HATCHERY AND GENETIC MANAGEMENT PLAN
RESIDENT FISH VERSION
(HGMP-RF)

Hatchery Program: Colville Tribal Fish Hatchery

Species or Hatchery Population/Strain: Eastern Brook Trout

Agency/Operator: Confederated Tribes of the Colville Reservation

Watershed and Region: Inter-Mountain Province

Date Submitted:

Date Last Updated:

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Colville Tribal Fish hatchery

1.2) Species and population (or ~~stock~~strain)~~)~~ under propagation, ~~and~~ ESA/population status.

State common and scientific names.

Eastern brook trout (Salvelinus fontinalis). Eastern brook trout are an exotic salmonid and have extensive history of artificial culture. This stock is not an ESA consideration.

1.3) Responsible organization and individuals

Indicate lead contact and on-site operations staff lead.

Name (and title):	Kirk Truscott, Hatchery Biologist
Agency or Tribe:	Confederated Tribes of the Colville Reservation
Address:	P.O. Box 150 Nespelem, WA. 99155
Telephone:	(509) 634-2115
Fax:	(509) 634-2126
Email:	kirk.truscott@colvilletribes.com

Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

1.4) Funding source, staffing level, and annual hatchery program operational costs.

Funding Agency- Bonneville Power Administration
Staff Level- 4 FTE.
O&M Costs- $350,000 approx.

1.5) Location(s) of hatchery and associated facilities.

Include name of stream, river kilometer, location, basin name, and state. Also include watershed code (e.g. WRIA number), ~~regional mark processing center code, or other~~ or sufficient information for GIS entry. See "Instruction E" for guidance in responding.

Stream:	Columbia River
River kilometer:	1,040

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Lat. Long.: 48^0 01' 45" North Latitude and 119^0 41' 19" West Longitude
State: Washington
County: Okanogan
Legal Description- S.E. ¼ N.E. ¼ S. 9 T29N R25E

1.6) Type of program(s).
Define as either: Integrated Recovery; Integrated Harvest; Isolated Recovery; or Isolated Harvest (see Attachment 1 - Definitions" section for guidance).

Integrated Harvest

1.7) Purpose (Goal) of program(s).
Define as either: Augmentation, Mitigation, Restoration, Preservation/Conservation, or Research (for Columbia Basin programs, use NPPC document 99-15 for guidance in providing these definitions of "Purpose"). Provide a one sentence statement of the goal of the program, consistent with the term selected and the response to Section 1.6. Example: "The goal of this program is the restoration of ~~spring chinook salmon~~ white sturgeon in the ~~White~~ Kootenai River using the indigenous ~~stock~~ population."

Purpose: Mitigation

Goal: The Colville Tribal Fish Hatchery is an artificial production program to partially mitigate for anadromous fish losses in the "Blocked Area" above Chief Joseph and Grand Coulee Dams pursuant to Resident Fish Substitution Policy of the Northwest Power Planning Councils Fish and Wildlife Program.

1.8) Justification for the program.
Indicate why the hatchery program is needed and how it ~~the hatchery program~~ will enhance or benefit the survival of the listed ~~natural~~ population (integrated or isolated recovery programs), or how the program will be operated to provide fish for harvest while minimizing adverse effects on listed fish (integrated or isolated harvest programs).

The Northwest Power Act authorizes the Council to promptly develop and adopt a program to protect, **mitigate** and enhance fish and wildlife populations affected by hydropower development. The Colville Tribal Hatchery provides fish stocking activities that support and enhance Tribal subsistence and non-Tribal recreational sport fisheries within the Colville Reservation, including boundary waters. These activities partially mitigate for the lost anadromous fish resources related to the construction of the federal hydropower system, including the complete extirpation of anadromous fish above Chief

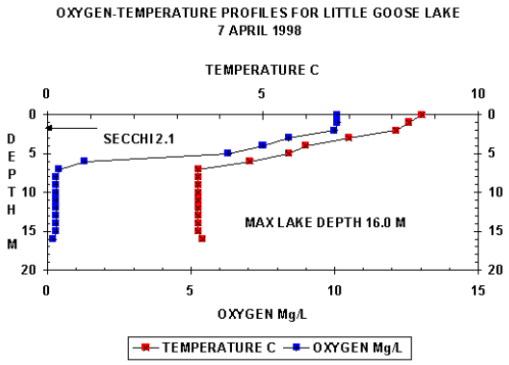
Joseph and Grand Coulee Dams. The program specifically addresses the mitigation portion of the Councils' Fish and Wildlife program.

The extirpation of anadromous fish resources from the Colville Reservation, resulting from the development of the Federal Hydro-system, substantially reduced fishing opportunities and catch for the Colville Tribe. Culture, religion and way-of -life were forever changed. Biological and environmental changes also occurred on the Colville Reservation and can be directly linked to the extirpation of the anadromous fish resource. The nutrient component derived from anadromous fish was lost and undoubtedly interrupted the nutrient cycle important to the remaining resident fish populations. Environmental conditions of interior waters of the Reservation not associated with the anadromous fish resource were also impacted due to the elimination of the anadromous fish. The reduction and eventual extirpation of anadromous fish forced the native cultures in the affected area to seek alternative resources to persist, largely because anadromous fish no longer provided the principle means of existence. Land-use activities such as agriculture, timber harvest, mining and live-stock grazing were and continue to be important means of existence for the Colville people and surrounding communities, unfortunately these activities have degraded the historical resident fish habitat and capacity to provide subsistence opportunities. Additionally, indigenous resident salmonid populations were adversely affected by exotic fish species introductions attributable to Euro-American settlement. Finally, the direct inundation of the upper Columbia River drastically altered 190 mile of fluvial habitat, reducing production capacity of resident salmonid populations in the affected area.

The Colville Tribes preference is to provide subsistence and recreational fisheries utilizing native salmonid species, including anadromous fish species. The vision of native species assemblages that support consumptive fisheries is a long-term approach and constrained by existing habitat conditions and species assemblages. Limnological monitoring of Reservation waters (Brock et al. 1995) reveal habitat that may be marginal for productive self-sustaining salmonid populations. Typically interior reservation lacustrine habitats exhibit extensive macophyte communities, decreased hypolimnion during summer stratification and high surface water temperatures (Fig 1-4). Riverine habitats exhibit unstable banks, poor riparian communities and high summer temperatures as exhibited by the Louie Cr., North Nanampkin Cr. and South Nanampkin (Fig 5). Substantial fines component in the substrates and intermittent flows are also serious habitat constraints to fish production. Surveys completed on two tributaries to North Twin Lake (Beaver Dam Creek and Granite Creek) during 1996, recorded embeddedness and fines values of 45% and 38%; and fines 40% and 32% respectively (unpublished data, Colville Tribe, 1996). In addition to the physical degradation of fluvial habitats, the elimination of anadromous fish component and the associated marine derived nutrients probably limits resident fish production Anadromous fish have been identified as keystone species (Lichatowich 1999), important to the function of ecosystems (Willson and Halupka 1995; Cederholm et al. 1989; Kline et al. 1989 and Mills et al. 1993). Marine derived nutrients in particular play an important role in the productivity of aquatic

ecosystems and salmonid production (Bilby et al. 1996, Larkin 1997 and Johnson et al. 1997). It is unlikely that existing habitats available within the reservation (particularly lacustrine habitats) provide sufficient native salmonid production of to support the current fishery without hatchery augmentation, let alone fully mitigate for the Tribes lost anadromous fishery.

Fig. 1.



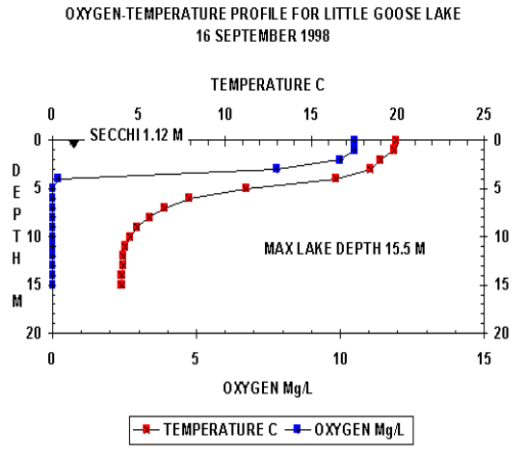
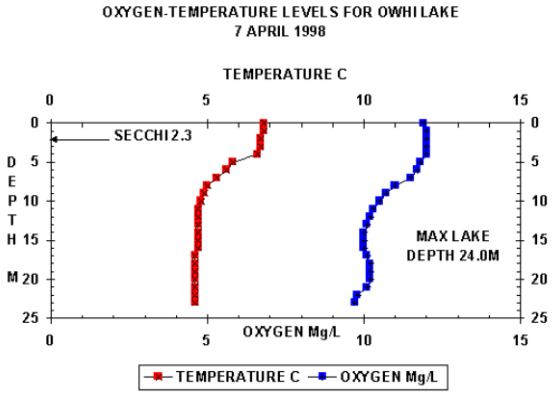

OXYGEN-TEMPERATURE PROFILE FOR LITTLE GOOSE LAKE
16 SEPTEMBER 1998
TEMPERATURE C
SECCHI 1.12 M
MAX LAKE DEPTH 15.5 M
DEPTH M
OXYGEN Mg/L
TEMPERATURE C
OXYGEN Mg/L

Fig. 2


OXYGEN-TEMPERATURE LEVELS FOR OWHI LAKE
7 APRIL 1998
TEMPERATURE C
SECCHI 2.3
MAX LAKE DEPTH 24.0M
DEPTH M
OXYGEN Mg/L
TEMPERATURE C
OXYGEN Mg/L

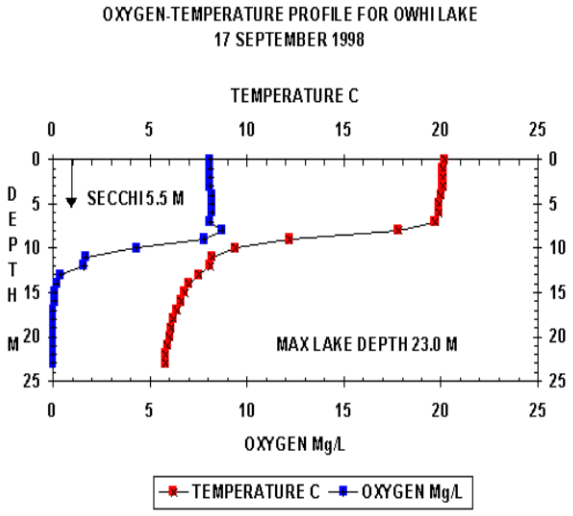
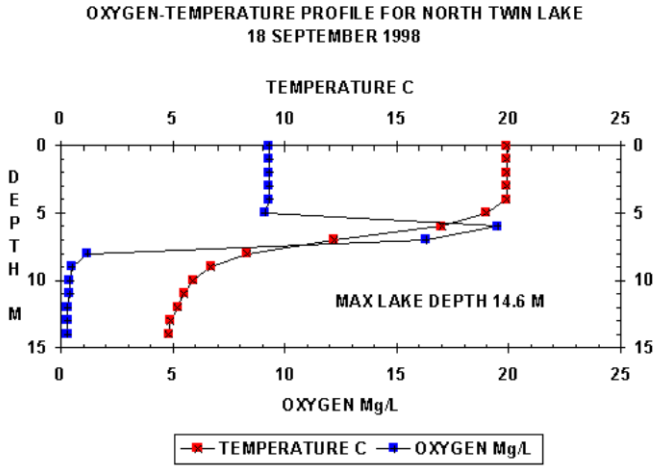

OXYGEN-TEMPERATURE PROFILE FOR OWHI LAKE
17 SEPTEMBER 1998
TEMPERATURE C
SECCHI 5.5 M
MAX LAKE DEPTH 23.0 M
DEPTH M
OXYGEN Mg/L
TEMPERATURE C
OXYGEN Mg/L

Fig. 3.


