PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Monitor Listed Stock Adult Chinook Salmon Escapement

BPA project number: 9703000
Contract renewal date (mm/yyyy): 1/2000 ☐ **Multiple actions?**

Business name of agency, institution or organization requesting funding
Nez Perce Tribe Department of Fisheries Resources Management

Business acronym (if appropriate) NPT

Proposal contact person or principal investigator:

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NPPC Program Measure Number(s) which this project addresses
7.1.D2, 7.1.C3, 7.3.B2

FWS/NMFS Biological Opinion Number(s) which this project addresses
ESA Section 10 permit, number 1134; NEPA Analysis

Other planning document references
Snake River Salmon Recovery Plan: IV.A.3 Initiate actions to improve survival rates of juvenile and adult salmon through the migration corridors of the tributaries and mainstem Snake and Columbia Rivers. The operational objective shall be to achieve spawner to spawner survival ratios for the ESA listed-stocks over two generations…Develop research and monitoring protocols and processes to enable this procedure.

The Tribal Recovery Plan (Wy-Kan-Ush-Mi Wa-Kish-Wit 1995): Vol. I, 5B-39. Establish and monitor escapement checkpoints at mainstem dams and in index subbasins…. Methods to be used include video counting at hydro power dams and at key locations in tributaries,…. The least intrusive method should be used… Establish additional monitoring programs…to monitor adult escapement and resulting smolt

production, and to evaluate (by measuring the number of adults returning) the abilitiy of managers to meet goals set by the Columbia River Fish Management Plan (CRFMP).

Short description
Monitor adult salmon escapement over time, with a passive temporary facility using underwater time-lapse video technology. This would allow comparison to redd count survey data and evaluation of recovery actions on unsupplemented chinook populations.

Target species
Snake River spring and summer chinook salmon.

Section 2. Sorting and evaluation

Subbasin
Salmon River

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
☒ Anadromous fish ☐ Resident fish ☐ Wildlife	☐ Multi-year (milestone-based evaluation) ☐ Watershed project evaluation	☐ Watershed councils/model watersheds ☐ Information dissemination ☐ Operation & maintenance ☐ New construction ☒ Research & monitoring ☐ Implementation & management ☐ Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
8909802	Idaho Salmon Supplementation	Use the Secesh River and Lake Creek as control streams for supplementation evaluations, and to compare to adult escapement via redd counts.

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1997	Install, operate and maintain the Secesh River fish counting station on a daily basis to ensure safe and accurate operation of the facility.	Yes - Various equipment failures were corrected. Continuous operation occurred by the end f the field season.
1997	Implement the monitoring and evaluation plan for the Secesh River fish counting station to ensure that adult salmon do not reject the structure and that fish passage is not impeded.	Yes - Fish passage did not appear to be impeded, nor was spawning displaced downstream.
1997	Determine the timing of adult spawner migration into the Secesh River.	No - Due to equipment failures, video coverage was not sufficient to provide run timing
1997	Determine the adult salmon escapement into the Secesh River.	No - Due to equipment failures, video coverage was not sufficient to provide an escapement estimate.
1998	Install, operate and maintain fish counting stations on the Secesh River and Lake Creek on a daily basis to ensure safe and accurate operation of the facility.	Yes - Both facilities operated throughout the season.
1998	Implement the monitoring and evaluation plan for the Secesh River and Lake Creek fish counting stations to ensure that adult salmon do not reject the structure and that fish passage is not impeded.	Yes - Fish passage did not appear to be impeded, nor was spawning displaced downstream.
1998	Yes - Fish passage did not appear to be impeded, nor was spawning displaced downstream.	Yes - Run timing was determined at both facilities.
1998	Determine the adult salmon escapement	Yes - Spawning escapement was

	into the Secesh River and Lake Creek.	documented at both facilities.
1998	Compare the fish counting station escapement number with intensive and index redd count technique numbers.	In progress.
1998	Investigate the use of underwater video in taking morphometric measurements of adult salmon migrating into the Secesh River and Lake Creek.	In progress - This method appears to be accurate to within 10 cm only. This may be sufficiently accurate to determine age groups.
1998	Determine if and estimate the number of hatchery strays.	No - Adipose fin clips (strays) were documented. Sloppy adipose fin clips and pelvic fin clips on the side of the fish away from the video camera could not be accurately determined.

