Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal Form

Section 1. General administrative information

Idaho Water Rental: Resident Fish and Wildlife Impacts. Phase III

Bonneville project number, if an ongoing project 9106700

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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Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name

NPPC Program Measure Number(s) which this project addresses.
2.2E.7; 5.5A.1

NMFS Biological Opinion Number(s) which this project addresses.

NMFS Biological Opinion: Reinitiation of consultation on 1994-1998 operation of the Federal Columbia River power system and juvenile transportation program in 1995 and future years. Action # 1

Other planning document references.

IDFG Fish Management Plan, 1996-2000 (sec. 1); NPPC's Fish and Wildlife Program (sec. 2.2E.7, 5.5A.1); CBFWA Draft Resident Fish Multi-Year Implementation Plan

(sec. 6.6.6; 6.8)

Subbasin.

Boise River, Payette River, Upper Snake River, Snake Headwaters, Mid Snake-Boise, Mid Snake-Powder

Short description.

Quantify changes in resident fish and wildlife habitat in the upper Snake basin resulting from the release of water (427,000 acre-feet) from upper Snake River reservoirs (upstream of Hell's Canyon Dam complex) for anadromous fish flow augmentation. Make recommendations on timing of releases to maximize benefits to resident fish.

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	*	Ecosystems
	Climate	X	Monitoring/eval.	X	Flow/survival
	Other	*	Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement	*	Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords.

Habitat, Weighted Usable Area, Instream Flow Incremental Methodology

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Coordinate with federal, state and tribal agencies to ensure	A	Idaho Department of Fish and Game will continue to consult

	that duplication of work does not occur in local efforts explore water management opportunities in the upper Snake River basin for salmon flow augmentation.		with the interagency work group and a technical subgroup to further refine goals and objectives during this project. Agencies on the technical work group include the Idaho Department of Fish and Game (IDFG), Shoshone-Bannock Tribes, Nez Perce Tribe, Bonneville Power Administration (BPA), U.S. Bureau of Reclamation (BOR), Idaho Department of Water Resources (IDWR), Idaho Department of Parks and Recreation (IDPR), U.S. Fish and Wildlife Service (USFWS), and Idaho Power Company (IPC). The subgroup is comprised of biologists from the BOR, SBT, IPC, USFWS, and IDFG.
		B	Coordinate with sub-regional planning efforts, and act as a clearinghouse for water rental/flow information. This includes tracking and summarizing salmon flow augmentation releases.
		C	Assist in coordinating and integrating BPA funded IDFG resident fish and wildlife programs in the upper Snake River drainage (e.g. Water Rental and Snake River Native Salmonid Assessment) and the BOR's Snake River Resources Review project into a cohesive watershed or ecosystem approach to water and fisheries management in the Snake River system.
2	Determine impacts to resident fish habitat (in weighted usable area - WUA) in the upper Snake River for key native fish species (rainbow trout and sturgeon)	A	Gather all existing habitat versus flow relationship data for the upper Snake River and analyze and analyze its utility for estimating resident fish habitat

	resulting from salmon flow augmentation releases and make recommendations that will maximize benefits to resident native fish..		changes resulting from salmon flow augmentation releases.
		B	Annually, estimate the impacts to key native, resident fish species (in WUA) in the upper Snake River upstream of Brownlee Reservoir resulting from salmon flow augmentation releases.
		C	Based on the results of task 2.2, recommend timing and volumes of salmon flow releases that maximize benefits to native resident fish species.
3	Develop a model that estimates changes in fish habitat (WUA) in the upper Snake River upstream of Brownlee Reservoir resulting from salmon flow augmentation releases.	A	Work with the technical subgroup to develop and test this model.
4	Investigate the methodology and the feasibility of 1) conducting large river habitat and flow surveys and 2) quantifying fish habitat in Snake River Basin reservoirs in order to adequately estimate and evaluate the impacts to resident fish caused by the release salmon flow augmentation water in the upper Snake River drainage.	A	Conduct a literature search on the state of the art methodology. Get properly trained in the techniques.
		B	Identify and prioritize reaches of the river where data is lacking.
		C	Coordinate activities with other state, federal, tribal, and public entities such as the Basin and Watershed Advisory groups, Bureau of Reclamation's Snake

			River Resources Review etc.
5	Prepare an annual report.	A	Prepare a draft report and circulate for comments.
		B	Incorporate comments into final report.

