

**Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal**

Section 1. General administrative information

Colville Hatchery

Bonneville project number, if an ongoing project 8503800

Business name of agency, institution or organization requesting funding
Colville Confederated Tribes

Business acronym (if appropriate) CCT

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.

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

Other planning document references.

Subbasin.

Upper Columbia River Subbasin

Short description.

Produce 22,679 kg (50,000 lbs) of resident salmonids for distribution to reservation waters in an effort to provide a successful subsistence/ recreational fishery as partial mitigation for anadromous fish losses above Chief Joseph and Grand Coulee Dams.

Section 2. Key words

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

Other keywords.

Resident Fish Substitution

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	Annually produce and stock 22,679 kg (50,000 lbs) of resident salmonid production into reservation waters.	a	Rear and stock 16,000 legal size (5 fish/lb) rainbow trout (Mt. Whitney stock).
		b	Rear and stock 13,200 lbs of subcatchable size (25 fish/lb) rainbow trout (Goldendale stock).
		c	Rear and stock 1,857 lbs of fingerling size (90 fish/lb) rainbow trout (Goldendale stock).
		d	Rear and stock 13,200 lbs of

			subcatchable size (25 fish/lb) eastern brook trout (Owhi Lk. Stock).
		e	Rear and stock 1,178 lbs of fingerling size (90 fish/lb) eastern brook trout (Owhi Lk. Stock).
		f	Rear and stock 4,000 lbs of subcatchable size (25 fish/lb) lahontan cutthroat trout (Omak Lk. stock).
		g	Obtain 850,000 eastern brook trout eggs from Owhi Lk. brood stock annually.
		h.	Obtain 200,000 lahontan cutthroat trout eggs from Omak Lk. Brood stock annually.
2	Support a tribal subsistence fishery of 1.0 fish/hr CPUE.	a	Provide hatchery production and spawning activities detailed in tasks 1a-1h.
		b	analyze and creel census data obtained from Owhi Lk., North and south Twin Lakes.
3	Support a recreational fishery on the Colville Reservation of .8-1.0 fish/hr. CPUE	a	Provide hatchery Production and spawning activities detailed in tasks 1a-1h.
		b	analyze creel census data obtained from Buffalo Lk., Omak Lk., and North and South Twin Lakes fisheries.
4	Average length Brook trout observed in the creel (343mm) and condition factors of 152×10^{-7}	a	Tasks 1d, 1e, 2b and 3b
		b	Provide gill netting surveys on Owhi Lk, North and south Twin lakes and Buffalo Lk., three times per year (spring, summer and fall)
5	Average length of rainbow trout observed in the creel (343mm) with condition factors of 152×10^{-7})		Tasks 1a-1c, 2b, 3b and 4b
6	Average lahontan cutthroat trout lengths observed in the	a	Tasks 1f, 1h, 3b and 4b

	creel (508mm) with condition factors of 125×10^{-7}		
7	Increase natural production of brook trout 15% by the year 2010.	a	Task 1d and 1e
		b	Assess existing and potential shoreline spawning success of brook trout in North Twin Lakes, South Twin lakes Owhi Lake and Simpson lake.
8	Increase natural production of rainbow trout 10% by the year 2010.	a	Task 1a
		b	Assess potential rainbow trout spawning potential in tributary streams to North Twin Lake, South Twin Lake.
9	Determine contribution to subsistence and recreational fisheries of natural production fisheries component and fingerling, subcatchable, legal size hatchery fish.	a	Develop/implement marking program for hatchery origin fish, including the continued development of thermal otolith marking.
		b	Tasks 2b, 3b, and 4b
10	Maintain current free-ranging brood stocks of brook trout and lahontan cutthroat trout.	a	Stock 35,000 sub-catchable brook trout into Owhi Lake annually.
		b	Stock 100,000 lahontan cutthroat trout into Omak Lake annually.
		c	Continue bacterial and viral sampling of adults during spawning operations.
11	Prevent bacterial and viral outbreaks and minimize fin erosion during hatchery rearing.	a	Continue proper fish culture techniques.
		b	Reduce loading rate of rainbow trout through rearing
		c	Experiment with feeding regimes and feed types to reduce fin erosion in rainbow trout.
12	Develop a free-ranging rainbow trout brood stock on the Colville Reservation.	a	Monitor and enumerate adult escapement of adfluvial rainbow trout in the SanPoil River Basin
		b	Monitor and enumerate gravid

