Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal

Section 1. General administrative information

Kootenai River Fisheries Investigations

Bonneville project number, if an ongoing project 8806500

Business name of agency, institution or organization requesting funding
Idaho Department of Fish and Game

Business acronym (if appropriate) IDFG

Proposal contact person or principal investigator:

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University of Idaho	Aquaculture Research Institute	Moscow, ID 83843	Matt Powell

NPPC Program Measure Number(s) which this project addresses.
10.4B;.1;.2;.3;.4;.5 and 10.6C.1

NMFS Biological Opinion Number(s) which this project addresses.
ND-USFWS BO Incedental take

Other planning document references.
Kootenai River White Sturgeon Recovery Plan, USFWS, Snake River Basin Office, 4696 Overland Road, Room 576, Boise, Idaho, 83705

Subbasin.
Kootenai River

Short description.
Recover the Kootenai River white sturgeon (ESA) population, develop a recovery plan for burbot , improve fishing for rainbow trout and other resident species in the Kootenai River, Idaho and recover ecosystem.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
	Anadromous fish		Construction		Watershed
X	Resident fish		O & M	+	Biodiversity/genetics
	Wildlife		Production	+	Population dynamics
	Oceans/estuaries	+	Research	X	Ecosystems
	Climate	X	Monitoring/eval.	+	Flow/survival
	Other	+	Resource mgmt		Fish disease
		+	Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords.
Recovery of an Endangered species, Stock identification, Hatchery-wild interaction, Develop recovery and restoration plans

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
8346700	Libby Reservoir levels/Kootenai IFIM	Recovery of Kootenai River white sturgeon is dependent on augmented spring flows for sturgeon spawning and rearing. Winter low flows to test limitations to burbot migrations are dependent on water management from Libby.
8806400	Kootenai River white sturgeon study and experimental culture	IDFG is a cooperator with the Kootenai Tribe of Idaho(KITI). IDFG assissts the tribe in the capture of brood fish for their hatchery and

		evaluates the hatchery contribution to the population, interaction between juvenile wild/hatchery sturgeon.
9401200	Kootenai River white sturgeon M&E	This aspect of Kootenai River white sturgeon recovery is a partnership with the KITI and is a budget supplementation for the additional cost of intense M&E.
9404900	Kootenai River ecosystem improvement study.	IDFG is a partner in the Adaptive Ecosystem Assessment method (AEA) with the Kootenai Tribe. IDFG has been a participant in the AEA process and has helped fund the associated workshops. I

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Determine if growth, condition, and Wr of adult white sturgeon in the Kootenai River are effected by operational changes in Libby Dam.	a	Collect a sample of 50 adult sturgeon, measure, weigh, sex, determine maturity, collect fin ray, tag and release.
		b	Calculate growth, condition, and Wr each year and evaluate with hydrologic and temperature data.
2	Determine the minimum flow that will provide spawning and rearing habitat in the Kootenai River for white sturgeon.	a	Tag 12 mature sturgeon with sonic and radio transmitters.
		b	Determine response of adult sturgeon to flows in river provided from Libby Dam.by radio and sonic telemetry.
		c	Measure physical parameters of habitats utilized by adults: temp., flow, depth, substrate etc.
		d	Measure egg deposition with egg sampling mats, numbers, date, location, egg stage, substrate, velocitiy, depth, and temperature.

			Stage each egg to determine spawn date and record number of spawning events.
		e	Profiles of substrate in the spawning reach will be generated using an acoustic substrate subprofiling instrument.
		f	Measure larval relative abundance with D-rings, half meter nets, and meter nets.
		g	Measure fingerling and juvenile abundance with gill nets, collect lengths weights, and fin rays. Age finrays and compare year class strength to hydrologic conditions.
		h	Quantify early life history white sturgeon habitat and prepare habitat suitability index (HSI) curves and compare to hydrologic conditions and HSIcurves for Columbia River white sturgeon.
3	Determine if food abundance is a factor limiting juvenile white sturgeon growth and condition.	a	Collect 25 juvenile hatchery white sturgeon , measure, weigh, and colllect stomachs. Examine stomach contents, number and weight of items.
		b	Calculate condition, growth rates, and Wr of juvenile and hatchery sturgeon and compare changes in these factors and stocking numbers and densities of hatchery fish.
		c	Calculate electivity index and determine food preferences to what is available(benthic data collected by KITI) and if limiting.
4	Determine if growth and survival of juvenile white sturgeon has been limited by operation of Libby Dam.	a	Capture hatchery and wild juvenile white sturgeon; measure , weigh, collect fin ray sections, and calculate Wr and condition.
		b	Compare annual growth rates to hydrologic conditions including power peaking, temperature, food abundance (data collected by KITI), and operations of Libby

