 1

1. Using boat electrofishing[1], collect predator fish; smallmouth bass, largemouth bass, and northern pike, from the lower St. Joe River (St. Maries, ID to St. Joe City, ID).

   Please Note. Electrofishing shall be conducted in accordance with the Washington **Department of Fish and Wildlife (WDFW) Guidelines** attached to this Scope of Work, marked as "Exhibit 1", and the **Sampling Protocol** document attached to this Scope of Work, marked as "Exhibit 2".
2. Remove collected predatory fish, northern pike, largemouth bass and smallmouth bass, from the lower St. Joe River.
3. Identify the number of predator fish (or stunned cutthroat trout or bull trout) observed and collected by ¼-mile river reaches.
4. Collect pertinent water temperature information.
5. Assess day time versus night time electrofishing efforts.

TASK 2

1. Collect stomach contents from the collected predator fish.
2. At the end of each year of collection, analyze the stomach content samples for fish prey. If fish species were consumed, analyze for the presence of bull trout.

Methods

During the spring and early summer period (late April through mid-July) electrofishing will be used within those portions of the St. Joe River where electrofishing is most likely to be effective, to capture smallmouth bass, largemouth bass, and northern pike (Task 1). All predator fish species identified above, regardless of size, will be targeted for removal. Those predatory fish of a size expected to prey on juvenile bull trout will have stomachs removed for further analyses. The appropriate predator size will be determined through coordination with the USFWS and Avista and will be based on appropriate available literature or data from predator diet studies. Areas with moderate to low water velocities and depths of less than 10 feet will be electrofished.

[1] *Electrofishing can be particularly tough on salmonids. Therefore, all native salmonids shall be released as soon as possible and will be examined for injuries. If injuries or mortality is prevalent, sampling will be temporarily suspended and consultation on a new methodology will made with the USFWS and IDFG within two days. It may be acceptable to have an alternative methodology designed prior to sampling so as not to delay field sampling.*

Electrofishing is typically not effective beyond depths of about 6 feet, and predators are likely to avoid the higher water column velocities and reduce the energy expenditures needed to remain within a local area. Initially, electrofishing will be conducted during both the day and night to determine the most effective time to sample. Collect the stomach contents from the smallmouth bass, largemouth bass and northern pike captured under Task 1, and freeze for later analyses of the incidence of bull trout predation (Task 2).

If any bull trout or native salmonids are captured during electrofishing efforts and need to be temporarily held for recovery reasons, they will be held in a separate holding tank from non-native predatory species to remove the risk of injury or predation while being held. If juvenile or sub-adult bull trout are captured simultaneously with adult bull trout, they will also be held separately. A healthy holding facility must be available for native salmonids that contain aeration and cold water. Native salmonids showing no signs of stress or injury shall be released as soon and as close to capture location as possible, with care given to avoid recapture. Stressed native fish shall only be released when they are able maintain themselves and freely swim away. Native salmonids will not be placed in MS-222. All injury or mortality to bull trout will be reported to the USFWS within two days.

Study Area

The fish removal effort will occur along the main channel of the St. Joe River, upstream of the Coeur d'Alene Tribal Reservation to the bridge at St. Joe City, ID. The St. Joe River will be partitioned into ¼-mile reaches, identified by GPS coordinates, to identify the number of predators removed from the various reaches in the river.

Task 1: Electrofish and predator removal along the lower St. Joe River

- Collect smallmouth bass, largemouth bass, and northern pike from the lower St. Joe River in the spring and early summer of 2009 and 2010 using a boat electroshocker. Results from the 2009 sampling season will be reported to the USFWS. Avista will meet with the USFWS prior to the 2010 sampling season to discuss if sampling methods need to be modified.
- Electrofish in the lower St. Joe River beginning during the spring runoff each year, as identified in consultation with USFWS and IDFG biologists following accepted protocols (attached).
- Confirm, through sampling, the assumption that nighttime electrofishing is more effective for collecting warm water predators than daytime collection.
- Electroshock for two nights in various reaches of the study area and if catch rates are good (a catch per unit of effort ("CPUE") of at least two predator-sized fish of any one of the target species per hour of sampling, continue for the length of the study area.
- If catch rates are poor (less than the above CPUE threshold) in the first two nights, stop collection.
- Return in two or three weeks and electroshock for two days or nights in various reaches of the study area and if catch rates are good continue for the length of the study area.
- If catch rates are poor in the first two days or nights, stop collection and repeat the previous step.
- Continue collecting predator fish through early July, with a maximum of three sampling periods. Two of the sampling periods must occur at the descending limb of the spring runoff

in late June or early July to capture the timeframe that non-native predators and bull trout may have a greater likelihood of occupying the inundated reach simultaneously.

- Identify the number of smallmouth bass, largemouth bass, and northern pike observed and/or collected, from ¼-mile long sampling reaches established throughout the lower river.
- Retain all targeted smallmouth bass, largemouth bass, and northern pike collected, and release any non-target species at or near their capture location.
- Weigh and measure the smallmouth bass, largemouth bass and northern pike collected in each sample reach, and remove and store the stomach contents as individual samples for appropriate future analysis (Task 2).
- In year one, use data to establish Length/Weight relationship by target species. Once L/W relationship has been established, collect length measurements.
- Records of readily identifiable prey species will be made in the field, after obtaining the stomach samples.
- Collect surface water temperature information in each quarter mile segment where target fish are collected, and more frequently if water temperature variation is greater than 1º C between these locations. Install temperature data loggers at three identified locations in the sampling area during the sampling season in addition collecting surface temperatures at all sampling reaches.
- Service and/or other resource agency staff may participate in the sampling activity.
- Prepare a summary memorandum addressing goals, objectives, tasks, methods, sampling effort (hours sampled), numbers of target fish observed and collected by reach, general habitat characteristics where target fish were located, predator size data, general observations of ingested prey and summary of water temperature data collected.

Task 2: Predator Stomach Content Analysis

- Collect stomach contents from all target species of the determined size range (see page two Methods).
- At the end of each year of collection, analyze all[2] stomach content samples for fish prey. If fish prey were consumed, analyze for the presence of bull trout.
- Immediately after collection, place the target fish in a lethal dose of MS-222, to prevent regurgitation.
- Remove stomach samples from the fish and place stomach contents in sample bags, as individual samples, for observation of the potential incidence of fish prey (including species if possible).
- Store stomach samples on ice while in the field, and freeze the samples as soon as possible.
- Prepare a summary report concerning the results of the stomach content analysis, including the incidence of prey fish by species (if discernable), relative to the total prey volume.

[2] *Stomach analysis consists of identifying whether or not stomachs contain food items. Diagnostic stomach content analysis will be conducted on stomach samples containing unidentifiable fish or fish parts. Based on discussions with Avista, and the USFWS, 30 diagnostic stomach content samples per predator species are adequate. If greater than 30 diagnostic stomach content samples are required to obtain an adequate statistical analysis, additional samples will be analyzed.*

PRODUCTS

The results of the removal effort and the stomach analysis will be summarized in a report memorandum, prepared for Avista staff. The stomach analysis report will also include a summary of the predator capture/removal information, and a brief assessment of the potential incidence of bull trout predation and possible future changes to the predator fish removal process to improve efficiencies.

BUDGET

Task 1a Electroshocking (2009)	**Cost**
Labor	$
Expenses	$
Task Total Estimated Cost	$

Task 1b Electroshocking (2010)	**Cost**
Labor	$
Expenses	$
Task Total Estimated Cost	$

Task 2a Stomach Content Analyses (2009)	**Cost**
Labor	$
Expenses	$
Task Total Estimated Cost	$

Task 2b Stomach Content Analyses (2010)	**Cost**
Labor	$
Expenses	$
Task Total Estimated Cost	$

Total Estimated Cost	$

Task 1 Assumptions:
A minimum of three passes through the sample reach will occur each year, from about mid-April through mid-July, depending on the effectiveness of the electrofishing. A crew of three will do the electroshocking. Annual report will consist of a memorandum summarizing results. This report will be complete enough discuss next steps, adaptive management, etc.

Task 2 Assumptions:
A maximum number of 90 stomach samples, or 30 per target species, will be analyzed each year.
Analysis will consist of identification of bull trout prey using diagnostic bone methodology.
Final report will consist of a short memorandum summarizing results.

Appendix B

Detailed Electrofishing Results Lower St. Joe River 2009 – 2010.

Avista Predatory Fish Removal Analysis Data Summary 2009 - 2010

Species Codes

SMB=smallmouth bass
LMB=largemouth bass
NP=northern pike
CTT=cutthroat trout
MTW=mountain whitefish
BT=bull trout
RBT=rainbow trout
NPM=northern pikeminnow
KOK=kokanee salmon
BBH=brown bullhead
TCH=tench
PKS=pumpkin seed
YP=yellow perch
BRK=brook trout
WC=white crappie

Location Codes

LOW = Lower river section
MID = Middle river section
UP = Upper river section
SL = Shore line habitat
BW = Back-water habitat

Boat Electrofishing Settings: Low: 50% Pulse, DC 60 volts.
Effort = 600 seconds (10 minutes) = ~ 1/4 mile section sampled.
Sampling Conducted from May to July 2010.

PFRA Electrofishing Data for 2009 – Sorted by Species.

	SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
1	BRK	6/9/2009	8:30pm	Rochet cr. Culvert	541418E 5242116N	155	N	N	
2	BRK	6/23/2009	8:55pm	backwater rb	547886E 5240998N	220	N	N	pics
3	BRK	6/23/2009	9:20pm	backwater rb	547886E 5240998N	180	N	N	
1	BT	5/15/2009	9:45am	Rochet cr. Culvert	541465E 5242084N	165	N	N	rel. alive & healthy -pic
1	CTT	5/15/2009	10:10am	u/s of Aqua P.ramp (rb)	532882E 5242073N	141	N	N	rel. alive & healthy -pic
2	CTT	5/15/2009	11:40am	u/s site 1	533190E 5242325N	124	N	N	rel. alive & healthy -pic
3	CTT	5/15/2009	11:40am	Rochet cr. Culvert	541465E 5242084N	115	N	N	rel.alive & healthy - pic
4	CTT	6/9/2009	8:30pm	u/s Rochet Cr.	542514E 5241713N	348	N	N	
5	CTT	6/9/2009	9:30pm	u/s Rochet Cr.	542514E 5241713N	196	N	N	
6	CTT	6/9/2009	9:30pm	main channel	543488E 5242102N	152	N	N	
7	CTT	6/9/2009	9:30pm	main channel	543488E 5242102N	345	N	N	
8	CTT	6/22/2009	9:40pm	main channel	538055E 5242508N	160	N	N	
9	CTT	6/23/2009	9:20pm	main channel	545156E 5241561N	350	N	N	pics
10	CTT	6/24/2009	9:05pm	main channel	540822E 5243320N	170	N	N	
11	CTT	6/24/2009	9:05pm	main channel	540822E 5243320N	200	N	N	
1	KOK	6/9/2009	9:30pm	u/s Rochet Cr.	542514E 5241713N	180	N	N	

	SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
2	KOK	6/9/2009	9:30pm	main channel	543488E 5242102N	260	N	N	
3	KOK	6/9/2009	9:30pm	main channel	545870E 5241277N	225	N	N	
4	KOK	6/9/2009	9:30pm	main channel	545870E 5241277N	224	N	N	
5	KOK	6/9/2009	9:30pm	main channel	545870E 5241277N	218	N	N	
6	KOK	6/9/2009	10:25pm	d/s St. Joe Bridge (lb)	548896E 5240252N	250	N	N	
7	KOK	6/22/2009	10:15pm	main channel	537702E 5243281N	160	N	N	
8	KOK	6/22/2009	10:15pm	main channel	537702E 5243281N	210	N	N	
9	KOK	6/24/2009	9:05pm	main channel	540822E 5243320N	180	N	N	
1	NP	5/14/2009	10:40am	sec.15, Rochet cr. Culvert	541554E 5242079N	330	230	Y NP01	5' deep b/w-good habitat
2	NP	5/14/2009	10:40am	sec17backeddy d/s of church	538811E 5242689N	650	2100	N NP02 E	filet Y, stom. Cont. saved
3	NP	6/9/2009	10:25pm	backwater d/s of Rochet	538824E 5242673N	567	3250	Y NP03	whole fish in stomach ctt
4	NP	6/9/2009	10:25pm	Rochet cr. Culvert	541418E 5242116N	724	3000	Y NP04	male
5	NP	6/9/2009	10:25pm	Rochet cr. Culvert	541418E 5242116N	430	720	Y NP05	
6	NP	6/9/2009	10:25pm	Rochet cr. Culvert	541418E 5242116N	575	1700	Y NP06	
7	NP	6/9/2009	10:25pm	u/s Rochet Cr.	542514E 5241713N	700	2510	Y NP07	many tench in gut
8	NP	6/9/2009	10:25pm	main channel	543488E 5242102N	670	2350	Y NP 08	tench
9	NP	6/9/2009	10:25pm	main channel	543488E 5242102N	660	2500	Y NP 09	
10	NP	6/22/2009	10:45pm	lower river, u/s ramp	538877E 5242668N	482	625	Y NP10	
11	NP	6/23/2009	9:20pm	backwater rb	547886E 5240998N	665	2600	Y NP11	
12	NP	6/24/2009	9:05pm	Rochet cr. Culvert	541456E 5242083N	685	2550	Y NP12	
13	NP	6/24/2009	9:05pm	Rochet cr. Culvert	541456E 5242083N	555	1600	Y NP13	
14	NP	6/24/2009	10:00pm	backwater d/s of Rochet	538888E 5242654N	735	3300	Y NP14	
15	NP	6/24/2009	10:00pm	backwater d/s of Rochet	538888E 5242654N	645	2250	Y NP15	
16	NP	6/24/2009	10:00pm	backwater d/s of Rochet	538888E 5242654N	670	2700	Y NP16	
17	NP	6/24/2009	10:00pm	backwater d/s of Rochet	538888E 5242654N	560	1400	N EMPTY	
18	NP	6/24/2009	10:00pm	backwater d/s of Rochet	538888E 5242654N	460	800	Y NP17	whole fish in stomach
19	NP	6/24/2009	10:00pm	backwater d/s of Rochet	538888E 5242654N	545	1500	Y NP18	
20	NP	6/24/2009	11:10pm	backwater d/s of Rochet	538888E 5242654N	430	600	Y NP19	
1	NPM	5/14/2009	10:40am	d/s St. Joe Bridge (lb)	549009E 5241229N	340	N	N	NPM, no stomach or wt.
2	NPM	5/14/2009	12:40pm	d/s St. Joe Bridge (lb)	549009E 5241229N	360	N	N	no stomach or wt.
3	NPM	5/14/2009	1:50pm	d/s St. Joe Bridge (lb)	549009E 5241229N	400	N	N	no stomach or wt.
4	NPM	5/14/2009	1:50pm	d/s Shadowy boat ramp (rb)	545451E 5241527N	330	N	N	no stomach or wt.
5	NPM	6/9/2009	10:25pm	backwater d/s of Rochet	538824E 5242673N	410	N	N	stomach empty
6	NPM	6/9/2009	10:25pm	Rochet cr. Culvert	541418E 5242116N	352	N	N	
7	NPM	6/9/2009	11:05pm	Rochet cr. Culvert	541418E 5242116N	360	N	N	
8	NPM	6/9/2009	11:05pm	Rochet cr. Culvert	541418E 5242116N	388	N	N	
9	NPM	6/9/2009	11:05pm	u/s Rochet Cr.	542514E 5241713N	282	N	N	

	SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
10	NPM	6/9/2009	11:05pm	u/s Rochet Cr.	542514E 5241713N	370	N	N	
11	NPM	6/9/2009	11:05pm	u/s Rochet Cr.	542514E 5241713N	326	N	N	
12	NPM	6/9/2009	11:05pm	u/s Rochet Cr.	542514E 5241713N	310	N	N	
13	NPM	6/9/2009	11:05pm	u/s Rochet Cr.	542514E 5241713N	341	N	N	
14	NPM	6/9/2009	11:05pm	u/s Rochet Cr.	542514E 5241713N	300	N	N	
15	NPM	6/9/2009	11:05pm	main channel	543488E 5242102N	280	N	N	
16	NPM	6/9/2009	11:05pm	main channel	543488E 5242102N	380	N	N	
17	NPM	6/9/2009	11:50pm	main channel	543488E 5242102N	310	N	N	
18	NPM	6/9/2009	11:50pm	main channel	543488E 5242102N	280	N	N	
19	NPM	6/9/2009	11:50pm	b/w u/s Shadowy BR	547904E 5240990N	528	N	N	
20	NPM	6/9/2009	12:20am	b/w u/s Shadowy BR	547904E 5240990N	345	N	N	
21	NPM	6/9/2009	12:20am	d/s St. Joe Bridge (lb)	548896E 5240252N	490	N	N	
22	NPM	6/9/2009	12:55am	d/s St. Joe Bridge (lb)	548896E 5240252N	460	N	N	
23	NPM	6/9/2009	11:50am	d/s St. Joe Bridge (lb)	548896E 5240252N	380	N	N	
24	NPM	6/9/2009	11:50pm	d/s St. Joe Bridge (lb)	548896E 5240252N	420	N	N	
25	NPM	6/23/2009	9:20pm	main channel	545156E 5241561N	260	N	N	
26	NPM	6/23/2009	11:00pm	main channel	545156E 5241561N	190	N	N	
27	NPM	6/23/2009	11:00pm	main channel	545156E 5241561N	160	N	N	
28	NPM	6/23/2009	11:00pm	backwater rb	547886E 5240998N	280	N	N	
29	NPM	6/23/2009	11:00pm	ds bridge us rock haz.	548895E 5240286N	415	N	N	
30	NPM	6/23/2009	12:00am	ds bridge us rock haz.	548895E 5240286N	402	N	N	
31	NPM	6/23/2009	12:00am	ds bridge us rock haz.	548895E 5240286N	330	N	N	
32	NPM	6/24/2009	11:10pm	Rochet cr. Culvert	541456E 5242083N	250	N	N	
33	NPM	6/24/2009	11:10pm	main channel	540822E 5243320N	280	N	N	
34	NPM	6/24/2009	11:10pm	main channel	540822E 5243320N	270	N	N	
1	PKS	6/9/2009	11:50pm	main channel	543488E 5242102N	N	N	N	
1	RBT	5/14/2009	2:35pm	d/s of site 5	540605E 5243372N	180	N	N	rel. alive & healthy
2	RBT	6/22/2009	10:45pm	main channel	538055E 5242508N	160	N	N	
1	SMB	6/22/2009	12:45pm	main channel	533380E 5241279N	200	N	N	rel. live & healthy
2	SMB	6/23/2009	12:00am	ds bridge us rock haz.	548895E 5240286N	310	480	Y SMB01	
3	SMB	6/24/2009	11:10pm	main channel	540822E 5243320N	240	N	N	rel. live & healthy
1	TCH	6/9/2009	8:30pm	Rochet cr. Culvert	541418E 5242116N	185	N	N	
2	TCH	6/24/2009	11:10pm	Rochet cr. Culvert	541456E 5242083N	170	N	N	
3	TCH	6/24/2009	11:10pm	Rochet cr. Culvert	541456E 5242083N	390	N	N	
1	YP	5/14/2009	3:00pm	sec.15, Rochet cr. Culvert	541554E 5242079N	~65	N	N	YOY
2	YP	6/22/2009	12:45pm	main channel	533380E 5241279N	180	N	N	
3	YP	6/23/2009	12:00am	main channel	543378E 5242113N	210	N	N	

SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
			END					

PFRA Electrofishing Data for 2010 – Sorted by Species.

SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
BRK	6/24/2010	12:15:00 AM	MID-SL	5241071N	320	N/A	NO	veg. shoreline u/s Shadowy CG
Total	**1**							
BT	5/27/2010	9:45:00 PM	UP - BW	5240985N	220	N/A	NO	small back-water d/s of Co. boat ramp
BT	5/27/2010	9:45:00 PM	UP - BW	5240985N	165	N/A	NO	small back-water d/s of Co. boat ramp
Total	**2**							
CTT	5/18/2010	12:40:00 AM	LOW - SL	5242742N	120	N/A	NO	veg. shoreline
CTT	5/18/2010	1:20:00 AM	LOW - SL	5242629N	125	N/A	NO	veg. shoreline
CTT	5/18/2010	9:15:00 PM	MID - SL	5242023N	380	N/A	NO	veg. shoreline d/s of Rochet
CTT	5/27/2010	8:40:00 PM	UP - BW	5240804N	210	N/A	NO	County boat ramp back-water
CTT	5/27/2010	10:45:00 PM	UP - SL	5240959N	155	N/A	NO	veg. shoreline
CTT	6/23/2010	1:30:00 AM	LOW-SL	5242996N	260	N/A	NO	veg. shoreline
CTT	6/23/2010	11:10:00 PM	LOW-SL	5243086N	150	N/A	NO	veg. shoreline
CTT	6/23/2010	11:35:00 PM	LOW-SL	5242484N	220	N/A	NO	veg. shoreline
CTT	6/24/2010	10:00:00 PM	UP-SL	5240839N	150	N/A	NO	shoreline u/s of Co. boat ramp
CTT	6/24/2010	11:05:00 PM	MID-SL	5241020N	420	N/A	NO	rip-rap shoreline next to road
CTT	7/7/2010	2:05:00 AM	LOW-SL	5242757N	180	N/A	NO	veg. shoreline
CTT	7/7/2010	11:30:00 PM	LOW-SL	5242581N	200	N/A	NO	veg. shoreline
CTT	7/7/2010	11:55:00 PM	LOW-BW	5242651N	430	N/A	NO	large back-water RB
CTT	7/8/2010	11:20:00 PM	UP-BW	5240993N	180	N/A	NO	back-water RB
CTT	7/8/2010	11:20:00 PM	UP-BW	5240993N	425	N/A	NO	back-water RB
CTT	7/8/2010	11:20:00 PM	UP-BW	5240993N	455	N/A	NO	back-water RB
Total	**16**							
KOK	5/18/2010	1:20:00 AM	LOW - SL	5243209N	180	N/A	NO	veg. shoreline
KOK	5/18/2010	9:45:00 PM	MID - SL	5242614N	180	N/A	NO	veg. shoreline d/s of Rochet

SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
KOK	5/18/2010	10:15:00 PM	MID - SL	5243250N	270	N/A	NO	veg. shoreline d/s of Rochet
KOK	5/18/2010	10:15:00 PM	MID - SL	5243250N	240	N/A	NO	veg. shoreline d/s of Rochet
KOK	5/18/2010	10:15:00 PM	MID - SL	5243250N	220	N/A	NO	veg. shoreline d/s of Rochet
KOK	5/27/2010	12:55:00 AM	MID-BW	5240922N	250	N/A	NO	back-water RB
KOK	5/27/2010	1:15:00 AM	MID-SL	5243250N	185	N/A	NO	veg. shoreline
KOK	5/27/2010	1:55:00 AM	MID-SL	5243250N	180	N/A	NO	shoreline old pilings d/s Shadowy CG
KOK	5/27/2010	1:55:00 AM	MID-SL	5243250N	185	N/A	NO	shoreline old pilings d/s Shadowy CG
KOK	5/27/2010	1:55:00 AM	MID-SL	5243250N	200	N/A	NO	shoreline old pilings d/s Shadowy CG
KOK	5/27/2010	1:55:00 AM	MID-SL	5243250N	185	N/A	NO	shoreline old pilings d/s Shadowy CG
KOK	5/27/2010	10:20:00 PM	UP - SL	5241075N	230	N/A	NO	veg. shoreline
KOK	5/27/2010	11:05:00 PM	UP - SL	5240922N	200	N/A	NO	veg. shoreline
KOK	6/23/2010	11:35:00 PM	LOW-SL	5242484N	180	N/A	NO	veg. shoreline
KOK	6/24/2010	12:15:00 AM	MID-SL	5241071N	160	N/A	NO	veg. shoreline u/s Shadowy CG
KOK	6/24/2010	12:55:00 AM	MID-SL	5241536N	180	N/A	NO	veg. shoreline
KOK	7/7/2010	1:35:00 AM	LOW-SL	5243301N	170	N/A	NO	rip-rap, veg. rock mix shoreline
KOK	7/7/2010	1:35:00 AM	LOW-SL	5243301N	180	N/A	NO	rip-rap, veg. rock mix shoreline
KOK	7/7/2010	1:35:00 AM	LOW-SL	5243301N	160	N/A	NO	rip-rap, veg. rock mix shoreline
KOK	7/7/2010	2:05:00 AM	LOW-SL	5242757N	180	N/A	NO	veg. shoreline
KOK	7/7/2010	2:05:00 AM	LOW-SL	5242757N	180	N/A	NO	veg. shoreline
KOK	7/7/2010	2:05:00 AM	LOW-SL	5242757N	180	N/A	NO	veg. shoreline
KOK	7/7/2010	2:05:00 AM	LOW-SL	5242757N	180	N/A	NO	veg. shoreline
KOK	7/7/2010	2:05:00 AM	LOW-SL	5242757N	180	N/A	NO	veg. shoreline
KOK	7/7/2010	2:05:00 AM	LOW-SL	5242757N	180	N/A	NO	veg. shoreline
KOK	7/7/2010	9:50:00 PM	MID-SL	5242045N	180	N/A	NO	veg. shoreline
KOK	7/7/2010	10:25:00 PM	MID-SL	5243267N	180	N/A	NO	rip-rap shoreline
KOK	7/7/2010	11:00:00 PM	LOW-SL	5243005N	180	N/A	NO	partial veg. shoreline sandy bottom
KOK	7/7/2010	11:30:00 PM	LOW-SL	5242581N	185	N/A	NO	veg. shoreline
KOK	7/8/2010	12:05:00 AM	UP-SL	5241228N	175	N/A	NO	veg. shoreline
KOK	7/8/2010	9:50:00 PM	UP-SL	5240982N	180	N/A	NO	veg. shoreline
KOK	7/8/2010	9:50:00 PM	UP-SL	5240982N	180	N/A	NO	veg. shoreline

SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
KOK	7/8/2010	9:50:00 PM	UP-SL	5240982N	180	N/A	NO	veg. shoreline
KOK	7/8/2010	11:20:00 PM	UP-BW	5240993N	175	N/A	NO	back-water RB
Total	**34**							
MWF	5/18/2010	10:15:00 PM	MID - SL	5243250N	330	N/A	NO	veg. shoreline d/s of Rochet
Total	**1**							
NP	5/18/2010	8:45:00 PM	MID - BW	5242084N	340	350	YES	sample NP-1; Rochet Cr. Back-water
NP	5/18/2010	10:45:00 PM	MID - BW	5242629N	490	660	YES	sample NP-2; first back-water u/s
NP	5/18/2010	11:25:00 PM	LOW - SL	5242742N	713	3041	NO	ripe male; first back-water u/s
NP	5/18/2010	11:25:00 PM	LOW - SL	5242742N	515	1000	NO	digested mat; first back-water u/s
NP	5/27/2010	12:55:00 AM	MID-BW	5240922N	380	420	NO	digested mat; back-water RB
NP	5/27/2010	8:40:00 PM	UP - BW	5240804N	320	210	YES	sample NP-3; Co. boat ramp back-water
NP	5/27/2010	8:40:00 PM	UP - BW	5240804N	370	380	YES	sample NP-4; Co. boat ramp back-water
NP	5/27/2010	8:40:00 PM	UP - BW	5240804N	385	385	YES	sample NP-5; Co. boat ramp back-water
NP	5/27/2010	9:45:00 PM	UP - BW	5240985N	320	250	YES	sample NP-6; back-water d/s Co. ramp
NP	5/27/2010	10:20:00 PM	UP - SL	5241075N	380	420	NO	digested mat; back-water d/s Co. ramp
NP	6/23/2010	12:10:00 AM	LOW-BW	5242670N	480	920	YES	sample NP-7; back-water RB
NP	6/23/2010	12:10:00 AM	LOW-BW	5242670N	675	2040	NO	digested mat; back-water RB
NP	6/24/2010	1:10:00 AM	MID-SL	5241369N	445	700	YES	sample NP-9; veg. shoreline u/s CG
NP	7/7/2010	12:40:00 AM	LOW-BW	5242736N	600	1600	YES	sample NP-11; large back-water RB
NP	7/7/2010	12:40:00 AM	LOW-BW	5242736N	810	4400	NO	ripe male; large back-water RB
NP	7/7/2010	12:40:00 AM	LOW-BW	5242736N	780	3800	NO	ripe male; large back-water RB
NP	7/7/2010	12:40:00 AM	LOW-BW	5242736N	660	2150	NO	ripe male; large back-water RB
NP	7/7/2010	12:40:00 AM	LOW-BW	5242736N	430	510	NO	ripe male; large back-water RB
NP	7/7/2010	12:40:00 AM	LOW-BW	5242736N	310	435	NO	ripe male; large back-

SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
								water RB
NP	7/7/2010	9:05:00 PM	MID-BW	5242055N	695	2800	YES	sample NP-8; Rochet Cr. Back-water
NP	7/7/2010	9:05:00 PM	MID-BW	5242055N	730	2800	NO	digested mat. Rochet Cr. Back-water
NP	7/7/2010	11:00:00 PM	LOW-SL	5243005N	490	1000	YES	sample NP-10; partial veg. shoreline
NP	7/7/2010	11:00:00 PM	LOW-SL	5243005N	400	520	NO	digested mat. partial veg. shoreline
NP	7/7/2010	11:00:00 PM	LOW-SL	5243005N	405	560	NO	digested mat. partial veg. shoreline
NP	7/7/2010	11:55:00 PM	LOW-BW	5242651N	390	560	NO	digested mat. large back-water RB
NP	7/7/2010	11:55:00 PM	LOW-BW	5242651N	445	680	NO	digested mat. large back-water RB
NP	7/7/2010	11:55:00 PM	LOW-BW	5242651N	730	2700	YES	sample NP-12; large back-water RB
NP	7/8/2010	9:30:00 PM	UP-BW	5240878N	470	920	YES	sample NP-14; Co. boat ramp back-water
NP	7/8/2010	10:15:00 PM	UP-SL	5240960N	455	800	NO	ripe male; large back-water RB
NP	7/8/2010	10:35:00 PM	UP-SL	5241057N	445	710	NO	digested mat; large back-water RB
Total	**30**							
Note: not all northern pikeminnow were netted and captured, many were observed but not counted.								
NPM	5/18/2010	1:50:00 AM	LOW - SL	5242523N	300	N/A	NO	rip-rap shoreline
NPM	5/18/2010	8:45:00 PM	MID - BW	5242084N	330	N/A	NO	Rochet Creek culvert back-water
NPM	5/18/2010	8:45:00 PM	MID - BW	5242084N	140	N/A	NO	Rochet Creek culvert back-water
NPM	5/18/2010	10:45:00 PM	MID - BW	5242629N	500	N/A	NO	first back-water u/s
NPM	5/19/2010	8:40:00 PM	UP - SL	5240520N	450	N/A	NO	d/s of upper brige - tressle LB
NPM	5/19/2010	9:00:00 PM	UP - SL	5240813N	230	N/A	NO	County boat ramp back-water
NPM	5/19/2010	9:45:00 PM	UP - SL	5240520N	300	N/A	NO	small back-water d/s of Co. boat ramp
NPM	5/19/2010	10:10:00 PM	UP - SL	5240520N	300	N/A	NO	veg. shoreline
NPM	5/27/2010	12:55:00 AM	MID-BW	5240922N	300	N/A	NO	back-water RB
NPM	5/27/2010	1:15:00 AM	MID-SL	5243250N	300	N/A	NO	veg. shoreline
NPM	5/27/2010	1:35:00 AM	MID-SL	5242023N	200	N/A	NO	veg. shoreline
NPM	5/27/2010	1:55:00 AM	MID-SL	5243250N	350	N/A	NO	shoreline old pilings d/s Shadowy CG

SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
NPM	5/27/2010	8:40:00 PM	UP - BW	5240804N	300	N/A	NO	County boat ramp back-water
NPM	5/27/2010	9:20:00 PM	UP - SL	5240739N	250	N/A	NO	veg. shoreline
NPM	5/27/2010	9:45:00 PM	UP - BW	5240985N	250	N/A	NO	small back-water d/s of Co. boat ramp
NPM	5/27/2010	10:20:00 PM	UP - SL	5241075N	310	N/A	NO	veg. shoreline
NPM	5/27/2010	10:45:00 PM	UP - SL	5240959N	200	N/A	NO	veg. shoreline
NPM	5/27/2010	11:05:00 PM	UP - SL	5240922N	250	N/A	NO	veg. shoreline
NPM	5/27/2010	11:25:00 PM	MID-BW	5240922N	200	N/A	NO	back-water RB
NPM	6/23/2010	9:40:00 PM	MID-sl	5242112N	300	N/A	NO	shoreline u/s of Rochet back-water
NPM	6/23/2010	10:05:00 PM	MID-BW	5242089N	250	N/A	NO	Rochet Creek culvert back-water
NPM	6/23/2010	10:55:00 PM	MID-SL	5243065N	310	N/A	NO	veg. shoreline
NPM	7/7/2010	9:50:00 PM	MID-SL	5242045N	300	N/A	NO	veg. shoreline
NPM	7/7/2010	10:10:00 PM	MID-SL	5242716N	250	N/A	NO	veg. shoreline
NPM	7/7/2010	11:00:00 PM	LOW-SL	5243005N	250	N/A	NO	partial veg. shoreline sandy bottom
NPM	7/8/2010	12:05:00 AM	UP-SL	5241228N	250	N/A	NO	veg. shoreline
NPM	7/8/2010	8:50:00 PM	UP-SL	5240450N	350	N/A	NO	d/s of upper brige - tressle LB
NPM	7/8/2010	9:30:00 PM	UP-SL	5240450N	270	N/A	NO	County boat ramp back-water
NPM	7/8/2010	11:40:00 PM	UP-SL	5241058N	350	N/A	NO	shoreline RB & partial back-water
Total	**29 +**							
PKS	7/7/2010	1:35:00 AM	LOW-SL	5243301N	140	N/A	NO	rip-rap, veg. rock mix shoreline
Total	**1**							
RBT	6/23/2010	12:10:00 AM	LOW-BW	5242670N	460	N/A	NO	back-water RB
RBT	6/23/2010	10:55:00 PM	MID-SL	5243065N	145	N/A	NO	veg. shoreline
RBT	6/24/2010	10:00:00 PM	UP-SL	5240839N	180	N/A	NO	shoreline u/s of Co. boat ramp
Total	**3**							
SCP	7/8/2010	9:50:00 PM	UP-SL	5240982N	120	N/A	NO	veg. shoreline
Total	**1**							
SMB	5/18/2010	10:15:00 PM	MID - SL	5243250N	310	?	NO	veg. shoreline d/s of Rochet
SMB	5/18/2010	10:45:00 PM	MID - BW	5242629N	345	630	YES	sample SMB-1; first

SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
								back-water u/s
SMB	6/23/2010	10:55:00 PM	MID-SL	5243065N	100	N/A	NO	too small; veg. shoreline
SMB	6/24/2010	9:30:00 PM	UP-SL	5240795N	385	680	YES	sample SMB-2; u/s of Co. boat ramp
SMB	7/7/2010	1:35:00 AM	LOW-SL	5243301N	180	N/A	NO	rip-rap, veg. rock mix shoreline
SMB	7/7/2010	1:35:00 AM	LOW-SL	5243301N	180	N/A	NO	rip-rap, veg. rock mix shoreline
SMB	7/7/2010	1:35:00 AM	LOW-SL	5243301N	180	N/A	NO	rip-rap, veg. rock mix shoreline
SMB	7/7/2010	1:35:00 AM	LOW-SL	5243301N	180	N/A	NO	rip-rap, veg. rock mix shoreline
SMB	7/7/2010	1:35:00 AM	LOW-SL	5243301N	180	N/A	NO	rip-rap, veg. rock mix shoreline
SMB	7/7/2010	2:05:00 AM	LOW-SL	5242757N	140	N/A	NO	veg. shoreline
SMB	7/7/2010	10:25:00 PM	MID-SL	5243267N	220	150	YES	sample SMB-3; rip-rap shoreline
SMB	7/7/2010	10:25:00 PM	MID-SL	5243267N	235	200	YES	sample SMB-4; rip-rap shoreline
SMB	7/7/2010	10:25:00 PM	MID-SL	5243267N	180	N/A	NO	rip-rap shoreline
SMB	7/8/2010	10:15:00 PM	UP-SL	5240960N	130	N/A	NO	large back-water RB
SMB	7/8/2010	10:15:00 PM	UP-SL	5240960N	140	N/A	NO	large back-water RB
SMB	7/8/2010	11:00:00 PM	UP-SL	5240985N	240	210	NO	digested mat; shoreline veg. sandy
Total	**16**							
TCH	7/7/2010	11:00:00 PM	LOW-SL	5243005N	200	N/A	NO	partial veg. shoreline sandy bottom
TCH	7/8/2010	10:15:00 PM	UP-SL	5240960N	180	N/A	NO	large back-water RB
Total	**2**							
WC	7/7/2010	11:00:00 PM	LOW-SL	5243005N	180	N/A	NO	partial veg. shoreline sandy bottom
Total	**1**							
YP	5/18/2010	12:40:00 AM	LOW - SL	5242629N	120	N/A	NO	veg. shoreline
YP	5/27/2010	1:15:00 AM	MID-SL	5243250N	150	N/A	NO	veg. shoreline
YP	5/27/2010	1:55:00 AM	MID-SL	5243250N	185	N/A	NO	shoreline old pilings d/s Shadowy CG
YP	5/27/2010	10:20:00 PM	UP - SL	5241075N	180	N/A	NO	veg. shoreline
YP	6/23/2010	1:30:00 AM	LOW-SL	5242996N	170	N/A	NO	veg. shoreline
YP	7/7/2010	9:50:00 PM	MID-SL	5242045N	150	N/A	NO	veg. shoreline

SPECIES	DATE CAUGHT	TIME CAUGHT	LOCATION	GPS	FL (MM)	WT. (G)	STOMACH SAMPLE	NOTES
YP	7/7/2010	9:50:00 PM	MID-SL	5242045N	160	N/A	NO	veg. shoreline
Total	**7**							

2010 Electrofishing Sampling Concluded on July 8, 2010

Appendix C

St. Joe River Predatory Fish Removal Analysis
Predator Fish Stomach Content Sampling Plan

June 9, 2009

Prepared by Normandeau Associates for
Avista Corporation

Purpose

This plan is intended to establish collection goals for predatory fish stomach content analysis relative to fish size, lethal take per species and laboratory function when conducting the predatory fish removal analysis on the lower St. Joe River, Idaho. Fish collection will be conducted according to the methods described in the Predatory Fish Removal and Analysis Scope of Work, Lower St. Joe River (2008), the Washington Department of Fish and Wildlife (WDFW) electrofishing guidelines, the sampling protocol as well as the Idaho Scientific Collector's Permit conditions as amended on May 13, 2009. This plan was also developed and refined through a meeting with Idaho Fish and Game and the US Fish and Wildlife Service on May 13, 2009 in which the following was agreed to.

Viable Predatory Fish Size

A minimum size viable predatory fish has been established through consultation with Idaho Fish and Game and the US Fish and Wildlife Service and existing literature to target stomach content samples collected as part of this analysis. A quota of 30 stomach samples each of three non-native predatory species (90 total) is the goal. The three non-native predatory fish are smallmouth bass *Micropterus dolomieui*, largemouth bass *M. salmoides* and northern pike *Esox lucius.* Predatory fish size, weight, abundance and distribution is unknown in the lower St. Joe River, therefore; this sampling plan has been developed to best represent the predatory fish size from which stomach contents will be removed and analyzed.

From past juvenile bull trout collection efforts on the upper St. Joe River, an average size of approximately 150mm or larger fork length has been established for juvenile bull trout that either migrate through or are rearing in the lower St. Joe River (Parametrix 2003). On average, predatory fish can be twice the length of their prey. With this assumption, viable predatory size fish in the lower St. Joe River would be approximately 300mm fork length based on juvenile bull trout prey being approximately 150mm long.

Predatory fish size is an important component of predation indices and can vary with a particular river, stream or other water body. Water temperature, prey size, predator size, water turbidity and fish seasonal behaviors (spawning, rearing etc.) are all important factors to consider when sampling stomach contents of an unknown predatory fish assemblage. The lower St. Joe River stomach content analysis sampling protocol can also be supported through existing literature.

A predation consumption index (CI) has been developed for the Columbia and Snake Rivers, mainly for northern pikeminnow, by Petersen et al. (1990) that factors in water temperature, mean weight of pikeminnow, mean number of juvenile salmonids per pikeminnow (stomach contents) and mean weight of pikeminnow gut contents. CI values found in the Columbia River hydroelectric plant tailrace areas range from 0.8 to 11.7 CI that factor in predator size as an important component of the CI.

In a study conducted by Rieman et al. 1991, predatory fish size was established as predators larger than 250 mm long fork length (northern pikeminnow and walleye) or 200 mm for smallmouth bass because consumption of juvenile salmonids by smaller predators was negligible (Poe et al 1991, Vigg et al. 1991). However, predator size for the Rieman et al. 1991, study was established for yearling and sub-yearling Chinook salmon (~ 70mm), coho salmon (~ 100-125mm), sockeye salmon (~ 100-150mm), and steelhead (~ 150-200mm). Most of these prey species are smaller than juvenile bull trout found in the lower St. Joe River; therefore, utilizing the same minimum predator length for juvenile bull trout, that are generally larger, does not seem justified and is set at 300 mm for all three target species.

- Minimum fork length for northern pike, smallmouth bass and largemouth bass is 300 mm for stomach content collection.

Lethal Take per Species

Per discussions with Idaho Fish and Game and the US Fish and Wildlife Service, lethal take of two of the three target species has been approved and will be adhered to. Lethal take for purposes of stomach content analysis and predatory fish removal can occur for all smallmouth bass and northern pike over 300 mm fork length. Up to 30 largemouth bass will be lethally taken during this study as per amended Idaho Fish and Game Scientific Collecting Permit No. F-02-09-09 amended on May 13, 2009 and clarified per telephone call with Scott Deeds, USFWS on June 9, 2009. In addition, no lethal take of any target species other than smallmouth bass and northern pike 300 mm or larger will occur.

