US Army Corps of Engineers ®
Portland District

Draft Environmental Assessment

HATCHERY FACILITIES IMPROVEMENTS FOR THE JOHN DAY MITIGATION PROGRAM

Photos of Ringold Springs State Fish Hatchery in Franklin County, Washington

Draft March 22, 2013

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Abbreviations and Acronyms

°C	degrees Centigrade
°F	degrees Fahrenheit
APE	area of potential effects
BiOp	Biological Opinion
BPA	Bonneville Power Administration
cfs	cubic feet per second
CWA	Clean Water Act
DPS	Distinct Population Segment
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FCRPS	Federal Columbia River Power System
FONSI	Finding of No Significant Impact
FR	Federal Register
HDPE	high-density polyethylene pipe
HGMP	Hatchery and Genetic Management Plan
HRSG	Hatchery Scientific Review Group
JDM	John Day Mitigation
mg/L	milligrams per liter
mS/cm	millisiemens per cm
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PCB	polychlorinated biphenyl(s)
RM	river mile
RSH	Ringold Springs Hatchery
SHPO	State Historic Preservation Office
µg/L	micrograms per liter
URB	upriver bright (fall Chinook salmon)
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USCB	U.S. Census Bureau
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife

1. INTRODUCTION

This draft Environmental Assessment evaluates the effects for constructing hatchery improvements as part of the John Day Mitigation program. Unless otherwise noted, introductory information and alternative descriptions used to prepare the EA were taken from the *Post-Authorization Change Report for the John Day Mitigation Program* (February 2013) and the *John Day Mitigation Alternatives Study* (October 2012), both prepared by Tetra Tech INCA for the U.S. Army Corps of Engineers (USACE).

The JDM program was authorized by Congress in 1978 to offset mainstem fall Chinook salmon (*Oncorhynchus tshawytscha*) production losses that resulted from construction and operation of The Dalles and John Day dams. The scope of the mitigation was based on historic spawning estimates presented in the project authorization documents and related administrative records. The USACE relied on historic data from U.S. Fish and Wildlife Service and the states of Oregon and Washington to determine the extent of the mitigation. The specified mitigation was to support escapement of 30,000 adult Chinook salmon to compensate for spawning habitat that was inundated. The USACE designed, constructed, and currently operates hatchery facilities to achieve mitigation, which consists of hatchery fall Chinook production.

Since implementation of the JDM program in 1978, adjustments to the program have occurred related to the specific stock of Chinook salmon and the production, rearing, and release locations. Currently, mitigation is provided by a combination of adult egg take, incubation, and juvenile rearing using a combination of Priest Rapids and Ringold Springs State Hatcheries (Washington), Little White Salmon and Spring Creek National Fish Hatcheries, Bonneville and Umatilla State Fish Hatcheries (Oregon), and the Prosser Tribal Hatchery. About half of the fall Chinook mitigation fish are upriver bright fall Chinook salmon that are released at various locations from just below Bonneville Dam to above McNary Dam. The remaining production is composed of tule fall Chinook that are released below Bonneville Dam or the pool above Bonneville Dam.

1.1. Purpose and Need for Action

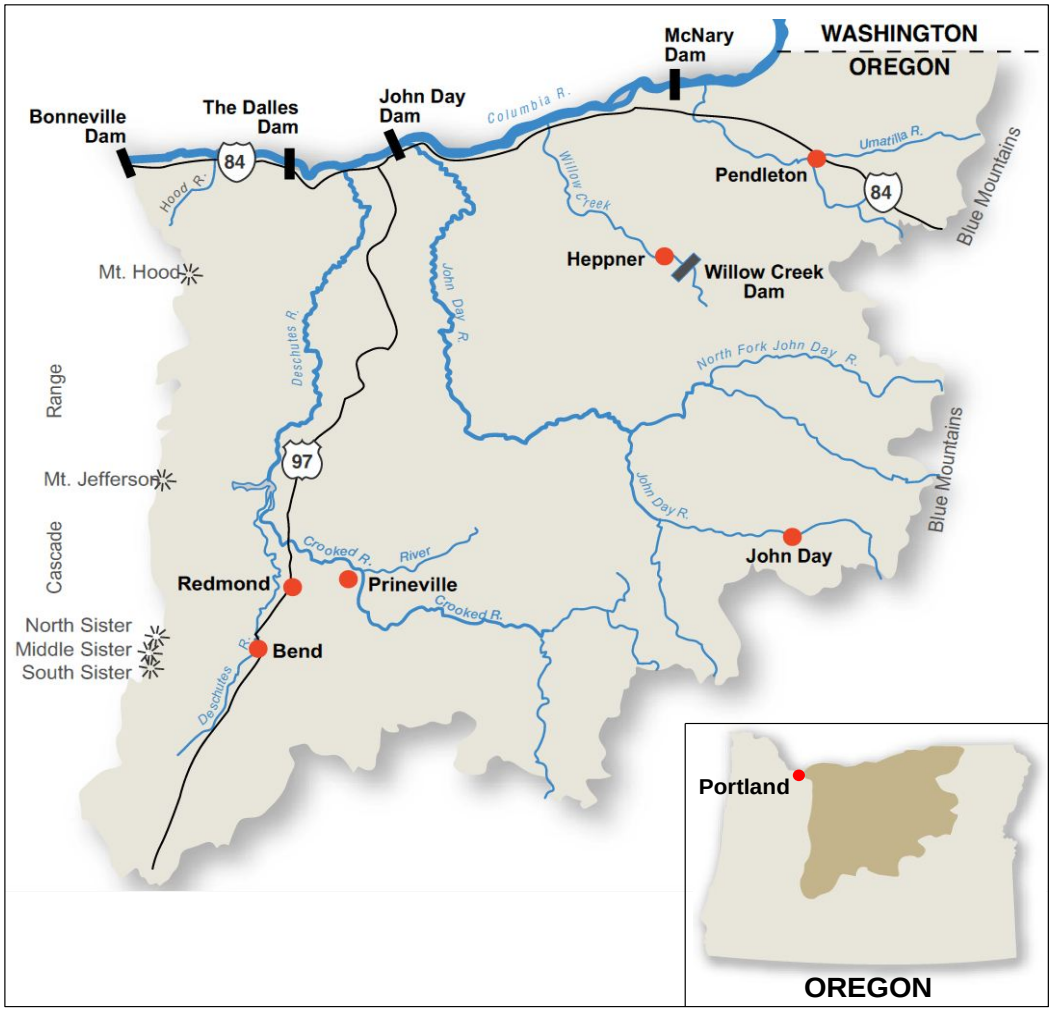
The Corps has determined that the current JDM program does not fulfill the 30,000 adult escapement and "in-place and in-kind" mitigation objectives and federal Indian Trust responsibilities related to The Dalles and John Day dams. Nor does the retention of the current program meet provisions of the 2008 Federal Columbia River Power System Biological Opinion (2008 FCRPS BiOp) or the 2008 Columbia Basin Fish Accords between the FCRPS Action Agencies [Bonneville Power Administration, USACE, and U.S. Bureau of Reclamation and Columbia Basin Treaty tribes. The FCRPS BiOp includes specific provisions to evaluate changes to the JDM program to improve production in order to offset losses of upriver bright fall Chinook with "in-place and in-kind" mitigation. The 2008 Accords include the following language: "The U.S. Army Corps of Engineers and U.S. v. Oregon parties are working on proposals regarding mitigation for the losses to anadromous fish caused by the construction of John Day and The Dalles dams, in particular the appropriate balance between upriver and downriver stock production…"