Objective schedules and costs

1	01/1999	12/1999	13
2	01/1999	12/1999	60
3	01/1999	12/1999	2
4	10/1999	12/1999	5
5	01/1999	09/1999	20
			TOTAL 100

Schedule constraints.

Model development is dependent on cooperation from BOR and progress of BOR's Snake River Resources Review project. The lack of habitat versus flow data for the upper Snake River Basin. Another constraint may be reluctance on part of the BOR and/or Idaho Power to implement recommended release strategies. A major milestone was the updated recommendations on the release of the salmon flow augmentation water to benefit resident fish (Leitzinger, in press).

Completion date.
2005

Section 5. Budget

FY99 budget by line item

Item	**Note**	**FY99**
Personnel		58,000
Fringe benefits		18,000
Supplies, materials, non-expendable property		5,300
Operations & maintenance		4,000
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		4,000
PIT tags	# of tags:	
Travel		9,000
Indirect costs	22% of personnel & operating	20,700

Subcontracts		
Other		
TOTAL		119,000

Outyear costs

Outyear costs	**FY2000**	**FY01**	**FY02**	**FY03**
Total budget	120,000	120,000	125,000	125,000
O&M as % of total	5	5	5	5

Section 6. Abstract

Section 2.2E.7 of the FWP asks the fish managers to address the trade-offs between resident fish and wildlife affected by upriver reservoir releases and anadromous fish affected by flow augmentation releases. Section 5.5A.1 calls on the states and tribes to review, compile, and submit information on impacts of anadromous flow augmentation on resident fish and wildlife. The overall goal of the project is to quantify the impacts of the salmon flow augmentation releases on resident fish habitat (expressed in weighted usable area - WUA) in the Snake River upstream of Brownlee Reservoir and implement recommendations that result in improved resident fish habitat. The focus is on weak native stocks (white sturgeon and rainbow trout). This project will submit that information.

Evaluation of the impacts is done by using existing habitat versus flow relationships from previous IFIM studies. Changes in WUA due to increased flows from salmon flow releases are estimated. Timing of releases and WUA changes are compared to known critical time periods for fish. Also, flows with and without the salmon flow releases are compared to recommended minimum flows to determine if the salmon flow releases help meet or exceed these recommended minimums.

The expected outcomes include an accurate history of the salmon flow releases, estimates of changes in fish habitat, recommended release strategies to improve resident fish habitat, implementation of these recommendations, and a model that can simulate the salmon flow releases and can be used to evaluate the trade-offs of different release strategies.

Section 7. Project description

a. Technical and/or scientific background.

The use of stored Snake River water to aid anadromous fish migration in the Snake River downstream of Lewiston, Idaho, and in the Columbia River began in 1982 with the adoption of the first Columbia Basin Fish and Wildlife Program (FWP) by the Northwest Power Planning Council (NPPC). The Program called for a total of 1.19 million acre-feet (af) of water from the Snake River Basin to be delivered to Lower Granite Dam between

April 15 and June 15 each year to aid spring outmigrating anadromous fish (NPPC 1982). This was called the water budget. This water would come primarily from Dworshak and Brownlee reservoirs.

The water budget evolved and became more specific in the NPPC's Strategy for Salmon (NPPC 1992) in the use of Snake River water for flow augmentation. It called for a total of 427,000 af of water to come from the Snake River upstream of Brownlee Reservoir, up to 900,000 af from Dworshak Reservoir to aid spring migrants, and up to 200,000 af from Dworshak Reservoir to aid fall migrants. Then with the listing of Snake River salmon stocks on the endangered species list, the National Marine Fisheries Service (NMFS) in its Biological Opinion (NMFS 1995) on endangered Snake River salmon, replaced the water budget with flow targets for the Snake and Columbia rivers while maintaining the requirement to use at least 427,000 af of upper Snake River Basin water for flow augmentation. In 1996, the Idaho Legislature approved the use of the 427,000 af on an experimental basis through the year 2000.

