

PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project Lake Roosevelt Kokanee Net Pens	
BPA project number	20146
Contract renewal date (mm/yyyy)	06/2016 (Sherman Creek Hatchery)
Multiple actions? (indicate Yes or No)	No
Business name of agency, institution or organization requesting funding Washington State Department of Fish and Wildlife, Sherman Creek Hatchery	
Business acronym (if appropriate)	WDFW
Proposal contact person or principal investigator:	
Name	Mitch Combs
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NPPC Program Measure Number(s) which this project addresses 10.8b, 10.8b.2, 10.8b.4	
FWS/NMFS Biological Opinion Number(s) which this project addresses Not applicable.	
Other planning document references NPPC , Columbia River Basin F&W Program, Resident Fish Substitutions: 10.8, 10.8A, 10.8B, 10.8B.1, through 10.8B.5, and 10.8B.11. Upper Columbia Blocked Area Management Plan, 1998.	
Short description Construct and operate 20 kokanee salmon net pens (25,000 fish/pen) as called for in the NPPC September 13, 1995 FWP Section 10.8b.4. Operation of the kokanee net pens will be by the Sherman Creek Hatchery (9104700). Sherman Creek was constructed in 1991 at which time WDFW and BPA entered into a non-discretionary 25 year contract to fund the hatchery's operation and maintenance. Monitoring and evaluation are by the Lake Roosevelt Fisheries Monitoring Project (No. 9404300).	
Target species Lake Whatcom Stock kokanee salmon, native Kootenay Lake Stock kokanee salmon,	

Section 2. Sorting and evaluation

Subbasin

Evaluation Process Sort

CBFWA caucus		CBFWA eval. process	ISRP project type
X one or more caucus		If your project fits either of these processes, X one or both	X one or more categories
	Anadromous fish	Multi-year (milestone-based evaluation)	Watershed councils/model watersheds
X	Resident Fish	Watershed project eval.	Information dissemination
	Wildlife		X Operation & maintenance
			New construction
			Research & monitoring
			X Implementation & mgmt
			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
9104700	Sherman Creek Hatchery O&M (SCH)	Sherman Creek Hatchery will operate and maintain the kokanee net pens in Lake Roosevelt. SCH operates conjunctive with the Spokane Tribal Hatchery to enhance the fisheries in Lake Roosevelt and Banks Lake.
9104600	Spokane Tribal Hatchery O&M (STH)	Operated conjunctively with Sherman Creek Hatchery to maximize the attributes of each facility while optimizing production. STH is the primary incubation, and early rearing facility.
9500900	Volunteer Rainbow Trout Net Pen Project	Net Pen Project rears 530,000 rainbow trout yearlings initially raised at

		Sherman Creek and Spokane Tribal Hatcheries for annual release into Lake Roosevelt.
9404300	Lake Roosevelt Monitoring/Data Collection Program (LRM/DCP)	Monitors and evaluates effects of hatcheries and stocking on Lake Roosevelt fisheries; collects fisheries and limnological data for reservoir modeling.
9001800	Habitat Improvement Project	Habitat improvement in Lake Roosevelt tributaries for rainbow trout juvenile rearing and adult passage to increase natural production.
9501100	Chief Joseph Kokanee Enhancement Project	Monitors native kokanee stock interactions and development, and fish entrainment through Grand Coulee Dam.
9502700	Lake Roosevelt Sturgeon Project	Restoration and enhancement of the Lake Roosevelt fishery.
	Ford Hatchery Water Supply Improvement	Increased kokanee survival through increased yearling releases.
	Phalon Lake Rainbow Trapping Facility	This native red band rainbow trout project will supply native trout for net pen and tributary stocking in the Upper Columbia River Basin.
	Lake Roosevelt Hatcheries Coordination Team	Fishery managers from above projects, meet quarterly for project review and coordination / information sharing.
9700400	Resident Fish Stock Status Above Chief Joseph/Grand Coulee Dam	Informational exchange / Blocked Area Coordination.

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
	Not applicable	

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Provide rearing capabilities for 500,000 kokanee salmon yearlings into Lake Roosevelt annually.	a	Construct and locate 20 net pens in Lake Roosevelt for rearing 500,000 kokanee salmon yearlings (25,000 fish/pen) for release into Lake

Obj 1,2,3	Objective	Task a,b,c	Task
			Roosevelt after spring drawdown.