In August 2011, as a part of the Columbia River Fish Mitigation Program, the Corps formally initiated studies to address adjustments in the JDM program that are necessary to achieve "in-place and in-kind" mitigation objectives. This included an assessment of alternatives to increase production of URB fall Chinook. As a result of these studies, it was determined that in order to meet mitigation objectives, hatchery improvements are needed that will accommodate an increase in production of the upriver bright fall Chinook while at the same time minimizing effects on Endangered Species Act-listed Columbia River salmonids.

1.2. Project Area Description

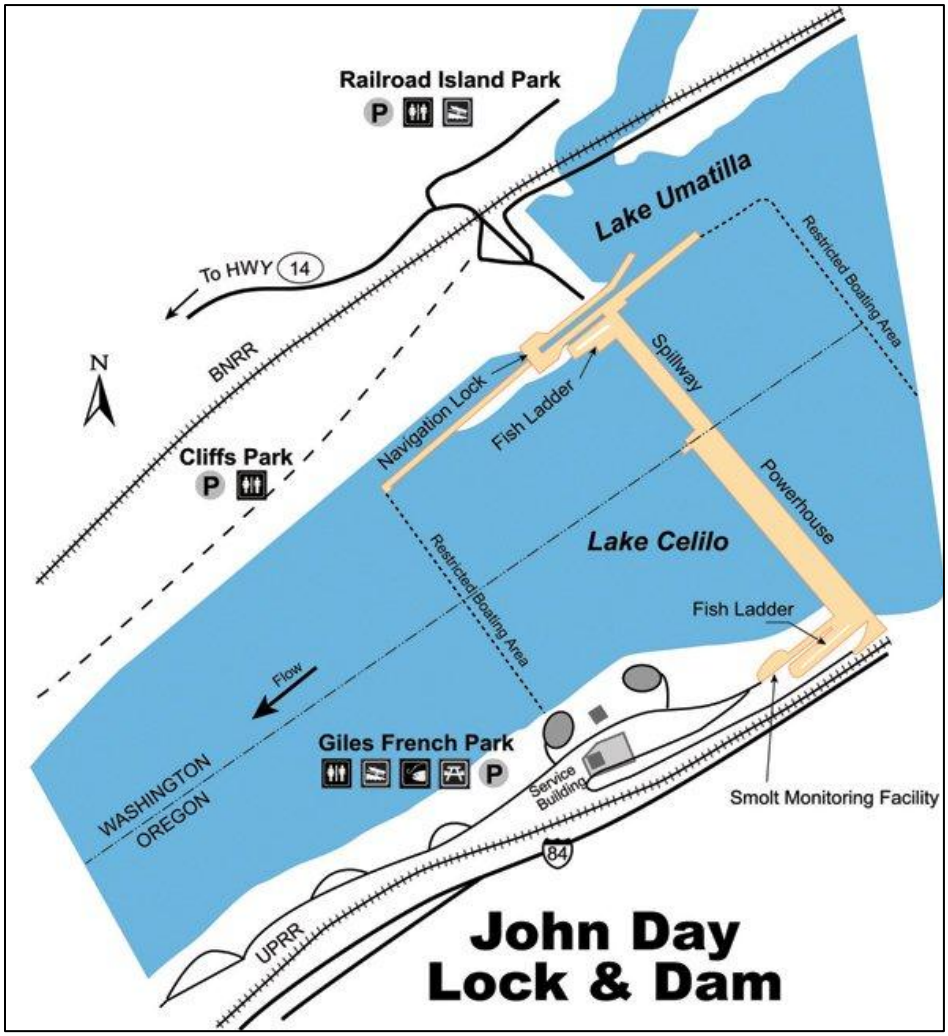
The JDM program addresses mitigation requirements for the John Day and The Dalles projects. John Day is one of four large dams in the Middle Columbia River Basin (Figure 1), and is located on the Columbia River 215.6 miles upstream from the river's mouth.