			Dam.
5	Determine if high flows created by "power peaking" and flood water evacuation during winter block or delay the migration of spawning burbot.	a	Capture adult burbot with hoopnets and implant a minimum of 12 sonic transmitters.
		b	Conduct routine sonic telemetry on burbot during various discharge regimes.
		c	Three 5 - 7 day blocks of minimum flows may be provided by the USACE to test movements of burbot. Use Fisher Exact test to determine statistical relation of movement and discharge
		d	Assess burbot reproductive status, habitat use, temperature, flows, and periodicity of spawning.
		e	Evaluate spawning success with (capture drifting eggs) with drift nets and D-rings.
		f	Deploy continuous recording thermographs in major spawning tributaries and compare temperature to timing of spawning.
		g	Monitor burbot migration into Idaho from lower river with hoopnets. Examine females for unspent eggs.
6	Identify a means of effectively sampling larval burbot and sturgeon.	a	Deploy drift nets (objective 6).
		b	Experiment with mid-water trawl, bottom trawl, half meter nets, meter nets, and other active and passive gears at prospective habitat locations in the Kootenai River and Kootenay Lake.
7	Determine the genetic level of similarity between burbot stocks in the Kootenai River and Duncan Lake (an impounded portion of a triibutary to Kootenay Lake).	a	Restriction fragment length polymorphisms will be used to determine the geneticsimilarity between the two stocks. Evaluate the feasibilty of the Duncan stocks potential use for recovery of Kootenai River fish as a captive

			breeding wild population.
8	Determine source of rainbow trout recruitment in Idaho portion of Kootenai River.	a	Trap outmigrating rainbow trout in Deep Creek with a screw trap.
		b	Locate marked juvenile out migrants in the Kootenai River with seine and electrofishing gear.
		c	Capture adult rainbow trout and mark with Floy reard tags. Implant 12 with radio transmitters and monitor movement.
		d	Conduct mark and recapture population estimates in selected reaches of the Kootenai River.
		e	Determine movement and habitat use of adult rainbow trout through radio tracking.
			Calculate minimum exploitation from return of reward tags. Return of tags will also provide information on repeat spawners and post spawn distribution of trout.
9	Determine if contaminants in the Kootenai River water and/or sediments are limiting survival of sturgeon eggs and larvae.	a	Determine select cotaminants to be tested.
		b	Remove 5 g sample of gonads from adult sturgeon and determine select contaminant levels.
		c	Determine primary mode of contaminant uptake in spawned white sturgeon eggs.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	1/1988	12/2014	10.00%
2	1/1995	12/2014	55.00%
3	1/1997	12/2014	5.00%
4	1/1995	12/2014	5.00%
5	1/1995	12/2002	11.00%
6	1/1996	12/2002	2.00%

7	1/1998	12/1998	1.00%
8	1/1997	12/2002	10.00%
9	1/1997	12/2000	1.00%
			TOTAL 100.00%

Schedule constraints.
Endangered Secies Act is abandoned by Congress and support for sturgeon recovery is impeded. USACE does not cooperate to fullest extent with winter test flows for burbot leading to inconclusive data and need to repeat testing the following year.