OXYGEN-TEMPERATURE PROFILE FOR NORTH TWIN LAKE
18 SEPTEMBER 1998
TEMPERATURE C
MAX LAKE DEPTH 14.6 M
DEPTH M
OXYGEN Mg/L
TEMPERATURE C
OXYGEN Mg/L

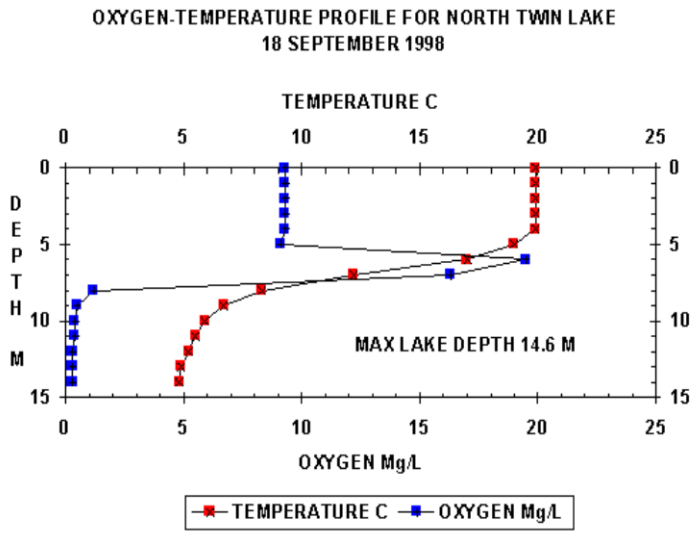
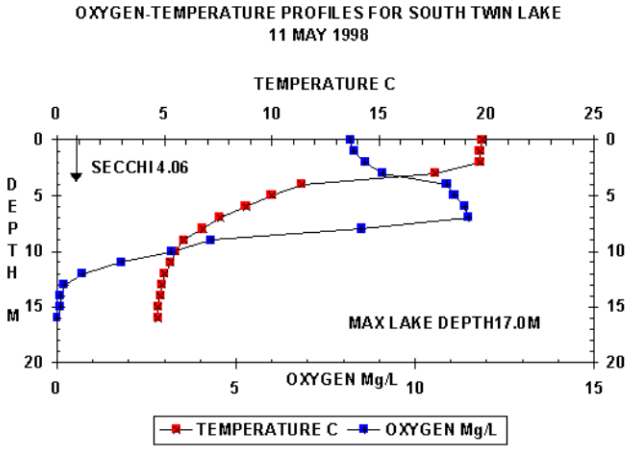

OXYGEN-TEMPERATURE PROFILE FOR NORTH TWIN LAKE
18 SEPTEMBER 1998
TEMPERATURE C
0 5 10 15 20 25
DEPTH M
0 5 10 15
MAX LAKE DEPTH 14.6 M
OXYGEN Mg/L
TEMPERATURE C
OXYGEN Mg/L

Fig. 4


OXYGEN-TEMPERATURE PROFILES FOR SOUTH TWIN LAKE
11 MAY 1998
TEMPERATURE C
0 5 10 15 20 25
SECCHI 4.06
DEPTH M
0 5 10 15 20
MAX LAKE DEPTH17.0M
OXYGEN Mg/L
0 5 10 15
TEMPERATURE C
OXYGEN Mg/L

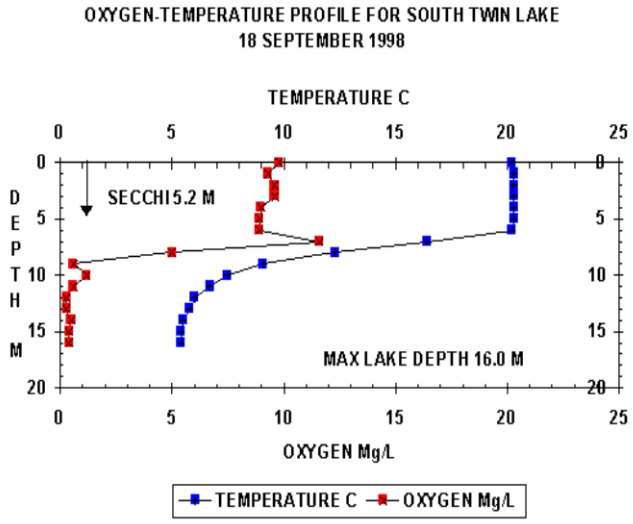
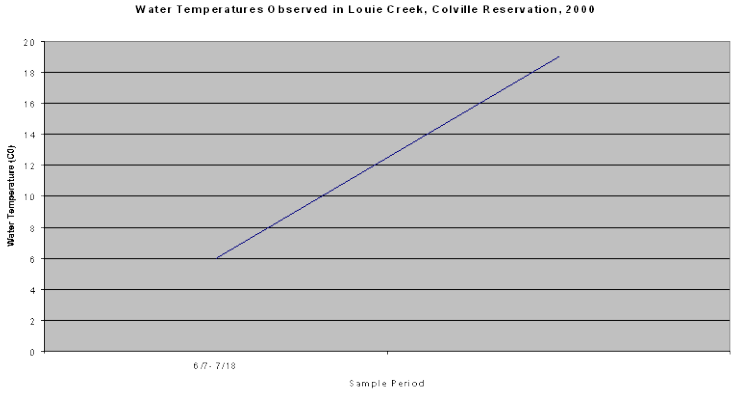
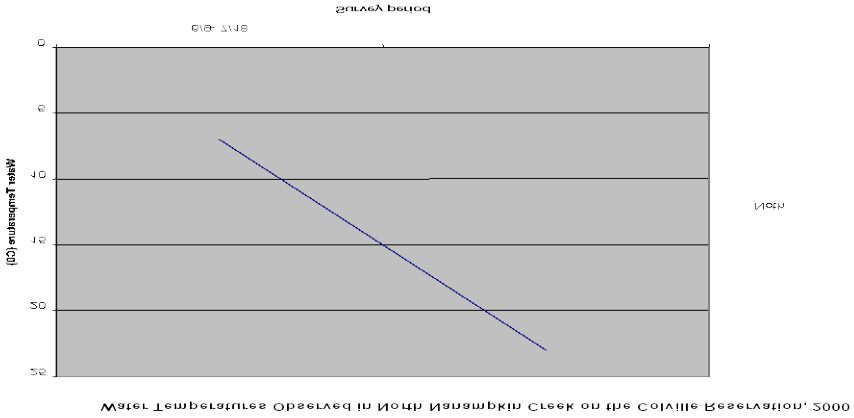
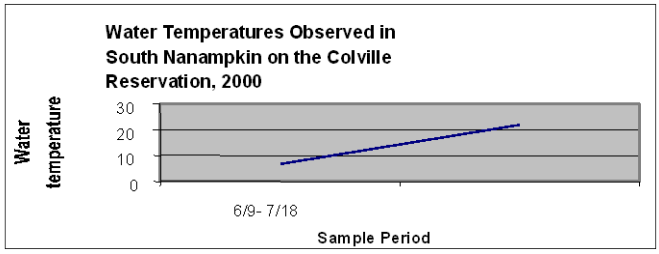

OXYGEN-TEMPERATURE PROFILE FOR SOUTH TWIN LAKE
18 SEPTEMBER 1998
TEMPERATURE C
0
5
10
15
20
25
DEPTH M
SECCHI 5.2 M
MAX LAKE DEPTH 16.0 M
OXYGEN Mg/L
TEMPERATURE C
OXYGEN Mg/L

Fig. 5


Water Temperatures Observed in Louie Creek, Colville Reservation, 2000
Water Temperature (C0)
0
2
4
6
8
10
12
14
16
18
20
6/7- 7/18
Sample Period





The habitat alteration/degradation and the introduction of non-native species has changed the ecological function of many watersheds within and around the Reservation constrains the probability that the affected area will return to native species dominated fishery. The utilization of non-native fish species/stocks has a long history on the Colville Reservation. Brook trout were observed by Tribal members as early as 1913 and were available in large numbers as early as 1930 (Hunner et al. 2000). 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). Stocking activities between 1930-1989 primarily involved stocking rainbow trout and brook trout in both lacustrine and fluvial habitats. During the early years, management of the resident fish resources on the Colville Reservation, (principally fish stocking) were

conducted by two management agencies, Washington Department of Game (WDG) and U.S. Fish and Wildlife Service (USFWS). Management assistance during 1930-1965 was provided by WDG and consisted of stocking hatchery rainbow and brook trout. Management assistance by USFWS was provided between 1965-1989 and consisted of hatchery stocking of primarily rainbow trout, brook trout, cascade cutthroat trout and lahontan cutthroat trout. Management since 1989 has been solely conducted by the Colville Tribe and has been a continuation of the basic species stocked by the USFWS from 1965-1989, except that cascade cutthroat trout are no longer stocked due to poor fishery results. The result of historical stocking within the reservation (legal and illegal) has been the development of non-native species/stock driven fisheries. In some situations stocking efforts have resulted in naturalized populations of non-indigenous populations and most likely constrain potential to manage native species exclusively. In an effort to diminish naturalized non-native species, the Tribe has discontinued non-native species stocking of fluvial habitats over the past 10-12 years and expects this trend to continue.

The current salmonid species composition of inland waters 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 to date have identified only two native salmonid stocks present, which include adfluvial rainbow trout and kokanee salmon; both reside in Lake Roosevelt and the SanPoil River Sub-Basins (Jerry Marco, Tribal Fisheries Biologist, personal communication). The most recent genetic evaluation suggests that the kokanee population represents a unique stock (Leary 1997, 1998 and 1999) while the adfluvial rainbow in the SanPoil River represent a hybrid swarm of coastal rainbow and redband rainbow trout (Leary 1997). Fisheries surveys within the boundary waters to the reservation have also failed to document viable populations of bull trout, redband rainbow trout and westslope cutthroat trout (Jerry marco, Tribal Fisheries biologist, personal communication). Currently, bull trout, westslope cutthroat trout, and redband trout are rarely encountered in Lake Roosevelt (Cichosz et al. 1999; Underwood and Shields 1995) or Rufus Woods Reservoir (Venditti, USACE In press).

Concerns regarding negative impacts of non-native fish management activities on native species as a result of direct stocking and or emigration are acknowledged and the Tribe has not dismissed this concern. The long history of non-native management, poor habitat conditions, lack of native species assemblages, and the Tribes decision not to conducted non-native species management in habitats occupied by viable native salmonid stocks minimizes the risk to native species. A large proportion (90%) of the lakes stocked through this project are closed lake systems and are not inhabited by native salmonids. The closed system habitat further minimizes the chance that this project will adversely affect native salmonid populations. The potential however does exist in several instances for these fish to emigrate to waters not specifically managed for non-native species; typically receiving waters. It is believed that minimal risks are associated with potential emigration, largely because receiving waters have long established non-native fish populations and exhibit marginal, native salmonid habitats, particularly those suitable for cutthroat and bull trout. Typically these habitats are low elevation (< 2600 ft), exhibit

warm summer temperatures (15 - 21^{0}C) and high sediment substrate conditions. Concerns that the Tribes current stocking program threatens and or is counter to native fish management in other portions of the Columbia River Basin are unsubstantiated. Fishery investigations in mainstem Columbia River reservoirs do not indicate that brook trout or lahontan cutthroat trout have established viable populations (Fig. 6). Presumably if the existing non-native fish-stocking program were a significant risk to the mainstem ecosystem, viable populations would exist. Absolutely no information has been presented to indicate that non-native species management on the Colville Reservation has had or currently poses any genetic or ecological impacts to native salmonids. In fact, the EA completed for the hatchery found, "the effects of the hatchery on fish habitat and resources are not likely to be significant." It is highly likely that the hatchery program has a positive effect upon the function of the ecosystem as a whole by providing a consistent forage base for Piscivors such as largemouth bass, adult brook trout, adult rainbow trout; avian predators such as eagles, osprey, heron, and grebe; mammalian predators such as mink, otter, and bear. Fishing pressure on westslope cutthroat and redband rainbow may be reduced as a function of providing a reliable consumptive rainbow and brook trout fishery in locations unoccupied by the indigenous salmonid stocks.

