

APPROVED

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Umatilla River Coho Program
Species or Hatchery Stock:	Coho Salmon (Stock-TBD)
Agency/Operator:	Oregon Department of Fish & Wildlife/ Confederated Tribes of the Umatilla Indian Reservation
Watershed and Region:	Umatilla/Columbia/Oregon
Draft Submitted: Re-submitted for ESA Consultation/Approval:	June 9, 2006 July 7, 2010; Approval Date: 04/20/2011
Date Last Updated:	July 2010

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Umatilla River Coho Program

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

Coho (*Oncorhynchus kisutch*), stock number- to be determined. This stock is not an ESA-listed population.

1.3) Responsible organization and individuals.

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

Confederated Tribes of the Umatilla Indian Reservation - Co-managers and operators of acclimation and adult collection facilities.

NOAA Fisheries – Provides funding for operation at Three Mile Falls Dam, Irrigon, Bonneville, and Cascade hatcheries under the Mitchell Act.

Bonneville Power Administration - Provides funding for transport and acclimation activities.

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

Primary funding for the Umatilla Coho program is provided by Mitchell Act. Bonneville Power Administration does provide funding for transportation and final rearing/acclimation. The Umatilla River coho production goal is 1,000,000 smolts which are produced at Cascade Hatchery. Cascade Hatchery is staffed with five full time permanent positions, plus one nine-month seasonal position. The budget for the Cascade Hatchery portion of the production is \$350,000. Beginning brood year 2010, Coho broodstock collection and spawning activities will be conducted at Three Mile Falls Dam, which will be funded from Mitchell Act budget for Research, Monitoring and Evaluation (\$79,000). For the coho broodstock backup program, adult coho will be collected and spawned at Bonneville Hatchery. The hatchery is staffed with fourteen permanent full time positions and 3 seasonal positions. Funding for egg incubation up to the eyed stage at Irrigon Hatchery will be from the Mitchell Act budget. Irrigon has the equivalent of 10 FTE's staff (shared staff with other fund types).

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

Three Mile Falls Dam - Beginning brood year 2010, Coho broodstock will be collected at the Three Mile Falls Dam's east bank adult trapping facility. Brood fish will be held at an adult holding and spawning facility which is also located at Three Mile Falls Dam's east bank, and fish will be spawned at this spawning facility. The facility is located approximately 4 miles upstream from the mouth of the Umatilla River, near the town of Umatilla, in Umatilla County, Oregon. The regional mark processing center site code for Three Mile Falls Dam is 5F33427 H27 24.

Bonneville Hatchery – If Coho broodstock requirements are not met at Three Mile Falls Dam, additional brood fish will be collected and spawned at Bonneville Hatchery as backup, as Coho population of the Umatilla River originated from the Tanner Creek stock. The facility is located on Tanner Creek, near its confluence with the Columbia River in Multnomah County, Oregon.

Irrigon Hatchery – Fertilized eggs from Three Mile Falls Dam will be transferred to Irrigon Hatchery for incubation up to the eyed stage before transfer to Cascade Hatchery. Irrigon Hatchery is located along the Columbia River above John Day Dam, 3 miles west of Irrigon, Oregon.

Cascade Hatchery – Cascade Hatchery will receive eyed eggs from Irrigon Hatchery for further incubation and rearing. If requires, Cascade Hatchery may also receive fertilized eggs from Bonneville Hatchery for incubation and rearing. Cascade Hatchery is located on Eagle Creek, approximately 2.5 miles west of Cascade Locks in Multnomah County, with the intake structure located in Hood River County.

Pendleton Acclimation Facility - Juvenile Coho will be transferred from Cascade Hatchery to the Pendleton Acclimation Facility for final rearing and release into the Umatilla River. The facility is located on the Umatilla River at RM 56 in Umatilla County, Oregon.

1.6) Type of program.

The Umatilla Coho program is a supplementation and harvest augmentation program. During basin reviews of Umatilla production programs by both ISRP and HSRG, recommendations were made for changes to the program. Co-managers are currently discussing options to reform this program to address review group's recommendations. Current framework agreements include:

- Transition to a localized Umatilla stock
- Increased Fish Health monitoring
- Increased Harvest reporting
- Increased Natural Production monitoring

Beginning 2010 brood year, the program will begin using localized stock as brood, which will be collected at Three Mile Falls Dam. If brood requirements are not met, addition brood of Tanner Creek stock may be used to supplement the broodstock need.

Reduction in Program Size—Since 1995, the Umatilla River Coho program had been releasing 1.5 million smolts into the Umatilla River (1.0 million from Cascade Hatchery and 500K from Lower Herman Creek Ponds of Oxbow Hatchery). Starting with the brood year 2008 (2010 release year) the Lower Herman Creek component of 500K smolts will be discontinued to reduce the program size and only 1.0 million smolts shall be released from the Cascade Hatchery production. Also, starting in brood year 2008, 90% of the smolts shall be ad-clipped for harvest augmentation.

1.7) Purpose (Goal) of program.

The goals of the Umatilla River Coho program are to provide ocean and in river harvest opportunities as well as supplement natural spawning. There are no numeric harvest goals for the Ocean and Columbia River fisheries; however, a return of 6,000 adults is the goal for the Umatilla River.

1.8) Justification for the program.

The Umatilla River hatchery coho program re-introduced Coho to the Umatilla River to provide harvest opportunities, while rebuilding and maintaining natural production. Beginning brood year 2010, the program will be transitioning to localized broodstock, which will be collected at Three Mile Falls Dam as suggested by ISRP and HSRG, provided that sufficient funding is made available for the operation. Beginning with the 2008 brood (release year 2010), 900K will be ad-clipped only and 100K will be un-clipped with CWTs. This will allow for

external identification of non-CWT hatchery adults for harvest purposes and minimize the number of fish that need to be checked for CWTs. This marking scheme will also provide for differentiation of natural and unmarked hatchery adults.

1.9) List of program “Performance Standards”.

See Section 1.10

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

1.10.1) “Performance Indicators” addressing benefits.

	Benefits	
Performance Standard	Performance Indicator	Monitoring and Evaluation
Transition to localized broodstock.	Collect brood fish and spawn at Three Mile Falls Dam.	Monitor adult return at Three Mile Falls Dam/
Program meets legally mandated rebuilding objectives.	Release 1,000,000 Coho smolts into the Umatilla River.	Monitor releases to insure numbers fall within IHOT guidelines of ±10% of stated goal.
Program meets legally mandated harvest objectives.	Program provides adults for mainstem treaty and non-treaty harvest.	Assess contribution to mainstem fisheries.
Program provides predictable, stable, and increased harvest opportunity.	Within tributary treaty and non-treaty harvest seasons occur annually.	Frequency of treaty and non-treaty tributary fisheries will be determined.
Restore and create viable natural spawning populations.	Natural adult return and escapement objectives to Threemile Dam are met.	Monitor adult returns at Threemile Dam to assess contribution of naturally produced adults and spawning escapement.
Release groups are sufficiently marked in order to assess contribution to rebuilding and fisheries goals.	All hatchery fish released are differentially marked either externally or with wire.	Adults enumerated at Threemile Dam, collected for broodstock, harvested, or recovered as carcasses are checked for marks and coded-wire tags to determine survival rates and run composition.
Communicate and coordinate effectively with co-managers in the Columbia River basin.	Participate in <u>US v Oregon</u> production advisory committee (PAC) meetings.	Provide technical information for PAC reports.

1.10.2) “Performance Indicators” addressing risks.

	Risks	
Performance Standard	Performance Indicator	Monitoring and Evaluation
Minimize impacts to ESA listed and other native species from enumeration and broodstock collection activities.	Level of trapping and handling mortality of STS at Three Mile Falls Dam.	Trap and recovery tank mortalities will be enumerated.
Minimize impacts to ESA listed and other native species from disease transmission.	Program will be in compliance with IHOT fish health transfer guidelines.	ODFW pathology will examine the fish at least once per month and just prior to transfer.
Minimize impacts to ESA listed and other native species from juvenile hatchery releases.	Smolts will be released and fish will be acclimated.	Outmigration timing and survival will be monitored at Three Mile Falls Dam.
Minimize impacts to ESA listed and other native species from program adults straying.	Number of program adults captured in other basins.	Coded wire and PIT tag recoveries of program adults are accessed through the PSMFC data bases and summarized.
Minimize impacts to ESA listed and other native species from program related harvest activities.	Number or percent of natural STS taken or caught and released in treaty and non-treaty tributary fisheries.	Creel surveys are conducted by the state and Tribal agencies to ensure take limitations for STS are not being exceeded.

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

Approximately 1,200 adults are required to meet production goals and beginning 2010 localized adult fish will be collected at Three Mile Falls Dam for broodstock. If brood requirements are not met with localized fish, supplemental brood fish may be collected at Bonneville Hatchery. No wild fish are incorporated in the broodstock.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

Life Stage	Release Location	Annual Release Level
Eyed Eggs		0
Unfed Fry		0
Fry		0
Fingerling		0
Yearling	Umatilla River (RM56)	1,000,000

Note: Smolt release goal has been reduced from 1.5 million to 1.0 million (see Section 1.6)

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

Harvest monitoring of coho has been conducted in the past and future monitoring is dependent on funding availability. Total adult coho returns to Three Mile Falls Dam since 1987 have ranged from 29 to 22,872 (Table 1).

Table1. Adult coho returns observed at Three Mile Dam, 1987-2008.

Year	Adults	Jacks	Total
1987	0	29	29
1988	923	761	1684
1989	4108	521	4629
1990	410	512	922
1991	1733	187	1920
1992	355	174	529
1993	1531	18	1549
1994	984	62	1046
1995	946	53	999
1996	618	24	642
1997	670	137	807
1998	3081	192	3273

1999	3702	205	3907
2000	4654	1276	5930
2001	22792	80	22872
2002	3820	971	4791
2003	8319	667	8986
2004	8668	165	8833
2005	4589	436	5025
2006	6590	679	7269
2007	5140	150	5290
2008	9042	1116	10158

Additional harvest data are presented later in Section 3.3 (Table 10). Harvest contribution to Ocean and Columbia River fisheries is unavailable. Currently, funding is unavailable to monitor harvest.

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

The Coho program was initially started in 1966 and was discontinued in 1970. The program was resumed in 1987.

1.14) Expected duration of program.

This is an on-going program and expected to continue indefinitely.

1.15) Watersheds targeted by program.

Umatilla River.

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

Managers have reassessed the program goals and reduced the smolt production goal from 1.5M to 1.0M starting with the 2010 release year. In addition, the majority of smolts will be ad clipped. Broodstock collection at Three Mile Falls Dam will begin in 2010. Egg incubation up to the eyed stage will be conducted at Irrigon Hatchery, and Cascade Hatchery would remain as the rearing and production facility for the program fish.

1.16.1) Potential Reform Proposal and Investments for Umatilla Coho Program.

Objective(s): The objective of this proposal is to transition the Tanner Creek population of coho that are released in the Umatilla River to a localized population. This proposed plan for transitioning to localized brood shall be implanted beginning brood year 2010.

Description of Proposal: This proposed plan would continue a 1,000,000 yearling smolts release in the Umatilla River. Smolts would be produced at Cascade Hatchery, acclimated at Pendleton facility, and released. Beginning brood year 2010, Coho adults would be collected at Three Mile Falls Dam (TMFD) and spawned. Green eggs could be transferred to Irrigon Hatchery for incubation. This proposal will request capital expenditures to incubate eggs locally to the “eyed-stage” and transfer to Cascade hatchery for production

Background: The Umatilla River Coho program was reduced to 1.0M smolts release in 2010. Production occurs at Cascade Hatchery with Mitchell Act funding. During subbasin reviews by HSRG, recommendations were made to; 1) change the brood stock to localized fish that are returning to the Umatilla River, and 2) develop conservation “stepping stone” program to enhance the localization of the population. The proposed modification is a response to these recommendations.