			adult rainbow trout in North Twin Lk., South Twin Lk. And Round Lk.
		c	Investigate other reservation waters for potential to sustain rainbow trout brood stock populations.
13	Provide administrative and technical over-sight of Colville Tribal fisheries projects funded by BPA and coordinate fisheries management approaches within the reservation and affected areas within the Upper Columbia river Subbasin and Columbia River Basin	a	Participate in the CBFWA and Northwest Power Planning Council process; specifically Resident Fish Managers group (RFM), Prioritization process, development of a Multi-Year Implementation Plan, Comprehensive Hatchery review and watershed project selection process.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	09/1999	09/2000	79%
2	09/1999	09/2000	2%
3	09/1990	09/2000	2%
4	09/1999	09/2000	1%
5	09/1999	09/2000	1%
6	09/1999	09/2000	1%
7	09/1999	09/2000	1%
8	09/1999	09/2000	1%
9	09/1999	09/2000	1%
10	09/1999	09/2000	0%
11	09/1999	09/2000	1%
12	09/1999	09/2000	1%
13	09/1999	09/2000	9%

Schedule constraints.

(1) The percent cost per objective is based upon current cooperation with other BPA funded projects implemented by the Tribe, Project personnel from BIA and Tribal funded Programs, if cooperation ceases to occur many of the objectives will not be met. (2) Increased process in the Power Council=s Program will decrease time spent

implementing the project.

Completion date.

2039

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel		\$131,614
Fringe benefits		\$34,220
Supplies, materials, non-expendable property		
Operations & maintenance	Actual O&M cost will include major portions of Line-Items for Personnel, Fringe Benefits, Indirect Costs, and Equipment acquisition	\$106,000
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Vehicle Replacement	\$30,000
PIT tags	# of tags:	
Travel		\$7,000
Indirect costs		\$51,592
Subcontracts		
Other		
TOTAL		\$360,426

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	\$360,426	365,000	370,000	375,000
O&M as % of total	91%	91%	91%	91%

Section 6. Abstract

The Colville Tribal Fish Hatchery is a project within the North West Power Planning Council's Fish and Wildlife Program that partially mitigates for anadromous fish losses in the Ablocked areas of the Columbia River Basin. The hatchery project was adopted into the Council's fish and wildlife Program in 1984 as resident fish substitution for anadromous fish losses. The goal of the project is to provide artificial production of fish that will help support and enhance tribal subsistence fisheries and non-tribal recreational sport fisheries within the Colville reservation including its boundary waters. The fish

provided by the facility are intended to be capable of not only direct creel contribution, but to contribute to the natural production component of the reservation fisheries in areas compatible with native fish conservation. The majority of the hatchery production provides a carry-over fishery rather than a put-and-take fishery. Specific hatchery objectives include: (1) 22,679 kg to include: 160,000 fingerling rainbow trout (90 fish/lb.), 330,000 sub-catchable rainbow trout, 80,000 legal size rainbow trout, 196,000 fingerling brook trout, 330,000 sub-catchable brook trout and 100,000 lahontan cutthroat trout, (2) Fishery Catch Per Unit Effort (CPUE): Subsistence fishery of 1.0 fish/hr and recreational/sport fishery of .8-1.0 fish/hr, (3) creel fish condition factors: Brook trout ($K > 152 \times 10^{-7}$), rainbow trout ($K > 152 \times 10^{-7}$) and lahontan cutthroat trout ($K > 152 \times 10^{-7}$), (4) increase natural production of brook and rainbow trout (10% and 15% respectively) by the year 2010, (5) brood stock objectives: maintain current free-ranging brood stock sources, develop a free-ranging rainbow trout brood stock source, (6) Fish culture objectives: provide rearing conditions that prevent the manifestation of bacterial and viral diseases and minimize fin erosion; (7) fishery monitoring objectives: Access the fishery contribution of natural and hatchery production; (8) Maintain coordinated fisheries management within the reservation and other affected areas within the Columbia River Basin.