Figure 1. Middle Columbia River Basin



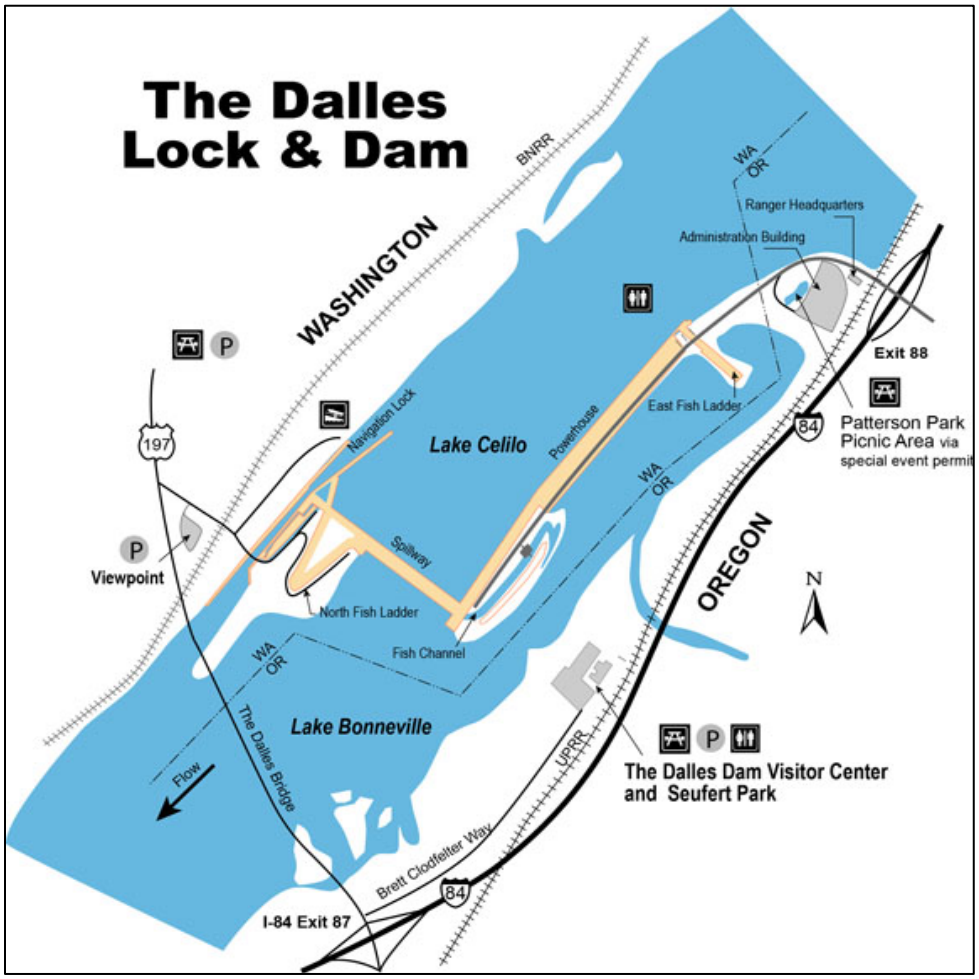
The John Day project was authorized in 1950 and consists of a navigation lock, spillway, powerhouse, and fish passage facilities on both shores. The reservoir behind the dam is known as Lake Umatilla. Recreational facilities are also provided along the shores of Lake Umatilla and on the John Day River. The primary project purposes are hydropower generation and navigation. The project also provides 500,000 acre-feet of flood storage for Columbia River system flood regulation and includes fish passage and recreation. Figure 2 shows details of the features at the John Day project.

Figure 2. Details of John Day Lock and Dam



John Day is approximately 25 miles upstream from The Dalles Dam (Figure 1). The reservoir behind The Dalles Dam, Lake Celilo, extends upstream to the base of John Day. Lake Umatilla extends upstream from John Day to the base of McNary Dam, a length of 77 miles with a water surface area of about 50,000 acres. The Dalles project was authorized in 1950 and consists of a navigation lock, spillway, powerhouse, and fish passage facilities on both shores. Recreational facilities are also provided along Lake Celilo. The primary project purposes are navigation and hydropower. Figure 3 shows details of the features at The Dalles project.

Figure 3. Details of The Dalles Lock and Dam



The stretch of the Columbia River between McNary Dam and Bonneville Dam is referred to as Zone 6 of the Columbia River Fishery (Figure 4). The reservoirs formed by John Day and The Dalles dams are included in Zone 6. The Columbia River Interstate Compact established fishery zones along the Columbia River, which were approved by Congress in 1918. This agreement between the states of Washington and Oregon allows their respective fish and wildlife departments to set commercial fishing seasons on the Columbia River. The compact divides the river into six zones. Zones 1-5 are located below Bonneville Dam. Zone 6, the 147-mile stretch between Bonneville and McNary dams, is an exclusive treaty Indian commercial fishing area where tribal members are legally entitled to half the harvestable surplus of fish in the river. To meet that requirement, Oregon and Washington must set their commercial fishing limits (season and catch) in Zones 1-5 in order to leave enough fish for harvest in Zone 6. Indian fishing is regulated under the ongoing U.S. District Court litigation known as *U.S. v. Oregon.* The mitigation for John Day and The Dalles in relation to impacts in Zone 6, and above and below this area, is a subject of importance to all parties in the basin.

Figure 4. Columbia River Zone 6

1.3. Existing JDM Program Production

Program adjustments in the 1980s and 1990s resulted in the current JDM production configuration with approximately half of the production as URB fall Chinook that are released from several facilities just below Bonneville Dam to above McNary Dam, and half of the production as tule fall Chinook that are released in the Bonneville pool or just below Bonneville Dam. The existing production includes releases above McNary Dam in Zone 6 and below Bonneville Dam as shown in Table 1. Figure 5 shows the locations of existing hatchery facilities and Table 2 shows the existing production mix, which is approximately 50% tule and 50% URB fall Chinook.

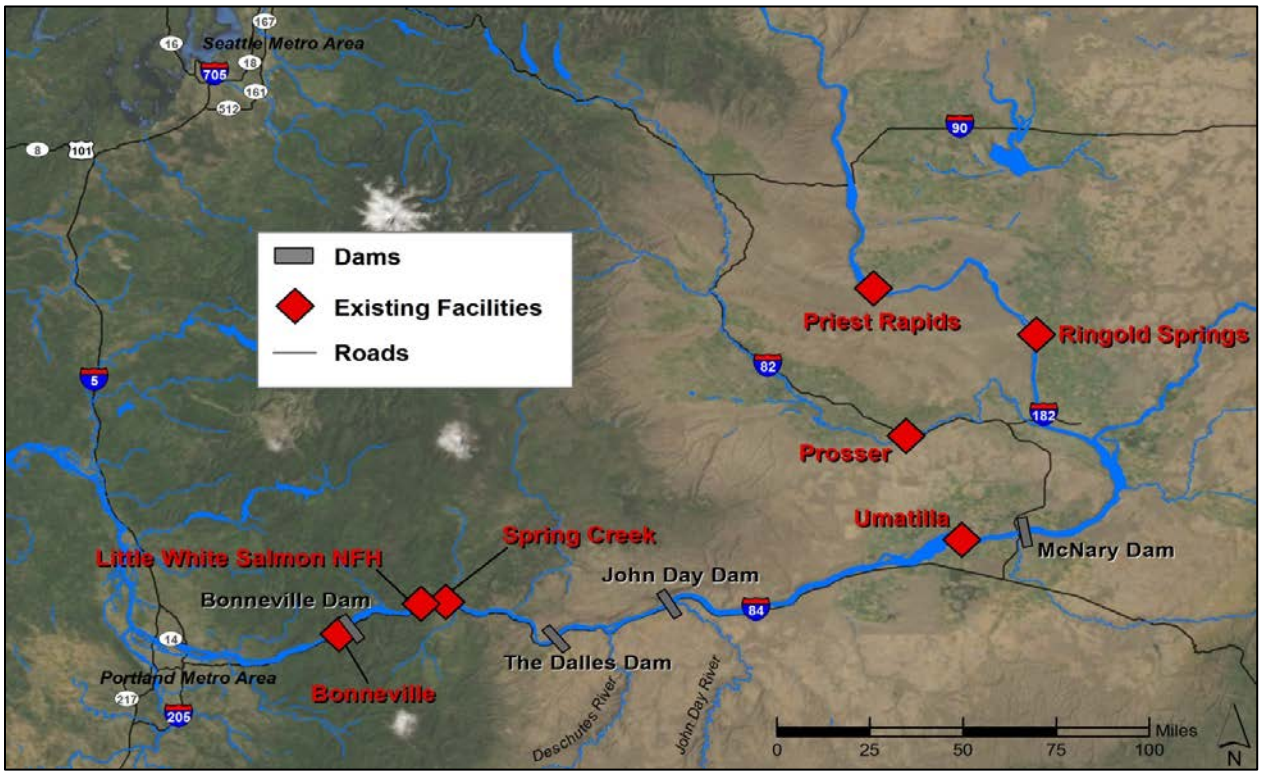
Table 1. JDM Program Existing Production and Release Locations