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Coordinate the listed stock chinook salmon escapement monitoring project with state and federal management agencies and Tribes in the Snake River basin.	a	Identify and meet with other agencies and Tribes who are interested in the results of this project.
2	Coordinate the escapement monitoring evaluation study with the National Marine Fisheries Service (NMFS).	a	Provide annual reports to NMFS which summarize project activities relating to chinook salmon populations listed under the ESA.
3	Monitor the abundance and timing of migration of adult chinook salmon into the Secesh River and Lake Creek drainages.	a	Install the temporary fish counting structures and underwater video prior to the spawning migration at the sites.
		b	Operate and maintain the fish counting station on a daily basis to ensure safe and accurate operation of the facility.
		c	Implement the monitoring and evaluation plan for the fish counting station to ensure that adult salmon do not reject the structure and that fish passage is not impeded.

		d	Determine the timing of adult spawner migration into the Secesh River and Lake Creek systems.
		e	Accurately determine the adult salmon escapement into the Secesh River and Lake Creek drainages.
		f	Compare the fish counting station adult escapement number with intensive and index area redd count technique estimated numbers and compare the relative accuracy of each method over time.
		g	Compare the adult spawner migration into the Secesh River and Lake Creek with stream discharge and water temperature and examine correlations between these variables over time.
		h	Investigate the use of underwater video in taking morphometric measurements of adult salmon migrating into the Secesh River and Lake Creek.
		i	Remove the fish counting stations by mid-September or after the adult spawning migration is finished.
4	Transfer of technology	a	Prepare and provide annual reports summarizing all activities associated with the adult chinook salmon escapement monitoring project.

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	1/2000	9/2000		Section 10 ESA Permit	5.00%
2	1/2000	9/2000		Anual report to NMFS which summarizes project activities under ESA	5.00%
3	4/2000	4/2001	Monitor timing and abundance	Annual escapement count	60.00%

4	9/2000	4/2001		Submit annual report	30.00%
				Total	100.00%

Schedule constraints
Extreme high or low spring runoff could affect the dates of installation of the fish counting stations.

Completion date
2020 - project is intended for long term monitoring of adult spawner abundance in an unsupplemented stream in the South Fork Salmon River, and to monitor effectiveness of recovery actions.

Section 5. Budget

FY99 project budget (BPA obligated): $160,000

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	Project Leader,Admin support-Department Aides, Permanent and Seasonal technicians (shared with ISS)	%45	74,000
Fringe benefits	Annual and sick leave, holiday pay, insurance, health	%11	18,540
Supplies, materials, non-expendable property	Telephone, utilities, office supplies	%4	6,500
Operations & maintenance	Video tapes, field supplies, field provisions, rent	%7	12,500
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Laser sizer, variable speed playback recorder, solar panel equipment	%6	10,000
NEPA costs			0
Construction-related support			0
PIT tags	# of tags:		0
Travel	Plane fare, per diem, vehicle lease, maintenance and mileage	%3	6,000
Indirect costs		%16	26,582
Subcontractor	River Masters Engineering - Structure modification, service and installation	%5	9,000

Other			0
		TOTAL BPA FY2000 BUDGET REQUEST	$163,122

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount ($)
N/A			
		Total project cost (including BPA portion)	$163,122

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	$160,000	$157,000	$157,000	$157,000