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	10/1999	09/2000	Construct and place for operations into Lake Roosevelt 20 kokanee net pens.		100 %
				Total	100 %

Schedule constraints
Hydropower operations can necessitate time changes in rearing / planting schedules and have caused survival limitations on resident fish in Lake Roosevelt.
Availability of native stocks limit the use of alternate target stocks.
Completion date
N/A

Section 5. Budget

FY99 project budget (BPA obligated):	\$ 0 - ?
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FY2000 budget by line item

Item	Note	% of total	FY2000 (\$)
Personnel	Fish Hatchery Specialist 2 .50 FTE	8 %	14,430
Fringe benefits		2 %	3,983
Supplies, materials, non- expendable property		1 %	1,000
Operations & maintenance		%	0
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Construct and locate 20 net pens (approximate dimensions: 20`x20`x15`).	81 %	150,529
NEPA costs		5%	10,000
Construction-related support		0	0

PIT tags	# of tags:	0	0
Travel		0	0
Indirect costs	Administrated Overhead: 20.0% of Total less Capital Purchases and Fish Feed	3 %	5,883
Subcontractor		0	0
Other	Equipment Operations and Maintenance	0%	0
TOTAL BPA REQUESTED BUDGET			185,825

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount (\$)
Lake Roosevelt Development Association	Lake Roosevelt Rainbow Trout Net Pen Project		
Spokane Tribe	Spokane Tribal Hatchery		
Total project cost (including BPA portion)			

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	35,000	36,050	37,131	38,245

Section 6. References

Watershed?	Reference
	Beckman, L.G., Novotny, J.F., Parsons, W.R., Tarrell, T.T. 1985. Assessment of the fisheries and limnology in Lake F.D. Roosevelt 1980-1983. U. S. Fish and Wildlife Service. Final Report to U. S. Bureau of Reclamation. Contract No. WPRS-0-07-10-X0216; FWS-14-06-009-904, May 1985.
	Cichosz, T., Shields, J., Underwood, K., Tilson, M.B., and Scholz, A.T. 1997. Lake Roosevelt Fisheries and Limnological Research. Annual Report 1996. Spokane Tribe of Indians. 94-043, Bonneville Power Administration, Portland, Oregon.
	Columbia River Basin Fish and Wildlife Program. 1994. Application For Amendment. Section 10.8B Resident Fish Substitution Projects Above Chief Joseph/Grand Coulee Dam. Northwest Power Planning Council, Portland, Oregon.
	Columbia River Basin Fish and Wildlife Program. 1995. Section 10 Resident Fish, Section 10.8 Resident Fish Substitutions. 95-4, Northwest Power Planning Council, Portland, Oregon.

	Combs, M. 1992. Sherman Creek Hatchery Annual Report April 1, 1992 - September 30, 1992. Washington Department of Fish and Wildlife. DE-B179-91BP21191, Bonneville Power Administration, Portland, Oregon.
	Combs, M. 1993. Sherman Creek Hatchery Annual Report October 1, 1992 - September 30, 1993. Washington Department of Fish and Wildlife. DE-B179-91BP21191, Bonneville Power Administration, Portland, Oregon.
	Combs, M. 1994. Sherman Creek Hatchery Annual Report October 1, 1993 - September 30, 1994. Washington Department of Fish and Wildlife. DE-B179-91BP21191, Bonneville Power Administration, Portland, Oregon.
	Combs, M. 1995. Sherman Creek Hatchery Annual Report October 1, 1994 - February 28, 1995. Washington Department of Fish and Wildlife. DE-B179-91BP21191, Bonneville Power Administration, Portland, Oregon.
	Combs, M. 1995. Sherman Creek Hatchery Annual Report March 1, 1995 - September 30, 1995. Washington Department of Fish and Wildlife. DE-B179-91BP21191, Bonneville Power Administration, Portland, Oregon.
	Combs, M. 1996. Sherman Creek Hatchery Annual Report October 1, 1995 - September 30, 1996. Washington Department of Fish and Wildlife. DE-B179-91BP21191, Bonneville Power Administration, Portland, Oregon.
	Combs, M. 1997. Sherman Creek Hatchery Annual Report October 1, 1996 - September 30, 1997. Washington Department of Fish and Wildlife. DE-B179-91BP21191, Bonneville Power Administration, Portland, Oregon.
	Griffith, J.R., Scholz, A.T. 1991. Lake Roosevelt Monitoring Program. Annual Report 1990. DE-8179-88BP91819, Bonneville Power Administration, Portland, Oregon.
	Peone, T., Scholz, A.T., Griffith, J.R., Graves, S. and Thatcher, M.G. 1990. Lake Roosevelt Fisheries Monitoring Program. Annual Report, 1988-89. DE-8179-88BP91819, Bonneville Power Administration, Portland, Oregon.
	Peone, T. 1996. Spokane Tribal Hatchery Annual Report January 1, 1996 - December 31, 1996. Spokane Tribe of Indians. DE-MS79-90BP92906, Bonneville Power Administration, Portland, Oregon.
	Scholz, A.T., Uehara, J.K., Hisata, J., and Marko, J. 1986. Feasibility report on restoration and enhancement of Lake Roosevelt Fisheries. In: Northwest Power Planning Council, Application for amendments. Vol 3A. Northwest Power Planning Council, Portland, Oregon.
	Thatcher, M.G., Griffith, J.R., McDowell, A.C., and Scholz, A.T. 1993. Lake Roosevelt Fisheries Monitoring Program. Annual Report 1991. DE-8179-BP91819, Bonneville Power Administration, Portland, Oregon.
	Thatcher, M.G., McDowell, A.C., Griffith, J.R., and Scholz, A.T. 1994. Lake Roosevelt Fisheries Monitoring Program. Annual Report 1992. DE-8179-BP91819, Bonneville Power Administration, Portland, Oregon.
	Underwood, K.D., Shields, J., and Tilson, M.B. 1996. Lake Roosevelt Fisheries Monitoring Program, 1994 Annual Report. Project No. 88-63, Bonneville Power Administration, Portland, Oregon.
	Upper Columbia Fishery Managers.(1998-in press). WDFW Upper Columbia Blocked Area Management Plan. Washington Department of Fish and Wildlife.