Release Locations		URB Fall Chinook			Tule Fall Chinook			Total Juvenile Release (1000s)	Total Adult Return (1000s)	Stock Split $ (based on Adult Return)	
		Juvenile Release (1000s)	Smolt-to-Adult Ratio	Adult Return/ Adult Survival (1000s)	Juvenile Release (1000s)	Smolt-to-Adult Ratio	Adult Return/ Adult Survival (1000s)				
Current Production (measured as total adult return)	Above McNary	5,598	0.00176	9.9	0	0.00176	0.0			%URB	%Tule
	In Zone 6	2,074	0.00176	3.6	6,954	0.00176	12.2			50%	50%
	Below Bonneville Dam	900	0.00176	1.6	1,596	0.00176	2.8				
Total Mitigation		8,572		15.1	8,550		15.0	17,122	30.1		

Table 2. JDM Program Existing Production Mix (November 2011)

Release Location	Stock	Total No. Released	USACE JDM Component	Spawn/Rear/Release Locations	Mitigation Impact Area (juvenile release location)
Spring Creek	Tule	10,500,000	5,985,000	Spring Creek	Bonneville Pool Zone 6
Little White Salmon	Tule	1,700,000	969,000	Spring Creek/Spring Creek/Little White Salmon	Bonneville Pool -Zone 6
Bonneville	Tule	2,800,000	1,596,000	Spring Creek/Bonneville/ Bonneville	Below Bonneville
Subtotal	**Tule**	**15,000,000**	**8,550,000**		
Little White Salmon	URB	2,500,000	1,125,000	Bonneville/Bonneville/Little White Salmon	Bonneville Pool - Zone 6
Little White Salmon	URB	2,000,000	468,800	See Note	Bonneville Pool -Zone 6
Bonneville	URB	2,000,000	900,000	Bonneville/Bonneville/ Bonneville	Below Bonneville
Umatilla	URB	480,000	480,000	Bonneville/Bonneville/ Umatilla	Zone 6
Ringold Springs	URB	3,500,000	3,500,000	Priest Rapids/Bonneville/ Ringold	Above McNary
Priest Rapids	URB	1,700,000	1,700,000	Priest Rapids/Priest Rapids/ Priest Rapids	Above McNary
Prosser Tribal Hatchery	URB	1,700,00	398,480	See Note	Above McNary
Subtotal	**URB**	**13,880,000**	**8,572,280**		
Total 2011 JDM Production			**17,122,280**		
Note: These numbers represent the fraction of the total stock production supported by JDM feed-only funding.					

Figure 5. JDM Program Existing Facilities



Bonneville Oregon State Fish Hatchery is on Tanner Creek, which flows into the Columbia River near the base of Bonneville Dam about 145 miles upriver from the ocean. The ODFW operates the hatchery. In 1957, the facility was remodeled and expanded as part of the 1938 Mitchell Act, a program to enhance declining fish runs in the Columbia River Basin. The USACE expanded the hatchery in 1974 to mitigate for fish losses from the construction of the John Day Dam. The hatchery currently receives funding from the National Marine Fisheries Service (NMFS) and the USACE. The hatchery releases 2,800,000 tule fall Chinook annually into the Columbia River, of which approximately 1,600,000 can be attributed to the JDM program. Bonneville also produces 2,000,000 URB fall Chinook, of which 900,000 can be attributed to the JDM program.

The Little White Salmon National Fish Hatchery is located on the Little White Salmon River approximately 1 mile upstream from the Columbia River. It was a pioneer in the science of salmon propagation when it began rearing salmon in 1896. Currently, more than 9,400,000 young salmon are released annually into the river in the Bonneville pool or transferred to other sites for release. Specifically, 1,700,000 tule and 2,500,000 URB fall Chinook were released in 2011, of which 970,000 (tule) and 1,130,000 (URB) can be attributed directly to the JDM program. The USFWS owns and operates the hatchery using funds from the NMFS under the Mitchell Act of 1938 and the JDM program.

The Spring Creek National Fish Hatchery is located on the Columbia River in Underwood, Washington. Spring Creek produces tule fall Chinook salmon to mitigate for lost fisheries and habitat under authority of the Mitchell Act of 1938 and the JDM program. The USACE funded expansion of the hatchery to its current size in 1972 to support the JDM program. The hatchery produces 10,500,000 tule fall Chinook annually for release into the Columbia River in the pool above Bonneville Dam, of which approximately 6,000,000 can be attributed to the JDM program. This hatchery plays a key role in maintaining the genetic integrity of this unique stock of fish, a native of the White Salmon River. The Spring Creek tule fall Chinook stock is also an indicator stock for the U.S.-Canada Pacific Salmon Treaty, and an integral component of the *U.S. v. Oregon* agreement, which reaffirms Native American treaty fishing rights under the Treaties of 1855.

The Umatilla Oregon State Fish Hatchery is located in Irrigon, Oregon, on the Columbia River. The 23-acre site is owned and operated by ODFW, which raises fall and spring Chinook and summer steelhead at the hatchery. Umatilla began operation in 1991 under the Northwest Power Planning Council's Fish and Wildlife Program to mitigate for fish losses caused by hydroelectric dams on the Columbia River. Hatchery funding is provided by the Bonneville Power Administration and USACE under the JDM program. Umatilla produces 480,000 URB fall Chinook annually for release into the Columbia River, all of which can be attributed to the JDM program.

The Prosser Tribal Fish Hatchery in Prosser, Washington, is owned by Bureau of Reclamation and co-operated by the Yakama Nation and Washington Department of Fish and Wildlife (WDFW). The URB fall Chinook program is funded by the USACE, the JDM program, and Bonneville Power Administration. Prosser produces 1,700,000 URB fall Chinook annually for release into the Columbia River above McNary Dam, approximately 400,000 of which can be attributed to the JDM program.