Fig. 6

Fig. Comparison of relative abundance (%) of Resedent fish species sampled in Wells Pool in 1974, 1979 and 1998 (Source: BeakConsultants Inc. and Resel Associates 1999)

SPECIES	1974 [1]	1979 [2]	1998 [3]
Black crappie	0.4	1	0.2
Bluegill	0.1	0	21.9
Bullhead Sp.	0.2	1.3	0.1
Bull trout	0.1	0	0
Carp	0.3	0.6	5
Chiselmouth	9.9	43.5	0.4
Dace sp.	0.1	0.4	0
Largemouth bass	0.2	0	0.4
Mountian whitefish	2.7	0.3	0.05
Peamouth	4.1	3	5.2
Pike minnow	21.1	8.1	8.7
Sculpin sp.	5.5	0.8	1.7
Pumpkinseed	0.2	13.4	0.02
Rainbow trout	0	0.3	.05
Redside shiner	14.3	13.1	17.5
Smallmouth bass	0.2	0	2.2
Sucker sp.	37.8	13	36.5
Tench	0.2	0.5	0
Walleye	0.2	0	0.1
Yellow perch	0.9	0.1	0.02

1- Dell et.al (1975). N= 4,221
2- McGee (1979). N= 1,994
3- Beak consultants Inc. (1999). N=5,657

Fig 6. Incidental species counted by Washington Department of Fish and Wilflife, mid-Columbia Predator Index Study, 1993. [1]

	Reservior						
Species	Priest Rapids Tailrace	Priest Rapids	Wanapum	Rock Island	Rock Reach	Wells	Total
American shad	67	0	0	0	0	0	76
Bluegill	0	0	10	0	0	0	10
Bridgelip sucker	6	16	64	49	30	46	214
Brown trout	0	0	0	0	0	2	2
Burbot	0	0	0	0	1	3	4
Crappie	0	8	9	0	1	0	18
Chinook salmon	17	66	0	27	78	9	199
Chiselmouth	21	1	10	146	571	45	794
Coho salmon	1	0	0	0	1	0	2
sculpin sp.	0	0	4	4	47	207	262
Carp	12	43	20	21	141	75	312
Cutthroat trout	0	1	0	0	0	0	1
Bull/Dolly Varden trout	0	0	0	0	1	0	1
Eastern brook trout	0	0	0	0	1	0	1
Largemouth bass	0	0	1	1	2	0	4
Longnose sucker	0	25	1	0	24	24	74
Largescale sucker	19	784	456	509	235	302	2305
Lake whitefish	18	6	4	5	27	7	67
Pike minnow	31	1	29	20	125	14	220
Pumpkinseed	0	0	1	0	0	0	1
Redside shiner	0	26	125	2	132	45	330
Rainbow trout	0	0	1	3	3	3	10
Pacific salmon Juv.	0	482	1205	498	431	60	2812
Steelhead	13	16	16	13	80	17	155
Sucker sp.	597	2964	1588	2994	3790	1756	12989
Unidentefied							
Smallmouth bass	0	0	0	0	0	33	33
Sockeye salmon	1	233	38	132	139	6	549
Tench	0	0	9	3	8	2	22
Three-spined stickelback	0	30	0	0	2	0	32
Walleye							
Whitefish	272	45	2	26	9	39	398
White sturgeon	4	0	0	0	0	0	4
Yellow perch	0	0	5	0	0	1	6
	1079	**4747**	**3598**	**4453**	**5879**	**2696**	**21907**

1- Burley et al. (1994)

Current fishery management philosophy employed on the reservation is to maintain / manage non-native fish species in lacustrine environments where there are established populations and provide important subsistence and recreational fisheries. The utilization of non-native species to provide fishery opportunity in conjunction with attempts to improve habitat conditions is consistent with historical Colville Tribal activities and that of Washington State. Currently, both the Tribe and Washington State use non-native species to provide fishery benefits. In many cases the species compositions are similar and are stocked into similar habitats in the same general geographic area. For example, the tribe stocks lahontan cutthroat in Omak Lake in Okanogan County and Washington stocks lahontan cutthroat trout into Lake Lenore, both are highly alkaline waters with no native salmonid species assemblages. Additionally, the tribe stocks brook trout in numerous lakes on the reservation (Okanogan and Ferry Counties) that do not have native salmonid species present. Washington also stocks brook trout in Okanogan and Ferry

County waters, some of with are adjacent to the Colville Reservation. Both management entities have discontinued the practice of stocking non-native salmonid species in fluvial habitats, initiated some habitat rehabilitation measures and have made native species management a priority where recovery is feasible to provide sustainable fishery opportunities.

The Tribe acknowledges that there are numerous constraints to managing native species within the Colville Reservation and that hatchery production of non-native species and stocks will probably be necessary to meet harvest needs. However, the Tribe also recognizes the role of native species in functioning ecosystems and is committed to efforts to re-establish native salmonid populations where feasible and to manage non-native fisheries in a manner consistent with native species conservation. Consistent with this endeavor, the hatchery program proposes to initiate several new actions to address native species issues and artificial production that include: (1) Native species presence/distribution/status survey to verify existing native salmonid populations within the reservation, their potential for enhancement and eventual utilization to enhance reservation fisheries. (2) A 100% marking program to assist in the identification with mixed stock harvest, natural production, hatchery contribution to fishery and emigration of hatchery fish. And (3) monitoring (in selected lacustrine habitats) of phytoplankton/zooplankton/fish interactions in an effort to maintain the critical density of trout below that which adversely affects ecosystem function, yet meets consumptive fishery needs.

1.9) List of program "Performance Standards."

"Performance Standards" are designed to achieve the program goal/purpose, and are generally measurable, realistic, and time specific. The NPPC "Artificial Production Review" document attached with the instructions for completing the HGMP presents a list of draft "Performance Standards" as examples of standards that could be applied for a hatchery program. If ~~an ESU-wide hatchery~~ a subbasin plan including your hatchery program is available, use the performance standard list already compiled.

Section 1.9 and 1.10 will be addressed once the NWPPC Fish and Wildlife Program develops and adopts specific hatchery" performance measures" and" indicators"

Example: " (1) Conserve the genetic and life history diversity of ~~Upper Columbia River spring chinook~~ westslope cutthroat trout populations in the Coeur d'Alene Basin through a~~12~~ x-year duration captive broodstock program; (2) Augment, restore and create viable naturally spawning populations using supplementation and reintroduction strategies; (3) Provide fish to satisfy legally mandated harvest in a manner which minimizes the risk of adverse effects to listed wild populations; (4)...."

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

"Performance Indicators" determine the degree that program standards have been achieved, and indicate the specific parameters to be monitored and evaluated. Adequate monitoring and evaluation must exist to detect and evaluate the success of the hatchery program and any risks to or impairment of recovery of affected, listed fish populations.

The NPPC "Artificial Production Review" document referenced above presents a list of draft "Performance Indicators" that, when linked with the appropriate performance standard, stand as examples of indicators that could be applied for the hatchery program. If ~~an ESU-wide hatchery~~ a subbasin plan is available, use the performance indicator list already compiled. Essential 'Performance Indicators" that should be included are monitoring and evaluation of overall fishery contribution and survival rates, stray rates, and divergence of hatchery fish morphological and behavioral characteristics from natural populations.

The list of "Performance Indicators" should be separated into two categories: "benefits" that the hatchery program will provide to the listed resident fish species, or in meeting harvest objectives while protecting listed resident fish species; and "risks" to listed resident fish species that may be posed by the hatchery program, including indicators that respond to uncertainties regarding program effects associated with a lack of data.

1.10.1) "Performance Indicators"-addressing benefits.
(e.g., "*Evaluate ~~smolt~~ fingerling-to-adult return rates for program fish to harvest, hatchery broodstock, and natural spawning.*")
NA

1.10.2) "Performance Indicators" addressing risks.
(~~(~~*e.g., "Evaluate predation effects on listed fish resulting from hatchery fish releases."*)
NA

1.11) Expected size of program.
In responding to the two elements below, take into account the potential for increased fish production that may result from increased fish survival rates effected by improvements in hatchery rearing methods, or in the productivity of fish habitat.

1.11.1) Proposed annual broodstock~~collection level~~ need (maximum number of~~adult~~ fish).
740 fish total (1:1 female to male ratio)

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. (*Use standardized life stage definitions by species presented in* Attachment 2.)

Life Stage	Release Location	Annual Release Level
Eyed Eggs	NA	NA
Unfed Fry	NA	NA
Fry	Buffalo Lake	20,000
	Fish Lake	3,000
	McGinnis Lake	15,000
	North Twin Lake	77,000
	South Twin Lake	77,000
	Summit Lake	4,000
	Total	196,000
Fingerling	Buffalo Lake	18,000
	Fish Lake	3,000
	Gold Lake	4,000
	Little Goose Lake	2,000
	McGinnis Lake	30,000
	North Twin Lake	113,000
	Owhi Lake	35,000
	Round Lake	5,000
	Simpson Lake	5,000
	South Twin Lake	113,000
	Summit Lake	2,000
	Total	330,000
Yearling	NA	NA

1.12) Current program performance, including estimated~~smolt-to-adult~~ survival rates, adult production levels, and escapement levels. Indicate the source of these data.

Catch-rates, condition factors, average length and average weight are presented for Owhi

Lake, North Twin Lake and South Twin Lake (Table1 and 2 respectively). These three lakes combined, receive approximately 72% of the annual brook trout production from this facility. The program goal for brook trout includes a .5 –1.0 CPUE, condition factors of 125 X 10-7 and average fork length of 305 mm. Owhi Lake fishery meets or exceeds the program objectives for all years in which fish from this facility available to the fishery (1991-1999).

The Twin Lakes brook trout fishery appears less successful. However, this fishery is a multi-species fishery (brook trout, largemouth bass and rainbow trout). The creel census program does not distinguish target species, typically brook trout fisheries are early spring and late fall fisheries, applying angler effort during July and August to a brook trout CPUE probably underestimates the true CPUE for brook trout. Relative abundance surveys conducted in North and South Twin Lakes during the 1994-1996 period indicate that brook trout are on average twice as abundant as rainbow trout (Table 18). It appears as if seasonality, angler bias and susceptibility to angling may impart a greater influence on CPUE than fish densities. The monitoring program is currently evaluating past creel census data, creel census methodology and creel census analysis to develop less biased assessment of the Twin Lakes brook trout fishery. While the .5 – 1.0 CPUE has not been achieved in the Twin Lakes fishery; the program objectives for fish condition factor and average fork length have been exceeded.

Table 1. Brook Trout Catch Per Unit Effort (CPUE), Weight and Condition Factor, Owhi

Year	Hrs.	Total	Avg Fl (mm)	Avg Wt (gr)	CPUE (Fish/Hr)	Condition (X 10^{-7})
1984	3542	4994	298	312	1.41	118
1985	2214	2845	285	284	1.29	123
1986	ND	ND	ND	ND	ND	ND
1987	ND	ND	ND	ND	ND	ND
1988	ND	ND	ND	ND	ND	ND
1989	2832	2556	316	416	0.90	132
1990	3046	3561	329	426	1.17	120
AVG.	**2909**	**3489**	**307**	**356**	**1.17**	**123**
1991 *	1086	932	319	433	0.86	133
1992 *	ND	ND	ND	ND	ND	ND
1993 *	4248	2974	365	612	0.70	126
1994 *	5335	4728	361	575	0.89	122
1995 *	1539	1321	383	718	0.86	128
1996 *	1978	2261	379	653	1.14	120
1997 *	4388	3351	370	628	0.76	124
1998*	1066	1197	359	573	1.12	124
1999*	2310	2133	356	533	0.92	118
AVG.	**3096**	**2595**	**363**	**603**	**0.91**	**124**

ND - No Data
* - Hatchery Operation

Table 2. Total Catch Per Unit Effort (CPUE), Fork Condition Factor and Brook South Twin Lakes,

			Brook Trout			
Year	Hrs. Fished	EBT Catch	AVG. Fl (mm)	AVG. Wt (gr)	CPUE Fish/hr	Condition Factor (X 10^{-7})
1978	55,652	3,444	295	343	0.06	133
1979	81,124	2,677	302	360	0.03	131
1980	84,322	9,153	348	504	0.11	164
1981	55,528	9,361	303	379	0.17	136
1982	57,659	5,681	314	415	0.20	134
1983	45,173	4,321	303	389	0.10	140
1984	51,614	7,020	310	419	0.14	141
1985	44,760	6,793	311	434	0.15	144
1986	42,893	2,646	340	593	0.06	151
1987	47,676	600	336	531	0.01	140
1988	52,571	966	309	421	0.02	143
1989	39,019	1,167	302	396	0.03	144
1990	47,029	794	358	656	0.02	143
AVG.	**52,763**	**4,069**	**312**	**434**	**0.08**	**141.8**
1991*	40,411	1,045	336	536	0.03	141
1992*	40,452	2,681	330	457	0.07	127
1993*	60,110	2,709	337	468	0.05	122
1994*	91,928	5,670	307	403	0.06	139
1995*	74,411	13,141	321	410	0.18	124
1996*	29,611	5,215	329	454	0.18	127
1997*	20,930	3,842	346	500	0.18	127
1998						
1999	34,825	2,528	344	508	0.07	125
AVG.	**51,122**	**4,900**	**329**	**461**	**0.11**	**129.0**

Table 3 . Relative Abundance of Salmonids Captured in Gill net on North and South Twin Lakes. 1994-1996.