Facility Requirements: There are no recommended changes to the production at Cascade Hatchery. However, three moist air incubators were purchased with Mitchell Act funding and installed at Irrigon Hatchery for incubation of eggs to eyed stage prior to transfer to Cascade Hatchery. This practice would reduce the transportation cost of shipping green eggs, as well as, synchronize embryo development via temperature manipulation. Synchronization of embryos is beneficial for production at Cascade

Release Strategy: Smolts would be transferred from Cascade to the Pendleton acclimation facility and released in the spring. Transportation and acclimation would be funded through the BPA Fish and Wildlife program.

Adult Disposition: In the near term, there would be no changes to the adult disposition. To implement the HSRG second recommendation, strategies would need to be developed to segregate the hatchery harvest from the conservation adults on the spawning grounds.

Ecological Interactions: There are no expected changes to the ecological interactions due to broodstock transition to a localized population, except that brood collection at Three Mile Falls Dam may affect the ESA-listed steelhead.

Fish Health Considerations: There are no unique pathogens associated with the Umatilla River. Standard practices of BKD screening and testing for culturable viruses and bacteria would apply. Pathogens of concern are BKD and IHNV.

Genetics: There is no wild coho population in the Umatilla River. The transition to a coho population returning to the Umatilla River should enhance the localization of the genetic process.

Monitoring and Evaluation: There is no direct funding through BPA to monitor

coho. All information is collected via secondary data collection by other projects. Adults are enumerated at TMFD and redds are recorded periodically while performing fall Chinook redd surveys.

This proposal would recommend funding a M&E efforts for redds surveys and augment the out migration study to enumerate natural production of coho

Logistics: Collaboration with the CTUIR would be essential to implement this program. Allocated tasks include:

Table 2. Allocation of proposed tasks by agency and funding source.

Hatchery Tasks	Agency	Funding	Comments
Adult collection	CTUIR	BPA	Supplement ongoing tasks
Adult spawning	CTUIR/ODFW	BPA/Mitchell Act	New
Fish Health (adults)	ODFW	Mitchell Act	New
Incubation	ODFW	Mitchell Act	New
Transportation (egg)	ODFW	Mitchell Act	New
Production	ODFW	Mitchell Act	On going
Marking	ODFW	Mitchell Act	On going
Transfer (smolts)	ODFW	BPA	On going
M&E Tasks			
Redd Surveys	CTUIR	BPA	Supplement ongoing tasks
Out migration	ODFW	Mitchell Act	Supplement ongoing tasks

Funding/Budget: This proposal would result in Mitchell Act cost of approximately \$167,075 for artificial production, fish health and harvest reporting.

Table 3. Proposed positions for personnel services, duration, and associated costs.

PERSONAL SERVICES					
Position	P/N	Months	Rate	OPE	Total
PEMC		1	7224	3500	\$10,724
F&W Tech Umatilla or Irrigon		4	\$2,585	\$1,810	\$17,580
Fish Pathologist (NRS3)		1	\$5,187	\$2,594	\$7,781
Experimental Biology Aide		2	\$2,052	\$1,300	\$6,704
Supr NRS3		1	\$5187	\$2,594	\$7,781
Experimental Biology Aide		4	\$2,052	\$1,300	\$13,408
Total PS					\$63,978
SERVICES AND SUPPLIES					
Item		Quantity	Unit	Amount	Total
Field supplies					\$20,000
Total SS					\$20,000
Capital					
Moist air incubators		2	\$16,000		\$32,000
Indirect (22.74%)					\$19,097
SUBTOTAL PS and SS					\$135,075

Additional Natural Production and smolt abundance out migration monitoring would be requested. Monitoring has not been included in the budget proposal.

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

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

An HGMP for this program was submitted to NOAA Fisheries on 6-9-2006 which serves as take authorization for the ESA-listed fish. This is an updated version of the previously submitted HGMP.

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.

- Identify the ESA-listed population(s) that will be directly affected by the program.

No direct take of ESA-listed fish is expected due to this coho program. However, about 200 juveniles of listed steelhead may be lethally taken by CTUIR's salmon progeny maker development program.

- Identify the ESA-listed population(s) that may be incidentally affected by the program.

During brood collection at Three Mile Falls Dam, ESA-listed steelhead may be incidentally affected by this program. Also, Coho adults that stray from Umatilla River releases may incidentally affect other populations; however, stray rates are not well documented. For example, it is unknown if stray rates are low or if monitoring efforts are not able to effectively detect strays. Nonetheless, the reduction in program size will reduce the total number of stray fish and the increase ad clipping rates should help identify hatchery strays. Although not well documented, it is anticipated that less than 5% of the adult coho stray outside the basin.

Umatilla River Summer Steelhead (*Oncorhynchus mykiss*; stock 091) – included as part of the Mid-Columbia ESU - listed as “Threatened” under the federal ESA. Historical returns (1987-2008) of wild- and hatchery-origin steelhead to Three Mile Falls Dam are listed in Table 3.

Table 3. Summer steelhead adult returns to Three Mile Falls Dam and percentage of natural- and hatchery-origin fish, 1987-2008¹.

Year	# Hatchery Fish	# Wild Fish	Total	% Hatchery Fish	% Wild Fish
1987-88	165	2315	2480	7	93
1988-89	370	2104	2474	15	85
1989-90	245	1422	1667	15	85
1990-91	387	724	1111	35	65
1991-92	523	2246	2769	19	81
1992-93	616	1297	1913	32	68
1993-94	345	945	1290	27	73
1994-95	657	874	1531	43	57
1995-96	785	1296	2081	38	62
1996-97	1463	1014	2477	59	41
1997-98	903	862	1765	51	49
1998-99	750	1135	1885	40	60
1999-00	752	2140	2892	26	74
2000-01	1091	2571	3662	30	70
2001-02	1895	3621	5516	34	66
2002-03	963	2117	3080	31	69
2003-04	1287	2101	3388	38	62
2004-05	756	1722	2478	31	69
2005-06	488	1480	1968	25	75
2006-07	914	2566	3480	26	74
2007-08	901	2232	3133	29	71
Average	774	1752	2526	31%	69%

¹Source: Clarke et al. 2009

To estimate the duration of naturally-produced steelhead in freshwater and salt water, scale samples were taken and processed in order to determine the years spent in the two different environments. Based on scale analysis, over 87.5% of

natural adult summer steelhead returning to TMFD spent two years in freshwater before outmigration (Figure 1). Nearly equal numbers of total age 4 (46%) and age 5 (48%) adult steelhead returned in all years combined. There is considerable variability from year to year as shown by the 2007 data (Figure 2).

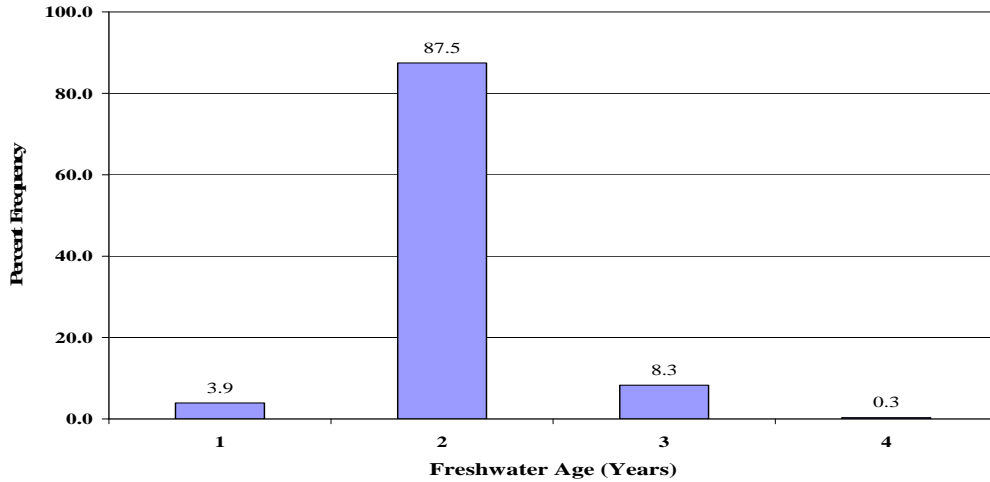


Figure 1. Years of Freshwater Rearing of Natural Summer Steelhead Adults Returning to the Umatilla River, 1983, 1989, 1990, 1992, and 1994-2004, 2006, 2007 (n = 918).

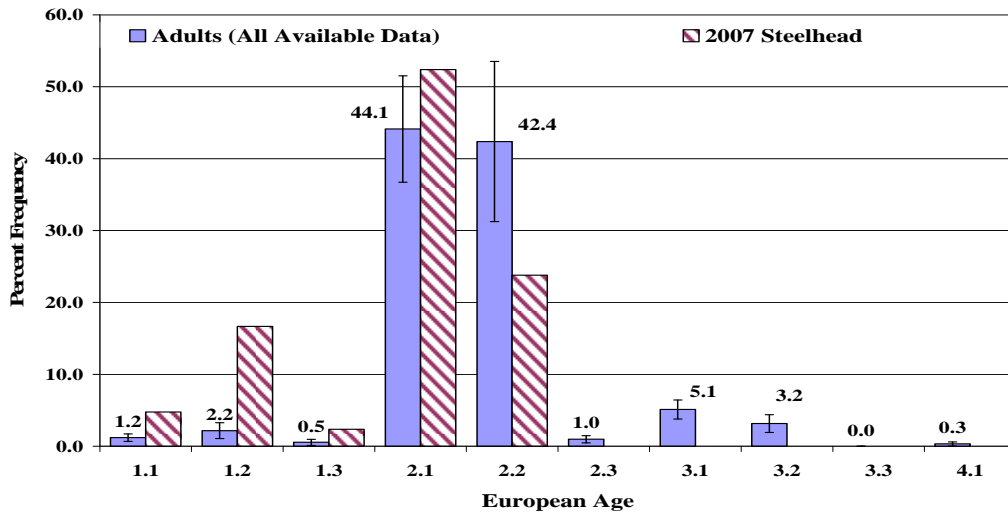


Figure 2. Combined European Age (years of freshwater and salt water rearing) of Natural Summer Steelhead Adults Returning to the Umatilla River (solid bars 1983, 1989, 1990, 1992, and 1994-2004, 2006, 2007 return years, n = 918 with plus and minus one standard deviation; banded bars, 2007 data only; n = 42).

Tables 4a-4c. Life History Tables of Umatilla Summer Steelhead by River Reach.

4a. From the mouth of the Umatilla to the mouth of McKay Creek (RM 0-50.5).

Life History Stage	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
Adult Migration	X	x	x	x	x	x	X	x				
Prespawning Holding												
Spawning												
Incubation												
Rearing	X	x	x	x	x	x	X	x	x	x	x	x
Juvenile Migration	X	x	x	x	x	x	X	x	x	x		

4b. From the mouth of McKay Creek to the mouth of Meacham Creek (RM 50.5-79) and mid-basin streams.

Life History Stage	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
Adult Migration	X	x	x	x	x	x	X	x				
Prespawning Holding					x	x	X	x				
Spawning						x	X	x				
Incubation						x	X	x	x			
Rearing	X	x	x	x	x	x	X	x	x	x	x	x
Juvenile Migration	X	x	x	x	x	x	X	x	x			

4c. From mouth of Meacham Creek to the forks (RM 79-89 and headwater streams).

Life History Stage	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
Adult Migration	X	x	x	x	x	x	X	x				
Prespawning Holding					x	x	X	x				
Spawning						x	X	x				
Incubation						x	X	x	x			
Rearing	X	x	x	x	x	x	X	x	x	x	x	x
Juvenile Migration	X	x	x	x	x	x	X	x	x			

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.

Abundance and Productivity: Population viability thresholds (5% extinction probability over 100 years) defined by the Mid-Columbia Steelhead ESA Recovery Plan are a 10-year geomean of 1,500 natural origin spawner and a SAR adjusted and delimited return/spawner productivity of 1.26 (NMFS 2008). Current viability measures reported for the Umatilla population by NMFS (2008) were 1,472 natural spawners and 1.50 return/spawner productivity.