The Ringold Springs State Fish Hatchery (RSH) is located on the Columbia River approximately 17 miles west of Mesa, Washington. The hatchery was initially built in 1962 as part of the Columbia River Fisheries Development Program, a program to mitigate for fishery losses from hydropower development. In 1996, a cooperative agreement was signed by USACE, WDFW, NMFS, and USBR to share the rearing facility at RSH to increase JDM program fall Chinook salmon releases upstream of McNary Dam and the Snake River. The USACE constructed a test facility at RSH to assess its capacity to produce URB fall

Chinook, and it was demonstrated that RSH could successfully rear fall Chinook smolts for the JDM program. The rearing facility program at RSH continues today at the existing capacity, which ranges from 3,500,000 to 5,500,000 fall Chinook smolts, depending on fish size. Of the total production, 3,500,000 contribute to the JDM program requirement. This was an important change in the mitigation program to better address in-place and in-kind mitigation objectives. The hatchery is owned and operated by WDFW using funds from NMFS under the Mitchell Act of 1938 and the JDM program. Other species produced at the hatchery include spring Chinook and summer steelhead.

The Priest Rapids State Fish Hatchery is located in the Hanford Reach, a 56-mile segment of the Columbia River upstream of the Priest Rapids Dam. The hatchery was originally designed as a mitigation facility for fall Chinook after the Priest Rapids and Wanapum dams were constructed. The hatchery is owned by the Grant County Public Utility District and receives funding from the USACE under the JDM program. In operation since 1963, Priest Rapids is run by WDFW and is part of the agency's Priest Rapids Hatchery Complex, which also includes the RSH, Meseberg, Naches, and Columbia Basin hatcheries. In 1992, the WDFW and USACE, in agreement with the Grant County Public Utility District, began rearing and releasing URB fall Chinook salmon at Priest Rapids for the JDM program. Currently, the hatchery produces 1,700,000 URB fall Chinook annually for release into the Columbia River above McNary Dam, all of which contribute to the JDM program.

2. ALTERNATIVES

2.1. JDM Program Mitigation Goal

During development and evaluation of alternatives, feedback was received from the *U.S. v. Oregon* Production Advisory Committee (a group established in response to a 1968 court decision that upheld treaty fishing rights) on the measurement of JDM program production levels. The *U.S. v. Oregon* parties recommended that the USACE use a method referred to as the total adult production and current smolt-to-adult ratio data to more accurately calculate the production level required to produce the 30,000 adult spawners under the authorized JDM program. After extensive review, in August 2012 the USACE accepted the total adult production and smolt-to-adult ratio as the best available methods with scientific basis to calculate production that is necessary to meet the authorized mitigation level. Based on this methodology, a total adult production of 107,000 fish is required to meet the authorized 30,000 adult escapement. This equates to a production of at least 26,000,000 juvenile fish. Current production associated with the JDM program is 17,122,280 juvenile fish. The juvenile production to support the revised figure requires expanded or new hatchery facilities.

2.2. Assumptions

The alternatives were formulated to better address in-place and in-kind mitigation by increasing the number of returning adults to the area impacted by John Day and The Dalles, and using a production ratio of 75% URB and 25% tule fall Chinook. Alternatives were also formulated based on the assumption that production of tule fall Chinook would decrease with the increase in URB fall Chinook.

It was assumed that Spring Creek, with its current tule release in Zone 6, would continue to be used to meet the 25% tule ratio target of total adult production. With Spring Creek tule making up 25% of the returns and a smolt-to-adult ratio of 0.004723, the production goal is the release of 5,664,300 tule juveniles. This would result in an adult production of 26,752 fish, which is 25% of the 107,000 total adult production goal. This production and release location for tule fall Chinook remains the same across alternatives. It is assumed that Bonneville and Priest Rapids would be not be needed to meet any of the JDM program requirements under the 75% URB and 25% tule fall Chinook ratio.

The target for the remainder of the 107,000 adult production goal is URB fall Chinook. The minimum URB adult production is 80,248. Alternatives were developed using different combinations of build-out at existing and new facilities. Release location was also considered in developing alternatives. The number of URB juveniles released to meet this goal is based on the smolt-to-adult survival ratios for the various hatcheries. These ratios are based on data from 1990 to 2004 and are shown in Table 3. Using these figures, the number of URB juveniles needed to meet the goal was at least 20,000,000, with the specific number dependent on the smolt-to-adult ratio for the hatchery.

Table 3. Summary of Smolt-to-Adult Survival Ratio by Hatchery

Facility	Smolt-to-Adult Survival Ratio
Spring Creek Tule	0.004723
Little White Salmon URB	0.003196
Ringold URB	0.00384
Umatilla URB	0.013323
Klickitat URB	0.003196
I-182 URB	0.00384

The hatchery facilities were considered for use in three different ways:

1. On-station production–Spawning, incubation, rearing, and release of smolts at the facility.
2. Intermediate rearing–Spawning, incubation, and initial rearing. The fish are then transferred to another facility for final acclimation.
3. Acclimation–Final rearing and release of smolts.

Hatchery facility designs were based on fish being sized at 200 fish per pound when transported and 50 fish per pound when released. The production, rearing, and release figures are limited to smolt, which are part of the JDM components, and not total facility production to meet mitigation or other requirements.

2.3. Alternatives

The alternatives under consideration include five hatchery improvement alternatives and the no action alternative. The hatchery improvement alternatives were developed using different combinations of build-out at existing and new facilities to meet revised juvenile production, and to better address in-place and in-kind mitigation. The alternatives include:

- Alternative 1A – Ringold Hatchery Expansion and URB Acclimation/Release at Klickitat
- Alternative 1B – Ringold Hatchery Expansion and New Acclimation/Release Facility near I-182
- Alternative 1C – Ringold Hatchery Expansion and URB Acclimation/Release at Little White Salmon Hatchery Complex
- Alternative 2 – Additional Production at Ringold Hatchery and URB Acclimation/Release at Little White Salmon Hatchery Complex
- Alternative 3 – Full Build-out at Ringold Hatchery
- No Action Alternative

The potential to support increased production at the RSH was recognized with the execution of the 1996 Cooperative Agreement for design and construction of the test facility for rearing and release of URB fall Chinook. The RSH provides rearing and release location above McNary Dam. Ringold is currently used to produce 3,500,000 URB fall Chinook. The five hatchery improvement alternatives include expansion at RSH for on-station production. The volume of production and release at RSH varies across the alternatives and ranges from 10,400,000 to 20,900,000 fish. These five alternatives also include a range of other facilities to meet the target juvenile release figure to support the mitigation goal. The primary distinguishing characteristic of the alternatives is the release location in the system. Each of the alternative locations also has ESA implications and feasibility differences.