Section 6. References

Watershed?	Reference
☐	Columbia River Basin Fish and Wildlife Program. 1994. Northwest Power Planning Council. Portland,OR.
☒	Feasibility design and location of a weir for escapement estimation of summer chinook salmon in the Secesh River, Idaho. 1991. Fish Management Consultants. Report prepared for the Nez Perce Tribe. Olympia, WA.
☒	Hatch, D.R., M. Schwartzberg, and P.R. Mundy. 1994. Estimation of Pacific salmon escapement with a time-lapse recording technique. North American Journal of Fisheries Management 14:626-635.
☒	Hatch, D.R., J.K. Fryer, M. Schwartzberg, and D.R. Pederson. In Press. A computerized editing system for monitoring of fish passage. North American Journal of Fisheries Management. 1998.
☒	Preliminary design of a non-impeding fish counting facility in the Secesh River for adult summer chinook. 1994. River Masters Engineering. Report prepared for the Nez Perce Tribe. Pullman, WA.
☒	Snake River Salmon Recovery Plan. 1994. National Marine Fisheries Service. Seattle, WA.
☒	Wy-Kan-Ush-Mi-Wa-Kish-Wit (Spirit of the Salmon). 1995. Columbia River Inter-Tribal Fish Commission. Portland, OR.

PART II - NARRATIVE

Section 7. Abstract

This project is designed to accurately determine the abundance and migratory timing of adult Snake River spring and summer chinook salmon into the Secesh River and Lake Creek using time-lapse underwater video technology. The information gathered would be compared to redd count survey data to determine the relative accuracy and cost of each method. One-time redd count surveys may not be accurate for determination of adult spawner abundance. Underwater time-lapse video is a passive methodology that does not trap or handle this ESA listed species. These streams have never been supplemented and the fish are considered to be a wild and naturally spawning population. The Secesh River is used as a control stream for the Idaho Salmon Supplementation Studies (ISS).

The NPPC Columbia River Basin Fish and Wildlife Program directs programs and management to maintain the genetic life history and morphological characteristics, and to conduct projects to determine population status, life history and other data on wild and naturally spawning populations. Adult escapement information would aid the ISS project in calculation of adult escapement to smolt production and smolt to adult escapement. Escapement activities are coordinated with state and federal management agencies and ESA species monitoring is coordinated with NMFS. Underwater time-lapse video monitoring is a relatively new methodology that has the potential to provide more consistent and accurate information than traditional redd surveys. Accurate adult escapement information would allow salmon managers to determine if recovery actions were recovering ESA listed salmon in unsupplemented drainages.

Section 8. Project description

a. Technical and/or scientific background

Traditional chinook salmon redd count surveys in Idaho have relied upon one-time counts as an index of relative abundance over time (trend). These counts have assumed that spawning has been completed, that viewing conditions for aerial surveys were acceptable, and that spawner distribution has remained constant. These surveys did not account for adult salmon straying, pre-spawning mortalities, and differences in redd counting techniques or differences between observers. The factor used to convert redd numbers into abundance estimates has not been determined for individual streams and is another potential source of error. The information gathered from one-time counts may not be accurate for determination of adult spawner abundance. Recent surveys on some streams have used multiple ground counts of spawning activities for more accurate escapement abundance estimates. Time, money and personnel involved with multiple counts have increased as managers strive for more accurate estimates. Chinook salmon in the Secesh River and Lake Creek are wild, unsupplemented populations and are a listed species under the ESA. The Idaho Salmon Supplementation Studies use the Secesh River as a control

stream. Accurate escapement monitoring of this population is very important to the salmon managers in their evaluation of anadromous salmonid recovery in the Snake River basin.

b. Rationale and significance to Regional Programs

Several Northwest Power Planning Council (NPPC) program measures in the Columbia River Basin Fish and Wildlife Program (CBFWP, 1994) direct the implementation of the listed stock chinook salmon escapement monitoring project.
FWP program measure 7.1.D2 directs the program should consider for inclusion the following…management to maintain the genetic life history and morphological characteristics of wild and naturally spawning populations including sustainable long-term spawning escapement and redd counts. Presently, there are inherent problems in the redd count survey methodology of determining chinook salmon escapement estimates.
FWP program measure 7.1.C3 directs projects to determine population status, life history and other data on wild and naturally spawning populations. FWP program measure 7.3.B2 directs "Implement high priority supplementation projects but those should include…monitoring and evaluation." A control population is necessary to measure the results of any supplementation and/or recovery actions taken. The current escapement monitoring project addresses a chinook population that is a control population under the ISS.