PART II - NARRATIVE

Section 7. Abstract

Construct and operate 20 kokanee salmon net pens (25,000 fish/pen) is directly called for in the NPPC September 13, 1995 FWP Section 10.8b.4 for rearing of kokanee salmon in Lake Roosevelt. The Sherman Creek Hatchery will construct, operate, and maintain these kokanee net pens as part of the annual hatchery operations and maintenance (9104700). The net pens will be supplied with fish from the Spokane Tribal hatchery (9104600). The existing hatchery facilities operating on Lake Roosevelt do not have the capacity or adequate water supply to produce the number of kokanee yearlings (post-smolts) as called for in the biological objectives (NPPC 95-4, 1995) for enhancement of the resident fisheries in Lake Roosevelt.

Sherman Creek Hatchery's (SCH) primary objective is the restoration and enhancement of the recreational and subsistence fishery in Lake Roosevelt and Banks Lake. This facility began operations in 1992 as one of two kokanee salmon / rainbow trout facilities provided to partially mitigate for the loss of anadromous fish in Northeastern Washington due to the construction of Grand Coulee Dam. Sherman Creek Hatchery was approved by the Northwest Power Planning Council as a measure in the Columbia River Basin Fish and Wildlife Program, Section 10.8b, 10.8B.2, (1987, 1995). The role of the Sherman Creek Hatchery in this program is to; {a} provide for kokanee imprinting and egg collection; {b} enhance the resident fishery within Lake Roosevelt; and {c} rear rainbow trout for net pen stocking.

The Washington Department of Fish and Wildlife, Spokane Tribe of Indians and the Colville Confederated Tribe form an interagency technical coordination team which sets goals and objectives for both Sherman Creek and the Spokane Tribal Hatchery and serves to coordinate enhancement efforts on Lake Roosevelt and Banks Lake. Monitoring and evaluation for this project is by the Lake Roosevelt Monitoring / Data Collection Program (9404300).

Section 8. Project description

a. Technical and/or scientific background

The Northwest Power Planning Council (NPPC) amended into their 1987 Columbia River Basin Fish and Wildlife Program (NPPC 1987) the construction and operation of two fish hatcheries as partial mitigation for the loss of resident fish and anadromous fish habitat due to the construction of Grand Coulee Dam in 1941. This was in part brought on by a feasibility study on restoring and enhancing the Lake Roosevelt fisheries (Scholz et al. 1986). The study recommended that two facilities, managed by the Spokane Tribe and Washington State Department of Fish and Wildlife (WDFW), be constructed to enhance the resident fishery on Lake Roosevelt and Banks Lake. The measure for the hatcheries included one constructed in 1991 at Galbraith Springs on the Spokane Indian Reservation operated by the Spokane Tribe of Indians (Spokane Tribal Hatchery),

and one constructed in 1991 at Sherman Creek (a northern tributary in Lake Roosevelt operated by the Washington Department of Fish and Wildlife. Operation of the two facilities complement each other. Kokanee eggs collected from Sherman Creek along with rainbow eggs received from WDFW are incubated at the Spokane Tribal Hatchery. These fish are then either transferred to Sherman Creek for final rearing, transferred to net pens for final rearing or planted directly into Lake Roosevelt or Banks Lake after the spring drawdown period.