Date	Total fish Caught	# Brook Trout	Relative Abundance	# Rainbow Trout	Relative Abundance
Jun-94	166	141	85%	9	5%
Jun-95	387	187	48%	176	46%
Jun-96	170	79	46%	35	21%
Avg.	**226.3**	**135.7**	**60%**	**73.3**	**32%**

1.13) Date program started (years in operation), or is expected to start.

The first production year occurred in 1990.

1.14) Expected duration of program.

Duration must be consistent with stated purpose. Refer to Table 1 in the APR for guidance.

The program is considered as BPA non-discretionary funding, stipulating a 25 -year funding agreement with a 25 -year renewal option.

1.15) Watersheds targeted by program.

Include ~~WRIA or similar stream identification number~~ HUC field for desired watershed ~~of return~~.
NA

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

Providing mitigation for extirpated anadromous fish in the "blocked Area" above Chief Joseph and Grand Coulee Dam currently involves substituting for anadromous fish losses with resident fish production. An alternative approach could include:

(1) Successfully re-establish anadromous fish throughout their historical range (i.e. historical abundance and distribution). While this approach is the preferred option considered by the Tribes in the affected area, it is obviously controversial (feasibility), costly and success is very long term in scope. This approach has not been accepted as an option in the Power Planning Council Program.

(2) Continue to mitigate for anadromous fish losses by substituting with resident fish production using native salmonids exclusively. This approach is also preferable to the status quo; however, the habitat conditions in the foreseeable future, current native species abundance/distribution/availability and non-native species abundance/distribution significantly limit this approach.

~~**SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.**~~

~~**2.1) List all ESA permits or authorizations in hand for the hatchery program.**~~

~~**2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.**~~

~~**2.2.1) Description of ESA-listed salmonid population(s) affected by the program.**~~
~~*Include information describing: adult age class structure, sex ratio, size range,migrational timing, spawning range, and spawn timing; and juvenile life history strategy, including smolt emigration timing. Emphasize spatial and temporal distribution relative to hatchery fish release locations and weir sites*~~

~~**Identify the ESA-listed population(s) that will be directly affected by the program.**~~
~~*(Includes listed fish used in supplementation programs or other programs that involve integration of a listed natural population. Identify the natural population targeted for integration).*~~

~~**Identify the ESA-listed population(s) that may be incidentally affected by the**~~

program.
(Includes ESA-listed fish in target hatchery fish release, adult return, and broodstock collection areas).

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds *(see definitions in "Attachment 1").*

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data. *(Include estimates of juvenile habitat seeding relative to capacity or natural fish densities, if available).*

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take *(see "Attachment 1" for definition of "take").*

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.
(e.g. "Broodstock collection directed at sockeye salmon has a "high" potential to take listed spring chinook salmon, through migrational delay, capture, handling, and upstream release, during trap operation at Tumwater Falls Dam between July 1 and October 15. Trapping and handling devices and methods may lead to injury to listed fish through descaling, delayed migration and spawning, or delayed mortality as a result of injury or increased susceptibility to predation").

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

~~*Complete the appended "take table" (**Table 1**) for this purpose. Provide a range of potential take numbers to account for alternate or "worst case" scenarios.*~~

~~**Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.**~~
~~*(e.g. "The number of days that steelhead are trapped at Priest Rapids Dam will be reduced if the total mortality of handled fish is projected inseason to exceed the 1988-99 maximum observed level of 100 fish.")*~~

SECTION ~~3~~2. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

~~3~~2.1) **Describe alignment of the hatchery program with other hatchery plans~~any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted~~ and policies (e.g., the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.**
(e.g. "The hatchery program will be operated consistent with the subbasin ~~ESU-wid~~e plan, with the exception of age class at release. Fish will be released as age-1~~yearlings~~ rather than as fingerlings~~sub-yearlings~~ as specified in the~~ESU-wide~~ subbasin plan, to maximize~~smolt-to-adult~~ survival rates given extremely low recruitment rates~~low run sizes~~ the past four years.")

Currently there are no sub-basin plans developed for the geographic locations affected by this hatchery program. The program is however aligned/consistent with:

(1) 1994 Fish and Wildlife Program (NWPPC).

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 "A healthy Columbia River Basin, one that supports both human settlement and the long-term sustainability 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 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 effort in the "blocked Area" above Chief Joseph and Grand Coulee Dam. This is consistent with the Council's priority to substitution measures (section 10.1B); satisfies principles of substitution where in-kind mitigation is not possible. It 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) and utilizes traditionally defined resident fish species (i.e. Brook trout, rainbow trout and cutthroat trout (section 10.1A). Further more the project has accepted/approved biological objectives (section 10.1C and 10.8B) and is specifically detailed as program measure 10.8B.6.

(2) Colville Confederated Tribes Integrated Resource Management Plan.

The hatchery program objectives of providing successful subsistence and recreational fisheries is consistent with the Fish and Wildlife goal the IRMP of "meeting the needs of the membership and reservation residents….provide for ceremonial and subsistence harvest….and ecosystem species (native and/desirable non-native) that have viable populations, which for some species will contain surplus of individuals to meet consumptive, cultural, subsistence and recreational needs". In addition, the IRMP identifies the Colville Tribal Fish Hatchery program as a specific management strategy.

(3) Artificial Production Review (NWPPC)

The Colville Tribal Fish Hatchery is consistent with the mitigation purpose described the APR document. This program is a resident fish substitution action to address lost anadromous fish production in the blocked areas as a result of the federal hydro-system. The APR document identifies "successful artificial production of resident fish is a necessary and crucial component to fully mitigate anadromous fish losses in these blocked areas".

The hatchery program is also consistent with fish management in altered environments. Much of habitat utilized by hatchery fish is in an altered/degraded condition that limit the ability of native fish species to providing harvest needs through self-sustaining natural production. The APR acknowledged, "The production of resident fish, and in some instances non-native species that are adapted to the existing altered habitat might be preferable to species that inhabited the basin before development".

~~3~~2.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.
Indicate whether this HGMP is consistent with these plans and commitments, and explain any discrepancies.

(1) Lease and Operation and Maintenance Agreement (DE-MS79- 88BP92434)

~~3~~2.3) Relationship to harvest objectives.
Explain whether artificial production and harvest management have been integrated to provide as many benefits and as few biological risks. ~~as possible to the listed species.~~ For example, ~~R~~reference any harvest plan that describes measures applied to integrate the program with harvest management.

Specific catch-rates, average fork lengths and fish condition factors have been identified for subsistence and recreational fisheries that this hatchery program is supporting. Creel census and relative abundance surveys are utilized to amend the stocking rate of individual lakes on an annual basis. In addition, trophic level investigations (primarily phyto-plankton/zooplankton/fish interactions), 100% hatchery fish marking and native species presence/distribution/status evaluations are proposed for future years, which should facilitate maximum hatchery benefit to the consumptive fisheries with a minimum biological risk.

2.3.1) ~~3.3.1)~~ Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last 12 years (1988-99), if available. *Also provide estimated future harvest rates on fish propagated by the program, and on listed fish that may be taken while harvesting program fish.*

Fisheries benefiting from the brook trout portion of this program include Tribal subsistence and non-tribal recreational fisheries. Brook trout attain a relatively large size, are readily caught through the ice, are accessible to Tribal anglers and highly sought after as a subsistence resource for Tribal members. Eleven lakes are stocked with brook trout on an annual basis to support subsistence and recreational fisheries (Section 1.11.2). Catch and catch-rates are detailed in section 1.12.

~~3~~2.4) Relationship to habitat protection and ~~recovery strategies~~ purposes of artificial production.
Describe the major factors affecting natural production (if known). Describe any habitat protection efforts, and expected natural production benefits over the short- and long-term.

For Columbia Basin programs, use NPPC document 99-15, section II.C. as guidance in indicating program linkage with assumptions regarding habitat conditions

Habitats in the blocked areas are currently blocked to a large proportion of the historic native species assemblage (anadromous fish). Habitats have been permanently altered (at least in the near-term) which has resulted in the decline in fish production capacity. Typically these habitats are low elevation (< 2600 ft), exhibit warm summer temperatures (15 - 21^{0}C) and high sediment substrate conditions. Moderate to high water temperatures, heavy sediment levels and high embeddedness generally characterizes fluvial habitat on the reservation. Additionally, the review of current limnological data, representing examples of various lacustrine environments within the reservation, heighten the reality of marginal habitat for self-sustaining native fish populations. Warm water conditions and extensive anoxic zones (during periods of stratification) limit production of salmonids in many of the reservation lakes (See Section 1.8 for additional detail).

Habitat restoration activities have been limited to site-specific actions in the SanPoil River basin (in-stream habitat and passage improvement) and "best management practices" identified through Integrated Resource Management Planning (IRMP) for site-specific land-use activities. Theoretically both should result in improved habitat conditions for all aquatic resources, including fish production. Empirical data monitoring and analysis of these two actions are inconclusive as of this HGMP submittal.

~~3~~2.5) Ecological interactions.

Describe~~salmonid and non-salmonid fishes or other~~ all species that could (1) negatively impact program; (2) be negatively impacted by program; (3) positively impact program; and (4) be positively impacted by program

(1) Negatively impact program

(a) Largemouth bass- Illegal introductions of largemouth bass have resulted in established naturalized populations of largemouth bass for several lakes (Bourgeau Lake, Buffalo Lake, North Twin Lake and South Twin Lake). Bass prey on all release sizes of brook trout.

(b) Avian predators- Numerous avian predators may utilize hatchery origin fish for principle prey items. Eagles, osprey, loons, red-necked grebes and eared-grebes all inhabit various locations around lakes stocked by this program.

(2) Negatively impacted by program

(a) Native salmonid species/stocks are not known to inhabit habitats stocked by this project. However, fish emigrating from stocking locations may interact with native

salmonids. The significance of any interaction is considered minimal because emigration potential is slight (outlet screening) and as all receiving waters that may be impacted have a long history of non-native specie/stock presence and in many cases have long established naturalize populations or habitat that is inconsistent or marginal for the establishment of productive native salmonid populations.

(b) Indigenous, non-salmonid species representing the following families: (Catostomidae, Cyprinidae and Cottidae) may be impacted by this program. The type and degree of interaction potential is unknown; however, as with native salmonids, the significance of interactions may be minimal because of the long history of non-native specie/stock presence.

(3) Positively impact program

(a) Naturally producing brook trout in any of the locations stocked by this program would benefit the brook trout component (i.e. increase fish densities and potential to reduce the requirement of artificially produced brook trout to meet fishery demand). Naturally producing brook trout also provide a source of locally adapted stocks for use in artificial production actions to meet fishery demands (i.e. free-ranging broodstock).

(4) Positively impacted by program

(a) Mitigating or compensating for bottle- necks such as limited spawning and early rearing with sub-yearling releases would positively impact brook trout.
(b) Piscivors such as largemouth bass, adult brook trout and adult rainbow trout would benefit due to increased forage availability.
(c) Avian predators benefit due to increasing forage availability.
(d) Humans (anglers) benefit from this program. The hatchery program allows greater fish production, therefore greater harvest potential than what would occur with natural production alone.
(e) Indigenous salmonid populations may benefit from this program. Fishing pressure on westslope cutthroat and redband rainbow may be reduced as a function of providing a reliable consumptive salmonid fishery in locations unoccupied by the indigenous salmonid stocks. ~~*Give most attention to interactions between listed and "candidate" salmonids and program fish.*~~

SECTION 43. WATER SOURCE

43.1) Provide a quantitative and narrative description of the water source (spring, well,

surface), water quality profile, and natural limitations to production attributable to the water source.
For integrated programs, identify any differences between hatchery water and source, and "natal" water used by the naturally spawning population. Also, describe any methods applied in the hatchery that affect water temperature regimes or quality.

The hatchery water supply is 100 percent groundwater derived. The current system consists of 5 wells that produce 23,000-liter/minute total capacity. Water temperature varies 7.2^0C throughout the year ranging from 7.2^0C – 14.4^0C. Organic and inorganic parameters are all within acceptable aquaculture standards. Manipulations of water quality consist of gas stabilization (i.e. O^2 and N) as is required for most ground water systems.