The Idaho Water Rental Pilot Project began in 1991 as part of the 1990 Non-Treaty Storage Fish and Wildlife Agreement (NTSFWA) between Bonneville Power Administration (BPA) and the Columbia Basin Fish and Wildlife Authority (CBFWA). This agreement resulted from concerns over potential impacts to fish and wildlife resulting from the Non-Treaty Storage Agreements (NTSA) signed between BPA and the mid-Columbia utilities, and between BPA and British Columbia Hydro and Power Authority. The NTSFWA contained several provisions designed to ensure the NTSA did not adversely impact fish and wildlife. One of the provisions called for identifying conditions needed for resident fish and wildlife and to protect those needs. Prior to this agreement, the impacts (both positive and negative) to resident fish from salmon flow augmentation were largely unknown and not adequately addressed.

In its 1995 biological opinion, the National Marine Fisheries Service has instructed the bureau of Reclamation (BOR) to release 427,000 af of water or more per year from the upper Snake River Basin (upstream of Hell's Canyon Dam complex) to aid juvenile salmon migration. The timing, volumes, duration, and locations of the water released is critical to the health and stability of the Snake River watershed. Releasing water at the wrong time, or at the wrong volume, or for the wrong length of time could have very serious detrimental impacts to the resident fish in the upper Snake River and tributaries. On the other hand careful, planned releases taking into consideration fish and wildlife impacts could greatly benefit the fish and wildlife in the Snake River basin. This project will determine what is the best way to release the water to maximize the benefits to resident fish upstream of the Hell's Canyon Dam complex.

The first phase of the Idaho Water Rental Pilot Project was designed to "identify resident fish and wildlife issues, concerns, and resources in the Snake River system, estimate impacts, and provide management recommendations to protect and enhance those resources" as impacted by the release of water in the upper Snake River Basin for enhancing juvenile salmon outmigration (Riggin and Hansen 1992). This phase was

completed in 1992.

The second phase focused on conducting an Instream Flow Incremental Methodology (IFIM) study on the Snake River upstream of American Falls Dam and summarizing Snake River Basin water issues and flow augmentation releases since the completion of phase I (Stovall 1994). This phase was completed in 1994. The IFIM study validated previous work done in the area by the Shoshone-Bannock Tribes.

Phase III is currently underway. It is focusing on quantifying changes in resident fish habitat in the upper Snake River Basin resulting from the salmon flow augmentation releases. Leitzinger (1996, in press) showed that the additional water provided by the salmon flow augmentation releases appears to have, at best, limited benefits to resident fish and fish habitat. Although usable habitat increased in the Snake River for adult and juvenile sturgeon and adult rainbow trout, the flows were still well below what is needed to sustain viable healthy fish populations. Flow augmentation in the tributaries sometimes helped meet minimum flows, sometimes the flows would have been met even without the additional water, and other times the flows were not met even with the extra water. Obviously, other factors are influencing flows more than the salmon flow releases (e.g. weather and precipitation). Further monitoring and evaluation is needed in order to gain a better understanding of the impacts these flow releases in the tributaries (primarily the Payette system) are having on resident fish. Flow versus habitat relationships (as developed through IFIM work) are needed in other areas of the basin so that this evaluation can be expanded to include other species and other reaches.

It is clear that changes are needed if water management in the Snake River Basin is to take into account the needs of the fishery resources. If water quality is to be improved and sturgeon populations are to be recovered to a healthy, viable level, then more water is needed at the proper times (namely spring for spawning sturgeon and larval sturgeon development and the summer to improve water quality and prevent fish kills). Salmon flow releases are not sufficient to do it alone. Modification of existing flow augmentation releases in the tributaries could go a long way to improving conditions for fish. The following recommendations have been presented in an effort to refine the salmon flow augmentation releases to maximize benefits to resident fish. Evaluation of these new flow regimes is also needed.