Table 4 summarizes the production at each facility by alternative. Figure 6 shows the locations of the facilities included in the alternatives. The five alternatives are described in the following subsections.

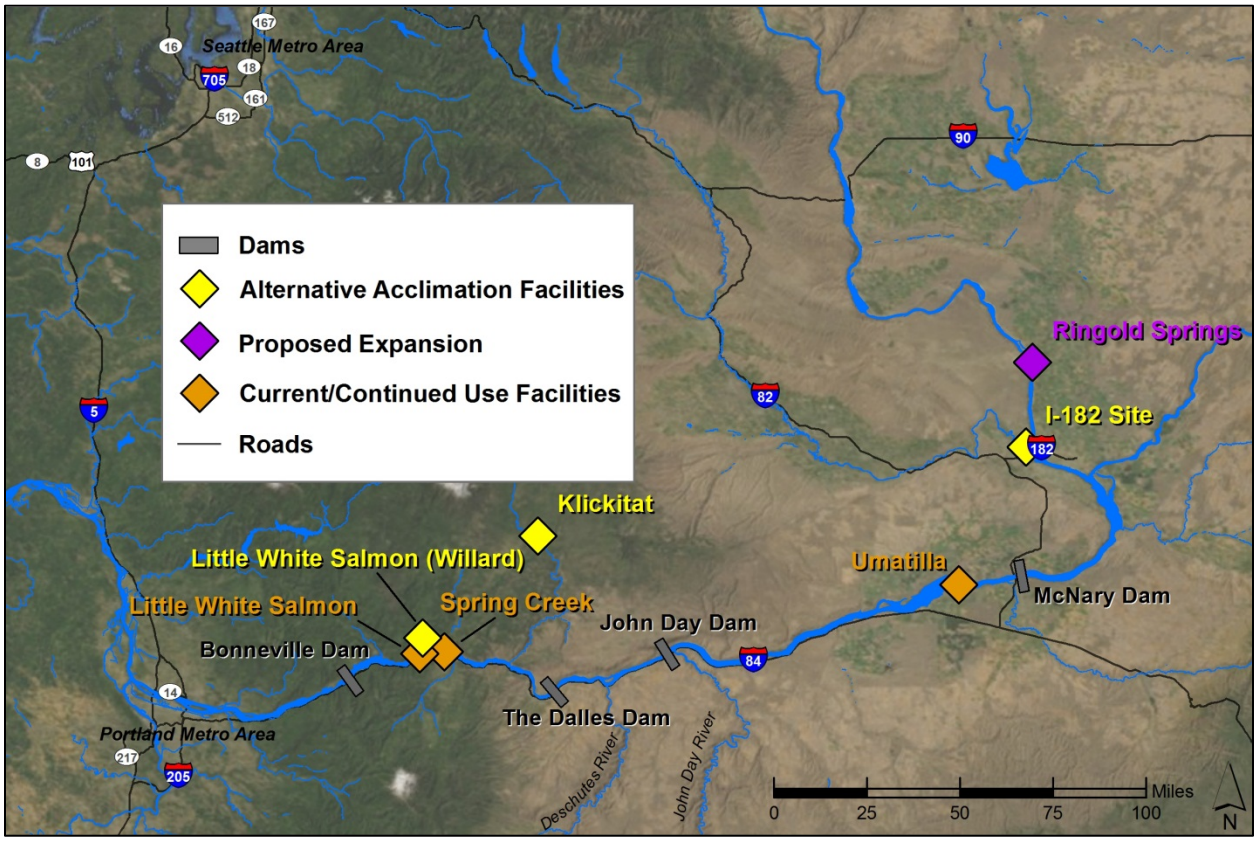
2.3.1. Alternative 1A – Ringold Expansion and URB Acclimation/Release at Klickitat

Alternative 1A was formulated to support increased on-station production at RSH and development of an acclimation facility at Klickitat. It would also use Little White Salmon and Umatilla to meet the targeted mitigation goal. The Klickitat hatchery is an existing facility operated by the Yakama Nation, located 7 miles east of Glenwood, Washington, at river mile (RM) 42.5 of the Klickitat River.

Table 4. Summary of Production at Each Facility by Alternative

Locations/Fish	Smolt-to-Adult Ratio	Alternative 1A		Alternative 1B		Alternative 1C		Alternative 2		Alternative 3	
		Juveniles	Adults	Juveniles	Adults	Juveniles	Adults	Juveniles	Adults	Juveniles	Adults
Spring Creek Tule	0.004723	5,664,300	26,752	5,664,300	26,752	5,664,300	26,752	5,664,300	26,752	5,664,300	26,752
Little White Salmon On-Station	0.003196	4,065,000	12,992	4,065,000	12,992	4,065,000	12,992	500,000	1,598	0	0
Little White Salmon URB Acclimate at Willard	0.003196	2,500,000	7,990	2,500,000	7,990	2,500,000	7,990	2,500,000	7,990	0	0
Ringold URB	0.00384	10,439,500	40,088	10,439,500	10,088	10,439,500	40,088	16,735,500	64,264	20,900,000	80,256
Umatilla	0.013323	480,000	6,395	480,000	6,395	480,000	6,395	480,000	6,395	-	0
Klickitat	0.003196	4,000,000	12,784	-	0	-	0	-	0	-	0
I-182	0.00384	-	0	3,400,000	13,056	0	0	-	0	-	0
Little White Salmon Increase	0.003196	0	0	0	0	4,000,000	12,784	0	0	0	0
Total Tule	-	5,664,300	26,752	5,664,300	26,752	5,664,300	26,752	5,664,300	26,752	5,664,300	26,752
Total URB	-	21,484,500	80,248	20,884,500	80,520	21,484,500	80,248	20,215,500	80,247	20,900,000	80,256
Total	-	27,147,800	107,001	26,548,800	107,273	27,148,800	107,001	25,879,800	107,000	26,564,300	107,008
Goal	-	-	107,000	-	107,000	-	107,000	-	107,000	-	107,000
Ratio	-	-	75.00%	-	75.10%	-	75.00%	-	75.00%	-	75.00%

Figure 6. Alternatives for the JDM Facilities Improvements



Alternative 1A provides for the on-station production of 10,439,500 URB fall Chinook at an expanded RSH (current URB production at RSH is 3,500,000). In addition, RSH would be modified to support production of 4,000,000 fish for intermediate rearing. Under Alternative 1A, 4,000,000 smolts would be acclimated at an expanded facility at Klickitat. Thus, the capacity of RSH for incubation and intermediate rearing would be 14,439,500 for this alternative.