Completion date.
December 31, 2014

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	All calculations are based on FY98 budget and 5% inflation.	$184,635
Fringe benefits		$66,376
Supplies, materials, non-expendable property		$32,875
Operations & maintenance		$44,213
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		$31,500
PIT tags	# of tags: Program has sufficient PIT tags	$0
Travel		$22,602
Indirect costs		$96,193
Subcontracts		$100,905
Other		
TOTAL		$579,299

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	$608,264	$638,677	$670,611	$704,142
O&M as % of total	57.00%	57.00%	57.00%	57.00%

Section 6. Abstract

The Kootenai River has undergone many physical changes. The most recent changes are due to operation of Libby Dam for hydropower and flood control. The operation of this dam and it's impoundment have altered the river ecosystem by reversing the hydrograph, the river is warmer during winter, and the reservoir is a nutrient trap. Results have been; reduced productivity of the river, an altered fish community (more omnivores), inadequate recruitment of white sturgeon (ESA listed), collapse of the burbot fisheries, and a reduction in the quality of rainbow trout fishing. Many resident species and were listed as species of special interest in the 1994 Columbia Basin Fish & Wildlife Program. Our main goal is the restoration of the ecosystem and these important fisheries through designed research, flow experiments, and monitoring target fish populations and environmental variables. The USACE provides mitigative flows for spawning and rearing of Kootenai River white sturgeon and research efforts have shown sturgeon responded to improved springtime flows. Numerous eggs have been collected and several juvenile white sturgeon hatched during mitigative flow years were captured. It will take a minimum of one generation (20 years) to restore the white sturgeon. The burbot population is imperiled. Only one tributary is known to support burbot spawning and it is in B.C.. The burbot stock in Idaho is genetically distinct from fish further upstream in Montana. Research information indicates burbot spawning migrations may be impeded by high winter water velocities created during hydropower production and floodwater evacuation. Also, warmer winter water temperature may be disrupting spawning synchrony of burbot. Rainbow trout are the most popular sportfish but few juvenile trout are found in the river and the source of recruitment is poorly understood. Although surveys indicate tributaries may be fully seeded, reduced productivity may be limiting juvenile trout survival once they reach the Kootenai River from nursery tributaries.

Section 7. Project description

a. Technical and/or scientific background.

The Kootenai River has undergone many adverse anthropogenic changes in the last century. The most recent of which was the construction and operation of Libby Dam. Operation of Libby Dam and the impoundment (Lake Koocanusa) changed the river hydrograph, water temperatures and nutrient cycling of the river. Many native species were affected by the dam including white sturgeon, burbot, rainbow, cutthroat, and bull trout, mountain whitefish, and kokanee. All of these species have been cited as important resident fish in the 1994 Fish and Wildlife Program.

The Kootenai River white sturgeon is an Endangered Species. It once provided a popular sport fishery for Native Americans, residents, and tourists. Since construction of Libby Dam recruitment has been extremely limited (Partridge 1983 and Apperson and Anders 1991). The reversal of the Kootenai River hydrograph from high flows in spring (predam) to low flows during the spring spawning season is thought to be the main reason for the loss of recruitment. Flows appear to be the most limiting factors to sturgeon,

growth, reproduction, and egg and larval survival. Other investigators of sturgeon populations have cited the importance of high spring flows for adequate sturgeon recruitment (Alekerperov 1966, Khoroshko 1972, Votinov and Kas'yanov 1978, Parsley 1991, Parsley and Beckman 1994, Auer 1996, and Nilo et al. 1997). Since listing of the Kootenai River white sturgeon the USACE has provided experimental water management in the form of increased springtime flows to provided improved spawning conditions for sturgeon. White sturgeon movement and spawning has been monitored with telemetry gear during these flows (Paragamian et al. 1995, 1996, and 1997). Spawning of white sturgeon is documented by deploying sampling mats (McCabe and Beckman 1990) and the eggs are staged (Wang et al. 1985) to determine spawn date in relation to flow. As a result of improved spawning conditions many white sturgeon eggs have been collected since 1994 (Paragamian et al. 1995, 1996, 1997). However habitat suitability curves have shown Kootenai River white sturgeon may have different spawning needs than other sturgeon (Parsley and Beckman 1994). Our research efforts have shown Kootenai River white sturgeon spawn at cooler temperatures, slower moving water, over sand substrate but spawn at similar depths as Columbia River sturgeon. Recruitment of some wild juvenile sturgeon from flow test years has shown optimism for the prospects of recovery (Paragamian et al. 1995, 1996, and 1997).