- 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.

Figure 3 shows progeny-to-parent and smolts per female productivity measures for Umatilla River naturally-reared steelhead (Clarke et al. 2009, White et al. 2007). All available egg-to-smolt survival and smolt-to-adult return data for Umatilla natural steelhead are presented in Table 3 (White et al. 2007).

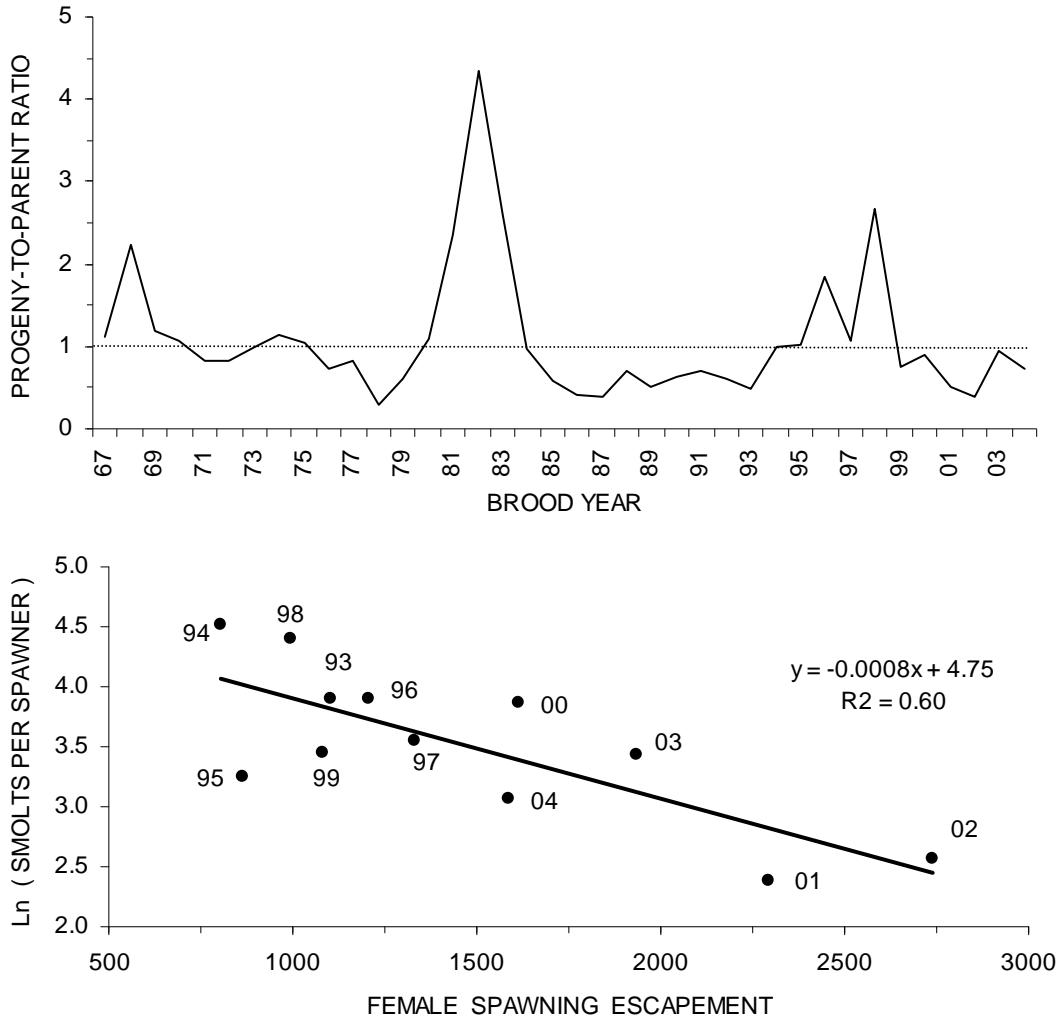


Figure 3. Progeny-to-parent ratios (top) and smolts per female spawner productivity measures for Umatilla River naturally-reared steelhead. Parents were hatchery and natural spawning escapement; progeny were estimates of natural adults produced; smolts were estimated abundance of juvenile outmigrants to the lower Umatilla River.

Table 5. Egg-to-smolt survival and smolt-to-adult return (SAR) for Umatilla natural steelhead. Data are incomplete for number of smolts produced by the 2003 and 2004 broods, and number of adult returns from the 2001 and 2002 broods.

EGG-TO-SMOLT SURVIVAL				SMOLT-TO-ADULT RETURN			
Brood		No.	Survival	Outmigration			
Year	No. Eggs	Smolts	(%)	Year	No. Smolts	No. Returns	SAR (%)
1993	6,116,187	52,010	0.85	1995	54,361	837	1.54
1994	4,323,435	68,162	1.58	1996	73,361	1,040	1.42
1995	4,824,913	26,295	0.54	1997	22,221	1,025	4.61
1996	5,761,557	59,278	1.03	1998	59,182	3,151	5.32
1997	6,969,537	46,532	0.67	1999	46,530	2,295	4.93
1998	5,267,468	83,144	1.58	2000	81,759	4,015	4.91
1999	5,809,681	32,573	0.56	2001	33,844	1,131	3.34
2000	7,278,281	73,177	1.01	2002	77,016	2,268	2.94
2001	12,631,251	26,813	0.21				
2002	13,813,433	37,559	0.27				
2003	11,815,091	56,855	0.48				
2004	7,214,651	31,423	0.44				
93-02 Mean	7,279,574	50,554	0.83	95-02 Mean	56,034	1,970	3.63

- 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.

The number and percent of adult steelhead available to spawn of wild and hatchery origin since 1996 are presented in Table 6.

Table 6. Disposition of summer steelhead (STS) adults returning to the Umatilla River at and above Three Mile Falls Dam, 1996-2008. (Data for the run year 2007-08 are preliminary).

RUN YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Steelhead	2081	2477	1765	1885	2892	3662	5516	3080	3388	2478	1968	3480	3133	
Natural STS	1296	1014	862	1135	2140	2571	3621	2117	2101	1722	1480	2566	2232	
Hatchery STS	785	1463	903	750	752	1091	1895	963	1287	756	488	914	901	
Natural STS Sacrificed or Mort	7F-1M	5F	1F-1M	1F	0	2F	1F	1F	2F	2F 2M	1F	0	1F	
Hatchery STS Sacrificed or Mort	58F-15M	51F-44M	43F-27M	51F-23M	29F-13M	69F2 8M	26F2 3M	54F 28M	35F-27M	23F 20M	26F 14M	22F 24M	34F 49M	
Natural STS Taken for Brood^a	52F-50M	50F-50M	40F-40M	47F-49M	44F-57M	46F4 6M	47F-47M	49F 51M	38F-41M	42F 39M	35F 42M	40F 40M	43F-42M	
Hatchery STS Taken for Brood	14F-17M	10M	11F-19M	15M	15M	10M	10M	9M	10F-9M	10F 9M	10F 10M	10F 10M	5F 5M	
Natural Females	863	689	549	720	1317	1753	1944	1472	1063	1029	646	1521	1496	

RUN YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Available to Spawn														
Hatchery Females Available to Spawn	342	641	450	370	308	547	800	465	540	377	122	383	377	
Total Females Available to Spawn	1205	1330	999	1090	1625	2300	2744	1937	1603	1406	768	1904	1873	
Natural Males Available to Spawn	323	220	226	313	722	724	1571	538	951	605	750	964	644	
Hatchery Males Available to Spawn	275	660	308	205	284	350	861	346	574	249	159	347	308	
Total Males Available to Spawn	598	880	534	518	1006	1074	2432	884	1525	854	909	1311	952	
Natural STS Available to Spawn	1186	909	775	1033	2039	2477	3515	2010	2014	1634	1396	2485	2140	
Hatchery STS Available to Spawn	617	1301	758	575	592	897	1661	811	1114	626	281	730	685	
Total STS Available to Spawn	1803	2210	1533	1608	2631	3374	5176	2821	3128	2260	1677	3215	2825	
Redds Observed in Index Reaches	119	138	126	218	238	382	347	322	208	218	50	190		
Index Reaches Miles Surveyed	21.4	21.4	21.4	21.4	21.4	21.4	19.4	21.4	19.9	21.4	17	19.5		
Total Redds Per Mile in Index Reaches	5.6	6.4	5.9	10.2	11.1	17.9	17.9	15.0	10.5	10.2	3.1	9.7		

^a Does not include excess brood released back to the river at the end of spawning operations.

- 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.

The number and percent of adult steelhead available to spawn of wild- and hatchery-origin since 1996 are presented in Table 7.

Table 7. Percent of adults available for spawning in the Umatilla River that were hatchery origin, brood years 1996-2008.

Brood Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
% of Hatchery Origin	34.2	58.9	49.4	35.8	22.5	26.6	32.1	28.7	35.6	27.7	16.8	22.7	24.2

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

- 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.

The Three Mile Falls Dam adult collection facility is operated on a daily basis from August 16 until December 1st. During this time period, the facility will be operated to collect Coho, fall Chinook and summer steelhead broodstock and to enumerate and record biological data on all returning salmonids including coho. All adults collected are anesthetized with CO₂. Fish not collected for broodstock are transferred to recovery tanks prior to release back into the Umatilla River.

Beginning December 1st, the trapping facility is generally operated for five days and is then closed for nine days. Returning adults are allowed to volitionally migrate upstream when the trap is not being operated and adult returns are video enumerated. During this time period, the trap is operated to collect summer steelhead and spring Chinook broodstock and to collect biological data. Trapping and transportation of all salmonids is implemented in the spring when passage flow criteria of 150 cfs for 30 days after release cannot be met. The trap is generally not operated from July 15 to August 16.

Operation of the adult collection and enumeration facility as described above may also lead to the incidental take of listed fish during handling activities. In addition, the current goal is to collect 50 pairs of unmarked steelhead for broodstock that provide the eggs for the hatchery program.

A complete list of activities for the ODFW Umatilla Hatchery Monitoring and Evaluation project (#1990-005-00), the ODFW Evaluation of Juvenile Salmonid Outmigration and Survival in the Lower Umatilla River Basin project (#1989-024-01), the CTUIR Umatilla Basin Natural Production Monitoring and Evaluation project (#1990-005-01), and the CTUIR Develop Progeny Marker for Salmonids to Evaluate Supplementation project (#2002-030-00) are provided in their respective Statements of Work to the Bonneville Power Administration.

The narrative below is an excerpt from the 2010 Annual Operation Plans summarizing M&E project activities on steelhead, Chinook and coho salmon.

A. Steelhead

1. Umatilla Hatchery, 2009 brood- Determine and compare rearing performance, smolt condition, juvenile migration performance, and smolt-to-adult survival of steelhead released from the Minthorn and Pendleton facilities, and those direct stream released near Bonifer site. Lengths (300), weights (100), smolt

conditions, and descaling (100) will be sampled from fish at transfer to and release from acclimation facilities. Thornhollow may be used in low river flow emergencies. To determine juvenile migration performance to TMFD, John Day and Bonneville Dams approximately 1,500 fish per raceway will be PIT tagged. To determine smolt-to-adult survival we will ADLV+CWT mark 20,000 fish from each of the three release groups. All remaining fish will be marked AD.

B. Spring Chinook salmon

1. Umatilla Hatchery, 2008 brood yearlings- Determine and compare rearing performance, smolt condition, juvenile migration performance, and smolt-to-adult survival of each of three yearling spring Chinook salmon release groups (standard transfer released in March, fall transfer released in March, and fall transfer released in December). Lengths (300), weights (100), smolt conditions, and descaling (100) will be sampled from fish at transfer to and release from acclimation facilities. To determine migration performance we will PIT-tag 4,600 fish from one Michigan series for each of two fall transfer release group (3 raceways) in October 2009 and transfer them to Imeqes acclimation facilities. An additional group of 2,300 will be PIT-tagged in one Michigan series (3-raceways) of the standard release group in January 2009.