1) Release the salmon flow augmentation water out of Lucky Peak Reservoir on the Boise River during the nonirrigation season (mid-October - mid-April) in addition to the stream channel maintenance flows presently being released. These flows will significantly help keep fry and juvenile trout habitat under water and available during the nonirrigation season. The resulting flows would be similar to the historic minimum monthly flows observed prior to any dam construction.

2) Continue the 50/50 summer/winter release in the Payette River Basin. This strategy may have benefits to resident fish, but no clear trend is evident. Hopefully, future monitoring will show clear benefits. This strategy is consistent

with previous recommendations.

3) The BOR and IDWR should monitor flow augmentation releases from Cascade and Deadwood reservoirs separately. This would allow a much more detailed evaluation of the impact of these flows in the Deadwood, South Fork and North Fork Payette rivers.

4) Discontinue the splitting of the salmon flow releases in the upper Snake River at Milner Dam. Keep the entire 1,500 cfs in the river channel. Current operation is to only send 200 cfs down the river, while the remaining water (approximately 1,300 cfs) gets sent down an irrigation canal for a little over a mile so that it can be sent through turbines before returning to the river. This splitting of the water may negate any water quality benefits this extra water could provide. The 200 cfs left in the river is subject to intense solar radiation and thus excessive warming. The remaining water is also subject to warming as well as additional nutrient loading from agricultural fields the canals irrigate.

This project is closely related to several planning documents. The system-wide goal in the NPPC's FWP is "a healthy Columbia Basin, one that supports both human settlement and the long-term sustainability of native fish and wildlife species in native habitats...". The resident fish goal mirrors the system-wide goal by emphasizing the "long-term sustainability of native species in native habitats where possible..." (NPPC 1994 amended 1995). The goal of the CBFWA draft resident fish multi-year implementation plan is to promote the long-term viability of native species in native habitats (CBFWA 1997). IDFG's fish management plan (IDFG 1996) states that wild, native, self sustaining fish populations are a management priority as is protection and restoration of habitats and water quality. One of the goals of the plan is to maintain and restore wild, native fish populations. It is our belief that the salmon flow augmentation water can be released in such a manner to improve habitat conditions for weak native species. These include sturgeon and rainbow trout in the Snake River below Shoshone Falls, rainbow trout and bull trout in the Boise and Payette rivers, and native cutthroat trout upstream of Shoshone Falls.

The study area encompasses the Snake River upstream of Brownlee Pool to the Idaho border, the Henrys Fork, Boise River, and Payette River drainages. The flow augmentation water is physically moved from these BOR facilities within the study area: American Falls, Lucky Peak, Cascade, and Deadwood reservoirs.

This project is attempting to mitigate for losses in place, in kind by modifying water release strategies to a more "normative condition" for the benefit of native resident fish. It is well known that he Snake River Basin has been significantly altered by human development since the late 1880's when the first major irrigation diversion was built. This development (especially dams and irrigation withdrawal) has resulted in major changes in the natural hydrograph (BOR 1997; Palmer 1991; USFS and BLM 1997)

much to the detriment of the native fishes (USFS and BLM 1997). We believe that a return to a more natural hydrograph will significantly improve conditions for native resident fish.

b. Proposal objectives.

Objective 1) Coordinate with federal, state and tribal agencies to ensure that duplication of work does not occur in local efforts explore water management opportunities in the upper Snake River basin for salmon flow augmentation.

Objective 2) Determine impacts to resident fish habitat (in weighted usable area - WUA) in the upper Snake River for key native fish species (rainbow trout and sturgeon) resulting from salmon flow augmentation releases and make recommendations that will maximize benefits to resident native fish.

Objective 3) Develop a model that estimates changes in fish habitat (WUA) in the upper Snake River upstream of Brownlee Reservoir resulting from salmon flow augmentation releases.