- Lethal sampling of all smallmouth bass and northern pike over 300 mm will occur.
- Lethal sampling of up to 30 largemouth bass over 300 mm will occur and then no lethal sampling of any additional largemouth bass will occur.
- All lethally taken target species will be filleted, put on ice and delivered to the Idaho Fish and Game Panhandle Regional Office for distribution to a local food bank.
- Any bull trout or cutthroat trout mortalities will be reported to IDFG within 72 hours.

All salmonids will be handled with extreme care and electrofishing settings will be used to target muscle taxis of larger fish (300 mm or larger) and a divided live-well will be used to revive any salmonids or bull trout captured.

Laboratory Function and Sample Collection Protocol

The Normandeau laboratory will function to process stomach content samples with either identifiable fish parts or unidentifiable fish parts/digestive matter that can undergo diagnostic bone analysis. Target fish of viable predatory size with empty stomach contents will be measured and noted and not sent to the laboratory then filleted for the food bank. Additional largemouth bass stomach content analysis will use the Lavage method (Hakala, 2004), on fish

300 mm or larger with a goal of collecting 30 samples for laboratory analysis and releasing the additional largemouth bass live and unharmed.

When collecting stomach samples using lethal take, protocol will be for field staff to apply blunt-force trauma to the base of the skull and proceed to cut open the digestive tract and abdomen of the target fish. Stomach contents will be examined in the field to note any identifiable fish or fish parts, bones, fins or other digestive material prior to bagging and freezing samples for laboratory analysis.

If an identifiable bull trout or bull trout piece is seen in a stomach content sample, an effort will be made to extract either a fin-clip or tissue sample to be preserved for genetic analysis. Additionally, a note will provided to the laboratory to assist in developing diagnostic bone analyses reference support with the identifiable fish.

Fish collection and stomach content samples will occur throughout the designated river study area (18 mile section) with catch plotted by ¼ mile river reaches using electrofishing where most likely effective as described in the statement of work. Habitat mapping and fish collections will be done to provide discrete sampling areas to document fish distribution by species and conduct sub-sampling in productive habitats distributed throughout the 18 mile section of river. Sampling will occur between late April and end by mid-July with a goal of collecting stomach content samples over a range of time, habitat and fish size.

Literature Cited

Hakala, J.P., and Johnson, F.D. 2004. Evaluation of a Gastric Lavage Method for Use on Largemouth Bass. Management Briefs: North American Journal of Fisheries Management 24:1398-1403, 2004.

Parametrix - Avista Corporation (Avista). 2003. Out-migration of Juvenile Adfluvial Bull Trout from the St. Joe River System into Coeur d'Alene Lake. Final Study Plan. Study plan prepared for the Spokane River Hydroelectric Project relicensing Fisheries Work Group and Avista Corporation, Spokane,Washington

Peteren, J.H., M.G. Mesa, J. Hall-Griswold, W.C. Schrader, G.W. Short and T.P. Poe. 1990. Magnitude and dynamics of predation on juvenile salmonids in Columbia and Snake River reservoirs. Annual report to BPA (contract DE-AI179-88BP91964, Portland, Oregon.

Poe, T.P., H.C. Hansel, S. Vigg, D.E. Palmer, and L. A. Prendergast. 1991. Feeding of predaceous fishes on out-migrating juvenile salmonids in john Day Reservoir, Columbia River. Transactions of the American Fisheries Society 120:405-420.

Rieman, B.E., R.C. Beamesderfer, S. Vigg, and T.P. Poe. 1991. Estimated loss of juvenile salmonids to predation by northern squawfish, walleyes, and smallmouth bass in John Day Reservoir, Columbia River. Transactions of the American Fisheries Society. Vol. 120, No. 4, July 1991.

Vigg, D.E., Poe, T.P., H.C. Hansel, S. Palmer, and L. A. Prendergast. 1991. Rates of consumption of juvenile salmonids and alternative prey fish by northern squawfish, walleyes, smallmouth bass, and channel catfish in John Day Reservoir, Columbia River. Transactions of the American Fisheries Society 120:421.

Appendix D Consultation Record

Avista Letter to USFWS Request for Review and Comments

October 31, 2011

Rick Donaldson
U.S. Fish and Wildlife Service
11103 E. Montgomery Drive
Spokane, WA 99206

Subject: **Spokane River Project, FERC Project No. 2545, License Article No. 407 Draft Report "Predatory Fish Removal and Analysis Lower St. Joe River, Idaho 2009 – 2011"**

Dear Mr. Donaldson:

As part of the U.S. Fish and Wildlife Service's (USFWS) Determination and Conclusion regarding Endangered Species Act Section 7 Consultation for the Post Falls Hydroelectric Development, Avista agreed to perform a two- to-three year Targeted Non-Native Predatory Fish Removal Program (Program). Avista began implementing the Program, which is enclosed for your reference, in 2009, and later agreed with the USFWS and Idaho Department of Fish and Game to continue the study through 2011. The continuation was an effort to increase the sample size and level of comfort for everyone involved.

The results from the three-year monitoring study are summarized in the enclosed draft document entitled, "Predatory Fish Removal and Analysis Lower St. Joe River, Idaho 2009-2011." The study results indicate that predation on bull trout by non-native fish in the Lower St. Joe River is not occurring. Based on this information, Avista is not proposing any associated enhancement measures related to predation on bull trout.

Please provide your comments on the enclosed report and the conclusion that no additional associated enhancement measures are necessary to me by December 1, 2011. If you have any questions please feel free to contact me by telephone at (509)495-8612 or by email at tim.vore@avistacorp.com.

Sincerely,

Tim Vore
Environmental Specialist

Enclosure
Cc: Jim Fredericks, IDFG
Angelo Vitale, CDA Tribe

US Fish and Wildlife Comment Letter

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Idaho Fish and Wildlife Office
Northern Idaho Field Office
11103 East Montgomery Drive
Spokane Valley, Washington 99206

DEC 14 2011

December 12, 2011

Tim Vore
Environmental Specialist
Avista Corporation
1411 E. Mission
PO Box 3727
Spokane, WA 99220-3727

Subject: Spokane River Hydroelectric Project (FERC No. 2545; FERC Article No. 407), Draft Final Report – Predatory Fish Removal and Analyses Lower St. Joe River, Idaho 2009-2011, Reference No. 1-9-08-I-0097 (File No. 503.0005)

Dear Mr. Vore:

This letter comprises the U.S. Fish and Wildlife Service's (Service) response to your October 31, 2011, letter and attached Draft Final Report (Report) entitled *"Predatory Fish Removal and Analyses Lower St. Joe River, Idaho 2009-2011,"* related to Avista's Spokane River Hydroelectric Project (Project). The Report dated October 2011, was prepared for Avista by Normandeau Associates, Inc., to comply with the Federal Energy Regulatory Commission's (FERC) License Article No. 407 and the requirements of the section 7 Endangered Species Act (ESA) consultation for the Project. Accordingly, the Service has reviewed the Report and is providing the following comments.

1) Cover letter, 2nd paragraph: "*The study results indicate that predation on bull trout by non-native fish in the lower St. Joe River is not occurring.*" Because of the relatively limited scope of the study that for example, did not include the lower 15.5 miles of the St Joe River; we do not agree that the findings in the Report support your conclusion in the cover letter.

2) Report, Section 4.0, Discussion, last paragraph (Page 25): "*The stomach content analysis conducted through this study revealed many prey items present in the diet of northern pike and smallmouth bass, but no evidence of bull trout being consumed by non-native predatory fish.*" We believe this is a more accurate statement related to the findings of the study. However, because 14 of the 60 (23 percent) northern pike stomachs had fish remains that were digested beyond identification, it is possible that bull trout were consumed but were not detected. This is supported by the study findings indicating that "*bull trout could be present in habitats during times when northern pike could be in similar habitats and be actively feeding.*"

In conclusion, Avista has fulfilled the requirements of the Predatory Fish Removal Analysis as agreed to by the Service pursuant to the section 7 ESA consultation for the Project. Furthermore, based on the criteria established and agreed to for this particular study, and although the scope of the Project was limited, we concur that the implementation of additional enhancement measures related to non-native predator control, as stipulated in FERC Article No. 407, are not warranted.

Thank you for the opportunity to provide our comments related to the Report. We look forward to working with your staff during the implementation of various mitigation activities during the course of the new license. If you have any questions, please contact Scott Deeds of our Spokane Office at 509-893-8007.

Sincerely,

Ben Conard
Field Supervisor

cc: IDFG, CdA (Corsi)
CDA Tribe (Vitale)

Avista Response to USFWS Comments:

Comment 1:

"The study results indicate that predation on bull trout by non-native fish in the lower St. Joe River is not occurring." Because of the relatively limited scope of the study that for example, did not include the lower 15.5 miles of the St Joe River; we do not agree that the findings in the Report support your conclusion in the cover letter.

Response to Comment 1:

Avista's reference to the Lower St. Joe River was specific to the Lower St. Joe River reach located between river mile 15.5 and 31 that was included in the study. It did not imply the entire Lower St. Joe River.

Comment 2:

"The stomach content analysis conducted through this study revealed many prey items present in the diet of northern pike and smallmouth bass, but no evidence of bull trout being consumed by non-native predatory fish." We believe this is a more accurate statement related to the findings of the study. However, because 14 of the 60 (23 percent) northern pike stomachs had fish remains that were digested beyond identification, it is possible that bull trout were consumed but were not detected. This is supported by the study findings indicating that "bull trout could be present in habitats during times when northern pike could be in similar habitats and be actively feeding."

Response to Comment 2:

Avista agrees with the USFWS that there was no evidence of bull trout being consumed by non-native predatory fish analyzed in this study and but that there was unidentifiable digested fish remains in some of the northern pike. The study results demonstrated the northern pike that were sampled had been preying on tench, other pike, northern pike minnow sculpin and other prey items.

Comment 3:

In conclusion, Avista has fulfilled the requirements of the Predatory Fish Removal Analysis as agreed to by the Service pursuant to the section 7 ESA consultation for the Project. Furthermore, based on the criteria established and agreed to for this particular study, and although the scope of the Project is limited, we concur that the implementation of additional enhancement measures related to non-native predator control, as stipulated in FERC article No. 407, are not warranted.

Response to Comment 3:

Avista agrees with the USFWS that it is not necessary to implement additional enhancement measures related to non-native predator control, as stipulated by FERC Article No. 407, based on the results of the Predatory Fish Removal and Analysis, Lower St. Joe River Study.