~~*Include information on water withdrawal permits, National Pollutant Discharge Elimination System (NPDES) permits, and compliance with NMFS screening criteria.*~~

43.2) Indicate any appropriate risk aversion measures that will be applied to minimize the likelihood for the take of listed ~~natural fish~~ species as a result of hatchery water withdrawal, screening, or effluent discharge.
(e.g., "Hatchery intake screens conform with NMFS and USFWS screening guidelines to minimize the risk of entrainment of ~~juvenile~~ listed ~~fish~~ species.")
Include information on water withdrawal permits, National Pollutant Discharge Elimination System (NPDES) permits, and compliance with NMFS and USFW and screening criteria. Although the USFWS does not have specific screening criteria at this time, research is being conducted at the Abernathy facility that will result in criteria specific for bull trout. In the interim, most USFWS field offices are using NMFS criteria.
To obtain information regarding what, if any, screening criteria are being used by the USFWS in your area, please refer to Attachment 3 for the phone number and address of the nearest field office.

This facility is groundwater supplied, therefore intake screening is not a concern. The effluent discharge is consistent with the project NPDES permit application.

SECTION ~~5~~4. FACILITIES

For each item, ~~P~~provide descriptions of the hatchery facilities that are to be included in this plan (see "Guidelines for Providing Responses" Item E), including dimensions of trapping, holding incubation, and rearing facilities. Indicate the fish life stage held or reared in each. Also describe any instance where operation of the hatchery facilities, or new construction, results in~~destruction o~~ adverse ~~modification~~effects ~~of~~to ~~critical~~habitat ~~designated~~for listed ~~salmonid~~ species (habitat effects must be considered even if critical habitat is not designated).

~~5~~4.1) Broodstock collection, holding, and spawning facilities ~~(or methods)~~.

This facility does not hold broodstock on-station. All spawning operations are remote site locations.

~~5~~4.2) Fish transportation equipment (description of pen, tank truck, or container used).

Fish transportation (distribution) is accomplished using industry standard equipment. Vehicles consist of two (2) 2.5-ton International diesel distribution trucks mounted with one (1) 4,500- liter container and one (1) 1.5-ton diesel truck mounted with two (2) 1,100-liter containers. All distribution containers are insulated fiberglass tanks equipped with diffused oxygen and water re-circulation.

~~5.3) Broodstock holding and spawning facilities.~~54.~~3~~4) Incubation facilities.

Incubation facilities are standard Heath-Tray stacks supplied with water from a multi-compartment head-box. A water chiller is also featured in the incubation system to facilitate variable incubation water temperatures.

~~5~~4.~~4~~5) Rearing facilities.

Rearing facilities consist of eighteen (22) Capalano Troughs each 6.4m x. 84m x. 56m and eight (8) concrete raceways each 30.5m x 3.05m x 1.37m. Capalano and concrete raceways receive 382 liters/min. and 2,271 liters/min. respectively.

~~5~~4.~~5~~6) Acclimation/release facilities.
NA

~~5~~4.~~6~~7) Describe operational difficulties or disasters that led to significant fish mortality.
Limited incubation and early rearing capacity limits survival through these life stages.

~~5~~4.6.~~1~~8) ~~———~~Indicate available back-up systems, and risk aversion measures ~~that will be applied,~~ that minimize the likelihood for the take of listed~~natural fish~~ species that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

(e.g., "The hatchery will be staffed full-time, and equipped with a low-water alarm system to help prevent catastrophic fish loss resulting from water system failure.")

NA. This facility does not rear listed or sensitive species. However the facility utilizes a 500 KVA diesel generator for "backup", is staffed full-time and utilizes low water alarms in all rearing vessels and the gas stabilization tower. Additionally, the facility also has an intrusion and fire detection system as well as on-station fire fighting capacity.

4.6.2) Indicate needed back-up systems and risk aversion measures that minimize the likelihood for the take of listed species that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

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Surface water supply would add additional backup in the event of a failure of the groundwater system not attributable to a power failure.

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SECTION ~~6~~5. BROODSTOCK ORIGIN AND IDENTITY

~~**Describe the origin and identity of broodstock used in the program, its ESA listing status, annual collection goals, and relationship to wild fish of the same species/population.**~~

~~6~~5.1) Source.

List all ~~historical~~original and current sources of broodstock for the program. Be specific (e.g., natural spawners from Bear Creek, ~~fish returning to the Loon Creek Hatchery trap,~~ etc.).

Free-ranging broodstock from Owhi Lake. Broodstock is composed of both hatchery origin a naturalized origin fish. The majority of the brood fish are hatchery origin, however the exact contribution of either group is unknown.

~~6~~5.2) Supporting information.

~~6~~5.2.1) History.

Provide a brief narrative history of the broodstock sources. For listed natural populations, specify its status relative to critical and viable population thresholds (use section ~~2~~10.2.2 if appropriate). For existing hatchery stocks, include information on how and when they were founded, sources of broodstock since founding, and any purposeful or inadvertent selection applied that changed characteristics of the founding broodstock.

Brook trout were stocked into Owhi Lake between 1905 and 1910 and probably originated from brook trout stock obtained from the Paradise Brook Trout Company,

Heneryville, Pennsylvania, which were introduced into Washington waters in 1894 (WDFW 1921). The broodstock source for stocking reservation waters has always been Owhi Lake stock. No other brook trout stocks have been mixed with the Owhi stock.

~~6~~5.2.2) Annual size.

Provide estimates of the proportion of the natural population that will be collected for broodstock. Specify number of each sex, or total number and sex ratio, if known. For broodstocks originating from natural populations, explain how their use will affect their population status relative to critical and viable thresholds.

The proportion of natural production fish to be in the broodstock is unknown because the proportion in the population is unknow. The brood lake (Owhi Lake) receives approximately 35,000 hatchery fish (Sub-yearling) annually, which supports the majority the fishery and probably comprises the majority of the adult broodfish. Critical and viable thresholds have not been developed and may not be an issue due to the stocking efforts that take place in Owhi Lake.

~~6~~5.2.3) Past and proposed level of natural fish in broodstock.

If using an existing hatchery stock, include specific information on how many natural fish were incorporated into the broodstock annually.

Unknown. The program currently does not mark hatchery origin fish, making it difficult to identify hatchery and natural origin fish. The program proposes to mark all hatchery origin fish, which will allow the collection and analysis of this type of data and facilitate improved broodstock management.

~~6~~5.2.4) Genetic or ecological differences.

Describe any known genotypic, phenotypic, or behavioral differences between current or proposed hatchery stocks and natural stocks in the target area.

Unknown

5.2.5) ~~6.2.5)~~ Reasons for choosing Broodstock traits

Describe traits or characteristics for which broodstock was choosen.

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The rational for choosing this particular stock of brook trout is unknown. The Owhi lake broodstock has remained the stock of choice due to its ability to support tribal and non-tribal fisheries (attain large size), high fecundity and apparent adaptation to the reservations aquatic environment.

5.2.6) ESA-Listing status

NA

~~*Describe any special traits or characteristics for which broodstock was selected.*~~

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~~6~~5.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects that may occur as a result of using the broodstock source. ~~to listed natural fish that may occur as a result of broodstock selection practices.~~

(e.g., "*The risk of among population genetic diversity loss will be reduced by selecting the indigenous~~chinook salmon~~ white sturgeon population for use as broodstock in the supplementation program.*")

The program will continue to secure eggs from the free-ranging fish in Owhi Lake. Although Owhi Lake receives hatchery fish annually (sub-yearlings), the fish typically rear one to three years prior to maturing, which imparts natural selection on the broostock and theoretically should produce a better-adapted fish than an on-station broodstock.

SECTION ~~7~~6. BROODSTOCK COLLECTION

~~7~~6.1) Life-history stage to be collected (~~adults, eggs, or juveniles~~ eggs, juveniles, adults).

Adults

~~7~~6.2) Collection or sampling design.

Include information on the location, time, and method of capture (e.g. weir trap, beach seine, etc.) Describe~~capture efficiency and~~ measures to reduce sources of bias that could lead to a non-representative sample of the desired broodstock source.

Brook trout spawning operations will commence at Owhi Lake during late October and continue into early-mid November. Brook trout will be captured with a beach seine and held at the lake in live pens during the spawning operation. The fish will be live spawned and released back into the lake. The male: female ration is expected to be 1:1. Fertilized eggs will be water-hardened in iodophor (100 ppm) at the spawning site and transported to the hatchery in insulated 19-liter capacity water coolers (5 gal.). Approximately 800,000 eggs will be taken to during the spawn taking operation. 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. The current incubation facilities do not allow the isolation of infected eggs; therefore tissue sample analysis will

be used for trend analysis of bacterial and viral occurrence/severity.

~~7~~6.3) Identity.
Describe method for identifying (a) target population if more than one population may be present; and (b) hatchery origin fish from naturally spawned fish.

If the proposed marking effort is approved, then adipose clipped fish will identify the hatchery origin fish from the naturally produced/naturalized origin fish.

~~7~~6.4) Proposed number to be collected:

~~7~~6.4.1) Program goal (assuming 1:1 sex ratio for adults):

~~7~~6.4.2) Broodstock collection levels for the last 12 years (e.g., 1988-99), or for most recent years available:

Year	Adults Females	Males	Jacks	Eggs	Juveniles
1988					
1989	682	682		1,552,580	
1990	349	349		830,396	
1991	312	312		811,792	
1992	337	337		875,337	
1993					
1994	340	340		841,138	
1995					
1996	359	359		875,121	
1997	373	373		941,239	

Year	Adults Females	Males	Jacks	Eggs	Juveniles
1998	510	510		962,202	
1999					

Data source: (Link to appended Excel spreadsheet using this structure. Include hyperlink to main database)

~~7~~6.5) **Disposition of hatchery-origin fish collected in surplus of broodstock needs.**
Describe procedures for remaining within programmed broodstock collection or allowable upstream hatchery fish escapement levels, including culling.

All fish are returned to the lake after spawning.

~~7~~6.6) **Fish transportation and holding methods.**
Describe procedures for the transportation (if necessary) and holding of fish, especially if captured unripe or as juveniles. Include length of time in transit and care before and during transit and holding, including application of anesthetics, salves, and antibiotics.

Only ripe Fish are retained for the spawning day. Fish are held in live-pens in Owhi Lake. Typically, fish are held less than 2 hours before being released back to the lake. No anesthesia or antibiotics are used on the broodfish.

~~7~~6.7) **Describe fish health maintenance and sanitation procedures applied**.

Fertilized eggs will be water-hardened in iodophor (100- ppm) at the spawning site. 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. The current incubation facilities do not allow the isolation of infected eggs; therefore tissue sample analysis will be used for trend analysis of bacterial and viral occurrence/severity.

~~7~~6.8) **Disposition of carcasses.**
Include information for spawned and unspawned carcasses, sale or other disposal methods, and use for stream reseeding.

NA. The program utilizes live- spawning; there are no carcasses with exception of those resulting from viral sampling. These carcasses are donated to the Tribal Food Distribution Program.

~~7~~6.9) **Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed ~~d natural fish~~ species resulting from the broodstock collection program.**
(e.g. "The risk of fish disease amplification will be minimized by following Co-manager

Fish Health Policy sanitation and fish health maintenance and monitoring guidelines.")

NA. No listed species are known to exist in the locations stocked by this program.

SECTION ~~8~~7. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

~~8~~7.1) Selection method.
Specify how spawners are chosen (e.g. randomly over whole run, randomly from ripe fish on a certain day, selectively chosen, or prioritized based on hatchery or natural origin).

Owhi Lake brook trout are a shoreline spawning population and are capture using a beach seine. Fish are captured on a spawn day and all ripe fish captured are spawned. A typical year spawn cycle for this population begins in mid to late October and concludes in mid-late November. Generally, the program intent is to acquire the majority of the eggs during the peak spawn activity (late October – early November).

~~8~~7.2~~3~~) Fertilization.
Describe spawning protocols applied, including the fertilization scheme used (such as equal sex ratios and 1:1 individual matings; equal sex ratios and pooled gametes; or factorial matings). Explain any fish health and sanitation procedures used for disease prevention.

The program employs a equal sex ratio and pooled gametes (five fish pools). Fertilized eggs are water-hardened in iodophor (100 ppm) at the spawning site. Fish with obvious external signs of bacterial kidney disease or frunculosis are eliminated from the spawning population.

~~8~~7.3~~4~~) Cryopreserved gametes.
If used, describe number of donors, year of collection, number of times donors were used in the past, and expected and observed viability

NA.