2. Umatilla Hatchery, 2009 brood yearlings- To determine migration performance we will PIT-tag 2,300 fish in each of the 2 Harvest Group releases, and 1,500 fish in the Conservation Group release. Smolt-to-adult survival of the *Conservation Group* will be determined by coded-wire-tagging all released fish without fin clips. For the *Harvest Group*, we will mark 40,000 fish (ADCWT) in release groups that are transferred to Imeqes in fall and winter. All remaining *Harvest Group* production will be Ad-clipped.

C. Fall Chinook salmon

1. Umatilla Hatchery, 2009 brood sub-yearlings- Determine rearing performance, smolt condition, juvenile migration performance, and smolt-to-adult survival of fall Chinook salmon reared at Umatilla Hatchery and released into the Umatilla River. Lengths (300), weights (100), smolt conditions, and descaling (100) will be sampled from fish at transfer to and release from acclimation raceways. To determine juvenile migration performance we will PIT tag 800 fish in May 2010.

2. Bonneville Hatchery, 2008 brood yearlings- Determine and compare smolt condition, and smolt-to-adult survival of yearling fall Chinook salmon release at Thornhollow and Pendleton. Lengths (300), weights (100), smolt conditions, and descaling (100) will be sampled from fish at transfer to and release from acclimation raceways. To determine and compare smolt-to-adult survival release groups, 25,000 fish from each of the two release groups will be marked ADCWT. All remaining fish will be marked Ad clipped.

D. All broods- Determine and compare smolt-to-adult survival, fishery contribution, straying, relative smolt-to-survival, adult production, Umatilla River return, and life history characteristics of all rearing and release strategies from groups at Umatilla and Bonneville Hatcheries.

NATURAL PRODUCTION EVALUATION (CTUIR)

- A. Monitor natural spawning activities of hatchery and natural adult spring Chinook, fall Chinook and coho salmon, and summer steelhead in the Umatilla River Basin.
- B. Estimate tribal harvest of adult salmon and steelhead returning to the Umatilla River Basin.
- C. Determine age, growth of spring Chinook salmon and summer steelhead in the Umatilla River Basin.
- D. Salvage stranded salmon or steelhead as needed
- E. Adult Passage Evaluations: Determine fallback ratios and passage routes, rates, and delays at diversions. Determine holding and spawning locations
 - Summer steelhead (tag 60 adults)
 - Fall Chinook (tag 15 adults)
 - Coho (tag 15 adults)
 - Collaborate with the Lamprey Project
 - Install and monitor 5 fixed site receivers on major diversions

Bureau of Reclamation Monitoring and Evaluation (M&E) Program:

Summer Steelhead – 2009 Brood

The Columbia Cascades Area Office for the Bureau of Reclamation (BOR) has requested 4,500 ad clipped Umatilla Hatchery summer steelhead smolts (HSTS) to assess *take* in BOR operated Feed and Maxwell irrigation canals. This first component will assess *take* from production releases of steelhead as they migrate through the Umatilla River. This component requires approximately 4,500 smolts, 1,500 for each release site; BOR will provide PIT tags (model #TX1411SGL or alternative) and Bonneville Power Administration (BPA) will fund ODFW staff (through their ongoing M&E project) to insert production release PIT tags. ODFW M&E staff will insert 4,500 fish with PIT tags between January and March 2010 to assess the production releases. These fish will be utilized for the out migrations study as well as *take* assessment.

Fish and Wildlife Service, Abernathy Laboratory, will provide technical expertise and monitoring of the detection systems at Feed and Maxwell Canals and TMFD. Additional systems maybe installed later, if needed. Pending results will determine the number of PIT fish for ongoing studies.

BOR will also contract with CTUIR to survey and salvage stranded fish within the Feed and Maxwell canals after the irrigation season when facilities are shutdown.

Juvenile Outmigration M&E:

- A. Operate and maintain smolt trap and PIT tag detection system at Three Mile Falls Dam.
- B. PIT tag up to 3,000 natural summer steelhead smolts.
- C. Estimate the abundance and survival of natural summer steelhead smolts.
- D. Monitor the life history characteristics of natural summer steelhead smolts.
- E. Collaborate with the Hatchery M&E and Natural Production M&E projects to estimate the productivity of natural summer steelhead.
- F. Collaborate with the Natural Production M&E project on the design and installation of new PIT tag antennas at Three Mile Falls Dam.

CTUIR's Development of Progeny Marker for Salmonids:

Following a habitat inventory a back pack electro shocking survey will be conducted for capturing and sampling juvenile steelhead. A multiple removal method will be used for calculating population estimates of juvenile steelhead in Iskuulpa Creek and for taking a lethal sample from about 200 juveniles. Juveniles will be anesthetized using MS-222. Juveniles taken for otoliths will be euthanized with an overdose of MS-222. After the first year of introducing the strontium marker we will focus our otolith sampling to the zero age fish only. After the second year of we will focus our otolith sampling to zero and yearling age juveniles. After the third year and succeeding years we collect samples from all age classes.

CTUIR is also monitoring freshwater mussels and lamprey.

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

Since 2001, mortality at Threemile Dam of natural steelhead has ranged from 0.00% to 0.23% of the total annual natural STS return (0-4 fish) with an average of 0.074%. Past mortality and broodstock collection data is included in Table 6. Past numbers of juveniles sampled, and sampling mortality, is shown in Table 8.

Table 8. Annual number of juvenile summer steelhead sampled, and sampling mortalities, in the Umatilla River from 1995 to 2007.

Year	Number Sampled		Sampling Hatchery	Mortalities Natural
	Hatchery	Natural		
1995 ^a	10,652	1,869	21	7
1996	12,432	3,451	50	14
1997	162	194	4	7
1998	1,924	2,642	50	61
1999	1,882	1,816	28	27
2000	1,078	626	0	1
2001	4,980	847	50	15
2002	1,029	630	14	6
2003	1,172	1,015	7	35
2004	1,071	660	3	6
2005	2,197	1,992	103	10
2006	1,720	1,020	9	18
2007	763	693	12	7

^a Includes fish sampled using a fyke net at river mile 0.5 and fish captured at Feed, Maxwell and Westland Canal traps.

- 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).

Table 9. Estimated listed salmonid take levels by hatchery activity (see notes at the bottom of the Table).

Listed species affected: Mid-Columbia steelhead ESU/Population: Mid-Columbia steelhead				
Activity: Coho Brood Collection, Operation of Three Mile Falls Dam, and RM&E of all programs				
Location of hatchery activity: Three Mile Falls Dam (TMFD); Dates of activity: Operated every month of the year due other hatchery and monitoring programs.				
Hatchery program operator: Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Oregon Department of Fish and Wildlife. TMFD operated by CTUIR				
Type of Take	Annual Take of Listed Fish By Life Stage (<i>Number of Fish</i>)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)	0	0	500*	0
Collect for transport b)	0	0	0	0
Capture, handle, and release c)	0	0	500*	0
Capture, handle, tag/mark/tissue sample, & release d)	0	10,000**	0	0
Removal (e.g. broodstock) e)	0	0	0	0
Intentional lethal take f)	0	200***	0	0
Unintentional lethal take g)	0	0	0	0
Other Take (specify) h)	0	0	0	0

- 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.

Notes:

* During spring Chinook salmon adult trapping at TMFD, potentially 500 listed steelhead may be encountered, handled, released, or used for the steelhead broodstock (6 pairs) production.

** M&E on salmonid juvenile emigration is an ongoing project that includes other programs as well, which may handle thousands of listed steelhead, as well as, thousands of non listed Chinook and Coho in April, May, and June.

***These intentional take are associated with the CTUIR’s project on the development of salmon progeny marker.

- 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.

Outmigration and Survival Study - As per 4d rule research permit # 13765, we will reduce numbers collected by adjusting the sampling times and avoid sampling when large numbers of natural steelhead are passing through the sampling location/facility. To reduce the number of mortalities from fish jumping out of the sample tank or from other areas, we will apply covers and screens to prevent escape and monitor the facility closely. Monitoring information is mostly obtained through remote interrogation of tags, without any handling. No contingency actions are planned for the adult handling or broodstock collection.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the *NPPC Annual Production Review Report and Recommendations - NPPC document 99-15*). Explain any proposed deviations from the plan or policies.

The program is consistent with Mitchell Act language and is included in Table B.7. of the *US v. Oregon* 2008-2017 Management Agreement of the Columbia River Fish Management Plan. The program is also consistent with the NPCC Umatilla/Willow Subbasin Plan and follows the 1995 Integrated Hatchery Operations Team (IHOT) Policy and Procedures for Columbia Basin Anadromous Salmonid Hatcheries. HSRG recommendation for transitioning to localized broodstock will be implemented beginning 2010 brood year.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

- 1) *US v. Oregon* 2008-2017 Management Agreement of the Columbia River Fish Management Plan
- 2) CTUIR. 1994. Wildlife Mitigation Plan (Draft) May 1996, Columbia Basin Salmon Policy. 1995 pg 9-10, and Water Assessment Report;
- 3) NMFS - Salmon & Steelhead Enhancement Plan for the Washington and Columbia River Conservation areas. Vol 1. chpt 4, 37pgs;
- 4) Reeve, R. 1988. Umatilla River Drainage Anadromous Fish Habitat Improvement Plan;
- 5) CTUIR/ODFW. 1990. Umatilla Hatchery Master Plan;
- 6) OWRD. 1988. Umatilla Basin Report;
- 7) BOR. 1988. Umatilla basin Project Planning Report,

- 8) Umatilla County - Comprehensive Plan. 1983, chpt 8;
- 9) USNF - Umatilla National Forest Land & Resource Management Plan. 1990, chpt 2, pg 13. and Final EIS. 1990, chpt III, pgs 59-62;
- 10) CTUIR/ODFW. 1990. Umatilla River Subbasin Salmon and Steelhead Production Plan;
- 11) Boyce, R. 1986. A Comprehensive Plan for Rehabilitation of Anadromous Fish Stocks in the Umatilla River Basin;
- 12) 11)USFWS & NMFS. 1982. Umatilla R. Planning Aid Report.
- 13) USBR and BPA. 1989. Umatilla Basin Project. Initial project workplan presented to the NWPPC, May 1989.
- 14) Mid-C Steelhead Recovery Plan

This HGMP is consistent with these plans and commitments and doesn't appear to be in conflict with the steelhead draft Mid-C Recovery Plan.

3.3) Relationship to harvest objectives.

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years, if available.

Since 1992, annual harvest in the Umatilla River non-tribal fishery has averaged 195 adults and 45 jacks, or 3.9% and 12.0% of their respective return size (Table 10). Tribal participation in the Umatilla River coho salmon fishery has been minimal since the early 1900's.

Table 10. Annual angling effort, harvest, and catch of coho salmon in the Umatilla River non-tribal fishery, run years 1992-2007.