Secesh River/Lake Creek video-based escapement estimates have the potential to provide the most accurate information on unmanipulated (control) populations and to assess the impact of recovery actions. One-time redd count surveys are subject to a variety of potential errors, from environmental conditions, to survey timing, to inter-observer differences. If dam breaching, drawdown, high technology changes, etc. are to be used to recover salmon populations, accurate "before and after" escapement estimates are necessary to assess the results.

c. Relationships to other projects

Both underwater time-lapse video facilities are located near ISS juvenile screw traps, with most of the spawning area upstream of the facilities. Information would be available for adult escapement to juvenile production, and juvenile survival to adult escapement

d. Project history (for ongoing projects)

This investigation began in 1991 with planning and a conceptual engineering design of an adult fish counting facility for the Secesh River funded through the Pacific Salmon Commission. Preliminary design work followed in 1994 (River Masters Engineering 1994). Approximately $125,000 was invested in the planning process from 1991 to 1996. Pacific Salmon Commission funding was used as seed money to begin the project, but was not sufficient to allow full project implementation. The Nez Perce Tribe has worked

cooperatively with the Idaho Department of Fish and Game and the U.S. Forest Service during the planning and developmental stages of this project.

The project began in 1997 on the Secesh River on private property. Delays in project approval and budget approval hampered timely hiring of project personnel and delayed purchase of backup field equipment. Equipment failures (with no backup) prevented continuous data collection in 1997. In 1998, the Secesh River and Lake Creek facilities were located on U.S. Forest service property once a MOU was in place. Both fish counting stations were fully operational and coverage was achieved over 95% of the operational period. The primary cause of unretrievable data was turbidity, along with a smaller amount lost due to personnel error.

Modifications were made to the counting chamber prior to the 1998 field season to provide better picture resolution. A 10 cm interval grid system painted on the back and bottom of the counting chamber provided more accurate length estimates. Impedance tunnels and laser sizers are being investigated for better length estimates. Other modifications are anticipated to attempt to provide a picture that can be edited with a computerized system. Video tapes of night-time only data are currently being reviewed for possible use with the computerized editing system. If this methodology proves to be better than redd count surveys, underwater time-lapse video counting stations would be a viable alternative for adult escapement monitoring in indicator streams.

Quarterly reports have been submitted to BPA, a draft annual report has been completed and final revisions are underway.

The budget for FY 1997 was $137,500, and for FY 1998, $157,000 which included $20,000 carried forward from 1997 due to the late funding approval. The budget for FY 1999 is $160,000 and $160,000 is proposed for FY 2000.

e. Proposal objectives

Objective 1 - Coordinate the listed stock chinook salmon escapement monitoring project with state and federal management agencies in the Snake River basin. This objective is not measurable. Considerable effort was put into this objective during the initial phases of the project and in 1998 when a MOU was developed with the U.S. Forest Service. Each subsequent year requires less coordination effort.

Objective 2 - Coordinate the escapement monitoring evaluation study with the National Marine Fisheries Service (NMFS). The Nez Perce Tribe does not recognize that the Endangered Species Act takes precedence over or precludes Tribal sovereignty or rights in any manner. However, the Tribe does recognize that salmon are a listed species, and strongly believes in coordination efforts to monitor, conserve, protect and recover populations at low levels of abundance and high risk of extirpation. In that regard, the Columbia River InterTribal Fish Commission maintains a Section 10 permit by and through the Bureau of Indian Affairs coordinating Tribal activities relative to listed salmon

populations. An annual report is submitted to NMFS which summarizes project activities relating to chinook salmon populations under the Endangered Species Act.