~~8~~7.4~~5~~) ~~———~~Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.
(*e.g., "A factorial mating scheme will be applied to reduce the risk of loss of within population genetic diversity for the~~small chum salmon~~ westslope cutthroat trout population that is the subject of this supplementation program."*).

NA. This population is not a listed species.

SECTION ~~9~~8. INCUBATION AND REARING

~~**Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.**~~

~~9~~8.1) Incubation:

~~9~~8.1.1) Number of eggs taken/received and survival rate at stages of egg development ~~and survival rates to eye-up and/or ponding~~

Provide data for the most recent 12 years (1988-99), or for years dependable data are available.

Table 4. ~~9.1.2) Cause for, and disposition of surplus egg takes.~~

Owhi lake Brook Trout Spawn and Incubation, 1989-1999

Year	Total Eggs	Eyed-Eggs	% Eye	Eggs/oz.
1989	1,552,580	1,166,797	75%	355
1990	830,396	612,554	74%	309
1991	811,792	621,500	77%	347
1992	875,337	677,029	77%	355
1993	911,400	749,700	82%	
1994	841,138	711,764	85%	480
1995	783,369	646,088	82%	470
1996	875,121	738,170	84%	355
1997	941,239	659,307	70%	494
1998	962,202	784531	82%	496
1999	868,149	646791	75%	524
2000				
Total	10,252,723	8,014,231	78%	418

~~*Describe circumstances where extra eggs may be taken (e.g. as a safeguard against potential incubation losses), and the disposition of surplus fish safely carried through to the eyed eggs or fry stage to prevent accedence of programmed levels.*~~

~~9~~8.1.2~~3~~) Loading densities applied during incubation.

Provide egg size data, standard incubator flows, and standard loading per Heath tray (or other incubation density parameters).

Vertical Heath tray incubators are loaded at approximately .94-1.2 liters/tray. Water flow through the vertical stacks will be approximately 19 liters/min. (5gpm). Egg Average 418 eggs/oz. (Table 4).

~~9~~8.1.3~~4~~) Incubation conditions.

Describe monitoring methods, temperature regimes, minimum dissolved oxygen criteria (influent/effluent), and silt management procedures (if applicable), and any other parameters monitored.

Typically, all brook trout eggs will arrive at the Colville Tribal Fish Hatchery within 5 hours of spawning. Arriving eggs are disinfected with 100-PPM iodine solution for 10 minutes and then put into vertical tray incubators at approximately .94-1.2 liters/tray. Eggs are incubated without medium. Water flow through the vertical stacks is approximately 19 liters/min. (5gpm). All brook trout eggs receive formalin treatments, seven days per week (1670-PPM concentration) to reduce fungus growth on the eggs. Formalin treatment are discontinued approximately one week prior to hatch. All egg lots are"shocked" and non-viable eggs removed approximately one week after a strong eye is appartent. Eggs are picked routinely up until expected hatching date. The brook trout will remain in the trays through the "button-up" stage before they are moved to capalano troughs.

A daily temperature log is maintained to monitor incubation water temperatures and total DTU's. Typically, the fingerling component is incubated at ambient temperatures (12^0C) while the sub-yearling component production is incubated at 7.2^0C to delay the hatching date in an effort to maintain reasonable rearing densities at peak production periods (i.e. September and October).

~~9~~8.1.4~~5~~) Ponding.

Describe procedures (e.g., dates of ponding, volitional, forced).

All brook trout rearing components are physically moved from the Heath incubation trays to the Capalano Troughs when the yolk sac has been fully absorbed. The fingerling and sub-yearling brook trout are ponded during mid-January and mid-February respectively.

~~*degree of button up, cumulative temperature units, and mean length and weight (and distribution around the mean) at ponding. State dates of ponding, and whether swim up and*~~

~~*ponding are volitional or forced.*~~

~~98~~.1.~~5~~~~6~~) **Fish health maintenance and monitoring.**
Describe fungus control methods, disease monitoring and treatment procedures, incidence of yolk-sac malformation, and egg mortality removal methods.

All eyed-eggs received at the hatchery are surface disinfected with a 100-ppm iodiphor bath for 10 minutes prior to loading into the Heath Trays. All egg trays are treated daily with formalin (1670 ppm) to control fungus. Eggs are typically shocked approximately one week after they have passed the eyed stage. Dead eggs are removed by hand and via automated egg picker.

~~98~~.1.~~6~~~~7~~) **Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to ~~listed~~ fish during incubation.**
(*e.g., "Eggs will be incubated using well water only to minimize the risk of catastrophic loss due to siltation.")*

Minimal handling, incubation within dark confines, well water supply and chemical treatment reduce potential mortality, thereby increasing total survival. Maximizing favorable incubation conditions minimize ecological risk during incubation; however, maximum survival may pose a genetic risk by allowing less fit individuals to survive. The genetic issue during incubation is probably not a serious threat to this program due to the long-term, intensive culture of the Owhi brook trout stock and the put-grow-harvest regime of the brook trout fisheries supported by this program. Additionally, natural selection imparting its influence over a 2 to 3 year period per broodyear may abate the genetic issue of maximizing survival during incubation.

~~98~~.2) **Rearing:**

~~98~~.2.1) **Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to release~~smolt~~) for the most recent twelve years (1988-99), or for years dependable data are available.**

Summary in progress.

General observations

Broodyear 1995 suffered high mortality during due to a fish culture error during the button-up/ alvian stage (delayed ponding). The 1998 broodyear suffered unusually high mortality during the initial ponding period for an unknown reason. Regardless, in any particular year mortality is significant during the initial ponding period and maybe related to crowded conditions in the incubation trays during the button-up

stage, when formalin treatments are discontinued. The facility is planning to evaluate incubation jars –vs- Heath trays for broodyear 2000. Increased mortality may also be attributable to the high rearing densities encountered during the initial inside rearing period where densities may be 2 to 2.5 times the recommended levels (Fig. 7-13).

~~9~~8.2.2) Density and loading criteria (goals and actual levels).

Include density targets (lbs fish/gpm, lbs fish/ft3 rearing volume, etc.).

Fig. 7

Fig. 8

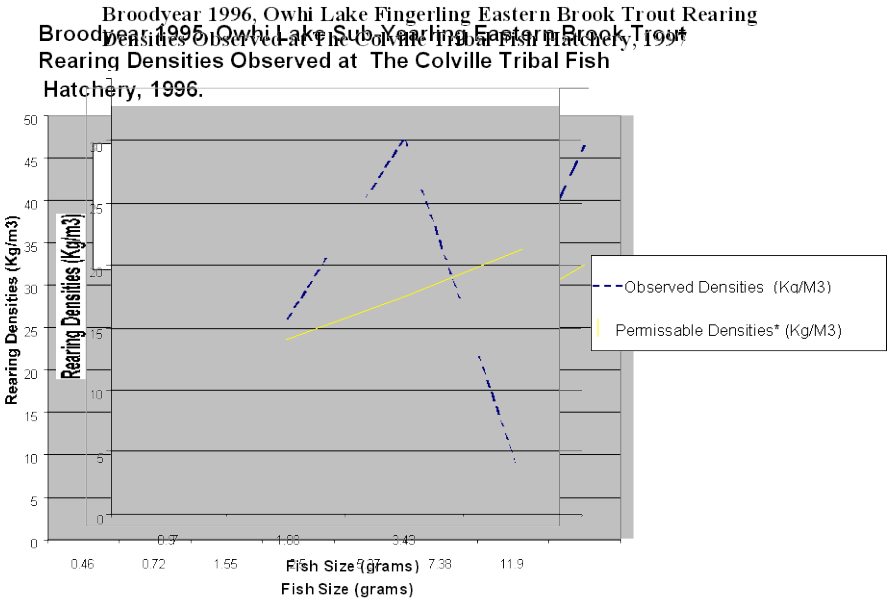


Fig. 9

Broodyear 1996 Owhi Lake Sub-Yearling Eastern Brook Trout Rearing Densities observed at the Colville Tribal Fish Hatchery, 1997.

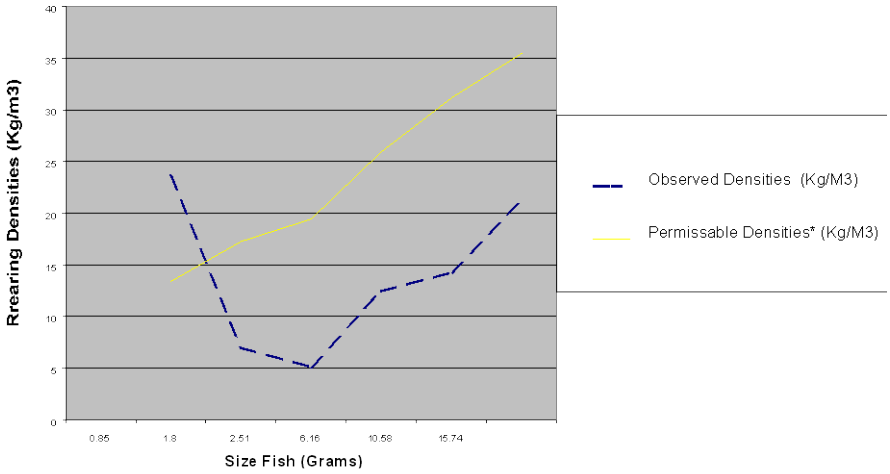


Fig. 10

Broodyear 1997 Owhi Lake Eastern Brook Trout Rearing Densities observed at the Colville Tribal Fish hatchery, 1998.

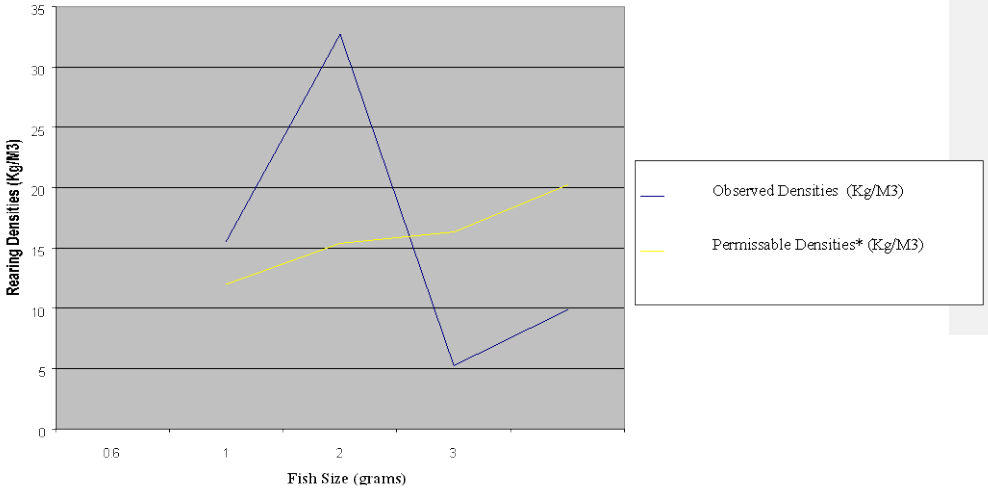


Fig. 11

Broodyear 1997,Owhi Lake Sub-Yearling Eastern Brook Trout Rearing Densities Observed the Colville Tribal Fish Hatchery, 1998.

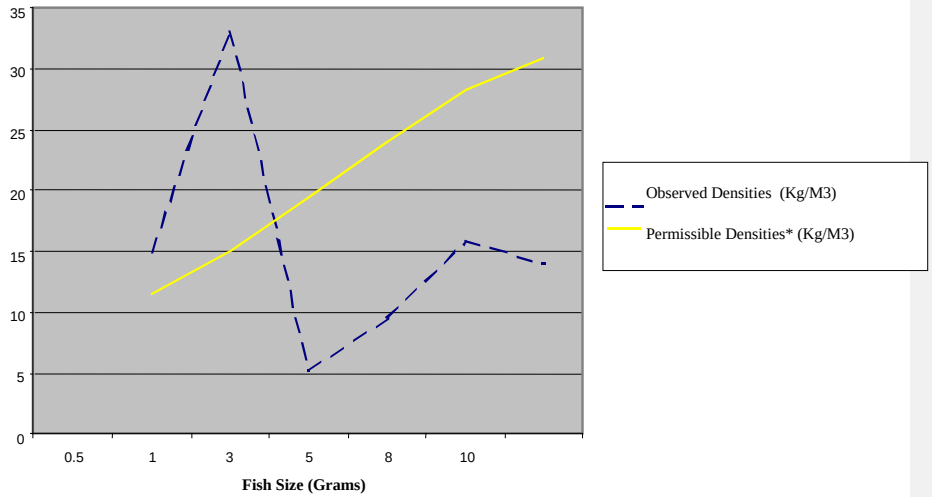


Fig. 12

Broodyear 1998, Owhi Lake Fingerling Eastern Brook Trout Rearing Densities Observed at the Colville Tribal Fish Hatchery, 1999.