Section 7. Project description

a. Technical and/or scientific background.

This project location is in the Upper Columbia Sub-Region above the Ablocked area created by the construction of Chief Joseph and Grand Coulee Dams, specifically the project enhances resident fisheries within the Colville Reservation and associated boundary waters. The project mitigates for anadromous fish losses through protection/enhancement of resident fish populations (i.e. in-place, out-of-kind mitigation).

The project goal of providing/contributing to a successful tribal subsistence fishery and a non-member recreational sport fishery is consistent with the Council's 1994 Fish and wildlife System Goal of Aa healthy Columbia River Basin, one that supports both human settlement and the long-term sustain ability of native fish and wildlife species in native habitats where possible, while recognizing that where impacts have irrevocably changed the ecosystem, we must protect and enhance the ecosystems that remains. To implement this goal the program will deal with the Columbia River as a system; will protect mitigate and enhance fish and wildlife while assuring an adequate, efficient, economical and reliable power supply; and will be consistent with the activities of the fish agencies and tribes.

The construction of Chief Joseph and Grand Coulee Dams completely and irrevocably blocked anadromous fish migrations to the Upper Columbia River Sub-Region (area

above Chief Joseph Dam). Prior to hydropower development the areas above the current Ablocked area≡ supported a large diverse fish population, including eleven salmonid stocks (Scholz et al. 1985). The complete extrapatation of anadromous fish stocks from this area reduced the native salmonid species assemblage by approximately 64 percent. Resident fish species were also impacted through habitat alteration (inundation), lost productivity (absence of nutrient component attributable to anadromous fish) and habitat degradation relating to land-use practices (agriculture, grazing, logging and municiple development) largely made possible by hydro-power development in the region.

The current salmonid species composition of inland waters contained within the Colville Reservation boundaries (including Lake Roosevelt) is exclusively resident fish and contains little if any native species assemblage. Fisheries surveys of reservation waters have identified only two possible native salmonid stocks present that includes adfluvial rainbow trout and natural production kokanee, both residing in Lake Roosevelt and the SanPoil River Basin (Jerry Marco, Tribal Fisheries Biologist, personal communication).

Definitive stock status of these two populations is currently unknown, however research is currently being conducted to determine stock origin and status of these two salmonid Populations (Chief Joseph Kokanee Enhancement Project and Lake Roosevelt Rainbow Trout Tributary Habitat/Passage Improvement Project). The remainder of the salmonid stock assemblage consists of native species comprised of non-native stocks and non-native species.

The species/stock assemblages present in reservation waters are adapted to survive in marginal salmonid habitat and have been present for many years. The potential for natural production (native or non-native species/stock) has been reducing in many of the associated watersheds through poor land use practices and elimination of the anadromous fish nutrient component which has been linked to salmon production potential in many watersheds (Bilby et al. 1996, Larkin 1997 and Johnson et al. 1997) .