Burbot once provided a popular winter sport and commercial fishery for Native Americans, residents and tourists in north Idaho. It was also important as a sportfish to the many anglers that fished Kootenay Lake in British Columbia (Paragamian 1994). In Idaho the burbot is endemic only to the Kootenai River. Little information is available on the management and biology of burbot but it seems to be a common phenomenon in the Pacific northwest that burbot populations collapse below dams but may flourish above them (McPhail 1997). Within one generation of construction of Libby Dam the population was on the verge of collapse (Paragamian 1994) and burbot are now closed to fishing. Burbot densities in Idaho are extremely low and the population is imperiled (Paragamian 1994, 1995, and 1996). Mt DNA analysis (Sambrook et al. 1989 and Dowling 1990) of Burbot in the Kootenai River in Idaho and B.C. indicated they are genetically distinct from burbot in Montana (Paragamian and Whitman in press). Although burbot are common in Lake Koocanusa the genetic evidence indicates the reservoir is not a sourof recruitment to the population in Idaho. Burbot areweak swimmers (Jones et al. 1974) and preliminary information indicates high velocities, created during power production/flood, may be inhibiting these winter spawning fish from reaching traditional spawning tributaries in Idaho (Paragamian 1995). In addition burbot spawn during very cold conditions (Becker 1990) and since the river is now warmer in the winter their spawning synchrony may be disrupted. Our study has focused on sonic tracking of burbot during varying winter flow conditions and before and after test periods of minimum flow. The objective is to determine how burbot respond to these varying flow conditions and to determine how Libby Dam can be managed to produce hydropower and evacuate floodwater but allow periods for burbot spawning migrations. In addition we have maintained temperature profiles of the Kootenai River and tributaries to examine the prospect that postdam temperature changes could have altered the spawning of burbot.

As previously mentioned the Kootenai River ecosystem has been seriously disrupted . Other factors such as loss of nutrients because of Libby Dam (Northcoat 1973, Bonde and Bush 1975, and Snyder and Minshall 1996) has also seriously affected primary and secondary productivity. As a result the alteration of food webs has changed the species composition of the fish community from the years immediately after the dam (Partridge 1983) to more recent times (Paragamian 1995). The system now harbors a greater biomass of omnivores vs. insectivores like trout and mountain whitefish (Paragamian 1995). A recent creel census (Paragamian 1995) indicated rainbow trout is the most popular sport fish in the Kootenai River but the harvest is much lower than that of other rivers in Idaho. Preliminary information indicates the nursery tributary streams are well seeded (Paragamian 1994) but in river inventories indicate low numbers of trout and very poor recruitment of young fish (Paragamian 1994 and 1995). Whitefish are the most abundant sportfish in the Kootenai River in Idaho. Whitefish densities, recruitment of young, and growth rate is lower than pre Libby days. At present our studies are designed to determine the main sources of rainbow trout recruitment and determine some of the limiting factors to recruitment. Recent returns of tags from trout marked in Idaho (captured in Fall Creek) and creeled in Kootenay Lake (unpublished findings) suggests these fish may be an adfluvial stock. Yet none were creeled in Idaho. Thus, we are unsure of where trout in Idaho recruit from.

To better understand the Kootenai River ecosystem and its biological interactions the IDFG and the KTOI has committed to using the Adaptive Ecosystem Assessment process. Workshops have been held and will be carried out to completion. Eventually we believe the AEA process will guide us to methods of improving productivity, survival, recovery, and growth of fish in the Kootenai River.

b. Proposal objectives.

FY 99: Hypothesis: flows simulating prelim conditions will improve survival and recruitment of white sturgeon – (1)Determine the minimum flow that will provide spawning and rearing habitat in the Kootenai River. Determine response of spawning white sturgeon during experimental discharges from Libby Dam by tracking tagged adults. Habitat physical parameters used by spawners will be measured during the migration and spawning periods. Measure egg deposition and physical parameters at each site. Measure larval abundance during flows. Measure fry and yearling abundance as related to flows. Habitat suitability curves for sturgeon spawning and life histories will be compared to established habitat suitability curves for Lower Columbia River white sturgeon. (2) Determine the numerical population status and growth of juvenile (hatchery and wild) adult white sturgeon and how operation of Libby Dam may be affecting growth. (3) Determine if food is a limiting factor to growth and survival of juvenile white sturgeon. Capture and sacrifice 25 hatchery juvenile sturgeon to identify food items and other parameters such as length, weight, and fin rays. (4) Determine the concentration level of selected toxicants in the reproductive products of sturgeon and if it