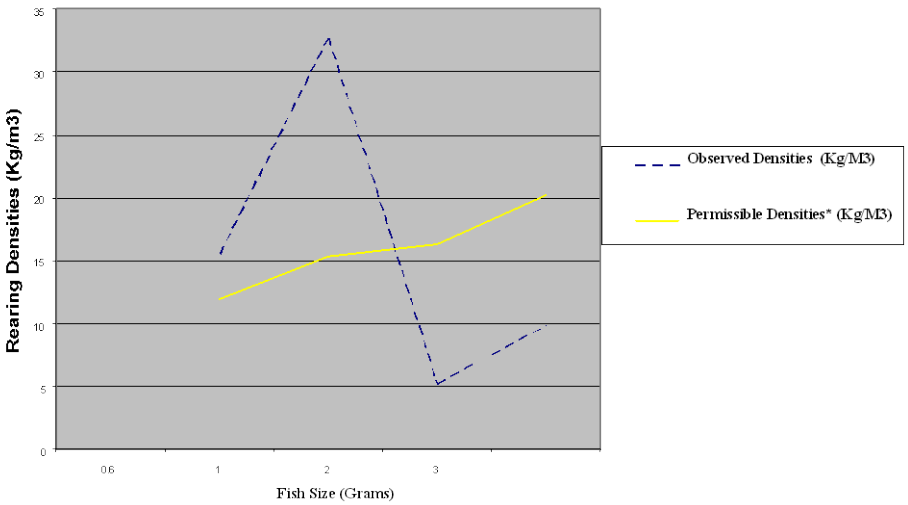
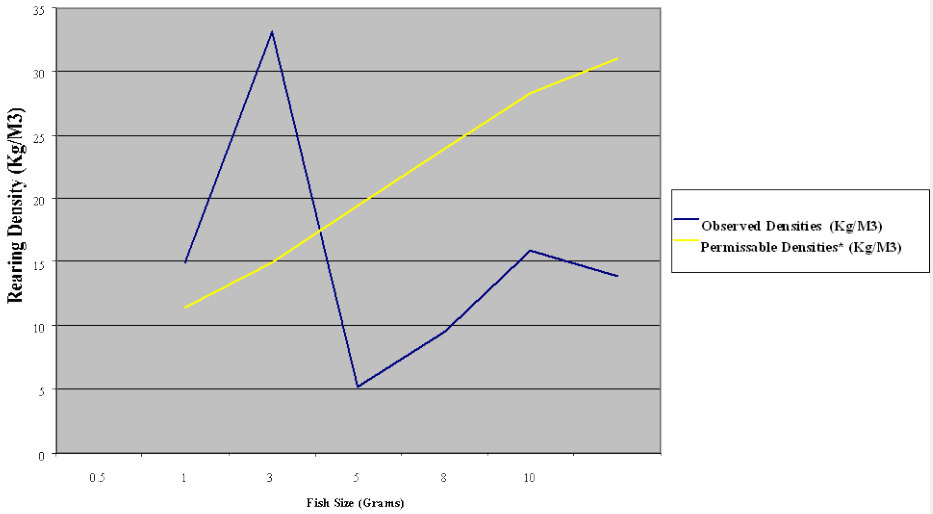


Fig. 13

Broodyear 1998, Owhi Lake Stock, Sub-Yearling Brook Trout Rearing Densities
Observed at the Colville Tribal Hatchery, 1999



~~98~~.2.3) Fish rearing conditions

(Describe monitoring methods, temperature regimes, minimum dissolved oxygen, carbon dioxide, total gas pressure criteria (influent/effluent if available), and

standard pond management procedures applied to rear fish).

Typically, rearing conditions are acceptable throughout most of the brook trout life stages. Generally, inside rearing conditions are crowded and have the potential to provide sub-optimal environmental conditions. Rearing conditions are tolerable from a fish health perspective because the water quality is excellent and flow provided to the Capalano troughs is two to three times that required by the project flow index of 1.5. The outside rearing conditions are acceptable from both a density and flow index in most years. Rearing density estimates are calculated three times per month, based on estimated food conversion. See section 8.2.2 for detailed rearing density information.

Currently, D.O., CO_2, and TPG are not routinely monitored, primarily because the entire water supply is ground water origin and conditioned through a gas stabilization tower to achieve 100 percent oxygen saturation and diffuse nitrogen and carbon dioxide prior to culture use, and is a "single-pass" water regime.

Typical management consists of 382 liters/minute flow provided each capaloano trough (approximately $2m^3$ rearing area/trough) and 1,890 liter/minute flow to each concrete raceway (approximately $85m^3$ rearing area/raceway). Each trough and raceway is manually cleaned once daily to remove morbid fish, fecal material and spent feed.

~~9~~8.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Summary in progress.

~~**9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.**~~
~~*Contrast fall and spring growth rates for yearling smolt programs. If available, indicate hepatosomatic index (liver weight/body weight) and body moisture content as an estimate of body fat concentration data collected during rearing.*~~

~~9~~8.2.~~5~~6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

All fish species at the facility are fed Bio Products "Bio Starter" as an initial feed. The fish will be given feed 8 times per day until they reach 1100-1300 fish/kg (500-600 fish/lb.), at which time they will be fed varying types of dry feeds supplies by

Silver Cup and Moore-Clark, a minimum of 4 times a day. The fish seem to perform equally well on feed supplied by either manufacturer. The source of feed at any one time will be dictated by the cost, given equal performance. Once the fish are less than 220 fish/kg (100 fish per pound), they will be fed twice daily (dry feed) until their release date. Fish will be held without feed two days prior to being moved or loaded for distribution. Feed rates are consistent with manufactures feed charts and conversions range from 1.1-.8.

~~9~~8.2.6~~7~~) **Fish health monitoring, disease treatment, and sanitation procedures**. Provide condition factor indices

The genetic issue during rearing is probably not a serious threat to this program due to the history of intensive culture of the rainbow stocks, minimal natural production potential and the put-grow-harvest regime of the rainbow fisheries supported by this program.

~~**9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.**~~

~~9~~8.2.7~~9~~) **Indicate the use of "natural" rearing methods as applied in the program.**

NA. The program does not employ a standardized systematic disease monitoring program. Typically fish behavior and daily mortality observations provide the monitoring information necessary to keep abreast of fish health. If behavior is erratic or mortality increases then samples are provided to the USFWS Fish Health Center in Olympia Washington for analysis. If treatment is required, specifics are provided by the pathologist and implemented by the hatchery staff.

~~9~~8.2.8~~10~~) **Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to~~listed~~ fish under propagation.** (*e.g., "Fish will be reared to sub-yearling ~~smolt size to mimic the natural fish emigration strategy and~~ to minimize the risk of domestication effects that may be imparted through rearing to yearling size.")*

Incubation is completed in a darkened environment and shading is provided over raceways for the majority of outside rearing period. With the exception of previously mentioned elements, this project does not practice natural rearing methods. Fish rearing at this facility is completed throughout all life stages in either aluminum troughs or concrete raceways without natural substrates. When and/or if this project begins rearing native salmonid stocks/species with a supplementation direction then a "natures rearing" regime may be the appropriate method of rearing.

SECTION ~~10~~9. RELEASE

Describe fish release levels, and release practices applied through the hatchery program. *Specify any management goals (e.g., number, size or age at release, population uniformity, residualization controls) that the hatchery is operating under for the hatchery stock in the appropriate sections below.*

~~**10.1) Proposed fish release levels.** *(Use standardized life stage definitions by species*~~ **9.1) Proposed fish release levels.** *(Use standardized life stage definitions by species presented in **Attachment 2**. "Location" is watershed planted (e.g., "Elwha River").*

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling	196,000	90 fish/lb.		Buffalo Lake Fish Lake McGinnis Lake North Twin Lake South Twin Lake Summit Lake

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Yearling	330,000			Buffalo Lake Fish Lake Gold Lake Little Goose Lake McGinnis Lake North Twin Lake Owhi Lake Round Lake Simpson Lake South Twin Lake Summit Lake

~~10~~9.~~.~~2) **Specific location(s) of proposed release(s).**

Stream, river, or watercourse: *(include name and watershed code (e.g. WRIA) number)*
Release point: (*river kilometer location, or latitude/longitude*)
Major watershed: (e.g., "~~Skagit~~ Kootenai River")
Basin or Region: *(e.g., "~~Puget Sound~~ Columbia River Basin/Mountain Columbia Province")*

Water Body: Buffalo Lake
Release Point: 118^0 53' 33" N. Latitude; 48^0 3' 54" W. Longitude
Watershed: Rufus Woods
Basin / Region: Inter-Mountain Province

Water Body: Fish Lake
Release point: 118^0 18' 1" N. Latitude; 48^0 12' 41" W. Longitude
Watershed: Lake Roosevelt
Basin / Region: Inter-Mountian

Water Body: Gold lake
Release point: 118^0 55' 32" N. Latitude; 48^0 22' 9" W. Longitude
Watershed: SanPoil River
Basin / Region: Inter-Mountian

Water Body: Little Goose Lake
Release Point: 119^0 31’ 1” N. Latitude; 48^0 16’ 30” W. Longitude
Watershed: Okanogan River
Basin / Region: Columbia Cascade Province

Water Body: McGinnis Lake
Release Point: 118^0 53’ 34” N. Latitude; 48^0 2’ 12” W. Longitude
Watershed: Rufus Woods
Basin / Region: Inter-Mountain Province

Water Body: North Twin Lakes
Release Point: 118^0 23’ 14” N. Latitude; 48^0 17’ 13” W. Longitude
Watershed: Lake Roosevelt
Basin / Region: Inter-Mountain Province

Water Body: Owhi Lake
Release Point: 118^0 53’ 51” N. Latitude; 48^0 14’ 9” W. Longitude
Watershed: Rufus Woods
Basin / Region: Inter-Mountain Province

Water Body: Round Lake
Release Point: 118^0 19’ 20” N. Latitude; 48^0 17’ 32” W. Longitude
Watershed: Lake Roosevelt
Basin / Region: Inter-Mountain Province

Water Body: Simpson Lake
Release Point: 118^0 15’ 23” N. Latitude; 48^0 24’ 22” W. Longitude
Watershed: Lake Roosevelt
Basin / Region: Inter-Mountain Province

Water Body: South Twin Lake
Release Point: 118^0 23’ 22” N. Latitude; 48^0 15’ 42” W. Longitude
Watershed: Lake Roosevelt
Basin / Region: Inter-Mountain Province

Water Body: Summit Lake

Release Point: 119^0 9’ 2” N. Latitude; 48^0 17’ 00” W. Longitude
Watershed: Okanogan River
Basin / Region: Columbia Cascade Province

~~10~~9.3) Actual numbers and sizes of fish released by age class through the program.
*For existing programs, provide fish release number and size data for ~~the past three fish generations, or approximately~~ the past 12 years, if available. Use standardized life stage definitions by species presented in **Attachment 2**. Cite the data source for this information.*

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988								
1989								
1990			706,301	97	364,212	17.5		
1991			141,856	86	359,465	21		
1992			214,406	92	300,208	27		
1993			188,096	159	312,163	22		
1994			177,651	258	324,297	22		
1995			195,141	211	298,630	29		
1996			0	0	232,107	24		
1997			121,563	232	317,576	26		
1998			192,703	109	343,934	17		
1999			0	0	224,601	16		
Average								

~~10~~9.4) **Actual dates of release and description of release protocols.**
Provide the recent five year release date ranges by life stage produced (mo/day/yr). Also indicate the rationale for choosing release dates, how fish are released (volitionally, forced, volitionally then forced).
~~*and any culling procedures applied for non-migrants.*~~

~~10~~9.5) **Fish transportation procedures, if applicable.**
Describe fish transportation procedures for off-station release. Include length of time in transit, fish loading densities, and temperature control and oxygenation methods.

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) 600- gallon distribution truck. All distribution tanks 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. Typically fish will be in transit less than 4 hours. Oxygen is supplied through re-circulation and diffused O^2. No temperature control is required due to hatchery ambient water temperature (7.2^0C – 14^0C) and insulation quality of the distribution tanks.