Alternative 1A also includes on-station production of 6,565,000 fish at the Little White Salmon facility. This portion of the production would not affect the design of RSH. Of these fish, 2,500,000 would be acclimated at the Willard facility, which is part of the Little White Salmon complex. These fish would be released in the Bonneville pool. Adult long-term holding facilities would not be required for this alternative since the existing adult return pond is adequate. Alternative 1A also includes the on-station production of 480,000 (0.5 million) fish at the Umatilla facility. This production is separate from any production at RSH.

Under Alternative 1A, acclimation and release of 4,000,000 juveniles would occur at the Klickitat hatchery. One of the disadvantages of this location is that the juveniles released in the Klickitat River would enter the Columbia River below The Dalles Dam in the Bonneville pool. This site is the greatest distance from RSH.

2.3.2. Alternative 1B – Ringold Expansion and New Acclimation/Release Facility

Alternative 1B would include the same expansion of RSH as Alternative 1A and would include a new off-site acclimation/release facility. This alternative would also use Little White Salmon and Umatilla to meet the targeted mitigation goal. Four off-site acclimation/rearing sites were evaluated: I-182, Horn Rapids County Park, Barker Ranch, and Priest Rapids Hatchery. The following information about these sites was taken from McMillen, LLC (2012) and USACE (October 2012).

The I-182 site is located on the southerly portion of an 87-acre parcel in Richland, WA, on the right bank of the Yakima River (RM 4) about 2.5 miles from its confluence with the Columbia River. The 5-acre site proposed for development is located about 27 miles south of RSH. The property is owned by the USACE and is mostly undeveloped. The portion of the site identified for potential use is a fairly level grass and sagebrush field. The river frontage is a heavily vegetated riparian zone. The USACE has a water right for irrigation of 5 acres at the site. There is an irrigation canal along the west side of the parcel that may be able to provide some additional water to the site.

The Horn Rapids site is located on the west bank of the Yakima River about 7 miles north of Benton City, WA. The site is located on a small portion of a 295-acre parcel operated as a multi-use county park by Benton County. At the project frontage, there is no riparian vegetation along the river bank. A gravel road provides access to the river bank. Most of the site consists of relatively barren uplands vegetated with cheat grass and occasional sage brush. The site does not have utilities or existing water rights.

The Barker Ranch site is located on the east bank of the Yakima River (RM 9) in Benton County, WA, about 6 miles northwest of Richland. The site would utilize several acres on the 1,040 acre parcel, forming the northern half of the total ranch area. Since 1994, the ranch has been owned by a hunting and conservation group that manages the land for wildlife habitat. Vehicular access to the proposed site is controlled by a locked gate on a 3/4 mile dirt road. The ranch property is fenced and is closed to the general public. The portion of the site identified for potential use is a fairly level grass field bordered by Russian olive, alders, and willow trees. The river frontage is a heavily vegetated riparian zone. The site has a pre-existing 17 cfs water right that would be available for only part of the year. During fall, the water is needed to attract waterfowl for hunting.

At Priest Rapids, services would be leased from Grant County Public Utility District at the Priest Rapids Hatchery for juvenile rearing and acclimation and for adult holding/collection. Priest Rapids Hatchery is planning a remodel. Currently, 1.7 million of URB fall Chinook produced at Priest Rapids are released there as part of JDM production goals. Whether this program is to be continued will depend largely on economic factors relating to operation and maintenance costs in the future.

Table 5 provides a summary of the qualitative analysis of the acclimation site alternatives using a scoring procedure in which a score of +1 was assigned when the alternative was positively rated for the evaluation criteria, assigned a score of 0 when the alternative was neutral for the evaluation criteria, and assigned a score of -1 when the alternative was negatively rated for the evaluation criteria. Based on this evaluation, the I-182 site is the most feasible alternative. Its location on the Yakima River supports spreading some of the URB fall Chinook production and collection throughout the Zone 6 Fishery and into the Yakima River.

Table 5. Comparison of Possible Acclimation Sites

Item	I-182	Horn Rapids	Barker Ranch Site	Priest Rapids Site
Water Source				
Water availability	0	-1	+1	+1
Water quality/temperature	0	0	0	+1
Site Characteristics				
Site size	+1	+1	+1	+1
Site access	+1	0	+1	+1
Available power	+1	-1	+1	+1
Site security	0	0	0	0
Site acquisition/ownership	+1	-1	-1	-1
Permitting Difficulty	0	0	-1	+1
Location			+1	
Relative to Zone 6 fishery	+1	+1	+1	-1
Future Flexibility				
Possible adult collection? Dual use?	+1	+1	-1	+1
Cost relative to other site alternatives	+1	-1	0	-1
Total Score	**+7**	**-1**	**+3**	**+4**

Alternative 1B would provide for on-station production and release of 10,400,000 juvenile URB fall Chinook. In addition to an increase in on-station production at RSH, the facility would also be modified to support production of an additional 3,400,000 smolts for intermediate rearing, and then use the I-182 site for acclimation and release. This site is located north of Highway I-182 on the right bank of the Yakima River about 2.5 miles from its confluence with the Columbia River. The site would allow for juvenile release above McNary Dam. There are currently no fisheries facilities at this site, which is owned by the federal government (USACE). The I-182 site is expected to have a higher smolt-to-adult ratio than Klickitat and Little White Salmon, so the smolt production figure and capacity at the acclimation facility can be reduced to obtain a release of 3,400,000 juveniles. Similar to Alternative 1A, on-station production at Little White Salmon (4,065,000) and Umatilla (480,000) would continue. An additional 2,500,000 eggs from Little White Salmon would be transported to and acclimated for release at the Willard facility as described under Alternative 1A.

2.3.3. Alternative 1C – Ringold Expansion and URB Acclimation/Release at Little White Salmon Hatchery Complex

Alternative 1C would provide for production in the same manner as described for Alternatives 1A and 1B, including the expansion of RSH and the use of Little White Salmon and Umatilla. However, this alternative would include new acclimation facilities at Little White Salmon. Alternative 1C would utilize the Little White Salmon complex (including Willard) for acclimation and release. The alternative would increase the number of fish released at Little White Salmon by 4,000,000. The facilities at Willard would also be used to provide space for production of these additional fish. Little White Salmon is located farthest downstream of the three acclimation and release sites proposed in Alternatives 1A, 1B, and 1C. Alternative 1C would return fish to the Bonneville pool.