is at a tolerable level. (5) With Acoustic Substrate Profiling identify the substrate characteristics of spawning locations for white sturgeon and with archived data determine if there have been any changes in the distribution of substrates since Libby Dam (6) Hypothesis: High velocities created during power production and flood control operations of Libby Dam impede or prevent burbot from reaching spawning tributaries - Determine if high flows created by power peaking /control during the winter block or delay burbot migration. Burbot will be captured, tagged and monitored throughout the year. Velocities will be measured at four randomly selected areas within three main river reaches. Burbot reproductive status, spawning, habitat use and periodicity of spawning will be assessed by implanting sonic tags in adults. Telemetry will occur year round. Temperature will be recorded in tributary streams and the Kootenai River on a daily basis. (7) Identify methods to effectively sample larval burbot and white sturgeon. Various gear types (mid-water trawl, bottom trawl and experimental sled) will be tried to capture larval burbot and sturgeon. (8) Identify sources of recruitment of rainbow trout (9) Identify factors limiting rainbow trout survival and or recruitment in the Kootenai River. (10) Determine the extent of rainbow trout spawning activity in the main river. Redds identified in the mainstem will be marked and monitored for desiccation and/or scouring. (11) Determine the size and age of juvenile rainbow trout outmigrating from the tributaries to the main river. Tag adult trout in tributary streams with radio transmitters and follow their movements and responses to water management. (12) Assist the Kootenai Tribe with an Adaptive Ecosystem Assessment Workshop (AEA) to help formulate long range management goals for the Kootenai River ecosystem.

c. Rationale and significance to Regional Programs.

The Kootenai River Fisheries Investigations (KRFI) compliments the five year plan for the Panhandle Region of IDFG. Within the Regional Five Year Plan are the goals to recover the endangered Kootenai River white sturgeon and the burbot. Our rationale is based on development of sound data bases and testable hypothesis. The Kootenai River ecosystem was altered significantly after construction and operation of Libby Dam. The changes to the ecosystem affected resident fish populations including: white sturgeon, burbot, rainbow, cutthroat, and bull trout, and kokanee. Populations of these species still inhabit the Kootenai River and are not demographicly extinct but are at a serious risk of loosing. Many of the techniques and methods that we have incorporated into study are standard fisheries prodedures but in some cases we have applied adaptive management/methods and tailored them to our study. All of the fish populations that we have targeted once provided important fisheries and in no circumstance have we compromised recovery of one stock to the detriment of another or any other native fish. The end results of our management recommendations should benefit even non – target native populations. In addition the Kootenai River White Sturgeon Recovery Plan also takes into consideration the water needs of salmon for salmon recovery downstream in the basin. However, it should be noted that it will also be important for numerous Federal Agencies to cooperate in these efforts. The KRFI is also important to fish

managers of the province of British Columbia. The primary species in this investigation are all transboudary and any research findings and recommendations are also important to our Canadian colleagues. The KRFI is a program within itself with numerous goals and several testable hypothesis. The project objectives were previously listed while the investigation Goal: Restore sportfish populations in the Kootenai River to self-sustaining levels capable of supporting an improved sport fishery by the year 2015. Sub goals are – White sturgeon Recover the Kootenai River white sturgeon population to a self-sustaining level and delisting status within one generation(2015). Burbot investigation Goal: Develop a recovery plan for Kootenai River burbot by the year 2000. Salmonid investigation Goal:By the year 2001 provide a management plan to improve the rainbow trout fishery in the Kootenai River. Hypothesis have been developed for white sturgeon-(1) Augmented discharge from Libby Dam will stimulate white sturgeon migration and spawning, and enhance survival of eggs and larval sturgeon. Burbot – (2) Minimum winter flows will allow burbot migration to spawning tributaries in Idaho. Rainbow trout and salmonid studies are still in the developmental stage. As these studies progress we expect new information to be of value in formulating sound testable hypothesis and eventual recovery plans. As mentioned in another section of this document many of the objectives of the KRFI are listed as measures in the Kootenai River White Sturgeon Recovery Plan, is also based on NMFS Biological Opinion, and on the charge of the NWPPC charge to restore native fishes that were adversly affected by hydropower and flood control development. It is also our intention to assist the KITI in achieving their goals in the cooperative effort to improve the Kootenai River ecosystem recover Kootenai River white sturgeon (the primary charge of the KITI is the short term goal to prevent extinction of white sturgeon by stocking hatchery fish), and other fish species.
At present the KRFI has the most complete long term data base on white sturgeon and the most complete data base on year around telemetry. In addition the burbot investigations are unique and have compiled the most detailed behavioral data on record.