Objective 4) Investigate the methodology and the feasibility of 1) conducting large river habitat and flow surveys and 2) quantifying fish habitat in Snake River Basin reservoirs in order to adequately estimate and evaluate the impacts to resident fish caused by the release salmon flow augmentation water in the upper Snake River drainage.

Objective 5) Prepare an annual report.

The main product will be an annual report summarizing the previous years flow augmentation releases, estimates in changes in WUA resulting from those releases, and a comparison of the augmented flows to recommended flow regimes. If new information becomes available, previous recommendations will be refined.

c. Rationale and significance to Regional Programs.

Development in the upper Snake River Basin has drastically changed the flow regime of the basin. The water is used primarily for agriculture and hydropower, usually to the detriment of aquatic resources. Often the timing of flows and flow volumes are insufficient for the maintenance of fisheries, other aquatic resources, and water quality. The lower Boise River (downstream from Lucky Peak Dam), lower Payette River (downstream from Black Canyon Dam), and much of the mainstem Snake River has been designated as “water quality limited” by the Idaho Department of Environmental Quality (D. Zaroban, IDEQ, personnal communication). We believe that the release of the salmon flow augmentation water when it can most benefit native resident fish (normative river concept) will also help with water quality problems.

The overall goal of this project mirrors the overall goal of the NPPC's FWP, IDFG's fish management plan, and CBFWA's draft MYIP. All these plans want a healthy Columbia Basin and to protect and restore native fish in native habitats. By evaluating the impacts of salmon flow augmentation releases on resident fish, we can make recommendations on how and when to release that water so that it maximizes potential benefits resident fish. The primary species of concern are white sturgeon and native rainbow trout.

This project is closely tied to the BOR's Snake River Resources Review (SR3). The Decision Support System and some models being developed for that project will allow the modeling of different flow scenarios in the upper Snake River Basin. Various salmon water release strategies can then be modeled very quickly and used to help determine the release strategies that maximize benefits to resident fish.

This project provides direct benefits to both anadromous fish and wildlife. The water that is being moved through the upper Snake River basin is ultimately used to aid juvenile salmon and steelhead outmigration in the lower Snake River. In fact, that was the impetus for this project. The initial concerns or questions were what does this water do to or for resident fish and can the movement of this water be shaped to improve and not harm resident fish and wildlife habitat. Phase I and Phase II water rental reports showed through modeling as did a 1992 USFWS study that increased spring and summer flows in the Snake River help maintain or preserve island integrity, thus preventing predators (domestic and wild) from reaching the islands and destroying waterfowl nests, eggs, and young. There are many islands in the Snake River and they are historic waterfowl nesting areas. There is even a USFWS wildlife refuge comprised of a series of islands in the Snake River (Deer Flat National Wildlife Refuge). In the past lower water (due to impoundments, hydropower, irrigation withdrawal etc) has left the islands exposed to predators and human disturbance. These are serious threats to waterfowl and other wildlife (USFWS 1992).

Although this project has biological objectives, they have not been submitted to the Council for adoption into the program. Biological objectives are being developed in this project for the movement of the 427,000 acre-feet of water through the Snake River in a way that best benefits resident fish and wildlife. These objectives will be submitted to the council for adoption into the program.

This project is not developing biological/integrated rule curves, however, the data and recommendations will be used in the development of them. The data will be used to balance the needs of reservoir fisheries (including weak native stocks) and reservoir operations with the needs of weak or threatened native fish in the rivers below the reservoirs.

This project does support an important fishery. The catch-and-release sturgeon fishery is important for several reasons. First, it provides a very unique fishing opportunity. The chance for people, especially those in inland states, to catch 6 - 10ft long fish is extremely rare. Second, it is a popular sport fishery that is gaining in popularity. The mandatory

sturgeon permit program began in 1989. That year, 2800 tags were issued. In 1994, over 6,000 tags were issued. Also in 1994, 9,800 days were spent fishing for sturgeon in the Snake River upstream of Brownlee Reservoir and 4,957 sturgeon were caught and released. These numbers are quite high when you consider the limited area and the limited nature of the fishery. Finally, the sturgeon fishery is an important tool IDFG uses to monitor and collect data on sturgeon populations. The mandatory permit program requires that all sturgeon fishermen keep diaries on when, where, and how they fished, the number and sizes of fish caught, location of catch, date and time of catch etc. These diaries need to be returned to IDFG at the end of each year.