Avista Letter to CDA Tribe Request for Review and Comments

October 31, 2011

Angelo Vitale
Coeur d'Alene Tribe of Indians
850 "A" Street
Plummer, ID 83851

Subject: Spokane River Project, FERC Project No. 2545, License Article No. 407

Draft Report "Predatory Fish Removal and Analysis Lower St. Joe River, Idaho 2009 – 2011"

Dear Mr. Vitale:

As part of the U.S. Fish and Wildlife Service's (USFWS) Determination and Conclusion regarding Endangered Species Act Section 7 Consultation for the Post Falls Hydroelectric Development, Avista agreed to perform a two- to-three year Targeted Non-Native Predatory Fish Removal Program (Program). Avista began implementing the Program, which is enclosed for your reference, in 2009, and later agreed with the USFWS and Idaho Department of Fish and Game to continue the study through 2011. The continuation was an effort to increase the sample size and level of comfort for everyone involved.

The results from the three-year monitoring study are summarized in the enclosed draft document entitled, "Predatory Fish Removal and Analysis Lower St. Joe River, Idaho 2009-2011." The study results indicate that predation on bull trout by non-native fish in the Lower St. Joe River is not occurring. Based on this information, Avista is not proposing any associated enhancement measures related to predation on bull trout.

Please provide your comments on the enclosed report and the conclusion that no additional associated enhancement measures are necessary to me by December 1, 2011. If you have any questions please feel free to contact me by telephone at (509)495-8612 or by email at tim.vore@avistacorp.com.

Sincerely,

Tim Vore
Environmental Specialist

Enclosure
Cc: Jim Fredericks, IDFG
Rick Donaldson, USFWS

Coeur d'Alene Tribal Comment Letter

COEUR D'ALENE TRIBE
850 "A" STREET
P.O. BOX 408
PLUMMER, IDAHO 83851
(208) 686-1800 FAX (208) 686-1182

December 15, 2011

Tim Vore
Environmental Specialist
Avista Corporation
1411 E. Mission
PO Box 3727
Spokane, WA 99220

Subject: Spokane River Hydroelectric Project (FERC No. 2545; FERC Article No. 407), Draft Final Report – Predatory Fish Removal and Analyses Lower St. Joe River, Idaho 2009-2011, Reference No. 1-9-08-I-0097 (File No. 503.0005)

Dear Mr. Vore:

As a natural resource trustee for the resident and migratory fisheries in the Coeur d'Alene Basin, the Coeur d'Alene Tribe is vitally concerned with native salmonid management and harvest. The Tribe has depended on these resources since time immemorial and our management objectives are to enhance native fish populations to levels that sustain a subsistence fishery. We have been monitoring the fishery resources in Coeur d'Alene Lake and its tributaries for over two decades and we are particularly concerned with the predator/prey relationships between northern pike and native salmonids. Low in-lake survival of cutthroat trout has recently led us to instigate a cooperative study through the Fisheries and Wildlife Resources Department at the University of Idaho to evaluate the impact of northern pike on cutthroat trout.

The forthcoming body of data should help augment the information generated by Avista's recent study and may very well have implications with regard to bull trout in Coeur d'Alene Lake. It is our hope that once completed, those interested in management of native fisheries in the Basin will have a more robust set of data with which to make conclusions and recommendations to better protect bull trout and cutthroat trout. So it is with these particular interests that we have reviewed the Avista Draft Final Report, Predatory Fish Removal and Analysis, Lower St. Joe River, Idaho 2009-2011. We offer the following general and specific comments on the study.

General comments:

The assumptions in this report are that impacts to bull trout from predatory fish would only be in that certain 15 miles of sample reach in the lower St. Joe River. Nowhere is it stated in this

document that overlap between bull trout and predators could also occur in other un-sampled reaches, such as riverine reaches below that which was sampled or in the any of the shallow-water habitats at the mouth of the St. Joe or those within the lake proper. Any conclusions drawn by this study must state so with such caveats and recognize that impacts may be occurring in other areas, or at other time periods, not addressed by this study. Furthermore, because salmonids were found in stomachs of northern pike, there is indication that northern pike are feeding on salmonids that were present in the study area and could thus likely feed upon bull trout. Given that there is a lack of information on the abundance of outmigrating juvenile bull trout in the St. Joe system, the lack of bull trout found in stomachs of northern pike may be due to the low numbers of migratory juvenile bull trout (as evidenced in your samples). In other words, the probability of finding a bull trout in the stomach of a pike may be substantially small if there aren't many bull trout present relative to other food items. Given the low numbers of pike stomachs analyzed over the three-year study, this probability may be exceptionally small. Thus, this report should include another caveat that suggests that under different levels of juvenile bull trout abundance, results may be different. Moreover, the time period sampled (descending limb of the hydrograph) and the microhabitats targeted in the study section (backwaters and shallow, low velocity shoreline environments) may not have yielded optimal temporal and spatial overlap between migratory bull trout and predators. More supporting information is needed on why these time periods and microhabitats were selected to evaluate consumption. In conclusion, this study is only relevant to the short river section that was targeted and only relevant to the current levels of juvenile abundance of outmigrating bull trout.

Specific Comments:

Introduction

1st paragraph:

Indicate that this study was completed only on a 15 mile stretch of the lower St. Joe. Currently, it is misleading to claim that this study looked at impacts along the lower 30 miles of the St. Joe (again this was repeated in the description of the Study area).

Goal and Objective

2nd paragraph:

Why were only 30 stomach samples considered the goal? Given the likelihood of low numbers of bull trout present during sampling (e.g., only 3 fish captured during shocking events), there would probably be even a smaller probability of finding a fish in a stomach sample.

More explanation is required on why the diagnostic method was unable to identify stomach contents to species. If the fish remains were unrecognizable, what procedures were taken? Were bones removed and diagnostic keys used to identify bones to species?

Study Area

1st paragraph:

Again, the study area cannot be 30 miles if it extends from RM 15.5 to RM 31.

Timing of sampling:
Timing of sampling should coincide with the period in which juvenile bull trout would be migrating through the lower St. Joe (per your reference in the Introduction, 2nd paragraph '…from the lower St. Joe River, a known migratory corridor for juvenile…bull trout), not during a putative rearing period in the lower River. Your description makes it sound as if juvenile bull trout are rearing in the lower St. Joe ('…optimal water temperature for juvenile bull trout rearing…) and that because of this they would be vulnerable to predation. Do you have any evidence for this? Similarly, why was the sampling conducted during the descending phase of the St. Joe River hydrograph? Was this related to ease of sampling or is there empirical evidence that this would be the time in which the distribution of juvenile bull trout would most likely occur in the lower St. Joe (regarding emigration timing, there is documentation that juvenile bull trout tend to emigrate as discharge is peaking during the spring)? Supporting documents for the reason for the time in which sampling occurred would have strengthened this section.

Methods and materials
Electrofishing; p. 7:
We understand that the microhabitats chosen for sampling (e.g., backwaters, side channels, shoreline areas) were based on the limitations for effective boat shocking. However, where in the channel would out-migrating bull trout be primarily found? If bull trout are predominantly emigrating in deep waters in this section of the river, then what is the likelihood that some of these predators such as pike are utilizing these same habitats? Given that the pike body type would not likely lend itself to maintaining position in deep, fast water habitats in the main channel, then there may not be much of a chance for pike to intercept outmigrating bull trout. In other words, how vulnerable are bull trout to predation at this time of the year if bull trout and pike are not using the same microhabitats in riverine reaches of the St. Joe. Again, it seems as if this sampling plan assumes that bull trout are predominantly rearing in this reach of the lower St. Joe at this time of year and using shallow, near-shore environments, and not using it as a migratory corridor. Documentation on the likelihood for bull trout to be using low-velocity shoreline or backwater habitats at this time of the year would help support the sampling strategy.

Electrofishing; p. 8, last paragraph:
We don't understand why a length/weight correlation needed to be developed. Most of the time there is a relatively strong relationship for this type of a power function.

Stomach content analysis field collection:
Why only 30 stomachs per predator? What was the justification for this sample size? In addition, what type of analyses were planned to be conducted with the data collected from the stomach content analysis? In other words, if bull trout were positively indentified in some of the analyzed stomachs, what type of analyses would be done to interpret the significance of the

findings? Not much detail in this section regarding analytical procedures for determining potential significance of predator impacts to bull trout.

Results

Day and Night sampling comparison:

Though shocking may be more effective at night than during the day, as others have found, this cannot be concluded from your data when only one comparison was made. Furthermore, the sampling events for this comparison were separated by almost a month and they did not include the same areas. The daytime event sampled the lower and mid sections, whereas the latter nighttime event included the mid and upper regions. Given the disparity in pike catch rates among river sections, we don't find this comparison nor the derived conclusions reliable.

Length to weight relationship:

As previously mentioned, we don't understand why this was included. A tight-fitting correlation should be expected for most length to weight regressions. This analysis does not support any of the primary objectives outlined in your study.

Water temperature and river flow:

Why were you concerned with comparing logged data to spot-check data; of course, you will find differences given that your loggers provide continuous data throughout the day, whereas your hand-held recordings will only provide data at the time of sampling (1st paragraph). Similarly, why even report min and max readings from your hand held spot-check temperatures when you have continuous recordings available? In addition, your temperature figures are difficult to interpret because points from both loggers overlap. Maybe you should display a minimum, maximum, and average for each of the stations. Also, your discharge figures would have been more informative if you included discharge data prior to your sampling events, and illustrated on the figures with points when sampling occurred. With your current presentation, it is difficult to determine at what phase of the hydrograph your sampling occurred (e.g., 2010). Generally, we found the presentation of your temperature and discharge data to be poor.

Stomach content analysis

More description of how bull trout were ruled out of the 'Unidentified salmonid remains (bones)' would be helpful to elucidate how this differentiation was made with those stomach samples. In addition, what were the 'unidentified pisces remains'; was it tissue or bones?

Also, it would've helped to have a table that collectively illustrated what species were sampled in the shock efforts and what species were found in the stomach analyses. For example, eleven and 16 cutthroat were captured in shocking events in 2009 and 2010, respectively. Only two and one cutthroat were found in pike stomachs in these two years. Given these food item to presence index ratios for cutthroat, and the fact that only 1 and 2 bull trout were captured in shocking events, the lack of bull trout detected in stomachs is not unexpected. Furthermore, only 3 tench were captured in shock events, though 40 were detected in stomachs. Apparently, there may have been some prey selectivity occurring but this was not transparent in your

description of results. Also, selectivity by pike may depend on the habitats in which the prey species were commonly found. If there was a table that described what types of habitats certain species were most often associated with during the shock events, then there may have been a relationship between prey items consumed by pike and the habitats in which these prey items occurred. For example, were food items typically those species that occupied backwaters or were they those present along shoreline, riverine habitats during sampling events. We found it interesting that pikeminnow comprised a major portion of the dietary items in 2010 and 2011, but weren't detected in fish remains in 2009. Were pikeminnow more abundant in specific habitat types that pike would frequent in sampling events in 2010 and 2011 than in 2009?