d. Project history

Historically the Kootenai River has been an important river to the settling and development of north Idaho. It also provided important fisheries to both Native Americans and other residents of north Idaho. Within five years of the operation of Libby Dam the IDFG began an investigation to inventory the fish community and sportfish populations (Partridge 1983). The study also included an investigation to determine the status of white sturgeon and burbot. The burbot population and fisheries were found to be on the decline and the white sturgeon population was comprised primarily of adult fish, few juvenile fish had recruited to the fishery since Libby Dam. The Kootenai River Fisheries Investigations (Project 88-65) began September 1, 1988 and was a follow up study to help formulate a management plan to recover the fisheries. The project includes the study of white sturgeon and burbot/whitefish/rainbow trout in the Kootenai River downriver of Libby Dam. Through a cooperative effort, the Idaho Department of Fish and Game and the Kootenai Tribe of Idaho completed an assessment of the status of white sturgeon in the Kootenai River, successfully cultured sturgeon from the endemic stock, and stocked age 1 and age 2 sturgeon into the Kootenai River

(Apperson 1992; Apperson and Anders 1990 and 1991). Recruitment of wild sturgeon to the Kootenai population has been very limited since Libby began operation in 1974. Regulated flow from the dam has been identified as the primary factor limiting sturgeon spawning and early rearing. On June 11, 1992, this population was petitioned for protection under the Endangered Species Act and listed as endangered by the FWS on October 6, 1994. The first experimental spawning flows occurred May-June 1991,1993, 1994 and 1995. Declines observed in populations of burbot, kokanee, whitefish, cutthroat, rainbow and bull trout, and Gerrard rainbow trout have been attributed to regulated flows from Libby Dam warmer winter temperature and entrapment of nutrients within the reservoir. Research work continues to recover the endangered Kootenai River white sturgeon, and develop management plans to recover burbot and restore trout fishing, and restore the ecosystem.

e. Methods.

White sturgeon studies; capture adult white sturgeon w/set lines (up to 50) white sturgeon respond to augmented flow - telemetry of 30-50 adult sturgeon (sonic and radio), documentation of sturgeon spawning by deploying 80 egg mats at various locations. Sample larval sturgeon with shrimp trawl, benthic trawl, D- rings, meter nets or midwater trawl, sample up to 50 juvenile sturgeon w/small mesh gill nets and sacrifice 25 hatchery juveniles for food habit analysis to determine if food is a limiting factor. Sample reproductive tissues to determine if toxic substance residues are limiting egg survival. Burbot studies; sample burbot w/baited hoop nets in lower river, implant sonic transmitters. Use Fisher Exact Test to determine affect of power production/flood control on burbot migration. Sample burbot eggs with drift nets to verify burbot spawning and locations. Record river and tributary temperatures with continuous recording thermographs. Use temperature data to determine relation to burbot spawning synchrony. Rainbow trout, sample adults and juveniles with backpack electroshocker, use ANOVA to determine differences in outmigrants from tributaries, sample with screw trap. Tag adult rainbow trout with Floy reward tags to determine minimum exploitation rate and movement. Surgically implant radio transmitters in 12 adult rainbow trout and monitor movements. Use the AEA process to formulate long range management plan to improve growth, productivity, and survival of target fish.

f. Facilities and equipment.