Run Year	No. anglers inter-viewed	Total hours fished	<u>No. HARVESTED</u>		<u>No. RELEASED</u>		<u>PERCENT OF RETURN HARVESTED</u>	
			Adult	Jack	Adult	Jack	Adult	Jack
1992	562	1,008	35	70	9	18	9.0	28.8
1993	639	583	49	4	0	0	3.1	18.2
1994	596	1,109	21	12	23	19	2.1	16.2
1995	517	813	23	25	7	0	2.4	32.1
1996	665	846	44	51	0	0	6.6	68.0
1997	434	885	37	134	0	24	5.2	49.4
1998	549	-----	56	33	0	4	1.8	14.7
1999	779	1,574	184	56	50	14	5.7	21.5
2000	1,001	1,517	79	112	50	21	1.7	8.1
2001	1,005	1,957	455	7	1,281	16	2.0	8.0
2002	995	2,669	220	104	351	95	5.4	9.7
2003	1,263	2,319	683	46	1,781	10	7.6	6.5
2004	763	1,618	271	2	1,102	6	3.0	1.2
2005	853	1,803	332	24	1,216	13	6.7	5.2
2006	835	1,925	395	36	1,275	46	5.6	5.0
2007	516	1,545	235	2	888	12	4.4	1.3
Mean	754	1,463	195	45	502	19	3.9	12.0

The Umatilla River coho program contributes to fisheries in the Columbia and Umatilla Rivers. Current Ocean and lower Columbia River (below Bonneville Dam) fisheries only allow for retention of adipose fin clipped fish, although the non-treaty commercial gill-net fisheries are not selective for adipose fin-clipped coho. In the past, 95% of the Umatilla releases have been unmarked. Beginning with the 2008 brood (2010 release year), 90% of the production will be adipose clipped, and the remaining 10% will have CWT only.

3.4) Relationship to habitat protection and recovery strategies.

The Umatilla Coho program is a part of an overall Umatilla Basin Salmon and Steelhead Restoration Program. In addition to on-going hatchery operations, fish passage and habitat restoration efforts are being implemented along with monitoring and evaluation of both the hatchery and natural components of the restoration program.

Factors limiting the natural production of Coho in the Umatilla River Basin include channelization, low summer flows, warm water temperatures, sediment, and poor habitat diversity caused by urban and rural development/land management practices. Ocean conditions and the mortalities and stresses from the operation of hydropower projects on the mainstem Columbia River are important

factors outside the basin. There continues to be degradation to fish habitat in these areas that hampers improvement efforts.

3.5) Ecological interactions.

- (1) Interactions with species that could negatively impact program: The program may be negatively impacted by a variety of freshwater and marine predators during migration periods such as northern pikeminnow, smallmouth bass, seagulls, cormorants, Caspian terns, and pinnipeds which could significantly reduce overall survival rates of program fish.
- (2) Interactions with species that could be negatively impacted by program: Co-occurring natural steelhead populations in the Umatilla River and ESA listed salmon and steelhead populations in the mainstem Columbia River could be negatively impacted by co-mingling with program fish in migration corridors. Impacts could potentially occur from competition for food, predation, disease transmission, or density dependent effects. In order to minimize the potential for any of these effects to occur, program fish are volitionally released from acclimation facilities as full term yearling smolts. The program also follows the protocols outlined by IHOT (1995) to minimize the potential for disease transmission to occur.
- (3) Interactions with species that could positively impact program: Other salmonid species that naturally spawn in the target stream may positively impact program fish by contributing nutrients from decaying carcasses that increase productivity of the Umatilla River.
- (4) Interactions with species that could be positively impacted by program: The program provides a benefit to other salmonid species in the basin by contributing nutrients from decaying carcasses that increase productivity of the Umatilla River. Coho may also play an important role in community ecology since this population historically existed sympatrically with other species in the basin.

In addition, migrating hatchery fish may overwhelm predator populations, providing a protective effect to natural steelhead in the migration corridor. Off spring from natural spawning of program fish may also provide a forage source for both bull trout and natural steelhead smolts.

SECTION 4. WATER SOURCE

- 4.1) 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.**

Three Mile Falls Dam - The water for both Three Mile Falls Dam's east bank

trapping and adult holding and spawning facilities is pumped directly from the Umatilla River. Water temperatures range from approximately 0°C (32°F) in winter to over 21°C (70°F) during the summer. Sediment loads vary dramatically during the year and large sediment loads are experienced annually during high flow conditions.

At the trapping facility, the Denil steppass utilizes 2,900 gpm and the holding pond uses 1,450 gpm. Both the steppass and holding pond pumps run continuously. The fish lock system uses 630 gpm, but is used only during handling operations (approximately two hours per day). The adult holding and spawning facility operates from late September through early December. It can utilize up to 8,000 gpm for the holding ponds but typically uses less than half of that amount. An additional 900 gpm can be used for the fish lock system during spawning operations which occur once or twice a week in November and early December.

Irrigon Hatchery – The water source for the Irrigon Hatchery consists of five remote wells that are capable of pumping 31,000 gpm (69 CFS) with temperature ranging from 50°F to 60°F. Water is chilled to 42°F for incubation. The 21,000 gpm is available year round with actual low water use occurring in June when only 2,400 gpm is needed. Water flows from an upper series of raceways and is reused in the lower series prior to discharge. The facility is operated under the NPDES general permit 300-J and complies with the permit requirements.

Cascade Hatchery – Water rights for Cascade Hatchery total 45 CFS from two separate locations on Eagle Creek. The first location is the hatchery intake which accounts for 35 CFS and the second location is the hatchery emergency pump which accounts for the remaining 10 CFS. During normal operations, all raceways are supplied with single-pass water. During periods of extreme low water flow in Eagle Creek, a re-use pump is activated that recycles approximately 3500 gpm from the rearing pond discharge and mixes it with available water from the main hatchery intake. The recycled water accounts for about one third of the water entering the ponds. Creek flows are rarely encountered that require the use of the re-use pump. The pump was utilized in the summer of 2003 and previous to that in 1983.

Water quality remains high throughout the year with problems only during flood events. Water temperatures range from 32 to 45 degrees Fahrenheit during the winter and spring and 45 to 69° F during the fall and summer. Small mesh screens are placed in the intake from May 1st to Oct 1st of each year. Large mesh screens are used the remainder of the years. Compliance with NMFS screening criteria needs to be addressed when funds are available.

Spring water is also plumbed to the hatch house and is capable of providing up to 100 gpm for incubation purposes. The water quality from the spring is consistently high with temperatures throughout the year ranging from 45 to 49 degrees Fahrenheit. This spring is shared with the US Forest Service for domestic drinking water to campgrounds and public restrooms. The spring also provides

drinking water to the hatchery and hatchery residences.

During cleaning operations, pond effluent is diverted to a pollution abatement pond. All hatchery effluent is monitored and reported quarterly under a National Pollutant Discharge Elimination System (0300J) permit. All conditions of the permit are administered within ODFW and regulated by the Oregon Department of Environmental Quality.

Bonneville Hatchery -- Bonneville Hatchery has water rights to 50 CFS of water from Tanner Cr. Water quality is high. Temperatures range from 32 to 62 degrees, with August recording the highest temperature and January the lowest.

Limitations: Tanner Creek water is dependent on rainfall and snowpack which effects water temperature and available CFS. During high water, adult salmon and steelhead can pass above the Tanner Creek intake to spawn. These fish have been known to carry IHN and have infected programs at Bonneville. Tanner Creek location subjects itself to very cold weather and water temperatures near 32 ° F which results in problems with anchor ice and slush build up on the intake and potential loss of flow.

A secondary source of water for Bonneville hatchery is a well field located on Robbins Island within the confines of the Bonneville Dam/Corp of Engineers Project. Originally seven wells operated to produce 18,000 GPM. In recent years, the well field has become depleted and now only produces approximately 15,000 GPM. In past years, there were discussions for water supply augmentation; however, it is unlikely to occur.

Bonneville Hatchery operates under NPDES general permit # 300J and complies with the federal Clean Water Act and Oregon Water Quality Standards for hatchery effluents.

Pendleton Acclimation Facility - Water for the facility is pumped directly from the Umatilla River. Water flow is approximately 1,600 gpm per pond. Temperatures range from approximately 34.7 to 50.0°F during the acclimation period which is normally February, March and April. High sediment loads are experienced in some years during high flow conditions.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

Irrigon Hatchery - Irrigon Hatchery uses 100% well water and poses no risk to entrainment of listed fish due to water intake.

Cascade Hatchery - Eagle Creek is located in the Columbia River Gorge and has numerous waterfalls, impassible by migratory fish. A fish passage facility is not provided at the hatchery water intake due to the limited spawning grounds

available above the intake. This reduces exposure of natural fish to the hatchery intake screens. Small mesh screens are placed in the intake from May 1st to Oct 1st of each year. Compliance with NMFS screening criteria needs to be addressed when funds are available.

Bonneville Hatchery – The water intake at this time is not NOAA fisheries screen compliant, but Oregon Dept. Fish and Wildlife Fish Passage and Screening section is currently reviewing the work necessary to bring it into compliance.

Pendleton Acclimation Facility - Facility water intake screens conform to NMFS screening guidelines to minimize the risk of entrainment of juvenile listed fish.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Three Mile Falls Dam Facility – Beginning 2010, coho broodstock collection will be conducted at the Three Mile Falls Dam’s east bank adult trapping facility. The facility consists of a vertical slot fish ladder, Denil steppass, adult holding pond (raceway), and fish handling and sorting complex.

The dimensions of the holding pond are 14' wide by 36' long by 3.5' deep (approximately 1,800 cubic feet). The holding pond has a jump screen located at the upper end and jump-out panels located at both upper corners to prevent adults from jumping out of the pond. In addition, the pond is equipped with a spray bar system to discourage jumping. The holding pond is located above the historical 100 year flood level.

The water supply for the holding pond is pumped directly from the Umatilla River at a rate of 1,450 gpm. A low water discharge alarm is located on the pond supply line to signal any loss of flow to the holding pond. No emergency generator system is located at the site. However, the pumps for broodstock facility at Three Mile Falls Dam are tied into the holding facility and can be used to supply water in case of mechanical failure of the trapping facility pumps. The adult holding facility pumps are backed up by an emergency generator. Two other emergency procedure options are available to on-site personnel. During power outages or other short term losses of flow, the outlet gate from the pond can be closed to maintain water depth. For long term losses of water supply, adults can be dip-netted out of the pond and returned to the river.

Adults will be crowded into the fish lock and raised up to the handling platform where they will be loaded into the anesthetic tank. Adults will be anesthetized with CO₂, and subsequently either selected for broodstock or returned to the river. The operation of the facility has no effect on the critical habitat for summer steelhead.

Operations will not change with the incorporation of the stepping stone program.

Bonneville Hatchery – If brood requirements are not met at Three Mile Falls Dam additional Coho broods will be collected at Bonneville Hatchery. The facility consists of a vertical slot fish ladder, 2 adult holding ponds and a fish handling and sorting complex. The water supply for the holding pond can be either from well water and/or Tanner Creek.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

No Coho broodstock will be transported. Adult fish collected at Three Mile Falls Dam facility will be held on adult holding facility on site.

5.3) Broodstock holding and spawning facilities.

Three Mile Falls Dam – See Section 5.1.

Bonneville Hatchery – The dimensions of the holding pond are 38' wide by 123.25 ' long by 8.0' deep (approximately 32,785 cubic feet).

5.4) Incubation facilities.

Irrigon Hatchery – It has 44 units of vertical incubation stacks and each unit contains 288 trays, which receive pathogen free well water for egg incubation. Also, Irrigon Hatchery has recently purchased 3 Moist Air incubators. The hatchery has water chiller to cool down incubation temperatures whenever necessary.

Cascade Hatchery -- Incubation facilities consist of 44 full stacks of vertical tray incubators (660 usable trays). Dual water supplies are available from Eagle Creek and hatchery spring water.

5.5) Rearing facilities.

Cascade Hatchery – Cascade Hatchery will receive eyed eggs from Irrigon Hatchery for further incubation and fry/juvenile rearing. Rearing facilities at Cascade Hatchery consist of 30 concrete raceways with a volume of 3,200 cubic feet each.

5.6) Acclimation/release facilities.

Pendleton Acclimation Facility – The facility includes a water intake structure with automatic screen cleaner, pump station with three vertical turbine pumps

(two primary and one backup), standby generator, water head box/distribution system, storage building, four acclimation ponds (approximately 13,000 cubic feet each), settling pond for cleaning operations, and water outlet and fish release structure. Water is supplied by gravity flow to the pump station where it is pumped into the head distribution box. Water is then supplied by gravity from the head distribution box to the individual ponds. Water flow is approximately 1,600 gpm per pond. The ponds are covered with netting to prevent bird predation.