This was adopted by the NPPC into their 1987 Fish and Wildlife Program (NPPC 1987). The initial annual production goals were: 13 million kokanee fry, 8 million for outplanting into Lake Roosevelt and 5 million into Banks Lake, and 500,000 rainbow trout to be supplied for Lake Roosevelt net pen rearing operations. The Lake Roosevelt Hatcheries Technical Coordination Team was formed in 1988 to provide guidance in operations, production goals, and stocking strategies on the Lake Roosevelt project. Members of this team include: the Spokane Tribe of Indians (ST), Colville Confederated Tribes (CCT) and WDFW. BPA, Eastern Washington University, Fishery Science Center and the Lake Roosevelt Net Pen Coordinator also serve as advisors who through the Monitoring Program also independently review the restoration and enhancement efforts on Lake Roosevelt.

The fishery managers operating above Chief Joseph / Grand Coulee Dam collectively identified the following biological objectives as partial mitigation for the loss of anadromous salmon and steelhead blocked by Chief Joseph and Grand Coulee Dams (NPPC 95-4).

Table 1. Lake Roosevelt biological objectives:

Biological objectives at Lake Roosevelt include the following targets of harvestable sized adult fish:

Species	Stock	Harvest goal (#)	Escapement goal (#)	Total adult fish #	lbs.	Year
kokanee	hatchery	290,000	10,000	300,000	2.0	2000
kokanee (adfluvial)	wild	120,000	60,000	180,000	2.0	*
rainbow trout	net pen	190,000	NA	190,000	1.5	1997
rainbow trout (interim) (adfluvial)	wild	12,000	12,000	18,000	2.0	2000
rainbow trout (adfluvial)	wild	150,000	74,000	224,000	2.0	final
walleye	wild	131,000	U	131,000	1.5	1996

NA = not applicable, U = unknown at present time, * target date will be determined upon completion of baseline investigations, t = target date will be determined after interim goal is achieved.

The above objectives are integrated into the basis for operation of the two fish hatcheries operating on Lake Roosevelt. Seeking to meet the biological objectives a series of strategies was developed to guide operation and stocking efforts within Lake Roosevelt. These are listed in Section b. Rationale and significance to Regional Programs. Since the natural production of kokanee and rainbow trout in Lake Roosevelt are limited, (Underwood, 1999) due to a lack of available habitat and prohibitive lake level operations, enhancement has become necessary. The use of hatcheries was also identified as a necessary measure to be independent of reservoir fluctuations (Scholz et al. 1986) in the enhancement of resident fisheries on Lake Roosevelt.

To achieve the biological objectives for adult kokanee salmon production (Table 1), kokanee salmon need to be produced in substantially greater numbers than is possible in existing hatcheries operating on Lake Roosevelt. The construction and use of the proposed 20 net pens will result in the annual production of approximately 500,000 additional kokanee salmon yearlings for release into Lake Roosevelt.

Sherman Creek Hatchery will receive from the Spokane tribal Hatchery 500,000 kokanee fingerlings each fall for net pen rearing. These fish will be reared at 25,000 per pen for annual release into Lake Roosevelt after the spring reservoir drawdown.

Sherman Creek Hatchery was constructed in 1991, at which time WDFW and BPA entered into a non-discretionary 25 year contract to fund the operations and maintenance. It is located immediately adjacent to Lake Roosevelt at the mouth of Sherman Creek. This is three miles west of Kettle Falls, Washington and 101 miles upstream from Grand Coulee Dam. The Hatchery was constructed by Bonneville Power Administration (BPA). Annual operations and maintenance are preformed by Washington Department of Fish and Wildlife with funding provided by BPA. Sherman Creek Hatchery works conductively with the Spokane Tribal Hatchery and the other fishery managers on Lake Roosevelt and Banks Lake to restore and enhance resident fish. Monitoring and evaluation for this project is preformed by the Lake Roosevelt Monitoring / Data Collection Program.

b. Rationale and significance to Regional Programs

The construction and operation of kokanee net pens is a cost effective means of producing additional kokanee salmon yearlings to meet the biological objectives of the Lake Roosevelt fisheries enhancement program. Furthermore the operations and maintenance of Sherman Creek Hatchery (SCH) and the associated net pens are consistent with the Northwest Power Act and the Northwest Power Planning Council's Fish and Wildlife Program, Resident Fish Substitution Biological Objectives and Measures Above Chief Joseph/Grand Coulee Dam (95-4, 1995). SCH produces resident fish for release into Lake Roosevelt and Banks Lake to restore and enhance the recreational fishery and for protection of the resident fish impacted by the construction of Grand Coulee Dam.