Historical stocking data indicates non-native species/stocks have been utilized to supplement depressed fisheries within the reservation since the early 1930's (Thiessen 1965 and Halfmoon 1978). Species utilized has included rainbow trout (various non-native stocks), eastern brook trout, westslope cutthroat trout and lahontan cutthroat trout. Currently this hatchery program stocks 22 different water bodies within the reservation (16 lakes and 6 streams). One hundred percent the water bodies currently being stocked have received hatchery origin fish since 1974 and seventy-seven percent of those have received stocking since 1960. Artificial supplementation (stocking) of resident fish species/stocks that are compatible with the available habitats seems to be a logical approach to mitigating/enhancing fisheries impacts in the blocked area, particularly considering the extensive habitat alterations, degradation and historical artificial stocking of resident fish that have occurred over the past 60 years.

b. Proposal objectives.

Specific measurable objectives for this project include: (1)50,000 pounds of resident trout

production, (2) Subsistence fishery of 1.0 fish/hr, (3) Recreational/sport fishery of .8-1.0 fish/hr, (4) Brook trout creel condition factors ($K > 152 \times 10^{-7}$), (5) Rainbow trout creel condition factors ($K > 152 \times 10^{-7}$), (6) Lahontan cutthroat trout creel condition factors ($K > 125 \times 10^{-7}$), (7) Increase natural production of eastern brook trout 10% by the year 2010, (8) Increase natural production of rainbow trout 15% by the year 2010. (9) Maintain current brood stock sources of brook and lahontan cutthroat, (10) Develop an on-reservation rainbow trout brood stock source. (11) Provide rearing conditions that prevent the manifestation of bacterial and viral diseases and minimize fin erosion, (12) Determine the natural and hatchery origin contribution to reservation fisheries. (13) Provide a coordinated fisheries management approach within the Colville Reservation and other affected areas within the Upper Columbia River Sub-Region and Columbia River Basin.

Expected benefits to the FWP include: Increased subsistence fishery opportunity for Colville Tribal members, increased fishery opportunities for non-members, fisheries results orientated hatchery programs rather than production orientated, realize benefits to wildlife species in the affected area (potential forage base) and a coordinated fisheries management approach within the reservation, Upper Columbia River Sub-Region and Columbia River Basin.

c. Rationale and significance to Regional Programs.

The project goal of providing/contributing to a successful tribal subsistence fishery and a non-member recreational sport fishery is consistent with the Council's 1994 Fish and wildlife System Goal of Aa healthy Columbia River Basin, one that supports both human settlement and the long-term sustain ability of native fish and wildlife species in native habitats where possible, while recognizing that where impacts have irrevocably changed the ecosystem, we must protect and enhance the ecosystems that remains. To implement this goal the program will deal with the Columbia River as a system; will protect mitigate and enhance fish and wildlife while assuring an adequate, efficient, economical and reliable power supply; and will be consistent with the activities of the fish agencies and tribes.≡ The project partially **mitigates** for anadromous fish losses in areas permanently blocked by Chief Joseph and Grand Coulee Dams by utilizing artificial production of resident salmonids, rather than providing substantially more expensive anadromous fish passage (adult and juvenile) at Chief Joseph and Grand Coulee Dams, implementing operational changes at both projects to benefit juvenile migration and extensive habitat restoration efforts for anadromous fish. This method of mitigation is consistent with mitigating for hydropower related impacts to fish and wildlife while assuring an adequate, efficient, economical and reliable power supply. In addition the development of a successful subsistence and recreational fishery is consistent with the goal of the Colville Tribe to provide subsistence fisheries for it=s tribal members. The project is also consistent with the principles, priorities and biological objectives stated in the Council=s resident fish section of the 1994 Fish and Wildlife Program (Sections 10.1A, 10.1B, 10.1C and 10.8B respectively). Specifically this project concentrates it=s effort in the Ablocked Area≡ above Chief Joseph and Grand Coulee Dam which is consistent with the

Council's priority to substitution measures (section 10.1B), satisfies principles of substitution where in-kind mitigation is not possible, occurs in the vicinity of the salmon and steelhead losses, complements the activities of the area agencies and tribes (i.e. promotes improved fishery opportunities while utilizing the best available science), utilizes traditionally defined resident fish species (i.e. Brook trout, rainbow trout and cutthroat trout (section 10.1A) and has accepted/approved biological objectives (section 10.1C and 10.8B). Further more the project is specifically detailed as program measure 10.8B.6.