The cutthroat trout in the upper Snake Basin provide an important recreational fishery on the few remaining viable stocks in eastern Idaho. Fishing effort is continuing to rise in eastern Idaho while regulations on native fish have reduced or stopped harvest. For example, IDFG has estimated a total of 30,479 hours were spent fishing on the Teton River in 1975, 31,074 hours in 1988, and 45,246 hours in 1994. The Teton is one of the bodies of water with a relatively healthy, stable cutthroat population. Henry's Lake generated 86,304 hours in 1975, 100,479 hours in 1988, and 177,826 hours in 1994. Total harvest (all species) on Henry's Lake averages between 4 and 5% of the total population with a peak of 9% one year. Cutthroat trout are just one component of the harvest, and not the major component. So, harvest on cutthroat, even where there is a lot of pressure and where there is a healthy population, is minor and may not impact the population. Recovery of weak native stocks would only improve the recreational fishing while reducing the pressure on the existing viable stocks.

This project protects and enhances other non-target resident fish populations. An improved flow regime in the Snake, Boise, and Payette rivers will improve survival of salmonids and other resident fish species. Water quality should also improve, which would improve conditions for all species present.

d. Project history

The project number has not changed.

The Idaho Water Rental Pilot Project began in 1991 as part of the 1990 Non-Treaty Storage Fish and Wildlife Agreement (NTSFWA) between Bonneville Power Administration (BPA) and the Columbia Basin Fish and Wildlife Authority (CBFWA). The NTSFWA contained several provisions designed to ensure the NTSA did not adversely impact fish and wildlife. One of the provisions called for identifying conditions needed for resident fish and wildlife and to protect those needs. After the initial three years of the project, it was integrated into the NPPC's Fish and Wildlife Program.

Phase I of the project was completed in October 1992 and included the identification of existing resident fish and wildlife resources in the upper Snake River basin, habitat conditions, management recommendations, and water release strategies designed to protect or enhance resident fish and wildlife and their habitats.

Phase II began in February 1993 and focused on a biological appraisal (IFIM) of resident fish and wildlife habitat in the upper Snake River between American Falls reservoir and the city of Blackfoot. The of this appraisal was to gather fish and wildlife habitat data on a portion of the Snake River that had been dewatered in 1992 due to irrigation diversions. The appraisal mapped fish and wildlife habitat, developed habitat versus flow curves for several species of fish (rainbow trout, cutthroat trout, and whitefish) and wildlife (Canada goose, mallard duck, beaver), and validated the findings of an earlier Shoshone-Bannock flow study.

Phase III is currently underway. It is focusing on quantifying changes in resident fish habitat in the upper Snake River Basin resulting from the salmon flow augmentation releases. Changes in WUA for white sturgeon and rainbow trout resulting from the salmon flow releases have been summarized for the 1994, 1995 (Leitzinger 1996), and 1996 (Leitzinger in press) water releases. The flow releases resulted in a short-term increase in available habitat. But, in most cases the water did not help meet minimum flow recommendations. The timing of the releases could be modified to increase the benefit to resident fish (Leitzinger in press).

The adaptive management implications: Fish managers can assess and quantify impacts to resident fish habitat resulting from salmon flow augmentation releases. Once these impacts are known, the timing and volume of flows can be shaped to maximize benefits to resident fish.

Project costs: 1991 - $85,123; 1992 - $0; 1993 - $145,470; 1994 - $119,770; 1995 - $46,381; 1996 - $98,776; 1997 - $91,905; 1998 - $125,000

Project Reports:

Riggin, S. H. and H. J. Hansen. 1992. Phase 1 water rental pilot project: Snake River resident fish and wildlife resources and management recommendations. Idaho Department of Fish and Game, Report to Bonneville Power Administration, Contract DE-BI79-91BP21416, Project 91-067. Boise.