Monitoring and evaluation investigations (Peone et al. 1990, Griffith and Scholz 1991, and Thatcher et al. 1993, 1994) indicated that the hatchery program has contributed significantly to increasing both the harvest rates of kokanee and rainbow trout in Lake Roosevelt, as well as the

economic value of the Lake Roosevelt sport fishery. Creel surveys conducted by the U.S. Fish and Wildlife Service from 1980 to 1982 (pre hatchery) estimated the annual harvest of kokanee at 300 to 1,000 fish and the annual harvest of rainbow at 1,000 to 3,000 fish (Beckman et al. 1985).

At that time the number of angler trips was approximately 80,000 per year and the economic value of the fishery was estimated at \$2.8 million. From 1990 to 1996 (post hatchery), harvest ranged from 1,2650 to 32,353 kokanee and 73,777 to 499,293 rainbow trout (Peone et al. 1990; Griffith and Scholz 1991; Thatcher et al. 1993; Chichoz et al. 1997). During this period the number of angler trips ranged from 171,725 to 594,508 and the economic value ranged from \$5.3 to \$20.7 million. In fisheries surveys conducted during this period, over 95% of the kokanee and rainbow collected bore tags or marks indicating they were of hatchery origin (Cichosz et al. 1997).

Seeking to meet the biological objectives, stated in NPPC 95-4 10.8b a series of strategies was developed to guide operation and enhancement efforts. Those strategies state that the Washington Department of Fish and Wildlife and Spokane Tribe of Indians will operate the hatcheries to produce 1 million age 1+ residualized smolt kokanee for release into Lake Roosevelt, including 500,000 reared in the hatcheries and 500,000 reared in net pens, and also produce 500,000 age 0+ rainbow fingerlings for the net pen program (NPPC 95-4 1995).(Emphasis added) The resident fish strategies further direct the hatcheries to construct and maintain both kokanee and rainbow trout net pens.

c. Relationships to other projects

The Sherman Creek Hatchery (SCH) including kokanee net pens and the Spokane Tribal Hatchery (STH) are operated conjunctively in an effort to maximize the attributes of each facility while optimizing production. The STH is the primary incubation, hatching and early rearing facility while the SCH serves as an acclimation, rearing and release facility up to program limitations. SCH also serves as a support facility for the Lake Roosevelt net pen project. Annual production goals and operational strategies are agreed to by the, Lake Roosevelt Hatchery Coordination Team, a regionally unique forum whose participants include the Spokane Tribe of Indians, Colville Confederated Tribes and WDFW. Other participants who are involved with fishery management and operational concerns on Lake Roosevelt and Banks Lake include; Upper Columbia United Tribes, Eastern Washington University Biology Department, National Park Service, Bonneville Power Administration (BPA) and the Lake Roosevelt Development Association (volunteer rainbow net pen project). Funding for the STH and the net pens, volunteer coordinator is provided by BPA. Fish feed is provided to the rainbow net pen project from WDFW. Rainbow trout and kokanee salmon eggs are provided by WDFW to STH, additional native kokanee eggs were obtained from Kootenay Lake, B.C. and are being reared at the STH.

This project is inter related to the following projects through direct operational objectives or in that all of the projects listed share the complementary goal of resident fishery restoration and enhancement on Lake Roosevelt and Banks Lake.

Lake Roosevelt Fishery Enhancement Projects

Sherman Creek Hatchery O& M (9104700)	Operated conjunctively with Spokane Tribal Hatchery to maximize the attributes of each facility while optimizing production. Sherman Creek is the final rearing, imprinting, and egg collection facility.
Spokane Tribal Hatchery O & M (9104600)	Operated conjunctively with Sherman Creek Hatchery to maximize the attributes of each facility while optimizing production. STH is the primary incubation, and early rearing facility.
Rainbow Trout Net Pens (9104900)	Net Pen Project rears 530,000 rainbow trout yearlings initially raised at Sherman Creek and Spokane Tribal Hatcheries for annual release into Lake Roosevelt.
Lake Roosevelt Kokanee Net Pens (5228100)	These net pens will rear 500,000 kokanee yearlings transferred from Spokane Tribal Hatchery for annual release into Lake Roosevelt.
Lake Roosevelt Monitoring Program (94043000)	Monitors and evaluates effects of hatcheries and stocking on Lake Roosevelt fisheries; collects fisheries and limnological data for reservoir modeling.
Habitat Improvement Project (9001800)	Habitat improvement in Lake Roosevelt tributaries for rainbow trout juvenile rearing and adult passage to increase natural production.
Chief Joseph Kokanee Enhancement Project (9501100)	Monitors native kokanee stock interactions and development, and fish entrainment through Grand Coulee Dam.
Lake Roosevelt Sturgeon Project(9502700)	Restoration and enhancement of the Lake Roosevelt fishery.
Ford Hatchery Water Supply Improvement (NPPC No. 10.8b.24)	Increased kokanee survival through increased yearling releases.
Phalon Lake Wild Rainbow Trapping Facility (NPPC No. 10.8b.25)	This native red band rainbow trout project will supply native trout for net pen and tributary stocking in the Upper Columbia River Basin.
Resident Fish Stock Status Above Chief Joseph/Grand Coulee Dam (NPPC No. 10.8b.26)	Informational exchange / Blocked Area Coordination.