Specific project objectives detailing production objectives, hatchery rearing conditions, fishery quality (CPUE, average fish length and fish condition factors of fish observed in the fishery) and monitoring and evaluation (fish marking and recovery) all provide for assessment of the projects contribution to a fishery, rather than just concentrating on the number of pounds of fish produced at a hatchery facility. The aforementioned objectives relate directly to the NPPC resident fish goal of Aprotecting, mitigating and enhancing the health and viability of resident fish populations to meet consumptive and non-consumptive needs in the Columbia River Basin (section 10.1; 1994 NPPC fish and wildlife Program). Objectives detailing increases in natural production of hatchery origin fish (natural supplementation) and development of free-ranging brood stocks all address the long-term viability of artificial production programs as well as natural production utilization of available habitats. Objectives addressing administrative functions (secure funding for all BPA funded projects implemented by the tribe and providing administrative and technical over-sight for all BPA funded fisheries projects implemented by the tribe) allows the project to function in a coordinated fashion with other fisheries enhancement projects in the Ablocked area, specifically the Lake Roosevelt Rainbow Trout Habitat/Passage Improvement project (proj.# 9001800), Chief Joseph Kokanee Enhancement Project (Proj# 9501100), Lake Roosevelt Fisheries Monitoring Program (Proj. # 944300) Spokane Tribal Hatchery (Proj.# 9104600), Sherman Creek Hatchery (Proj.# 9104700) Lake Roosevelt Rainbow Trout Net Pens (Proj.# 9500900) and Resident Fish Stock Status Above Chief Joseph and Grand Coulee Dams (proj.# 9700400).

d. Project history

The Colville Tribal Fish Hatchery Project was amended into the Northwest Power Planning Councils Fish and Wildlife Program in 1984, to provide funding for the design, construction and operation and maintenance of a resident trout hatchery program on the Colville Reservation. The resident trout hatchery program partially satisfies Bonneville Power Administrations fish and wildlife responsibilities pursuant to Section 4(b)(10)(a) of the Pacific Northwest Electric Power Planning and Conservation Act and other legislation.

The project has been in existence for 13 years and has expended \$6,845,226 to date, including construction costs. Feasibility studies, NEPA compliance documentation and design work all occurring between 1984 and 1988. Construction of the hatchery occurred between 1988 and 1990, including an Operations and Maintenance Agreement (O&M)

between BPA and the Colville Confederated Tribes. The O&M Agreement is a 25 year legal obligation with a 25 year renewal option to provide appropriate funding to satisfy program goals and objectives and for the program to operate within industry standards and accepted methods (for more detailed information see Colville Tribal Hatchery Operations and Maintenance Agreement). Reports and technical papers developed during this period include: Environmental Assessment Report (Jones & Stokes Associates, Inc. 1986), Well Field Construction Report (Sweet, Edwards/EMCON 1987), Well Field Analysis Report (Sweet, Edwards and Associates 1987), Water Quality Report (Truscott 1987), Pre-design report (R.W. Beck and Associates 1986), Design Report (R.W. Beck and Associates 1988) and Hatchery Construction Documents, including design drawings (R.W. Beck and Associates 1988).

Operations began at the hatchery in the fall of 1990 and have continued to the present time. Originally the project was only production goal orientated (1990-1994). Beginning in the operating year 1995 more fishery related goals and objectives were developed for the program to assess the programs impact on subsistence and recreational fisheries (Truscott 1995) Objectives include both short-term (annual production objectives and administrative objectives) and long-term (fishery related objectives such as average creel size fish, catch per unit efforts, average fish condition factor in creel, increases in natural production fishery component, maintenance and development of free-ranging brood stock sources, monitoring and evaluation and development of comprehensive fishery management plans. Reports and technical papers developed during this period include: Annual operating plans (Truscott 1990-1998), and annual operating reports (Truscott 1990-1996).