In case of power failure, pump failure, or low water level alarm, a phone dialer will begin calling ten telephone numbers repeatedly until someone acknowledges the alarm. Fish are released from the facility by pulling the pond outlet screen and dam boards, lowering the pond, and crowding out the fish using a seine. The fish then exit the pond through an underground pipe to the Umatilla River. In an extreme emergency, the fish are also released in this manner. ODFW Fish Health Services personnel are available to address disease concerns.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

Cascade Hatchery – Flood events can cause operational difficulties due to debris damage to intake facilities and by causing heavy silt loads in the water supply which require increased maintenance of the water supply intake, rearing ponds and incubation facilities. Normally flood events do not result in significant fish mortality.

Severe cold weather can cause operational difficulties due to ice formation at key water passageways like the hatchery intake, rearing pond headbox and rearing ponds. Severe cold weather requires increased monitoring of the water supply, rearing ponds and incubation facilities. Normally, severe cold weather does not result in significant fish mortality.

Severe snow events can cause operational difficulties due to slush buildup at key water passageways like the hatchery intake, rearing pond head box and rearing ponds. Severe snow events require increased monitoring of the water supply, rearing ponds and incubation facilities. Severe snow events also greatly impair mobility and chances for outside assistance due to closed roads and treacherous conditions. In 1980 and 1996, severe snow events caused significant fish mortality at Cascade Hatchery.

Pendleton Acclimation Facility – No operational difficulties or disasters have resulted in any significant loss at the facility since it has been in operation. Extreme cold weather and icing of the intake and acclimation ponds does occur in some years however, and the fish may need to be emergency released due to loss of water. This has happened only once since the facility began operations in 2001. The fish were stressed to some degree being released, but no unusual mortalities were observed.

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

N/A for this program – fish being propagated are non-listed.

SECTION 6. 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.

6.1) Source.

Three Mile Falls Dam – Until 2009, all broodstock for the Umatilla Coho program were collected at Bonneville Hatchery. In order to transition to localized broodstock, the program will begin collecting coho adults in 2010 that will return to Three Mile Falls Dam. These fish are in fact the Tanner Creek stock-14 which were released in the Umatilla River and return to Three Mile Falls Dam. This population is considered as an “early” run of coho.

Bonneville Hatchery – The following (Table 11) are Coho transfers into Bonneville by year:

Table 11. Historical sources of Coho broodstock to Bonneville Hatchery used for Umatilla Hatchery program.

<i>From</i>	<i>Region</i>	<i>Year</i>
Trask	(coast)	1911, 57
Alsea	(coast)	1922
Coos	(coast)	1925
Ten-mile Lake	(coast)	1930, 34, 35, 40, 43
Lewis River	(Washington)	1933
Yaquina	(Coast)	1939
Klaskanine	(Columbia)	1941, 44, 45, 46, 48, 49
Big Creek	(Columbia)	1942, 54, 58, 60, 61, 71
Oxbow	(Columbia)	1942, 68, 77
Sandy	(Columbia)	1945, 57, 58, 59, 70
Toutle	(Washington)	1955, 56
Eagle Creek	(Clackamas)	1959
Cascade	(Columbia)	1970, 71, 73

6.2) Supporting information.

6.2.1) History.

Three Mile Falls Dam – The year 2010 will be the first for localized coho brood collection at Three Mile Falls Dam. Prior to 2010, all brood fish for the program were collected and spawned at Bonneville Hatchery.

Bonneville Hatchery – Bonneville Hatchery started operations in 1909 on Tanner Creek. Coho operations have been inconsistent, with there being no concentrated effort to maintain a run of local coho. Coho were transferred in from the Oregon coast in 1911. No data are available regarding other transfers between 1912 and 1921, or regarding on site collections of coho prior to 1924. Coho have been collected from Tanner Creek in 1924, 1937, 1939, 1945, 1947, 1949, 1951, 1952, 1954, 1955, and 1957 through 2004. Early collections likely included wild Tanner Creek Coho.

6.2.2) Annual size.

Three Mile Falls Dam – It is expected that all the required 1,200 adults will be collected at Three Falls Dam facility. If brood requirement goal is not met at Three Mile Falls Dam then the remaining brood will be collected at Bonneville Hatchery, as both stocks are genetically similar.

Bonneville Hatchery – Until 2009 the Umatilla coho program was one of the components of the overall coho brood and egg collection at Bonneville Hatchery which included Coho for the Yakima River, lower Columbia River, and on-site releases at Bonneville. Currently no naturally produced wild coho are used as brood stock at Bonneville Hatchery. The Umatilla Coho program requires approximately 1,200 adults annually (1:1 sex ratio). If Coho brood requirements for the Umatilla program are not met at Three Mile Falls Dam then Bonneville Hatchery will serve as backup to supplement brood fish.

6.2.3) Past and proposed level of natural fish in broodstock.

No natural fish are incorporated into the broodstock.

6.2.4) Genetic or ecological differences.

It is not anticipated that there is a genetic difference between the hatchery-origin and naturally spawning coho in the Umatilla River, as the natural coho were extirpated from the Umatilla River.

6.2.5) Reasons for choosing.

In the past, Tanner Creek stock was chosen for the Umatilla Coho program. This

is an early run south turning Coho population that is considered to have the same or similar genetic traits as the extirpated endemic mid Columbia Coho stocks. Beginning 2010, localized coho returning to the Three Mile Falls Dam shall be used as broodstock for better adaptation to rebuilding natural coho population within the Umatilla Basin.

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

Three Mile Falls Dam – Umatilla Coho is not an ESA-listed population, and therefore, it's unlikely that Coho broodstock selection practices will have any adverse genetic or ecological effects on listed steelhead.

Bonneville Hatchery – All unmarked Coho collected at Bonneville are checked for coded wire tags using a hand held detector. Adult Coho without coded wire tags are placed in a 200 gallon portable tank and transported above Bonneville Dam where they are released.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Only adults and a few jacks will be collected for broodstock.

7.2) Collection or sampling design.

The brood stock collection goal is to collect healthy Coho from a cross section of the run based on historic levels per week, to maintain genetic diversity within the stock. Percentages of adults collected are based on numbers of adults needed for meeting egg collection goals.

7.3) Identity.

Three Mile Falls Dam – Hatchery produced adult coho returning to Three Mile Falls Dam will have adipose fin clipped. Since the native coho population of Umatilla Basin was extirpated, all coho returning to Three Mile Falls Dam shall virtually be of hatchery origin.

Bonneville Hatchery – Hatchery coho returning to Tanner Creek are identified by an adipose fin clip. All adipose fin clipped coho are placed through a R8 Detector designed to detect the presence of coded wire tags in large fish. Unmarked coho do stray into the Bonneville trapping facility. These salmon are removed directly after identification and transported above Bonneville Dam then released.

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

Three Mile Falls Dam - The Umatilla Coho program requires approximately 1,200 adults assuming 1:1 sex ratio, which is expected to be collected from Three Mile Falls Dam trapping facility. If the required numbers are not met at Three Mile Falls Dam, the remaining fish shall be collected at Bonneville Hatchery

Bonneville Hatchery –The Bonneville Hatchery requires a total of approximately 5,000 coho adults for spawning that includes other coho programs.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Table 12. Number of Coho broodstock and eggs collected at Bonneville Hatchery, 1992-2008.

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
1992	5599	7486	1493		
1993	4161	4343	205		
1994	12559	14851	362		
1995	2417	2433	234		
1996	7143	7740	264	9,754,000	
1997	6568	8392	363	9,596,000	
1998	3067	2994	312	6,101,000	
1999	2280	2232	163	4,774,000	
2000	8936	9199	1037	5,441,000	
2001	19657	24870	767	6,946,000	
2002	11778	13873	1888	7,477,000	
2003	15417	19444	457	7,199,000	
2004	11267	12495	386	6,667,970	
2005	12020	13262	1455	6,449,881	
2006	17335	20121	4547	6,973,662	
2007	15978	17394	994	6,507,954	
2008	24170	22622	4464	5,076,480	

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Three Mile Falls Dam - All coho returning to Three Mile Falls Dam in excess of broodstock needs shall be released upstream. These fish shall be available for natural production and, in some years, will also be available for harvest.

Bonneville Hatchery – Broodstock collected in excess of program are sold to private vendors via the State of Oregon bid process and also donated to Oregon Food Banks.

7.6) Fish transportation and holding methods.

Three Mile Falls Dam - No transportation of Coho broodstock shall take place as fish will be holding on site at Three Mile Falls Dam facility. Adults shall be held in concrete ponds. There are six ponds at the facility, each of 90' x 10' x 5' feet with an effective water volume of 4,500 ft³. Holding densities may range from approximately 3.6 to 7.3 cubic feet per adult and flow rates may vary from approximately 2.2 to 19.0 gpm per adult. The current broodstock goal is for 1,200 adults. Pre-spawn mortality for Coho at Three Mile Falls Dam is unknown, as 2010 will be the first year to hold Coho adults at this facility. Fish will be treated as necessary, to prevent diseases.

Bonneville Hatchery – There is no transportation requirement for Coho adults, as they return directly to Bonneville Hatchery through a fish ladder via Tanner Creek. The fish ladder is open the first week in September. Fish are collected in the sorting channel, moved upstairs where they are sorted as per male, female, jack and enumerated. Electric shock is used as an anesthetic. Coho are then placed in one of the two holding ponds, with 5,000 gpm flow. Adults are treated with the antibiotic erythromycin at a dosage rate of approx. 22 mg/kg body weight for bacterial kidney disease. This prophylactic/therapeutic treatment is administered by injection

7.7) Describe fish health maintenance and sanitation procedures applied.

Three Mile Falls Dam - Adults retained for broodstock prior to the onset of spawning shall be injected with oxytetracycline (10 mg/kg) and erythromycin (20 mg/kg) at Three Mile Falls Dam. During holding, hydrogen peroxide treatment may be applied into the inflowing water to achieve a maximum concentration of 100 ppm active ingredient. The treatment may last for one hour to control fungus and parasites and may be repeated three times per week.

Bonneville Hatchery – The fish health monitoring plan is identical to that developed by the Integrated Hatchery Operations Team (see IHOT Policies and Procedures for the Columbia Basin Anadromous Salmonid Hatcheries, Annual Report 1994). Each year broodstocks are examined to detect the presence of any reportable viral pathogens. The number of individuals examined is usually 60 fish

which is an enough sample size to ensure a 95% chance of detection of a pathogen present in the population at the 5% level. The American Fisheries Society “Fish Health Blue Book” procedures are followed. Adults are administered erythromycin (Erythromycin 200 or Gallimycin 200) at a dosage rate of approximately 22 mg/kg body weight for treatment of bacterial kidney. Oxytetracycline HCL (OTC 100) is administered at approximately 10 mg/kg body weight. During holding, adult Coho are treated 3 days/week with hydrogen peroxide at a ratio of 1:3500 for 90 minutes to control fungus in brood stock held for up to 90 days.

7.8) Disposition of carcasses.

Three Mile Falls Dam - All Coho broodstock carcasses shall be buried in the regional landfill.

Bonneville Hatchery – Spawned carcasses are transported weekly during the spawning season (Oct - Nov) to a landfill for burial. Un-spawned carcasses are sold to private vendors through the State of Oregon bid process. Fish are sold in the round. In recent years, carcasses have been donated to the Oregon Food Bank program. Adult mortality are removed daily, enumerated, frozen, and then shipped to the landfill for burial.

7.9) 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 broodstock collection program.

Three Mile Falls Dam – Brood stock for coho, fall Chinook and steelhead are trapped at Three Mile Falls Dam during the same time of the year. The ESA-listed steelhead also get trapped along with the hatchery fish. To minimize adverse ecological impacts to listed steelhead, any listed summer steelhead caught during brood collection will either be released unharmed with minimal handling stress or used as brood for steelhead propagation program, which has been described in a separate HGMP for the steelhead program.