Objective 3 - Monitor the abundance and timing of migration of adult chinook salmon into the Secesh River and Lake Creek drainages. A temporary fish counting station was operated in the Secesh River in 1997 and 1998. A second temporary fish counting station was operated in Lake Creek in 1998. The purpose of these two facilities is to accurately determine adult escapement into wild chinook salmon production areas. An estimated escapement number for both counting facilities was obtained in 1998. A final number will be obtained when the ongoing tape analyzation is completed. At this time, it is felt that this number will be accurate for the Lake Creek site. No adult salmon were passed during the first two weeks of operation of the Lake Creek facility. The first adult salmon migrated past the Secesh River site before facility installation. Efforts to install the facility prior to spring runoff were halted due to equipment problems at the Lake Creek site. All efforts were shifted to the Lake Creek site since that was the first priority for data collection. Both structures will be in place prior to spring runoff in 1999, and efforts will be made to ensure, and then to monitor the "fish tightness" of the fish guiding fences throughout the season. The escapement numbers at both sites, for 1999 and beyond, should be accurate.

Adult escapement information as determined by this project would be compared to annual redd counting surveys to assess if redd count information provides abundance based adult salmon escapement information. If both methods produce similar results, a decision would based on economics and other considerations. If the methodologies produce different results, an analysis of the inaccuracies within each method would be conducted.

HO1a: Adult salmon escapement into the Secesh River and Lake Creek is accurately estimated using various redd count survey methods.
Corollary: Rejecting HO1a indicates that redd count surveys do not accurately estimate or reflect the actual number of adult chinook salmon returning to the Secesh River and Lake Creek.

Objective 4 - Transfer of Technology. An annual report summarizing all activities associated with the adult chinook salmon escapement monitoring project will be prepared.

f. Methods

Task 3a and 3i pertain to the installation and removal of the fish counting stations. Each fish guiding station consists of an upstream and downstream fish guiding fence, in a V configuration . The fish guiding fences lead the fish into the counting chamber. The apex of the upstream and downstream V meet at the fish counting station (><). The design of the tripod supports, longitudinal stringers and pickets is similar to a standard Alaskan picket weir. The fish counting station is basically an opening that fish are directed through. The opening to the fish counting station is 3 feet wide and 2.5 feet high, by 4 feet long. The fish counting station is placed across the stream with the guiding fences angled 30-45 degrees to the bank. The fish counting chamber is placed in the thalweg.

The video camera is attached to the side of the fish counting chamber, 2.5 feet away from a clear plexiglass window. As fish travel through the 4 foot long counting chamber, the video camera takes two pictures every second. The chamber is illuminated with red light at night to facilitate nighttime picture resolution. The camera is an ultra-high resolution monochrome (black and white) CCD camera sealed in a waterproof housing. A cable carrying the video signal, power and camera control conductors is connected to the video recorder. Recording is continuous while the station is in operation. A photocell automatically turns the lights on during periods of darkness. All electrical equipment uses 12 volt DC which is furnished by a combination of hydrogenerators, solar panels and battery charger, and stored in high amperage golf cart type batteries.

Task 3b Daily operation and maintenance of the fish counting station requires tapes to be changed, the power source to be checked for proper operation and charge level, and the pickets on the fish guiding fence to be cleaned of debris.

Task 3c is the monitoring and evaluation portion of the project to determine if the structure is impeding migration of fish or displacing spawning downstream. The monitoring and evaluation plan has been developed to provide safeguards against any potential migration impedance or spawning displacement. The plan contains criteria for determining when facility impacts are significant to salmon, guidelines for corrective actions, and a plan implementation schedule. Snorkel and discrete bank observations are used to determine if the fish counting station is impeding fish movement. Locations of adult fish sighted and comments are reported on a form that includes a map of the project area. Observations will be made daily, upstream and downstream of the counting facility, with particular attention paid to downstream salmon holding areas. If any problems are identified according to plan criteria, the pickets or entire counting station will be removed as outlined in the M&E plan. The fish counting station did not appear to impede fish movement or displace spawning downstream in 1997 and 1998.

Task 3d and 3e (determination of abundance and migration timing) This will be accomplished by analyzing the video tapes. Tapes will be analyzed for fish movement by date, time of day, and by direction of movement. Results will show timing of upstream migration over the season (abundance), and on a diel basis will show upstream and downstream movement by time of day. Fish with an adipose fin or other fin missing will be recorded, as will sex if it can be determined. Fish with any unusual marking will be noted for future downstream and upstream passages.