In conclusion, given that the dietary habits of predators was the most important objective of your study, there wasn't that much content in the report devoted to it. A better analysis may have revealed what types of habitats pike were frequenting during their feeding bouts during your seasonal sampling events.

Discussion

2nd paragraph, second to last sentence:

We suggest including a caveat for this sentence, stating that during the time periods (e.g., late spring) and river reaches sampled, smallmouth bass would not be a predator of concern.

4th paragraph:

The IDEQ criteria were considered rearing temperatures not migration criteria; wording it as migration criteria makes it sound as if these would be the temperatures in which bull trout would most likely migrate. We don't think that was the intention of the IDEQ report. You mentioned when bull trout were captured relative to water temperatures. What we find more interesting is that bull trout, though captured in extremely low numbers, were captured during the earlier sampling events in 2009 and 2010, which may have been due to the lack of overlap in outmigration peak times and sampling events. Again, more discussion is required of the choice of sampling times relative to when juvenile bull trout would be expected to be moving through the lower St. Joe River.

5th paragraph:

You state the possibility for spatial overlap between bull trout and pike in May and early June. Though some bull trout may be present in shallow, low velocity environments that pike would be frequenting (e.g., 87% of the pike were collected in back-water habitats), there needs to be more discussion regarding the microhabitats that bull trout would predominantly be using if they were engaged in motivated outmigration behavior. How much evidence is there that juvenile bull trout linger in back-water habitats during their outmigration?

Final paragraph:

Again, a caveat needs to be included in the final sentence that states that there was no evidence of bull trout predation for the time period examined and for this reach of the lower St. Joe River.

We appreciate the opportunity to review and comment on this report and hope that these remarks are regarded constructively, as they are intended. The understanding of life history dynamics and species interactions within the project area influenced by Post Falls Dam may best be developed in a cooperative environment and the informational needs to achieve the management objectives for bull trout and other native salmonids in the larger Coeur d'Alene Basin are still significant. Future uncertainties research should be well conceived and subjected to peer review and we look forward to partnering with other managers and Avista to this end. Please advise us directly when Avista will submit this report to FERC, how our comments will be addressed and whether Avista will include these comments as part of the submittal to FERC.

Sincerely,

Phyllis Johnson for

Angelo Vitale
Fisheries Program Manager
Coeur d'Alene Tribe

Cc: Jim Fredericks, IDFG
Rick Donaldson, USFWS

Coeur d'Alene Tribe General Comments and Avista's Associated Responses

General Comment 1:

The assumptions in this report are that impacts to bull trout from predatory fish would only be in that certain 15 miles of sample reach in the lower St. Joe River. Nowhere is it stated in this document that overlap between bull trout and predators could also occur in other un-sampled reaches, such as riverine reaches below that which was sampled or in the any of the shallow water habitats at the mouth of the St. Joe or those within the lake proper. Any conclusions drawn by this study must state so with such caveats and recognize that impacts may be occurring in other areas, or at other time periods, not addressed by this study. Furthermore, because salmonids were found in stomachs of northern pike, there is indication that northern pike are feeding on salmonids that were present in the study area and could thus likely feed upon bull trout.

Response to General Comment 1:

The Tribe's comments are noted.

For clarity, the following sentence will be added to the report Goals and Objectives section: "Based on available literature from within the Coeur d'Alene Lake basin and from other areas, predation on salmonid species by introduced, non-native species is known to occur and may have population limiting consequences." The report has been revised to better clarify the USFWS and IDFG approved geographic boundary for the study, which was conducted between river mile 15.5 and 31 on the lower St. Joe River. The study results are specific to this river reach which was determined by the USFWS and IDFG as a known migratory corridor for juvenile, sub-adult and adult bull trout and that there was no evidence of bull trout being consumed by the non-native predatory fish analyzed in this study.

General Comment 2:

Thus, this report should include another caveat that suggests that under different levels of juvenile bull trout abundance, results may be different.

Response to General Comment 2:

Please see previous response to general comment 1. Avista recognizes that different levels of juvenile bull trout abundance, and differences in many other variables that existed when the study was conducted could have led to different results.

General Comment 3:

More supporting information is needed on why these time periods and microhabitats were selected to evaluate consumption.

Response to General Comment 3:

The spring time period, including the descending limb of the hydrograph, were required by the USFWS as the most probable time when juvenile/sub adult bull trout would be migrating through the study reach and when predatory fish would likely be feeding on them. We have revised the Timing of Sampling section of the report to include the following sentence taken from the Scope of Work (SOW): "The PFRA effort was best conducted in that time most

probable that juvenile bull trout would be migrating through the study reach and predatory fish would be feeding, which is during the specific time-frame that encompassed the spring and early summer when water temperature is still cool enough for juvenile bull trout presence yet not cold enough to preclude piscivorous activity by non-native fish in the area."

The USFWS and IDFG approved SOW included sampling within all reaches and habitats of the study area, including shoreline, side channel and backwater habitats. The SOW provides more supporting information and has been added to the report as Appendix A.

General Comment 4:

In conclusion, this study is only relevant to the short river section that was targeted and only relevant to the current levels of juvenile abundance of outmigrating bull trout.

Response to General Comment 4:

Please see previous response to general comment 1. The report has been revised accordingly.

Coeur d'Alene Tribe Specific Comments and Associated Responses

Specific Comment 1:

Indicate that this study was completed only on a 15 mile stretch of the lower St. Joe. Currently, it is misleading to claim that this study looked at impacts along the lower 30 miles of the St. Joe (again this was repeated in the description of the Study area).

Response to Specific Comment 1:

Please see response to general comment 1. The report has been revised appropriately

Specific comment 2:

Why were only 30 stomach samples considered the goal? Given the likelihood of low numbers of bull trout present during sampling (e.g., only 3 fish captured during shocking events), there would probably be even a smaller probability of finding a fish in a stomach sample.

More explanation is required on why the diagnostic method was unable to identify stomach contents to species. If the fish remains were unrecognizable, what procedures were taken? Were bones removed and diagnostic keys used to identify bones to species?

Response to Specific Comment 2:

The USFWS and IDFG determined that up to thirty stomach samples were required as described in the approved SOW for the study. We have revised the Stomach Content Analysis Field Collection section of the report to read: "The plan, developed through consultation with the USFWS and with guidance from Normandeau Associates, called for lethal collection per each of the three target species in 2009 and 2010 and one target species of northern pike in 2011 with a goal to collect up to 30 stomach samples per species." As agreed with the USFWS and IDFG, sampling in 2011 would make effort to collect 30 stomach samples from northern pike.

As discussed in the report the sample that contained enough intact body parts, fins or other distinguishing morphology allowed the lab to identify family or genus level; however, if the head

and jaw bones were not available, identification to species level was not always possible." No other procedures were taken than to preserve the samples at the lab.

Specific Comment 3:

Again, the study area cannot be 30 miles if it extends from RM 15.5 to RM 31.

Response to Specific Comment 3:

Please see previous response to general comment 1. The report has been revised accordingly.

Specific Comment 4:

Timing of sampling should coincide with the period in which juvenile bull trout would be migrating through the lower St. Joe (per your reference in the Introduction, 2nd paragraph '...from the lower St. Joe River, a known migratory corridor for juvenile...bull trout), not during a putative rearing period in the lower River. Your description makes it sound as if juvenile bull trout are rearing in the lower St. Joe ('...optimal water temperature for juvenile bull trout rearing...) and that because of this they would be vulnerable to predation. Do you have any evidence for this? Similarly, why was the sampling conducted during the descending phase of the St. Joe River hydrograph? Was this related to ease of sampling or is there empirical evidence that this would be the time in which the distribution of juvenile bull trout would most likely occur in the lower St. Joe (regarding emigration timing, there is documentation that juvenile bull trout tend to emigrate as discharge is peaking during the spring)? Supporting documents for the reason for the time in which sampling occurred would have strengthened this section.

Response to Specific Comment 4:

Please see response to previous general comment 3 and 4. Sampling occurred during the descending limb of the hydrograph as a specific requirement by the USFWS and as described by the SOW, which states "…Two of the sampling periods must occur at the descending limb of the spring runoff in late June or early July to capture the timeframe that non-native predators and bull trout may have a greater likelihood of occupying the inundated reach simultaneously." The USFWS and IDFG approved the specific sampling schedule for the study.

We have removed the sentence that refers to rearing from the report.

Specific Comment 5:

We understand that the microhabitats chosen for sampling (e.g., backwaters, side channels, shoreline areas) were based on the limitations for effective boat shocking. However, where in the channel would out-migrating bull trout be primarily found? If bull trout are predominantly emigrating in deep waters in this section of the river, then what is the likelihood that some of these predators such as pike are utilizing these same habitats? Given that the pike body type would not likely lend itself to maintaining position in deep, fast water habitats in the main channel, then there may not be much of a chance for pike to intercept outmigrating bull trout. In other words, how vulnerable are bull trout to predation at this time of the year if bull trout and pike are not using the same microhabitats in riverine reaches of the St Joe. Again, it seems as if this sampling plan assumes that bull trout are predominantly rearing in this reach of the lower St. Joe at this time of year and using shallow, near-shore environments, and not using it as a migratory corridor. Documentation on the likelihood for bull trout to be using low velocity shoreline or backwater habitats at this time of year would help support the sampling strategy.

Response to Specific Comment 5:

The study design included sampling within all reaches and various habitats of the study area, including the backwater habitats. Through consultation with the USFWS and IDFG, emphasis was placed on areas most likely to have northern pike, as discussed in the report's Introduction and in the USFWS and IDFG approved SOW. Neither the report, nor the study plan is intended to suggest that bull trout are predominantly rearing in this reach of the lower St. Joe River. The purpose of the study was not to collect bull trout but rather to collect non-native predatory fish (that may have been preying on bull trout as they migrated through the study area), which occupy the environments where sampling occurred or utilized near shore or backwater habitats.

Sampling occurred within the entire 15 mile study reach so as not to neglect any habitat type present during the study period. To help clarify, the following was added to the Discussion section: "The USFWS and IDEQ approved sampling schedule included sampling during late spring and early summer and was conducted in the riverine portions of the study area to collect predator species when juvenile/ sub adult bull trout likely use the deeper river channel to migrate. No bull trout were collected in June or July during this study."

Specific Comment 6:

We don't understand why a length/weight correlation needed to be developed. Most of the time there is a relatively strong relationship for this type of a power function.

Response to Specific Comment 6:

The USFWS required that a length/weight correlation be completed as described in the SOW, which states: "In year one, use data to establish Length/Weight relationship by target species. Once L/W relationship has been established, collect length measurements."