The majority of office work is centered out of the Idaho Department of Fish and Game Panhandle Region office in Coeur d Alene. There are five desktop computers and one laptop computer that belong to the project. There is access to computer printers, a fax machine, a Xerox machine and other necessary office supplies. We have an extensive library collection for information pertaining to sturgeon, burbot and trout and can access any information through the Idaho State Library. Field operations are centered at our

field station, located at the Kootenai River National Wildlife Refuge in Bonners Ferry. The field station consists of a 3-bedroom modular home with residence and minimal office facilities. There is a fax machine, desk and office supplies. There is presently a portable 30 foot storage shed, used to store one boat and other non-sensitive equipment. All sensitive equipment is stored inside the modular home.

This project operates with 6 boats (14' Mirrocraft, 16' Valco, 16' Boston Whaler and a 21' Almar with outboard propeller-driven motors, a 16' Wooldridge with an outboard jet motor and a 21' Customweld inboard jet). All boats are equipped with paddles, tools, life vests or cushions, boat hook, whistle or horn, fire extinguisher, anchor and rope, cigarette lighter port and a first aid kit. Coast guard certified anti-exposure suits and jackets are also available. We have use of four 4wd and one 2wd trucks. One truck is equipped with a snowplow and a winch. All trucks contain a fire extinguisher, tools, snow chains and other safety devices.

The work that pertains to sturgeon includes sampling for white sturgeon eggs, larvae and juveniles during the spring spawning season. We capture adult white sturgeon and attach radio and sonic tags for tracking with telemetry equipment.

Equipment used for collecting eggs includes: 1 boat; an ammo box stocked with sample vials, labels, hand-held thermometer, pens, markers, extra bolts and nuts for repairing the eggmats, pliers, screwdriver and formalin to preserve eggs; data sheets; map of the river; Eagle depth sounder with spare rechargeable batteries and a pelican case for storage; General Oceanics digital flow meter with 100' of cable, lead weight with a fin, rope and pelican case for storage; buoys; 3.5'x4' angle iron eggmats fitted with furnace filter material; experimental eggmat drift nets; anchors for eggmats; rope and gloves; Magellan GPS unit to locate set sites for eggmats. A microscope is used to determine developmental stages of eggs.

Equipment used for sampling larval and young-of-the-year sturgeon includes: 1 outboard motor boat; 16'x7.5' benthic trawl, two half-meter nets and one meter net; weights to hold half-meter nets in the water column; diver depth gauges attached to nets to determine exact depth of tow; ammo box equipped with sample vials and labels, pencils, markers and formalin to fix samples; Eagle depth sounder with spare rechargeable batteries and pelican storage case; boom winches on boat to run nets from; rope; timer to time tows; data sheets; river map.

Equipment used for juvenile white sturgeon sampling includes: 1 boat; 5-6 gillnets with 1.5-2" multifilament mesh; weights, rope and bouys for use with nets; surgery kit stocked with sonic tags, downrigger wire and crimps for attaching sonic tags, Passive Integrated Transponder (PIT) tags, envelopes for collecting fin rays, hacksaw to remove fin ray, measuring tape, sample vials and labels, knife, pens and markers; hard copy of the sturgeon database; data sheets; river map; hand-held thermometer; sonic and radio tag receivers and antennae and pelican storage cases; PIT tag reader and pelican storage case; scale for weighing fish; stretcher to hold fish in water while recording data;

Bottomline Fishing Buddy depth sounder with spare rechargeable batteries and pelican storage case; plastic tub; formalin for fixing samples; weight scale.

Equipment for telemetry tracking of tagged adult and juvenile sturgeon includes: 1 boat; two Sonotronics USR-91 narrow band sonic receivers equipped with a DH-2 directional hydrophone and earphones and rechargeable batteries; pelican storage cases; two model R2100 ATS, 30-32 MHz radio receivers equipped with a loop antennae; two stationary ATS model RRT2000 stationary radio receivers for 30-32 MHz tags, model DRT5040 data loggers and yagi antennas; ATS model TSA2000, 30-32 MHz external attachment radio tags; 50-month CT-82-3 external attachment sonic tags; data sheets; river map; pencils. We also use a DPL-275A diver-operated sonic receiver for retrieving shed sonic tags from the river bottom.