The project has met or has closely met the production objective of 22,679 kg (50,000 lbs of resident salmonid production annually. Most recently The Colville Tribal Fish hatchery distributed 21,747 kilograms (953,962 fish) during 1996, which is 95.9% of the annual production goal of 22,679 kilograms (Truscott 1996). Disease out-breaks have been almost non-existent since operations began in 1990. Rearing densities at the hatchery have been within industry standards with the exception of short durations during inside rearing. Excessive fin erosion has been a continual problem with rainbow trout and is considered to be a space related problem at the hatchery even though the rearing densities are within industry standards. The continued development and monitoring of reservation rainbow brood stocks has been limited to four streams and one lake during 1990-1996 period. Potential brood source stock investigations included adfluvial rainbow trout stocks in the SanPoil River Basin and Mt. Whitney stock rainbow in Round Lake. Monitoring activities in 1996 recovered 42 gravid adfluvial rainbow and 72 gravid Mt. Whitney stock adults, neither of the stocks were recovered in numbers acceptable for hatchery production consideration in 1996. . Continued monitoring of both rainbow stocks is warranted at this time. Additional monitoring and evaluation of these two stocks is required to determine their utility as brood stock sources.

Hatchery monitoring activities relative to fishery contribution included: Creel census surveys on North Twin Lake, South Twin Lake and Owhi Lake and with gill net surveys

on North Twin Lake, South Twin Lake and Buffalo Lake. Specific evaluation components of interest included Catch Per Unit Effort (CPUE), average fish length, weight and condition factor as well as relative species abundance.

Creel census data from the Twin lakes and Owhi fishery indicated a resurgence of the brook trout fishery at both locations, while the rainbow fishery in Twin Lakes may have decreased slightly during the 1991-96 period. The 1996 observed values for Owhi Lake and brook trout CPUE and average fish length were greater than or equal to the program objectives, while the average condition factor was slightly less. Program objectives for CPUE and condition factor were not observed for brook trout in the Twin Lakes fishery however, the average fish length objective was satisfied and the average fish weights were the greatest since 1993 (Truscott 1996). the observed vales for rainbow trout did not meet any of the objectives, however they were essentially equal to values observed during the period when the fishery was being supplemented with stocking from the Winthrop National Fish Hatchery. Creel census information for buffalo Lake is unavailable, therefore gill net survey information was used to determine average fish size and condition factor. Rainbow trout observed in the Buffalo Lake gill net catches during the 1994-96 survey period exceeded the programs objective for average fish length condition factor, however the values observed in 1996 were slightly less than the objective (Truscott 1996).

It appears as if the operation of the Colville Tribal Hatchery is having a positive affect or at least maintaining the existing recreational and subsistence fisheries on the reservation. Some lakes and species have responded better to the hatchery program than others. Brook trout fisheries in all waters monitored with the exception of Buffalo Lake have shown substantial improvement since the inception of the hatchery program. the hatcheries effect upon the monitored rainbow fisheries doesn=t appear to as conclusive as the brook trout fisheries. Continued creel census and increased gill net survey frequencies are warranted in an effort to better determine the hatcheries current contribution to the reservation fishery, potential contribution and define it=s role in fisheries management on the Colville reservation.

e. Methods.

SCOPE

The Colville Tribal fish Hatchery will rear and stock 22,679 kg of resident salmonids into reservation lakes and streams in an effort to support a successful subsistence and recreational fishery. The stocking program will utilize eastern brook trout, rainbow trout and lahontan cutthroat trout in reservation waters where these species have been utilized for the past 30-60 years. The fishery will be primarily a Acarry-over≡ fishery supported by fingerling and sub-catchable and legal size stocking of the brook trout, lahontan cutthroat trout and rainbow trout. Brood stock sources for brook trout and lahontan cutthroat trout are and will continue to be Afree-ranging≡ as will the rainbow trout brood

stock once it is developed, in an effort to provide the highest quality product through natural selection. Hatchery fish will contribute to natural spawning populations of hatchery origin fish.