~~10~~9.6) **Acclimation procedures (***methods applied and length of time***).**

Acclimation is conducted when water temperature differential between receiving water and tank water exceeds 6^0C. Acclimation is achieved through addition of receiving water over a one -hour period, until tank water temperature equal receiving water temperature.

~~10~~9.7) **Marks applied, and proportions of the total hatchery population marked, to identify hatchery component~~adults~~.**

None, the program has proposed a 100% marking (adipose and coded-wire) for hatchery fish beginning in 2001.

~~10~~9.8) **Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.**

Excess fish will be programmed into the distribution plans and outplanted into reservation lakes and streams.

~~10~~9.9) **Fish health certification procedures applied pre-release.**

No Certification is conducted immediately prior to release. All egg received by the facility receive a certified bacterial and viral screening.

~~10~~9.10) ~~)~~ Emergency release procedures in response to flooding or water system failure.

Flooding is not a concern. The system is ground water supplied (pumped). The system is backed-up with a 500 KVA diesel generator.

~~10~~9.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed ~~fish~~ species resulting from fish releases.

No listed fish species have been identified in locations stocked by this project. See Section 1.8 for additional information.

~~*(e.g. "All yearling coho salmon will be released in early June in the lower mainstem of the Green River to minimize the likelihood for interaction, and adverse ecological effects, to listed natural chinook salmon juveniles, which rear in up-river areas and migrate seaward as sub-yearling smolts predominately in May").*~~

SECTION 10. PROGRAM EFFECTS ON ALL ESA-LISTED, PROPOSED, AND CANDIDATE SPECIES (FISH AND WILDLIFE)

10.1) List all ESA permits or authorizations in hand for the hatchery program.

NA

10.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

10.2.1) Description of ESA-listed, proposed, and candidate species affected by the program.

Include information describing: adult age class structure, sex ratio, size range,migrational timing, spawning range, and spawn timing; and juvenile life history strategy, including smolt emigration timing. Emphasize spatial and temporal distribution relative to hatchery fish release locations and weir sites.

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If the following species exist within the area of influence of actions conducted by this facility they may be affected.

Bull trout
Redband rainbow trout
Westslope cutthroat trout

- Identify the ESA-listed population(s) that will be directly affected by the program. *(Includes listed fish used in supplementation programs or other programs that involve integration of a listed natural population. Identify the natural population targeted for integration).*
*** To obtain a list of listed species in your area, refer to Attachment 3 for the phone number and address of the nearest ecological field office.***

No known populations in the affected area.

- Identify the ESA-listed population(s) that may be incidentally affected by the program.
(Includes ESA-listed fish in target hatchery fish release, adult return, and broodstock collection areas).

No known populations in the affected area.

10.2.2) Status of ESA-listed species affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds (*see definitions in "Attachment 1").*

Bull trout – "Threatened" – No known population in the affected area.

- Provide the most recent 12 year (e.g. 1988 - present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

No known populations in the affected area.

- **Provide the most recent 12 year (e.g. 1988 - 1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.** *(Include estimates of juvenile habitat seeding relative to capacity or natural fish densities, if available).*

No known populations in the affected area.

- Provide the most recent 12 year (e.g. 1988 - 1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

No known populations in the affected area.

10.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed species in the target area, and provide estimated annual levels of take *(see "Attachment 1" for definition of "take")***. Provide the rationale for deriving the estimate.**

- Describe hatchery activities that may lead to the take of listed species in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Populations of bull trout are not known to exist within Colville Reservation waters, therefore a "take" is unlikely. The how, where, when, potential occurrence, risk and effects of a take are undeterminable because populations of bull trout are unknown on the reservation

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

None

- **Provide projected annual take levels for listed species by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).** *Complete the appended "take table" (Table 1) for this purpose. Provide a range of potential take numbers to account for alternate or "worst case" scenarios.*

- Unknown, See "take table"

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.
(e.g. "The number of days that westslope cutthroat trout are trapped in Lake Creek will be reduced if the total mortality of handled fish is projected inseason to exceed the 1988-99 maximum observed level.")

Modify or discontinue the activity that is the causative factor in exceeding a described take level.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

This section describes how "Performance Indicators" listed in Section 1.10 will be monitored. Results of "Performance Indicator" monitoring will be evaluated annually and used to adaptively manage the hatchery program, as needed, to meet "Performance Standards".

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

This Section will be addressed once the Northwest Power Planning Council has identified and approved Performance Indicators and Standards.

11.1.1) Describe the proposed plans and methods necessary to respond to the ~~proposed to collect data~~ appropriate "Performance Indicators" that have been identified for the program.

11.1.2) Indicate whether funding, staffing, and other support logistics are ~~-~~available or committed to allow implementation of the monitoring and evaluation program.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed ~~fish~~ species resulting from monitoring and evaluation activities.

~~*(e.g. "The Wenatchee River smolt trap will be continuously monitored, and checked every eight hours, to minimize the duration of holding and risk of harm to listed spring chinook and steelhead that may be incidentally captured during the sockeye smolt emigration period.)"*~~

SECTION 12. RESEARCH

Provide the following information for any research programs conducted in direct association with the hatchery program described in this HGMP. Provide sufficient detail to allow for the independent assessment of the effects of the research program on listed fish. ~~If applicable, correlate with research indicated as needed in any ESU hatchery plan approved by the co-managers and NMFS.~~ Attach a copy of any formal research proposal addressing activities covered in this section. Include estimated take levels for the research program with take levels provided for the associated hatchery program in Table 1.

12.1) Objective or purpose.

Indicate why the research is needed, its benefit or effect on listed natural fish populations, and broad significance of the proposed project.

Determine bull trout, redband rainbow trout and westslope cutthroat trout presence absence/distribution/status and determine potential utilization as a brood source for hatchery production. Although current fisheries data has not identified viable populations of indigenous salmonids inhabiting the Colville Indian Reservation, intensive surveys to assess the probability of their presence have not been conducted throughout the reservation. Headwater locations in particular may harbor remnant populations of bull trout, redband rainbow trout and westslope cutthroat trout, which may allow recovery in feasible locations. In an effort re-establish native salmonid populations where feasible and to manage consumptive non-native stock fisheries in a manner consistent with native species conservation, the hatchery program will initiate a native species presence/distribution/status survey to verify existing native salmonid populations within the reservation, their potential for enhancement and eventual utilization to enhance reservation fisheries.

12.2) Cooperating and funding agencies.

Funding Agency, Bonneville Power Administration

12.3) Principle investigator or project supervisor and staff.

Kirk Truscott, Hatchery Biologist, Colvile Confederated Tribes.

12.3) Status of population, particularly the group affected by project, if different than the population(s) described in Section 2.

Unknown

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

Several methods have been used to survey fish in streams. Several methods such as Hankin and Reeves esimate fish abundance, while other detect presence (Hillman and Platts, 1993; Green and Young 1993 and Bonar et al. 1997). Due to the assumed rare occurrence of species such as bull trout, redband rainbow trout and westslope cutthroat trout on the Colville Reservation, a fishery survey method which detects presence /distribution rather than abundance will better serve this initial investigation. Because all the aforementioned fish presence methods have inherent biases such as minimum species threshold densities, non-uniform population distribution (overdispersion), variable sampling efficiencies and time constraints, the tribe proposes to utilize a modification of methods described in the Interim Protocol for Determining Bull Trout Presence (Peterson et al. 2000). Although this protocol was establish specifically for bull trout, its application may be appropriate to assess presence of "rare" salmonids. It is important to note that establishing 100% confidence of species absence is not feasible and this survey will provide a single point-in-time estimate of rare species presence/distribution throughout a given stream. A zero catch using this method only indicates that species densities are below that identified in watersheds which used to develop the model (i.e. Salmon River, Clearwater River and Boise River basins in Idaho) for a given detection level (95% in this instance).

Due to the lack of data available of historical and current distribution of native resident salmonids within the Colville Reservation, a large-scale survey will be conducted (watershed scale). All streams within a watershed that exhibit perennial flows through all or portions of the stream course will be surveyed, employing a stratified random design to assess all types of habitat within a designated valley segment as described in the Timber Fish and Wildlife Ambient Stream Monitoring Methodology (Ralph 1990). The number a sample units required for each stream will be determined by consulting the probabilities of detection in 50- meter long sampling units table presented in Peterson et al. 2000. The random selection of the 50-meter sample sites will be proportional to the lengths of the identified valley segments.

Electro-fishing will be utilized as the principle means of sampling rather than nighttime snorkeling due to multiple species targeted and safety concerns. Electro-fishing (DC un-pulsed) passes and data recorded through each 50-meter sample unit will be conducted in accordance with the procedures described in Peterson et al. 2000. Electro-fishing will be limited to the morning hours once water temperatures reach 16^0C to reduce handling stress. Habitat variables such as gradient, temperature, channel dimension and large woody debris will be measured and recorded in accordance with procedures detailed in Peterson et al. 2000. However, because this objective attempts to determine distribution and genetic origin as well as presence, all survey sites designated for a 95% detection level will be sampled, regardless of bull trout observations.

Mitochondrial DNA analysis from 50 fish of each species (bull trout, redband rainbow trout and westslope cutthroat trout) will be conducted. Samples will be obtained during the presence/distribution survey (Task 3a). A One hundred percent or 50 fish sample, which ever is less, will be taken from each sample location. A random sub-sample of the aggregate of all sample sites will be selected to provide the 50 fish sample for a given stream. Samples will be obtained in

accordance with the protocol described by WDFW Genetics Laboratory Tissue Sampling for DNA Analysis (Shaklee 1998). A reputable State, Federal or University laboratory will perform the genetic analysis.

Priority streams for investigation will be identified prior to implementation. Criteria for prioritization will include:

(1) Locations adjacent to known or suspected indigenous salmonid populations.
(2) Locations where artificial stocking has not occurred.
(3) Stream courses that have average summer temperatures less than 18^0C.
(4) Locations that occur above natural barriers.
(5) Locations above man-made barriers.

12.6) Dates or time period in which research activity occurs.

June – October (2001-2005).

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

Fish encountered will be held in live-boxes continuously supplied with ambient stream water. Sampling will be limited to periods in which water temperatures are less than 16^0C. Fish will be anesthetized with MS-222 during the collection of biological data and tissue sampling for genetic analysis. All fish will be fully recovered from the anesthesia prior to release back to the collection site.

12.8) Expected type and effects of take and potential for injury or mortality.

Potential disturbance of bull trout from electrofishing is possible. Additionally, stress from handling and reaction to MS-222 has potential negative impacts to individuals, including direct mortality. The greatest type of effect is most likely the capture/handle/tissue sample of individuals.

12.9) Level of take of listed ~~fish~~ species: number or range of ~~fish~~ individuals handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

Unknown

12.10) Alternative methods to achieve project objectives.

None

12.10) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

None

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed ~~fish~~ species as a result of the proposed research activities.
(*e.g., "Listed~~coastal~~ westslope cutthroat trout sampled for the~~predation~~ growth study will be collected in compliance with~~NMFS Electrofishing~~ Federal Guidelines to minimize the risk of injury or immediate mortality.").*

See Section 12.5, 12.7 and 12.8

SECTION 13. ATTACHMENTS AND CITATIONS

Include all references cited in the HGMP. In particular, indicate hatchery databases used to provide data for each section. Include electronic links to the hatchery databases used (if feasible), or to the staff person responsible for maintaining the hatchery database referenced (indicate email address). Attach or cite (where commonly available) relevant reports that describe the hatchery operation and impacts on the listed species or its critical habitat. Include any EISs, EAs, Biological Assessments, benefit/risk assessments, or other analysis or plans that provide pertinent background information to facilitate evaluation of the HGMP.

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SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Table 1. Estimated listed species take levels by hatchery activity.

Listed species affected: _Bull trout_____ ESU/Population:_ Unknown_____ Activity:_ Native salmonid population presence, status, and distribution survey_____				
Location of hatchery activity:_ Northeastern Washington Within the Colville Reservation_____ Dates of activity:_ June-November_____ Hatchery program operator:_ Colville Confederated Tribes_____				
Type of Take	Annual Take of Listed Fish By Life Stage *(Number of Fish)*			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)		Unknown #		
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:
1. *An entry for a fish to be taken should be in the take category that describes the greatest impact.*
2. *Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).*
3. *If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take tabl*