Specific Comment 7:

Why only 30 stomachs per predator? What was the justification for this sample size? In addition, what type of analyses were planned to be conducted with the data collected from the stomach content analysis? In other words, if bull trout were positively identified in some of the analyzed stomachs, what type of analyses would be done to interpret the significance of the findings? Not much detail in this section regarding analytical procedures for determining potential significance of predator impacts to bull trout.

Response to Specific Comment 7:

Please see previous response to specific comment 2.

As stated in the PFRA, if predation on bull trout was found through this study, which it wasn't, then the USFWS and Avista would have met to decide on a course of action.

Specific Comment 8:

Though shocking may be more effective at night than during the day, as others have found, this cannot be concluded from your data when only one comparison was made. Furthermore, the sampling events for this comparison were separated by almost a month and they did not include the same areas. The daytime event sampled the lower and mid sections, whereas the latter

nighttime event included the mid and upper regions. Given the disparity in pike catch rates among river sections, we don't find this comparison nor the derived conclusions reliable.

Response to Specific Comment 8:

The Tribe's comments are noted. Through consultation with the USFWS and IDFG, daytime electrofishing was discontinued after the first year of sampling. Both parties concurred that night electrofishing was more productive, and that Avista should conduct future sampling at night, as described in the Introduction of the report. As stated in the report, a qualitative discussion was required rather than an extensive evaluation, and no further comparison was necessary.

Specific Comment 9:

As previously mentioned, we don't understand why this was included. A tight-fitting correlation should be expected for most length to weight regressions. This analysis does not support any of the primary objectives outlined in your study.

Response to Specific Comment 9:

Please see previous response to specific comment 6

Specific Comment 10:

Why were you concerned with comparing logged data to spot-check data; of course, you will find differences given that your loggers provide continuous data throughout tile day, whereas your hand-held recordings will only provide data at the time of sampling (1 st paragraph). Similarly, why even report min and max readings from your hand held spot-check temperatures when you have continuous recordings available? In addition, your temperature figures are difficult to interpret because points from both loggers overlap. Maybe you should display a minimum, maximum, and average for each of the stations. Also, your discharge figures would have been more informative if you included discharge data prior to your sampling events, and illustrated on the figures with points when sampling occurred. With your current presentation, it is difficult to determine at what phase of tile hydrograph your sampling occurred (e.g., 2010). Generally, we found tile presentation of your temperature and discharge data to be poor.

Response to Specific Comment 10:

The Tribe's comments are noted.

We have revised the figures and the data presentation to characterize the study conditions to address the Tribe's comments. Maximum, minimum and average temperature throughout the study period, and water temperature results, are provided in the figures and summary tables for each graph.

Specific Comment 11:

More description of how bull trout were ruled out of the 'unidentified salmonid remains (bones)' would be helpful to elucidate how this differentiation was made with those stomach samples. In addition, what were the 'unidentified pisces remains'; was it tissue or bones?

Also, it would've helped to have a table that collectively illustrated what species were sampled in the shock efforts and what species were found in the stomach analyses. For example, eleven and 16 cutthroat were captured in shocking events in 2009 and 2010, respectively. Only two and one cutthroat were found in pike stomachs in these two years. Given these food item to presence

index ratios for cutthroat, and the fact that only 1 and 2 bull trout were captured in shocking events, the lack of bull trout detected in stomachs is not unexpected. Furthermore, only 3 tench were captured in shock events, though 40 were detected in stomachs. Apparently, there may have been some prey selectivity occurring but this was not transparent in your description of results. Also, selectivity by pike may depend on the habitats in which the prey species were commonly found. If there was a table that described what types of habitats certain species were most often associated with during the shock events, then there may have been a relationship between prey items consumed by pike and the habitats in which these prey items occurred. For example, were food items typically those species that occupied back-waters or were they those present along shoreline, riverine habitats during sampling events. We found it interesting that pikeminnow comprised a major portion of the dietary items in 2010 and 2011, but weren't detected in fish remains in 2009. Were pikeminnow more abundant in specific habitat types that pike would frequent in sampling events in 2010 and 2011 than in 2009?

In conclusion, given that the dietary habits of predators was the most important objective of your study, there wasn't that much content in the report devoted to it. A better analysis may have revealed what types of habitats pike were frequenting during their feeding bouts during your seasonal sampling events.

Response to Specific Comment 11:

Please see previous response to specific comment 2. Unidentified pisces remains consisted of bones, tissues, fin rays and scales.

The objective of the PFRA was to determine if predation on migratory juvenile/sub-adult bull trout is occurring from the sample obtained, not to conduct a extensive species habitat usage, predator selectivity, predator/prey habitat overlaps study. During the 2009 and 2010 sampling seasons pike were most often found in lower velocity, backwater habitats. The 2011 sampling addressed the study goal of reducing the number of predators by focusing efforts in areas most likely to have pike as directed by the USFWS.

Specific Comment 12:

We suggest including a caveat for this sentence, stating that during the time periods (e.g., late spring) and river reaches sampled, smallmouth bass would not be a predator of concern.

Response to Specific Comment 12:

The sentence was revised to read: “Based on the findings in this PFRA three-year analysis, smallmouth bass are not present in sufficient numbers, or of size, to be a predator species of concern on bull trout in the study area of the lower St. Joe River during spring.”

Specific Comment 13:

The IDEQ criteria were considered rearing temperatures not migration criteria; wording it as migration criteria makes it sound as if these would be the temperatures in which bull trout would most likely migrate. We don't think that was the intention of the IDEQ report. You mentioned when bull trout were captured relative to water temperatures. What we find more interesting is that bull trout, though captured in extremely low numbers, were captured during the earlier sampling events in 2009 and 2010, which may have been due to the lack of overlap in outmigration peak times and sampling events. Again, more discussion is required of the choice of sampling times relative to when juvenile bull trout would be expected to be moving through the

lower St. Joe River.

Response to Specific Comment 13:

The reference to the IDEQ criteria was removed from the Discussion Section. The following sentence was added for clarity: "This information was used to help guide project goals for sampling during times of the year when migrating juvenile/sub adult bull trout and predators likely occupy the same habitats at the greatest frequency.

Please see previous response to specific comment 5, in which the USFWS and IDFG determined when Avista would conduct the sampling.

Specific Comment 14:

You state the possibility for spatial overlap between bull trout and pike in May and early June. Though some bull trout may be present in shallow, low velocity environments that pike would be frequenting (e.g., 87% of the pike were collected in back-water habitats), there needs to be more discussion regarding the microhabitats that bull trout would predominantly be using if they were engaged in motivated outmigration behavior. How much evidence is there that juvenile bull trout linger in back-water habitats during their outmigration?

Response to Specific Comment 14:

Please see previous response to specific comments 5, 11, and 13.

In addition, the following sentence will be added to the discussion: "The sampling schedule included sampling during late spring and early summer and in the riverine portions of the study area to attempt to collect predator species during a time when juvenile/ sub-adult bull trout may be using the deeper river channel to migrate. No bull trout were collected in June or July during this study."

Specific Comment 15:

Again, a caveat needs to be included in the final sentence that states that there was no evidence of bull trout predation for the time period examined and for this reach of the lower St. Joe River.

Response to Specific Comment 15:

Please see previous response to general comment 1. We have revised the Discussion Section by adding the following: "The stomach content analysis conducted through this study revealed many prey items present in the diet of northern pike and smallmouth bass, but there is no evidence of bull trout being consumed by non-native predatory fish during the time-period sampled and within the study area."

Avista Letter to IDFG Request for Review and Comments

October 31, 2011

Jim Fredericks
Idaho Department of Fish and Game
2885 W. Kathleen Ave
Coeur d'Alene ID 83815

Subject: Spokane River Project, FERC Project No. 2545, License Article No. 407

Draft Report "Predatory Fish Removal and Analysis Lower St. Joe River, Idaho 2009 – 2011"

Dear Mr. Fredericks:

As part of the U.S. Fish and Wildlife Service's (USFWS) Determination and Conclusion regarding Endangered Species Act Section 7 Consultation for the Post Falls Hydroelectric Development, Avista agreed to perform a two- to-three year Targeted Non-Native Predatory Fish Removal Program (Program). Avista began implementing the Program, which is enclosed for your reference, in 2009, and later agreed with the USFWS and Idaho Department of Fish and Game to continue the study through 2011. The continuation was an effort to increase the sample size and level of comfort for everyone involved.

The results from the three-year monitoring study are summarized in the enclosed draft document entitled, "Predatory Fish Removal and Analysis Lower St. Joe River, Idaho 2009-2011." The study results indicate that predation on bull trout by non-native fish in the Lower St. Joe River is not occurring. Based on this information, Avista is not proposing any associated enhancement measures related to predation on bull trout.

Please provide your comments on the enclosed report and the conclusion that no additional associated enhancement measures are necessary to me by December 1, 2011. If you have any questions please feel free to contact me by telephone at (509)495-8612 or by email at tim.vore@avistacorp.com.

Sincerely,

Tim Vore
Environmental Specialist

Enclosure
Cc: Rick Donaldson, USFWS
Angelo Vitale, CDA Tribe

Idaho Department of Fish and Game Comments and Recommendations

No comments received

Avista Email for Extension of Comment Period

From: Vore, Tim
Sent: Friday, November 11, 2011 10:56 AM
To: 'Angelo J. Vitale'; Rick_Donaldson@fws.gov; Fredericks,Jim
Cc: Goloborodko, Yelena; Fitzhugh, Speed (Elvin)
Subject: RE: Predatory Fish Removal and Analysis Lower St. Joe River, Idaho 2009-2001

Good morning all-
On October 31, 2011 I sent each of you the draft report "Predatory Fish Removal and Analysis Lower St. Joe River, Idaho 2009-2011" and letter asking for your comments by December 1, 2011. The Coeur d'Alene Tribe has requested a comment period to end December 15, 2011. We can accommodate this request and still meet our timeline to provide this information to the Federal Energy Regulatory Commission (FERC).

With this email I am extending the comment period to end December 15, 2011.

If you have any questions you can contact me at telephone number 509.495.8612.

Thank you,

Appendix E

Color Plates of Fish Collected and Stomach Contents St. Joe River 2009 - 2011.

Plate 1: Juvenile bull trout (165 mm FL) collected May 14, 2009. Released unharmed.

Plate 2: Westslope cutthroat trout (350 mm FL) collected June 23, 2009. Released unharmed.

Plate 3: Northern pike collected on June 9, 2009 with whole cutthroat trout in stomach.

Plate 4: Northern pike stomach contents of tench collected June 9, 2009.

Plate 5: Northern pike stomach contents (whole fish) collected June 24, 2009.