Stovall, S. H. 1994. Phase II water rental pilot project: Snake River resident fish and wildlife resources and management recommendations. Idaho Department of Fish and Game Annual Report to Bonneville Power Administration, Contract DE-BI79-91BP21416, Project 91-067. Boise.

Leitzinger, E. J. 1996. Idaho water rental pilot project: Probability/coordination study - resident fish and wildlife impacts. Phase III. Idaho Department of Fish and Game Annual Report to Bonneville Power Administration, Contract 93-BI-02390, Project 91-067. Boise.

Leitzinger, E. J. In Press. Idaho water rental pilot project: Probability/coordination study - resident fish and wildlife impacts. Phase III. Idaho Department

of Fish and Game Annual Report to Bonneville Power Administration, Contract 93-BI-02390, Project 91-067. Boise.

e. Methods.

The methods being used in phase III are described in Leitzinger (1996) and Leitzinger (in press). A Lotus spreadsheet was developed that calculated the change in WUA expressed in millions of square feet for these four age classes of sturgeon in each reach: adult, larvae, spawning, and incubation. The age classes for rainbow trout were adult, juvenile, spawning, and fry. The spreadsheet took United States Geological Survey (USGS) daily stream gauge data and subtracted the daily flow augmentation releases from IDWR and BOR. The resulting values represented what the flow in the river would have been without the flow augmentation releases. The stream gauge data represents the flow in the river with the flow augmentation water. Then using habitat versus flow relationships from the Swan Falls Instream Flow Study (SFIFS) (Anglin et al. 1992), WUA was calculated for each flow (with and without the flow augmentation water). These values were subtracted to get the change in WUA resulting from the flow augmentation releases. The SFIFS habitat versus flow curves were developed using flows from 5,000 to 17,000 cubic feet per second (cfs) in 1,000 cfs increments (5,000, 6,000, 7,000, etc.). Actual flows were somewhere between these points, so WUA for the actual flows were estimated by linear interpolation between the two closest increments. If the actual flow was 6,500 cfs, the WUA was calculated to be half-way between the WUA at 6,000 and 7,000 cfs. If the actual flow was 8,900 cfs, the WUA was estimated to be 90% of the difference between the WUA at 8,000 and 9,000 cfs. Habitat changes were summarized for each month the flow augmentation water was released.

Flows in the Boise River, Payette River, and Snake River, with and without the flow augmentation water were compared to flow recommendations from the literature to see if flows were being met and if the augmentation water helped achieve those flows.

The following are the tasks associated with the objectives listed in section 7.b.

Task 1.1: Idaho Department of Fish and Game will continue to consult with the interagency work group and a technical subgroup to further refine goals and objectives during this project. Agencies on the technical work group include the Idaho Department of Fish and Game (IDFG), Shoshone-Bannock Tribes, Nez Perce Tribe, Bonneville Power Administration (BPA), BOR, Idaho Department of Water Resources (IDWR), Idaho Department of Parks and Recreation (IDPR), U.S. Fish and Wildlife Service (USFWS), and Idaho Power Company (IPC). The subgroup is comprised of biologists from the BOR, SBT, IPC, USFWS, and IDFG.

Task 1.2 Coordinate with sub-regional planning efforts, and act as a clearinghouse for water rental/flow information. This includes tracking and summarizing salmon flow augmentation releases.

Task 1.3 Assist in coordinating and integrating BPA funded IDFG resident fish and wildlife programs in the upper Snake River drainage (e.g. Water Rental and Snake River Native Salmonid Assessment) and the BOR's Snake River Resources Review project into a cohesive watershed or ecosystem approach to water and fisheries management in the Snake River system.

Task 2.1 Gather all existing habitat versus flow relationship data for the upper Snake River and analyze and analyze its utility for estimating resident fish habitat changes resulting from salmon flow augmentation releases.

Task 2.2 Annually, estimate the impacts to key native, resident fish species (in WUA) in the upper Snake River upstream of Brownlee Reservoir resulting from salmon flow augmentation releases.