Bonneville Hatchery – An electronic weir is located adjacent to the entrance to the Bonneville Hatchery fish ladder. It is operated during the spawning season as a means to prevent adults from moving above the ladder entrance. To minimize ecological effects, any unmarked fish caught during brood collection are released unharmed with minimum stress. The risk of fish disease amplification will be minimized by following ODFW Fish Health Policy while collecting and holding the broodstock.

SECTION 8. MATING

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

8.1) Selection method.

Three Mile Falls Dam – During spawning period, brood fish will be checked and sorted once or twice per week for maturation. All ripe females from each matured group will be spawned on a given spawn day until the egg goals are met. Enough ripe males (including jacks) from each group will be randomly selected on a given spawn day to fertilize the available females from that group.

Bonneville Hatchery – Spawners are chosen by collecting a cross section of the run based on historic run time levels per week. The percentage per week of adults collected is based on numbers of adults needed plus mortality to meet egg collection goals. During Coho spawning, new fish are brought into the spawning room and sorted by male or female and ripe or green. Green fish are sent back to the holding pond while the ripe fish are spawned.

8.2) Males.

Males (including jacks) may be used at a proposed rate of one ripe male for every ripe female and are randomly selected from their respective broodstock population. No backup males are typically used, however in some cases milt may be pooled when not enough males are available on a given day to spawn the available females at a 1:1 ratio. No repeat spawners will be used either at Three Mile Falls Dam facility or Bonneville Hatchery.

8.3) Fertilization.

Spawning ratio is one male to one female. Jacks are spawned at a ratio of 1:100 males.

8.4) Cryopreserved gametes.

None are used.

8.5) 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.

Not applicable as Umatilla Coho is not an ESA-listed population.

SECTION 9. INCUBATION AND REARING

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Irrigon Hatchery – No data is available, as coho egg incubation at Irrigon Hatchery will begin in 2010. Eyed eggs from Irrigon Hatchery shall be shipped to Cascade Hatchery for further incubation and fry/juvenile rearing.

Cascade Hatchery – Data of egg take and their survival rates are combined for Cascade and Bonneville hatcheries. Prior to 1996, broodstock were collected and spawned at Cascade Hatchery. Broodstock were collected and eggs taken at each hatchery in 1996, 1998, 1999, and 2000. In 1997 and 2001, broodstock collection and egg take only occurred at Bonneville. Green-eyed egg survival figures are weighted averages of the two hatcheries for 1996, 1997, and 2001.

Table 13. Egg take and survival rates of Coho salmon up to ponding.

Year	Egg Take	Green-Eyed Survival (%)	Eyed-Ponding Survival (%)
1990	5,845,268	94	96.7
1991	6,673,000	89	98.8
1992	4,368,000	86.5	98.8
1993	5,270,000	90.7	98.6
1994	9,901,000	85.3	99.2
1995	5,448,000	90.1	97.2
1996	10,711,000	78	na
1997	9,596,000	92.2	94.3
1998	7,099,730	91.9	97.7
1999	2,021,152	71.6	97.9
2000	6,313,210	92.4	97.1
2001	6,946,000	92.9	98.1

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

Irrigon Hatchery – Not applicable as the program will begin in 2010.

Cascade Hatchery – Cascade Hatchery collects surplus eggs to safeguard production due to an aggressive BKD culling program. Our goal is to raise BKD negative Coho. When BKD test results are available, the BKD positive eggs are bagged, frozen and sent to a sanitary landfill. If surplus BKD negative eggs are still on hand at the eyed stage, a percentage from each spawn group is culled to minimize the impact to one group.

9.1.3) Loading densities applied during incubation.

Irrigon Hatchery – Incubating eggs will be loaded at similar densities as in

Bonneville and Cascade hatcheries.

Cascade Hatchery – Egg size = 84 eggs/oz; Incubator flows = 5 gpm; 10,500 eggs per tray; 8,250 eyed eggs per tray.

9.1.4) Incubation conditions.

Irrigon Hatchery – Water temperature will be monitored via recording thermograph or via chillers for water entering incubation trays. Daily thermal units (CTU's) will be calculated to determine developmental stages. Water temperatures shall be controlled, if necessary. Dissolved oxygen, typically be greater than 90% saturation level. Eggs will be incubated up to the eyed stage at Irrigon Hatchery and then be transferred to Cascade Hatchery for hatching and fry/juvenile rearing.

Cascade Hatchery – Water temperatures are monitored with thermographs. Silt management is accomplished by visual inspection and rodding of trays when needed. Cumulative temperatures are recorded daily.

9.1.5) Ponding.

Cascade Hatchery – Button up happens from ~1150 to 1250 TU's. A visual check is performed to determine degree of button up. Ponding normally occurs in late February through March and is a forced ponding. Once ponded, feeding is delayed for up to 4 days for maximum absorption of yolk sac. Lengths are not taken at ponding.

9.1.6) Fish health maintenance and monitoring.

Cascade Hatchery – Cascade Hatchery is operated in compliance with both the ODFW Fish Health Management Policy and the Integrated Hatchery Operations Team (IHOT) fish health guidelines. Green eggs are water hardened in iodophor as per label. Eyed eggs brought into the facility are disinfected with iodophor as per label instructions. Eggs are treated with formalin three times a week for fungus control using a drip method. Visual monitoring is conducted daily to detect disease or other problems. Eggs are shocked at approximately 500 TU's. Eggs are counted and picked by machine with some hand picking by hatchery crew. Yolk sac malformation is not a problem at Cascade Hatchery. All family egg groups are numbered and tracked throughout BKD testing and culling phases. An alarm system on the water supply and daily monitoring of eggs minimizes risk. Silt is removed by rodding of the trays. Egg mortality is bagged, frozen and sent to a sanitary landfill.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

Cascade Hatchery – N/A

9.2) Rearing:

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

Cascade Hatchery – Data is combined for Cascade and Bonneville Hatcheries. Prior to 1996, broodstock were collected and spawned at Cascade Hatchery. Broodstock were collected and eggs taken at each hatchery in 1996, 1998, 1999, and 2000. In 1997 and 2001, broodstock collection and egg take only occurred at Bonneville. Green-eyed egg survival figures are weighted averages of the two hatcheries for 1996, 1997, and 2001. Data of survival rates are presented in Table 14.

Table 14. Fry survival rates of Coho salmon (combined data of Cascade and Bonneville hatcheries), 1990-2001.

YEAR	fry to fingerling	fingerling to smolt
1990	92.1 %	99.94%
1991	90.6%	99.89%
1992	91.3%	84.6%
1993	86.0%	99.88%
1994	93.9%	98.75%
1995	70.0%	97.0%
1996	85.3%	96.8%
1997	80.9%	99.25%
1998	90.0%	99.46%
1999	88.8%	99.39%
2000	97.1%	98.05%
2001	88.5%	99.41%

9.2.2) Density and loading criteria (goals and actual levels).

Cascade Hatchery – Rearing standard limits for Coho are dependant upon fish size and water temperature. Using coho at 50/lb and a water temp of 48 degrees, IHOT recommends a loading density of 8 lbs/gpm. IHOT recommends a space criteria ranging from 0.3 to 1.7 lbs/ft³ depending on fish size. Rearing densities at Cascade Hatchery range between 1.43 and 1.57 lb/ft³ and 13.0 to 16.6 lbs/gpm at transfer.

Pendleton Acclimation – Densities during final acclimation range from 1.10 to

1.28 lb/ft³ and 8.9 to 16.6 lbs/gpm.

9.2.3) Fish rearing conditions.

Cascade Hatchery – Water temperatures are recorded daily by thermograph, loading densities monitored with monthly sampling, ponds cleaned weekly, and mortality removed daily.

Pendleton Acclimation – Water temperatures during final acclimation range from 1.5 to 10.0°C.

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

Table 15. Average monthly Coho salmon growth (fish/lb) at Cascade Hatchery.

Month	Fish/lb
March	829
April	392
May	190
June	115
July	75
August	39
September	26.8
October	22.3
November	20.4
December	19.1
January	17.9
February	16.6
March	16.3

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

See Table 15 for fish growth in terms of number of fish per pound. No energy reserve data are available.

9.2.6) 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*).

Cascade Hatchery – Fish are hand fed a dry diet of BioVita, Bio Dry 1000, Nutra Fry or Nutra Plus throughout the day as needed. When the fish are first ponded they are presented with feed every hour. As they grow, rations per interval are increased while frequency decreases. Fish are fed to satiation until they grow to a size of 300 fish/lb, when they are placed on a growth program to reach production

goals. The %BWD fed ranges from 0.3 to 3.6%. Average yearly food conversion is 1.05.

Pendleton Acclimation Facility- Fish are not fed regularly during acclimation and may not be fed at all due to low water temperatures.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Cascade Hatchery – The fish health monitoring plan is identical to that developed by the Integrated Hatchery Operations Team (see Policies and Procedures for the Columbia Basin Anadromous Salmonid Hatcheries, Annual Report 1994.).

Juvenile fish are examined at least monthly and more often as necessary.

Representative samples of healthy and moribund fish from each lot of fish are examined. The number of fish examined will be at the discretion of the fish health specialist. Abnormal levels of fish loss are investigated when they occur.

Appropriate actions including drug or chemical treatments will be recommended as necessary. If a bacterial pathogen requires treatment with antibiotics a drug sensitivity profile will be generated when possible. Findings and results of fish health monitoring will be recorded on a standard fish health reporting form and maintained in a fish health database.

Pendleton Acclimation Facility- Fish inspections are performed if necessary due to fish loss.

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

Cascade Hatchery and Pendleton Acclimation Facility- N/A

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

Cascade Hatchery – Fish are reared under natural water temperatures and light conditions.

Pendleton Acclimation – No natural rearing strategies are used at the facility other than fish are reared under natural temperature and light conditions.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

Cascade Hatchery – N/A

Pendleton Acclimation – ODFW Fish Health Services conducts pre-transport screening to minimize the risk of disease transfer and investigates any abnormal mortality situations to minimize the risk of disease transfer. Fish screens are

regularly checked and maintained in order to ensure that natural fish are not entrained onto the screens or into the facility.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

Table 16. Proposed fish release levels.

Age Class	Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling				
Yearling	1,000,000	15/lb	mid-March to mid-April	Acclimated releases from Pendleton AF (RM 56)

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse: Umatilla River

Release point: Pendleton Acclimation Facility (RM 56.0)

Major watershed: Umatilla River

Basin or Region: Mid-Columbia River

10.3) Actual numbers and sizes of fish released by age class through the program.

Table 17. Numbers and sizes of Coho salmon released into the Umatilla River, 1997-2008.

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1997							1,400,939	15.7
1998							1,606,786	16.6
1999							1,475,922	17.2
2000							1,561,290	16.0
2001							1,474,559	15.3
2002							1,621,857	14.7
2003							1,546,147	15.5
2004							1,552,595	16.2
2005							1,559,916	16.7
2006							1,493,816	18.1
2007							1,510,214	17.5
2008							1,514,432	16.8
Average							1,526,541	16.4

10.4) Actual dates of release and description of release protocols.

Since 2000, fish are generally released in the early spring. There have historically been two groups of Coho acclimated and released with the first occurring in early to mid March and the second in mid to late April. With the exception of 2005 and 2006, release dates for the acclimated groups have been from March 1 to April 28. Fish are typically acclimated for one month with a volitional release beginning one week prior to force out. In 2005, the first group was direct stream released from February 14-17 due to low river flows and in 2006 the first group was released on February 19 due to ice up of the facility.

10.5) Fish transportation procedures, if applicable.

Cascade Hatchery – Fish have been transported in February and March; however, March transfers are preferred. Transportations are completed in truck using insulated and oxygenated tanks ranging in size from 2,000 to 5,000 gallons and at a density of 1 pound of fish/gallon. Transportation time to the Pendleton

Acclimation Facility is approximately 3 ½ hours.