d. Project history (for ongoing projects)

The Sherman Creek Hatchery (SCH) is one of two kokanee facilities provided to partially mitigate for the loss of anadromous fish passage and habitat due to the construction of Columbia River mainstem dams. As a part of this program, the BPA, Spokane Tribe of Indians, Colville Confederated Tribes and WDFW have worked collectively toward the goal of fishery enhancement on Lake Roosevelt and Banks Lake. This Project BPA No. 9104700 and the Northwest Power Planning Council Amendment No. 10.8B.2 and 10.8B Resident Fish Substitution has remained consistent since the inception of this project. The SCH became operational in April 1992 with first releases later that year. The facility has annually produced kokanee salmon and rainbow trout for release since then.

The SCH was designed to rear and acclimate 1.7 million kokanee fry during the spring and to trap available adult kokanee during the fall. Since the inception of the SCH program, the annual production goals have been modified through adaptive management to achieve program objectives. These changes in rearing and stocking strategies have been the result of recommendations made and approved by the Lake Roosevelt Hatcheries Coordination Team (WDFW, STOI, and CCT) in conjunction with BPA. One such change was from fry to post-smolt. During the first four years (1991 - 1995) of hatchery stocking, the emphasis was for production and release of kokanee fry/fingerlings. However, coded wire tag data and a study to chemically imprint and assess smoltification of hatchery produced kokanee indicated that kokanee released as residualized smolts (e.g. yearlings) were captured in higher numbers than kokanee released as fry (Scholz et al. 1993, Tilson et al. 1994 and 1995). Additionally, entrainment losses and predation are thought to be a greater factor for kokanee released as fry as opposed to residualized smolts. (Tilson et al. 1994 and 1995). As a result, the hatcheries have shifted from kokanee fry to residualized smolt (yearling) releases.

To achieve biological objectives (NPPC 95-4, 1995) for adult kokanee production/harvest kokanee salmon yearlings need to be produced in substantially greater numbers than is possible in existing hatcheries operating on Lake Roosevelt. The construction and use of the proposed 20 net pens will result in the production of approximately 500,000 additional kokanee salmon yearlings for annual release into Lake Roosevelt.

Sherman Creek Hatchery (9104700) publishes an annual report (see lists below) on progress made in achieving program goals and objectives. The monitoring and evaluation for this project are performed by the Lake Roosevelt Monitoring/Data Collection Program BPA No. 9404300 that also produces annual reports along with management recommendations for operations of the Lake Roosevelt Fishery Enhancement Projects.

Since the start of operations in April 1992 the Sherman Creek Hatchery has released the following numbers of fish into Lake Roosevelt:

1992 -	976,925 fingerling kokanee salmon,	45,714 yearling kokanee salmon;
1993 -	902,749 fingerling kokanee salmon,	85,321 yearling kokanee salmon;
1994 -	946,762 fingerling kokanee salmon,	126,159 yearling kokanee salmon;
1995 -		275,609 yearling kokanee salmon;

1996 -	286,253 yearling kokanee salmon;
1997 -	265,313 yearling kokanee salmon;
1998 -	487,000 yearling kokanee salmon.

Starting in 1995, the following rainbow trout were reared at Sherman Creek for fall stocking into net pens on Lake Roosevelt.

1995 -	101,116 fingerling rainbow trout;
1996 -	142,072 fingerling rainbow trout;
1997 -	140,359 fingerling rainbow trout;
1998 -	200,000 fingerling rainbow trout.

Sherman Creek Hatchery Annual Reports:

Combs, Mitch. 1992, 1993, 1994, 1995(I-II), 1996, 1997. Sherman Creek Hatchery Annual Report's. Washington Department of Fish and Wildlife. DE-B179-91BP21191, Bonneville Power Administration, Portland, Oregon.

e. Proposal objectives

Sherman Creek Hatchery is an acclimation, rearing, outplanting, adult trapping, egg taking and support facility for Lake Roosevelt and Banks Lake. It works with the Spokane Tribal Hatchery (9104600) and the volunteer net pen project (9500900) to restore and enhance the resident fisheries on Lake Roosevelt. The monitoring and evaluation for this project are performed by the Lake Roosevelt Monitoring/Data Collection Program (9404300) which also produces an annual report along with management recommendations for operations of the Lake Roosevelt Fishery Enhancement Projects.