Task 2.3 Based on the results of task 2.2, recommend timing and volumes of salmon flow releases that maximize benefits to native resident fish species.

Task 3.1 Work with the technical subgroup to develop and test this model.

Task 4.1 Conduct a literature search on the state of the art methodology. Get properly trained in the techniques.

Task 4.2 Identify and prioritize reaches of the river where data is lacking.

Task 4.3 Coordinate activities with other state, federal, tribal, and public entities such as the Basin and Watershed Advisory groups, Bureau of Reclamation's Snake River Resources Review etc.

Task 5.1 Prepare a draft report and circulate for comments.

Task 5.2 Incorporate comments into final report.

The major assumptions associated with this project are that the flow versus habitat (WUA) relationships are reasonably accurate and that changes in WUA will result in changes in the fish population over the long-term. Another assumption is that the salmon flow releases make it through the system intact to benefit resident fish and ultimately anadromous fish downstream of the study area.

The results expected from this project are quantified estimates of changes in fish habitat resulting from the salmon flow augmentation releases, implementation of a release strategy that maximizes the potential benefits to resident fish, and a model that can ultimately be used to evaluate the impacts of various flow release strategies in the upper Snake River Basin on resident fish. This model is being developed by the BOR with input from this project through coordination with the BOR's SR3 project.

f. Facilities and equipment.

Facilities are adequate for the project. No major capitol expenditures are planned. The project computer is adequate for the job (Micron 486 with Windows95, network and internet access). All needed software is available. Storage is also provided. Vehicles are available from the motor pool. There is other equipment and manpower available from the Department if needed (e.g. volunteers, administrative and computer help, expertise on many subjects).

g. References.

Anglin, D. R., T. R. Cummings, and A. E. Ecklund. 1992. Swan Falls instream flow study. U. S. Department of the Interior, Fish and Wildlife Service, Lower Columbia Fisheries Resource Office. Vancouver, Washington. A cooperative study by the U.S. Fish and Wildlife Service and Idaho Power Company. Report number AFF1-FRO-92-14.

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Section 8. Relationships to other projects

This project is related to other projects in the subregion. The water rental project will provide useful, quantified information concerning habitat versus flow requirements for native salmonids in several of the upper Snake subbasins. This information should be very useful in identifying and implementing protection and restoration actions and will be incorporated into the Snake River Native Salmonid Assessment project (BPA # 9800200)

The water rental project is most closely tied to the BOR's SR3 project. This project is building a decision support system (DSS) to improve the overall management of the upper Snake River Subregion. The DSS will allow managers to make better informed decisions on water management in the Upper Snake. They will be able to see and analyze the trade-offs (benefits and risks) of different management (or water release) strategies. Information from the water rental project is being incorporated directly into the DSS so that impacts to fisheries from various flow scenarios can be evaluated. It is through the coordination of these projects that the modeling aspect of the water rental project is being

accomplished.

Section 9. Key personnel

The principal investigator on the project is Eric Leitzinger, Fisheries Staff Biologist. He has been working for the Idaho Department of Fish and Game for the past eight years. His first five years were spent in fish research as a research biologist and a senior research biologist. He worked on the Idaho Supplementation Studies research project (BPA # 89-098) and the Idaho Habitat/Natural Production Monitoring project (BPA project # 91-73). He has spent the last three years as a staff biologist working on the Water Rental project (BPA# 91-067).

He received a B. S. in Fisheries Biology from Colorado State University in 1983 and an M. S. in Fisheries Science from Oregon State University in 1992.

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Section 10. Information/technology transfer

Information from this project will be shared primarily through the coordination with the BOR through their SR3 project. They have a large public outreach program associated with SR3. This information will also be directly incorporated into the Decision Support System being developed by SR3. Applicable data generated from the project will be made available to the Stream Net project and all Stream Net users. Findings are presented at project review meetings held by BPA, when they occur. All data will become part of IDFG's common databases. Information will also be shared through quarterly and annual reports, and presentations at professional society meetings. Information may also be put on IDFG's home page on the internet.