10.6) Acclimation procedures.

Pendleton Acclimation – Fish are typically held for three weeks and then the effluent pond screens are removed. The fish are then allowed to voluntarily swim over a notched dam board and down the outlet channel directly into the Umatilla River for a period of one week. Fish are fed until one or two days prior to the remaining fish being forced out. The effluent dam boards are removed and the ponds are lowered. Fish are then crowded out of the ponds using a seine.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Beginning with the 2008 brood (release year 2010), 900K smolts will be ad-clipped and 100K will be un-clipped with CWTs only. This will allow for external identification of non-CWT hatchery adults for harvest purposes and minimize the number of fish that need to be checked for CWTs. This marking scheme will also provide for differentiation of natural and unmarked hatchery adults.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Pendleton Acclimation – Surplus fish reared to smolt stage are released.

10.9) Fish health certification procedures applied pre-release.

Cascade Hatchery – The fish health monitoring plan is identical to that developed by IHOT (see Policies and Procedures for the Columbia Basin Anadromous Salmonid Hatcheries, Annual Report 1994). Fish health status is determined during the pre-transfer fish health examination.

Pendleton Acclimation – Typically, no additional health certification is conducted after the pre-transfer examination. A pre-liberation examination would be conducted if a fish health examination has not been conducted within six weeks of the release date.

10.10) Emergency release procedures in response to flooding or water system failure.

Pendleton Acclimation -- The Pendleton acclimation/release facility includes three vertical turbine pumps (two primary and one backup), standby generator, four acclimation ponds and outlet pipes on each pond for releasing fish. In case of power failure, a standby generator provides emergency power to the pump(s). If one of the two primary pumps fails, the backup pump will automatically start. In the event of a power failure, pump failure, screen cleaning failure, or low water level, a phone dialer will begin calling up to ten telephone numbers (stating there

is an alarm condition at the facility) until the alarm is acknowledged. In an extreme emergency, the effluent dam boards are removed from the ponds and the fish are crowded out using a seine while the water level is lowering.

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

Pendleton Acclimation – Coho are released as full term yearling smolts in an area that is not primary rearing habitat for summer steelhead.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

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

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each “Performance Indicator” identified for the program.

The Comprehensive Research, Monitoring, and Evaluation Plan for Umatilla Subbasin Summer Steelhead and Chinook Salmon was finalized in January 2006. Since the Umatilla Coho program is funded primarily under Mitchell Act, specific Coho monitoring and evaluation activities are not identified in that plan or funded by BPA. Coho data is collected as an adjunct while conducting monitoring and evaluation of summer steelhead and Chinook.

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

There is no monitoring and evaluation plan or funding that specifically targets Coho in the Umatilla River. Any Coho data collected is an adjunct of monitoring and evaluation activities for steelhead and/or Chinook. The following is a list of unfunded Coho monitoring and evaluation activities that should be implemented.

- Expand the existing Umatilla River Juvenile Outmigration and Survival Project (BPA project no. 1989-024-01) to include sampling for spring and fall Chinook, and Coho salmon. Estimated cost: \$250,000 annually.
- Provide comprehensive monitoring and evaluation of Coho releases. We will track the post-release performance of each release group using coded-wire-tag (CWT) recoveries (100K CWTs @ 90\$/1000) to estimate smolt-to adult survival and stray rate, PIT-tags (4,000 @ \$1.82/tag) to monitor outmigration survival and adult migration timing, and spawning ground surveys to monitor

natural production. The existing Umatilla River Juvenile Outmigration and Survival Project (BPA project no. 1989-024-01) will estimate the number of naturally-produced Coho outmigrants. Estimated cost for CWTs, PIT tags, needles, temporary services help for tagging, and seasonal technicians for spawning ground surveys: \$45,000.

- Evaluate use of moist-air incubators. Moist-air incubators provide a more water-efficient means to incubate eggs. Recently, moist-air incubators have been used to incubate Umatilla Hatchery Coho eggs to the eyed-stage. However, there are questions about the efficacy of moist-air incubators compared to traditional incubation methods. This experiment would use a side-by-side approach to compare survival to the eyed stage. Cost: \$2,000 annually for personnel time to evaluate the study.

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

N/A for Coho monitoring or evaluation activities.

SECTION 12. RESEARCH

This section is not applicable to the Umatilla Coho program.

12.1) Objective or purpose. N/A

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

12.2) Cooperating and funding agencies. N/A

12.3) Principle investigator or project supervisor and staff. N/A

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2. N/A

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

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

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

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

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached “take table”.

See Table 9.

12.10) Alternative methods to achieve project objectives. N/A

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

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities. N/A

SECTION 13. ATTACHMENTS AND CITATIONS

Citations:

BOR (U. S. Bureau of Reclamation). 1988. Umatilla Basin Project Oregon planning report – Final environmental impact statements. BOR Pacific Northwest Region, Boise, Idaho.

Boyce, R.R. 1986. A comprehensive plan for rehabilitation of anadromous fish stocks in the Umatilla river basin. Final report of Oregon Department of Fish and Wildlife to Bonneville Power Administration, Portland, Oregon.

BPA (Bonneville Power Administration). 1987. Environmental Assessment: Umatilla Hatchery. Office of Power and Resources Management. Portland, Oregon.

Clarke, L. R., W. A. Cameron, R. W. Stonecypher, and R. W. Carmichael. 2009. Umatilla monitoring and evaluation annual report: 2008. Annual Report to the Bonneville Power Administration, Project 1990-005-00, Portland, Oregon.

CTUIR and ODFW (Confederated Tribes of the Umatilla Indian Reservation and Oregon Department Fish & Wildlife). 1989. Umatilla Hatchery Master Plan. Report for the Northwest Power Planning Council, Portland, Oregon.

CTUIR and ODFW (Confederated Tribes of the Umatilla Indian Reservation and Oregon Department Fish & Wildlife). 1990. Umatilla River subbasin salmon and steelhead production plan. Report to the Northwest Power Planning Council. Portland, Oregon.

IHOT. 1995. Integrated Hatchery Operations Team: Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries, 1994 Annual Report. Annual Report to the Bonneville Power Administration, , Portland, Oregon.

NMFS (National Marine Fisheries Service). 2008. Proposed middle Columbia River steelhead distinct population segment ESA recovery plan. September, 2008.

Reeve, R., S. Williams, J. Neal and J. Sanchez. 1988. Umatilla River Drainage Anadromous Fish Habitat Improvement Implementation Plan. March 1988, Available from: Bonneville Power Administration, Portland, Oregon 53 pages.

**SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE
OF RESPONSIBLE PARTY**

“I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief.”

Name and Title of Applicant: Kevin Blakely, John Day Watershed District Manager,
ODFW, NE Region

Signature of Applicant: _____ Date: _____

Certified by: Scott Patterson, Fish Propagation Program Manger, ODFW, Salem

Signature: _____ Date: _____

SECTION 15. PROGRAM EFFECTS ON OTHER (AQUATIC OR TERRESTRIAL) ESA-LISTED POPULATIONS. (Anadromous salmonid effects are addressed in Section 2)

15.1) List all ESA permits or authorizations for USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species associated with the hatchery program.

The UBNPME project monitoring and evaluation activities are conducted under USFWS Section 10 permit #TE-844468-8. ODFW monitoring and evaluation activities are conducted under a Section 6 agreement between the State of Oregon and the United States Fish and Wildlife Service.

The USFWS Biological Opinion for the Umatilla Hatchery Program, Bonneville Power Administration, Umatilla and Wallowa counties, Oregon and Walla Walla County, Washington (USFWS ref # 13420-2008-F-0109) provides Section 7 coverage for incidental take of bull trout under these programs.

15.2) Describe USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species and habitat that may be affected by hatchery program.

Other Listed Species:

Common Name	Scientific Name	Status
Fish:		
Bull trout ¹	<i>Salvelinus confluentus</i>	Threatened

¹ listing unit is the Columbia River Distinct Population Segment

Columbia Basin bull trout (*Salvelinus confluentus*) are listed as Threatened and occur in the project area. There are at least two bull trout life history types in the Umatilla Basin; resident and fluvial. The ad-fluvial life history type, which includes bull trout that migrate down to the mainstem Columbia River, likely exists at an extremely low level as seven adults have been observed at Threemile Dam since 1995. In the Umatilla River some fish have been observed as far down as Pendleton; but most are found in upper mainstem areas above Gibbon.

Within the Umatilla Basin bull trout status has been highly variable (Table 16) but is generally considered to be viable. In recent years, redd counts in the Umatilla River have declined. Hatchery juveniles may provide a forage base benefit to bull trout.

Table 18. Number of Bull Trout Redds Observed Annually in the Umatilla River since 1994 (data provided by Paul Sankovich, USFWS, La Grande, OR).

Bull Trout Redds, Umatilla Basin		
Year	Total Redd	Redds in Index Sites
1994	42	29
1995	24	19
1996	37	28
1997	32	32
1998	84	81
1999	153	144
2000	143	128
2001	103	99
2002	53	48
2003	49	43
2004	56	45
2005	28	28
2006	25	24
2007	13	13
2008	19	19

Proposed for listing: None.

Candidate Species:

Common Name	Scientific Name
Columbia spotted frog	<i>Rana luteiventris</i>
Washington ground squirrel	<i>Spermophilus washingtoni</i>
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>
Western Boreal Toad	<i>Bufo boreas</i>

Critical Habitat: Critical habitat for bull trout has been designated in subbasin.

15.3) Analyze effects.

4.10 Summary of Effects [from the USFWS Biological Opinion, see above]
 The proposed action is not expected to cause any habitat effects; therefore, the effects of the Project elements are expected to be limited to direct and indirect effects to bull trout. The release of over one million hatchery-raised Chinook, steelhead, and Coho smolts into the Umatilla River, each year, will likely result in direct or indirect interactions between the hatchery-raised fish and bull trout. Hatchery fish will eat prey, occupy space in the river, provide food for predators, influence nutrient flow through carcasses, and potentially introduce pathogens (Pearsons et al. 2007, Pearsons and Hopley 1999).

Based on Project timing and location, all life stages of bull trout (except fry) will most likely be exposed to at least some type of effect from the Project within the action area. A small number of bull trout may be temporarily disrupted from their

normal behavior during Project activities such as adult broodstock collection, smolt releases, and adult releases. However, these effects are not expected to significantly disrupt behavior patterns of bull trout. Additionally, based on past experience with Project activities, the Service expects death or significant injury to be extremely rare from Project activities and only associated from activities at Three Mile Falls Dam. Project activities are not likely to adversely affect bull trout local populations in the Umatilla and Walla Walla River core areas and effects to the Umatilla-Walla Walla Recovery Unit are likely to be minimal.

15.4) Actions taken to minimize potential effects.

The USFWS Biological Opinion contains one reasonable and prudent measure: Minimize the amount and extent of incidental take associated with adult collection activities at Three Mile Falls Dam. To implement Reasonable and Prudent Measure #1 (collection activities), the project proponents must:

a. Ensure bull trout captured at Three Mile Falls Dam are held in a separate container, and if transport is warranted, bull trout are transported separate from anadromous salmonids, and released at a safe but different location than the anadromous salmonids.

b. Ensure bull trout captured at Three Mile Falls Dam are released as quickly as possible.

c. Record all observations of bull trout and report this information to the Service on an annual basis. Reports should be sent, by January 31 of each year, to:

Field Supervisor
La Grande Field Office
3502 Highway 30
La Grande, OR 97850

15.5) References:

CTUIR, et al.. Umatilla/Willow Subbasin Plan. Prepared for the Northwest Power and Conservation Council, Portland, Oregon.

USFWS, 2008. Biological Opinion for the Umatilla Hatchery Program, Bonneville Power Administration, Umatilla and Wallowa counties, Oregon and Walla Walla County, Washington (USFWS ref # 13420-2008-F-0109), September 12, 2008.