METHODOLOGY

Hatchery Operations

The hatchery currently utilizes single-pass ground water that is essentially pathogen free. Eggs of all species utilized are incubated in vertical hatch trays and treated daily with formalin (167 ppm) for fungus control (Truscott 1997). Feed training occurs in shallow troughs, while Capalano troughs are utilized for rearing until the fish reach 200-600 fish/pound, at which time they will be moved to outside rearing facilities. Outside rearing facilities consist of eight 100'x10' concrete raceways passing 450 gpm. Fish will be reared to out-planting size in the raceways as described in the 1997 Colville Tribal Hatchery Annual Operating Plan (Truscott 1997). Rearing densities throughout the rearing cycle will not exceed industry standards cited in the Fish Hatchery Management manual (Piper et al. 1992) and will attempt to load at approximately 75% of maximum loading densities cited by Burrows and Combs (1968).

Egg acquisition of brook trout and lahontan cutthroat trout will be derived from free-ranging brood stocks located in Owhi and Omak lake respectively. Brook trout will be capture with a beach seine on the spawning day and spawned at a 1:1 sex ratio. All fish will be live spawned and returned to the lake. Fertilized eggs will be water-hardened in iodophor (100 ppm) at the spawning site and transported to the hatchery facility in insulated water coolers. Bacterial and viral samples will be obtained from 60 fish during the spawning process and analyzed by the USFWS Fish Health Center in Olympia Washington. Lahontan cutthroat trout will be captured in Omak Lake during April and May utilizing a Lake Merwin Trap. Spawning procedures will be essentially the same as those detailed for brook trout in the 1997 Colville Tribal Hatchery Annual Operating Plan (Truscott 1997).

Feeding regimes will range from hourly feedings to twice daily, utilizing both hand and auto-feeding. Feed types will include both semi-moist and traditional dry trout feeds. Auto-feeders will be utilized with a portion of the production in an attempt to lessen aggressive behavior to over-head disturbance and lessen fish densities during feeding in efforts to reduce fin nipping in rainbow trout.

Out-planting into reservation lakes consists of 22,679 kg of resident salmonids stocked into 22 waters within the Colville reservation, and will occur during the late winter, spring and fall as detailed in the 1997 Colville Tribal Annual Operating Plan (Truscott 1997). Stocking dates are determined by ice cover, water temperatures, fish size at the hatchery and predatory population status at the stocking locations. Stocking will be accomplished by trucking fish from the hatchery location to the stocking site in two (2) 1200 gallon distribution trucks and one (1) 300 gallon distribution truck. Loading rates

will range between .7-1.0 lb/gal. Anti-foaming agents and a .2% salt solution will be utilized during the distribution process. Stocking location and number is determined by available habitat, angler preference and angler effort. Specialized species such as lahontan cutthroat trout will continue to be stocked into only high saline lakes.

Monitoring and Evaluation

Development of an on-reservation egg source for rainbow trout (spring spawning stock) will involve the continued outplanting of Tokul Creek stock into Round Lake, North Twin Lake and South Twin Lakes, trapping and enumerating adult adfluvial rainbow in North and South Nanampkin Creeks, as well as trapping and enumerating adult spring spawning rainbow in North Twin, South Twin and Round Lakes. Monitoring of lake populations will utilize Lake Merwin traps and Apicket-weir traps, while stream populations will be trapped with only Apicket weir type traps. Picket weir design is described in the Lake Roosevelt Rainbow trout Habitat/Passage Improvement Project, Phase III Monitoring and Evaluation, 1997 (Alexis 1997). Random sampling of rainbow from North and South Nanampkin (tributaries to the SanPoil River), North and South Twin Lakes and Round Lake will occur to assess the prevalence of BKD and viral agents associated with the fish population in the three potential brood locations.