Equipment used to capture adult white sturgeon includes: 1 boat; rope, bouys, anchors, 12,14&16/O circle hooks and bait; surgery kit containing sutures, scalpel blades, forceps, needles, tape measure, knife, hacksaw and blades to remove fin rays; sample vials and labels; markers and pencils; nitrifurizone antibiotic, alcohol, otoscope, PIT tags and injector, taigon tubing, digital scale, sonic and radio tags, downrigger wire and crimps to attach sonic and radio tags, pliers, envelopes for fin rays; cooler to store egg samples; buckets; stretcher to hold fish in water while recording data; bilge pump to pump water over fishes' gills during surgery; weight scale; PIT tag detectors and pelican storage case; Eagle depth sounder and pelican storage case; rod and reel gear; hand-held thermometer; data sheets; river map; hard copy of the sturgeon database; sonic and radio telemetry receivers, antennae and hydrophone and pelican storage case; winch. A dremmel tool, slides, mounting media and a microscope are used to determine age of sturgeon with fin rays.

Miscellaneous tools and equipment include: portable thermographs, drill, skill saw, wrenches, screwdrivers, hammers etc.; materials for boat and vehicle repairs; battery charger; portable honda pump. SCUBA equipment is used for visual surveys and to retrieve shed sonic and radio tags as well as stuck nets and mats. A minolta 35mm camera is available to photograph significant events.

Some of the above equipment and the following equipment is used for burbot and trout studies: Hoopnets; backpack and boat electroshocker, screw trap, snorkel equipment, floy tags, 14-month sonic tags, 3-month radio tags, drift nets, dip nets, beach seine and measuring board.

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Section 8. Relationships to other projects

The Kootenai River Fisheries Investigation (KRFI) is comprised of several companion studies with inter agency cooperation with other related studies. The KRFI has targeted white sturgeon (ESA listed), burbot, whitefish, and rainbow trout and secondarily bull trout in the Kootenai River and tributaries to determine factors limiting these depressed populations and improving habitat. Tasks outlined in the KRFI Work Plan also include assisting the Kootenai Tribe of Idaho with brood fish collections, Monitoring and Evaluation of sturgeon spawning and rearing, evaluation of hatchery stockings of sturgeon from the tribal hatchery including contribution to the total population, intraspecific competition with wild juveniles, and condition. In addition is the separate supplemental budget for Monitoring and Evaluation (M&E) of flows provided by the US Army Corps of Engineers for sturgeon spawning and rearing. M&E is a cooperative study by IDFG, Kootenai Tribe of Idaho, and the Montana Department of Fish Wildlife and Parks. The AEA process is also a cooperative effort between IDFG and the Kootenai Tribe of Idaho. In addition we work cooperatively with the British Columbia Minnistry of Environment (BCME) subcontract through our study. We now know white sturgeon, burbot, and rainbow trout are transboudary populations. Study with BCME includes larval tows for white sturgeon and burbot in Kootenay Lake, adult white sturgeon sampling, sonic and radio telemetry for burbot and sturgeon, hoopnet sampling for burbot, and angler tag returns of rainbow trout tagged in Idaho and creeled in Kootenay Lake.

Section 9. Key personnel

Key Personnel

Vaughn L. Paragamian – Senior Fisheries Research Biologist and Program Leader
Full time FTE

Chris Downs – Fisheries Research Biologist – Full time FTE

Gretchen Kruse – Senior Fisheries Technician – Full time FTE

Vint Whitman – Senior Fisheries Technician – Full time FTE

Section 10. Information/technology transfer

Information and technology resulting from these studies will be transferred by a variety of oral and written methods of communication. Some of these communication methods will be coordinated with the IDFG Administrative staff, Information and Education Specialist, local media professionals, and professional society officers. Oral communication includes weekly staff meetings, conference calls, phone conversation, not technical oral reports, radio and television programs, and presentations to sport and service clubs; State, Divisional and National American Fisheries Society Conferences; Professional symposia (International Burbot Symposium 1998 and Paddlefish and Sturgeon Symposium 1996); and workshops like the Columbia Basin and BPA funded program meetings. Written communication methods include memos, Quarterly Reports, Annual Reports, Completion Reports, and news releases. Specific aspects of our studies will be published in peer reviewed symposium proceedings and scientific journals. All of these methods have already been used in disseminating information from the Kootenai River Fisheries Investigations. At the present time one ms. Has been accepted by the Transactions of the American Fisheries Society and four ms. are in preparation for journal consideration.