Task 3g will compare the adult spawner migration into the Secesh River and Lake Creek with stream discharge and water temperature, and examine correlations between these variables over time. A Hobo temp meter will be placed near both fish counting stations. A permanent staff gauge has been placed in the Secesh River, upstream of the fish counting station. Efforts to find a suitable location for a permanent staff gauge site on Lake Creek is continuing.

Task 3h will investigate the use of underwater video in taking morphometric measurements of adult salmon migrating into the Secesh River and Lake Creek. Lines have been placed on the bottom and far wall of the counting chamber at 10 centimeter intervals. Fish passing though the counting chamber close to the back wall can be measured accurately. Fish passing closer to the camera appear to be larger due to the angle of view of the camera. The length of these fish would be estimated using the 10 centimeter grid lines on the bottom. The higher in the water column the fish is, the less accurate the length estimate would be. These estimates may not be sufficiently accurate to determine exact lengths, but may be accurate enough to determine age class.

g. Facilities and equipment

The fish counting station includes tripod supported upstream and downstream guide fences with a video equipped counting chamber. Fish guiding fences are modeled after the standard Alaskan picket weir. Tripods are constructed of 2 inch galvanized steel pipe equipped with Kee Klamp structural pipe fittings. Support brackets attached to the upstream tripod leg support longitudinal picket stringers. Picket stringers are constructed of ¼ inch angle aluminum with 1 inch diameter holes punched on 2 inch centers. One inch galvanized pickets are installed in the stringers. The fish guiding fences are angled 30 - 45 degrees to the bank. As upstream migrating salmon encounter the downstream guiding fence they are funneled upstream into the counting chamber. Likewise, as downstream migrating fish encounter the upstream guiding fence they are funneled downstream into the counting chamber. The counting chamber (4 feet long by 2 ½ feet high by 3 feet wide) is installed in the channel thalweg, which is anticipated to be the preferred adult salmon migration corridor. Upstream or downstream migrating adult salmon can move freely through the counting chamber. An underwater video camera is attached to the side of the counting chamber. The camera is an ultra-high resolution monochrome (black and white) CCD camera sealed in a waterproof housing. A cable carrying the video signal, power and camera control conductors is connected to the video recorder. The camera takes pictures of the fish while they are in the counting chamber at the rate of two frames per second (Hatch et al. 1994). The pictures are recorded on an 8 mm time-lapse video recorder tapes have a 36 hour duration, but are change once a day. A photo cell turns lights on during periods of darkness. Artificial light in the form of two arrays of 36 red LED's mounted on the near side of the counting chamber is the preferred source of light for night photography. The video recorder is located on the bank immediately adjacent to the fish counting facility. Two 6 volt DC high amperage capacity golf cart batteries, connected in series, provide 12 volt DC power to the recorder and lights. Three 18 inch by 48 inch solar panels charge the batteries at the Secesh River site. The Lake Creek site is shaded and a hydrogenerator is used to charges the batteries. As water velocities at the Lake Creek site decrease, the hydrogenerator provides less charge and power is supplemented approximately every 3 to 4 days with fresh batteries from the office. The fish are not handled, trapped or held in any manner during this process. Video tapes are reviewed during the season at a fast rewind speed. This provides an estimate of the number of fish passing as well as an assessment of how the equipment is operating and how the fish are accepting the fish counting station. After the season, video tapes are

analyzed at normal speed through a variable speed, freeze frame Hi-8 mm VCR and 27 inch TV.

There is a spare fish counting chamber and enough fish guiding fence material to change the fish counting station to a better location late in the season under low water conditions, or in case of a major station blowout. Each fish counting station has a complete back up of video equipment (camera, cables, lights, photo cells, recorder, 4 inch field TV monitors and batteries). Columbia River Inter-Tribal Fish Commission is continuing to coordinate efforts to provide a computerized tape editing system. The editing system eliminates all the tape with no fish information, by recording onto a second tape, only those frames with large fish. This editing system has been used at dams (Hatch et al. In press), but has not worked at our field locations due to interference of turbulence, varying light conditions, etc. Modifications to the counting chamber will continue in an effort to use the computerized editing system. Further refinement may be needed in the methods for determining fish lengths. This could involve purchase of laser equipment.

h. Budget

The budget amount requested this year is slightly higher ($163,122) than last year ($160,000). Personnel costs are reduced, but this has been offset by an increase in the subcontracting we do. There has been a slight increase in supplies, O&M and equipment to cover refinements to equipment and field operations. A reduction in our indirect costs has allowed us to do this without a substantial increase in total budget.