Contribution to the fishery of natural production component and that of various sizes of fish stocked from the hatchery will require that hatchery fish receive differential marks to identify them as hatchery origin, broodyear, and size. Ideally fish would be adipose clipped and coded-wire tagged, however BPA has not agreed to this type of marking because of the cost. An alternative method of mark may be thermal marking of the otolith. Thermal marking will be conducted with the rainbow trout fingerling and sub-catchable component per the 1997 Colville Tribal Hatchery Annual Operating Plan (Truscott 1997), while an adipose clip will be utilized to identify the legal size component.

Recovery of marked fish will be accomplished utilizing a roving creel census survey with non-uniform probability sampling (Malvestuto, 1978) conducted on Owhi Lake, North Twin and South Twin Lakes. Adipose and non-adipose clipped fish will be noted and 10% of non-adipose clipped fish will have otolith samples taken for subsequent examination to determine the natural production component to the fishery and determine the contribution to the fishery of fingerling, subcatchable and legal size hatchery production. Methods of otolith examination to determine thermal marking is currently in the development stage, Washington Department of Fish and Wildlife has extensive background in otolith review and the Tribe proposes to utilize the methodology employed by WDFW to analyze the otoliths recovered in the fishery. In addition to the creel census data recovery efforts, three gill netting surveys will be conducted on Buffalo lake, Owhi Lake, North Twin Lake and South Twin Lake to better determine (reduce potential bias of angler preference and seasonal variances) the contribution to the fishery of natural production components, brood years, various sizes of fish stocked from the hatchery facility and evaluation of the potential CLUE, average fish length, fish condition factors

observed in the reservation fisheries . Gill net surveys will be accomplished using four (4) experimental bottom-set and four (4) vertical gill nets set fished approximately 16 hours each. Fishing period will from approximately 4:00 PM - 8:00 AM. Analysis of creel and gill netting data will utilize standard statistical analysis (mean, median, mode, standard deviation ect.) The difference between data sets will analyzed using ANOVA analysis of variance.

f. Facilities and equipment.

The hatchery is a relatively new facility (constructed in 1988-89) and consists of standard heath tray incubation; water chiller; shallow, deep and capalano trough inside rearing; 10'x100concrete raceways for outside rearing; 100% groundwater supplied rearing water; back-up emergency generator; garage, hatchery building, fully equipped shop; on-site residences and equipment and supplies to operate a standard fish culture operation. Hatchery limitations are primarily rearing space related. FY- 97 operations and budget should address the outside rearing space delema. Field equipment is satisfactory for the most part with limitations being stream trapping equipment to cope with periodic high flow conditions.

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Section 8. Relationships to other projects

This is not intended to duplicate the Relationships table in Section 3. Instead, it allows for more detailed descriptions of relationships, includes non-interdependent relationships,

and includes those not limited to specific Bonneville projects.

Currently the Colville Tribal Trout Hatchery Program shares personnel and equipment with the Lake Roosevelt Rainbow Trout Habitat/Passage Improvement project and the Chief Joseph Kokanee Enhancement Project.

Section 9. Key personnel

Kirk Truscott, Hatchery Biologist
Rodney Stensgar, Hatchery Manager
Joseph Carden, Fish Culturist
Phillip Grunlose, Fish Culturist

The persons involved with this project meet the educational and experience requirements of the Colville Confederated Tribes of the Colville Reservation for these types of positions. The Tribes are the entity charged by law with the responsibility for carrying out these types of activities.

Section 10. Information/technology transfer

Dispersal of information regarding this project will be primarily through annual reports submitted to Bonneville Power Administration, Resident fish Managers Project Review (CBFWA), periodic meetings with the Spokane Tribe, WDFW, public presentations in the NPPC process and other public venues when requested.