Since the start of operations the annual production goals have been modified through adaptive management to achieve program objectives. These changes in rearing and stocking strategies have been the result of recommendations made and approved by the Lake Roosevelt Hatcheries Coordination Team (WDFW, STOI, and CCT) in conjunction with BPA.

The purpose of the kokanee net pens is to increase the number of kokanee salmon yearlings reared for release into Lake Roosevelt. Yearling (post-smolts) are less susceptible to predation and entrainment loss from Lake Roosevelt/Grand Coulee Dam. This should increase the available adult kokanee and enhance the resident fishery within Lake Roosevelt.

f. Methods

- 1) Site selection of anchoring system and pen location identified.
- 2) Permitting process (NEPA) completed.
- 3) Construct 2 six pen arrays and 2 four pen arrays on site.

*The following methods are for Fiscal Year 2001 and are shown for reference only.

4) Rear 500,000 kokanee yearlings (post-smolt) in net pens (25,000 per/pen) for release into Lake Roosevelt.

5) The fish health monitoring for both the Sherman Creek and Spokane Tribal Hatcheries are preformed by the WDFW Fish Health Program.

Fish disease prevention and control is based upon a preventative health program concept. This is accomplished through the implementation of a program that involves routine facility visits which monitor the health of the stocks reared. A strong disease control policy (Co-Managers Fish Disease Policy) carefully scrutinizes fish and egg transfers to prevent disease transmission. The SCH attempts to prevent disease through an integrated fish health management program plan that includes improving rearing conditions, improving diets and feeding practices. This strategy helps reduce operating costs but also adds costs by requiring more ponds to produce the same number of fish.

Stock transfer guidelines and hatchery spawning practice guidelines were developed by the Agency in the 1980's. As scientific knowledge has advanced, these guidelines have been modified to reflect that new knowledge.

We will continue to follow the WDFW guidelines for sockeye net pen rearing. These guidelines suggest that the desirable results for a kokanee/sockeye program are attained by using semi-moist / high energy feeds along with higher loading densities. The benefits being realized are increased growth during the cold water rearing periods. Past experience indicates that the overall health of the net pen reared fish has improved with the use of this type of feeds.

6) Coordinate between agencies on marking and coded wire tagging. We also help in collection and analyzing of population estimates and catch data.

Collecting tags from recovered kokanee will continue as in previous years with the heads being processed by the monitoring program.

7) Outplanting of the kokanee yearlings will be directly into Lake Roosevelt through the fish ladder or from the net pens located either at the Kettle Falls, Sherman Cove or Colville River sites. We will also attempt to hold fish as late into the summer as possible to reduce predation, lessen entrainment losses and increase overall survival.

8) We will trap all returning adults back to SCH in order to meet program goals. We have made significant improvements in our adult collections which include Floating "Oneida" traps and electrofishing as our primary methods. Any adult kokanee trapped would be either brought into the hatchery raceways or due to cold water temperatures held in wire cages in the cove for spawning.

Because predation and fungus on captured adult kokanee have been a problem in fish held in net pens, any captured adult kokanee may be held at the Colville State Fish Hatchery or in fully

enclosed wire cages until spawning. Hatchery staff will continue experimenting with different methods of holding adults for spawning purposes.

9) We will be monitoring fish populations in Lake Roosevelt for any mature kokanee in the area. Our goal is to identify and recover any returning adults. We will also collect, compile and manage biological information from returning fish relative to age composition, size, survival, maturity and coded wire tagging.

10) Spawning operations at SCH will follow WDFW current broodstock collection and Fish Health spawning guidelines and policies. This is to ensure genetic diversity and to prevent the spread of any known pathogens. While at this time egg take goals are at 5 million annually, we will be coordinating with the LRHCT on available adults for broodstock and viable population lots. Egg takes will be fertilized and shipped either "green" or as eyed eggs to the STH for incubation and initial rearing.

We will continue to coordinate between STH, British Columbia Ministry of Environment, Lands and Parks, and the WDFW Lake Whatcom Hatchery for supplying kokanee eggs until such time as we can fulfill the egg allotments using Lake Roosevelt stock.

11) Alternate brood sources (ie native Kootenay Lake Stock / native red band rainbow) will continue to be sought and evaluated for future use to: improve returns, supplement native stocks and increase resident populations throughout the reservoir.

12) Provide technical assistance, labor and equipment to volunteer cooperators rearing rainbow trout in net pens on Lake Roosevelt.