Section 9. Key personnel

Dave Faurot is the Listed Stock Chinook Salmon Escapement Monitoring Project Leader Nez Perce Tribe, Department of Fisheries Resources Management. He is responsible for the daily operations of the project; budget preparation, purchasing, personnel supervision, data analysis, report preparation and administration of the project. Dave is 1.0 FTE.

Education: Bachelor of Science, 1965.
U.S.Coast Guard Academy.
Major: Engineering.
Masters of Science, 1980.
University of Michigan.
Major: Aquatic Ecology.

Pertinent employment:

National Marine Fisheries Service Pasco, WA 1976-1982
Performed research on the effects of dams on the migration rates, timing and survival of juvenile salmon and steelhead in the Columbia River system.

Alaska Department of Fish and Game Soldotna, AK 1983-1984
Conducted tag and release, and creel census studies on adult chinook salmon.

U.S.Fish and Wildlife Service Kenai, AK 1985-1990

Performed research and administrative duties in planning, implementing and evaluating fishery resource management in naturally functioning wilderness areas.

Publications:

Faurot, D.A. 1980. Juvenile salmonid outmigration of the Mid-Columbia River, 1977. M.S. Thesis, University of Michigan, Ann Arbor, MI.

Sims, C.W., J.G. Williams, D.A. Faurot, R.C. Johnson, and D.A. Brege. 1981. Migrational characteristics of juvenile salmon and steelhead in the Columbia River basin, 1980 Vol II. Final Report to the U.S. Army Corps of Engineers. Seattle, WA.

Faurot, D.A., L.C. Stuehrenberg, and C.W. Sims. 1982. Radio tracking of juvenile salmonids in John Day Reservoir, 1981. Final Report to the U.S. Army Corps of Engineers, Seattle, WA.

Faurot, D. and R.N. Jones. 1990. Run timing and spawning distribution of coho and late run chinook salmon in the Kasilof River watershed, Alaska, 1987. U.S. Fish and Wildlife Service, Alaska Fisheries Technical Report Number 9. Anchorage, AK

Faurot, D. 1992. Fishery resources in the Kisaralik River basin, Yukon Delta National Wildlife Refuge, Alaska. U.S. Fish and Wildlife Service, Alaska Fisheries Technical Report Series. Anchorage, AK.

Paul A. Kucera, Director of Biological Services, is the program leader for the Listed Stock Chinook Salmon Escapement Monitoring Project. Mr. Kucera has 23 years profesional experience as a Fisheries Biologist in research, management and administration and is a Certified Fisheries Scientist through the AFS. He has also authored or co-authored seven peer-reviewed fisheries journal publications and over 40 project reports. Responsible for technical program direction and administration of the Fisheries Research Division. This position fills 0.1 FTE.

Education: Bachelor of Science, 1975.
Utah State University.
Major: Fisheries Management.
Graduate Studies, 1984-1987.
University of Idaho.
Major: Fisheries Management.

Jay Hesse is the Research Coordinator, and supervises the project leader of the Listed Stock Chinook Salmon Escapement Monitoring Project. Mr. Hesse has five years of professional experience as a Fisheries Research Biologist and as Research Coordinator. He is responsible for technical direction and supervision of fisheries research projects, research coordination, development of fisheries research, and representation at federal and state meetings. This position fills 0.05 FTE.

Education: Bachelor of Science, 1992.
Michigan State University.
Major: Fisheries.
Masters of Science, 1994.

Michigan State University.
Major, Fisheries and Wildlife.

Section 10. Information/technology transfer

An annual report following scientific publication guidelines is distributed through the BPA publications system. A presentation to the American Fisheries Society is planned for the 2001 meeting.

Congratulations!