The hatchery staff will seek training as per WDFW guidelines to enable them to perform their duties at the hatchery and to be made aware of industry standards and developments.

The hatchery staff will assist with community efforts and media contacts which reflect on the program and efforts of the project.

g. Facilities and equipment

The support facility for this project is the Sherman Creek Hatchery which became operational in April 1992. The facility consists of three cement raceways, a gravity flow water intake and associated pipeline, facility support building with visitor area, standard support services (i.e.: domestic water supply, access roads and electrical distribution, etc.) fish ladder/water discharge line, "Oneida" type portable fish trap net, four kokanee net pens at the Sherman Cove and Colville River sites, one on-station hatchery residence (a mobile home placed on the site), one hatchery vehicle and a 16 foot open boat. The computer and fax machine in place at the facility currently meet WDFW minimums.

Operations and maintenance of the facility and equipment will be preformed as per the State of Washington and WDFW policies and guidelines.

h. Budget

FY2000 budget by line item

Item	Justification	FY2000 (\$)
SHERMAN CREEK HATCHERY OPERATIONS AND MAINTENANCE		
SHERMAN CREEK	FY 2000 ANNUAL BUDGET	
Salaries: Fish Hatchery Specialist 2	.50 FTE 6 months	\$ 14,430
Benefits:		3,983
	Subtotal:	\$ 18,413
Goods and Services: Supplies	Miscellaneous Supplies	\$ 1,000
	Subtotal:	\$ 1,000
Travel:		
	Subtotal:	\$ 0
Capitol Equipment: Construct Kokanee Net Pens	20 pens (20 @ \$4,586.45 each) Delivery / Set up (\$4,000) Anchor System (2 @ \$5,000 each) Feed Storage (2 sites 3,000 each) Fish Feeders (20 @ \$600 each) Docks & Walkways (\$6,400) Nets & Predation Covers (24 @ \$850 each)	\$ 150,529
	Subtotal:	\$ 150,529
Facility Modifications:		
	Subtotal:	\$ 0
Permits: NEPA	Environmental Assessment	\$ 10,000
	Subtotal:	\$ 10,000
Administrative Overhead: 20.0 % of Total less Capital Purchases and Fish Feed		\$ 5,883
	Subtotal:	\$ 5,883
	Project Total:	\$ 185,825

Section 9. Key personnel

Project Manager: Jerry Moore, Division Manager 0.08 FTE
Washington Department of Fish and Wildlife

600 Capitol Way N
Olympia, WA 98501-1091

This position provides all aspects of project management including supervision, planning coordination, budgetary support, cross-governmental, inter- and intra-agency coordination of hatchery production at Sherman Creek Hatchery.

Mitch Combs, Fish Hatchery Specialist 3 1.0 FTE
Sherman Creek Hatchery
3825 Mellenberger Road
Kettle Falls, WA 99141
e-mail: mcombs@plix.com

This position provides all on-site hatchery operations and maintenance for the daily operations of Sherman Creek Hatchery. The position is responsible for ensuring the quality of fish produced and that annual production goals are met in a cost efficient and safe manner. Additional responsibilities include extensive work with public groups, providing technical assistance to volunteer organizations and coordination with Spokane Tribal Hatchery staff to facilitate the movement of fish and/or eggs between the respective facilities.

Steve Roberts, Fish Health Specialist 0.08 FTE
Washington Department of Fish and Wildlife
600 Capitol Way N
Olympia, WA 98501-1091

This position is responsible for all aspects of fish health including the diagnosis of any diseases and prescribing treatments and appropriate therapeutants. Utilizing a pro-active approach to fish health management the incumbent makes routine visits to the Sherman Creek and Spokane Tribal hatcheries to inspect fish health.

Section 10. Information/technology transfer

Information is distributed through the publication of annual reports, community involvement by staff in: local events; thru providing technical assistance to local volunteer groups and facility tours by groups and individuals. Information is also distributed through coordination with Lake Roosevelt Fishery Enhancement project participants through a locally unique coordination forum organized around this project. That forum, entitled the Lake Roosevelt Hatchery Coordination Team comprises representatives from WDFW, Colville Confederated Tribes and Spokane Tribe of Indians. The participants include: BPA, Eastern Washington University Biology Department, National Park Service and the Lake Roosevelt Development Association (rainbow net pen project

9500900).

WDFW participates as a Fishery Manager in the Upper Columbia Blocked Area Management Plan.

SCH also participates in the annual International Kokanee Workshop as an informational exchange of the most current management and rearing strategies dealing with kokanee salmon and reservoir/large lake operations.

Congratulations!