2.3.4. Alternative 2 – Additional Production at Ringold and URB Acclimation/Release at Little White Salmon Hatchery Complex

Alternative 2 proposes that production be more focused at an expanded RSH and supplemented by the Little White Salmon complex (including Willard) and Umatilla. In Alternative 2, the total on-station production at RSH would be 16,735,500 fish. Under this alternative, the total program production at Little White Salmon would decrease from 6,565,000 fish (Alternatives 1A and 1B) to 3,000,000 fish. The details of how this production would be split between Little White Salmon and Willard would be determined in the future. No additional facilities would be required for this reduced number of fish. The production at Umatilla would remain the same at 480,000 fish. This alternative provides a release location above McNary Dam, but there is concern that the high juvenile release level at RSH may not be environmentally sound and that a mix of sites may be preferable.

2.3.5. Alternative 3 – Full Build-out at Ringold

Alternative 3 would represent a full build-out at RSH. This alternative would eliminate URB production from other sites and rely completely on RSH for on-station production. The greatly expanded RSH would provide for the release of 20,900,000 juvenile URB fall Chinook. All acclimation and release would occur at RSH; no transportation would be required. As with Alternative 2, there is concern that using only one site for acclimation and release may not be the most environmentally sound approach, and that a mix of release sites is preferable.

2.3.6. No Action Alternative

For the no action alternative, existing hatchery operations would continue with insufficient in-place/in-kind production to meet the mitigation terms of the JDM program. The JDM program has been and will continue to be shaped by tribal trust responsibilities, ESA requirements, and other legal and management agreements. Taking no action would not meet the requirement of Reasonable and Prudent Action #40 in the 2008 FCRPS BiOp, which was developed to ensure that the JDM program does not impede recovery for Lower Columbia Chinook salmon. In addition, taking no action would not address the balance between upriver and downriver stock production as required in the 2008 Columbia Basin Fish Accords, and would not meet requirements of the *U.S. v. Oregon* Management Agreement.

2.4. Comparison of Alternatives

The following criteria were used to compare the alternatives. These criteria are listed and alternatives compared in Table 5.

- Ability to meet in-place and in-kind objectives (2008 FCRPS BiOp and 2008 Accords).
- Transportation costs from production site to acclimation/release site (low, medium, or high).
- Potential for adverse ESA impacts, policy, and/or authorization concerns.

The alternatives were also compared with the goal of meeting JDM objectives. These objectives are listed and alternatives compared in Table 6.

Table 6. Comparison of Alternatives

Alt.	Meets in-place and in-kind objectives	Transportation Cost			Potential for Adverse ESA Impacts, Policy, and/or Authorization Concerns?
		Low	Medium	High	
1A	Partial			X	Yes - Real estate acquisition.
1B	**Optimal**		**X**		**No**
1C	Partial			X	No
2	High	X			Yes - Concern with high juvenile release at one location.
3	High	X			Yes - Concern with high juvenile release at one location.
No Action	Partial	X			Yes - potential to impede recovery of Lower Columbia Chinook salmon; does not meet requirements of 2008 FCRPS BiOp and 2008 Accords.

Table 7. JDM Objectives Comparison

JDM Objective	Alt 1A	Alt 1B	Alt 1C	Alt 2	Alt 3
Meets existing JDM mitigation objective of an escapement of 30,000 Chinook based on using the total adult production method and specific smolt-to-adult ratio.	Yes	**Yes**	Yes	Yes	Yes
Meets in-kind production ratio of 75% URB and 25% tule fall Chinook salmon.	Yes	**Yes**	Yes	Yes	Yes
Meets in-place mitigation objective by increasing release of juvenile salmon in Zone 6 and above McNary Dam.	No	**Yes**	No	Yes	Yes
Provides a mitigation program that is economically efficient.	No	**Yes**	No	No	No
Provides a mitigation program that is environmentally sound.	Yes	**Yes**	Yes	No	No

Based on the above comparisons, Alternative 1B would best meet the evaluation criteria and JDM objectives listed in Tables 5 and 6, respectively.

Further evaluation of the preliminary alternatives was provided by the *U.S. v. Oregon* Production Advisory Committee in March 2012. Concerns were raised by the committee as related to alternatives that proposed siting all (or nearly all) of the John Day URB mitigation at RSH, as summarized below:

- A 20,900,000 production-level facility would not be acceptable ecologically with this number of hatchery fish released directly into the Hanford Reach natural spawning areas. This approach does not implement best management practices for new hatchery production programs.
- A 20,900,000 production program would require new water rights and substantially more water than is currently available, which may be difficult and/or not timely to achieve. There is also uncertainty about water quality/quantity availability with a perched well design for such a large program.
- Consolidating all of the production of URB leaves vulnerability to catastrophic failure (disease, facility failure, etc). Reliance on a single brood stock collection and rearing site also presents vulnerabilities.
- A 20,900,000 production program does not adequately address logistics for an integrated hatchery approach under best management practices.
- Federally funded mitigation programs require 100% mass marking and a 20,900,000 program would be unprecedented and logistically impossible given short marking windows.

Alternative 3 would rear and release all of the required URB production for meeting the 75% split, totaling 20,200,000. Based on the *U.S. v. Oregon* Production Advisory Committee comments, this production has several issues that would not comply with the objective of being environmentally sound. Alternative 2, with a proposed production at RSH of 16,700,000 URB, faced similar concerns as Alternative 3. The Production Advisory Committee generally agreed that a mix of facilities should be used and the RSH build-out should be limited to a production range of 8,000,000 to 12,000,000.

Based on these reasons, Alternative 2 and 3 are not recommended for further consideration. Using a mix of sites for acclimation, as described under Alternatives 1A, 1B, and 1C, was assessed to be the preferred approach and was deemed to be more environmentally sound and aligned with best management practices.

Alternative 1A: Alternative 1A better meets the in-place and in-kind objectives when compared to existing conditions. However, given the Klickitat hatchery location, the release of 4,000,000 juvenile URB fall Chinook would be below the John Day Dam in the Bonneville pool. The location is closer to the Bonneville Dam than to the John Day Dam. This alternative would result in higher operation costs due primarily to the distance and time involved with transfer of fish from Ringold to Klickitat. The time that fish would be in the transport trucks may also affect their health, resulting in lower adult returns due to potential increased mortality. Since the USACE does not own the land, acquisition and leasing arrangements would incur additional costs. Approval and implementation could be complicated and delayed given the lack of USACE ownership.

Alternative 1B: Alternative 1B best meets the in-place and in-kind objectives due to its release location above McNary Dam on the Yakima River, very close to the Columbia River. This alternative would result in comparatively lower operation costs because of the close distance and time involved with transfer of fish from Ringold to the I-182 site. The short period of time that fish would be in the transport trucks would minimize stress and decrease health issues associated with the transport. The site is on property owned by the USACE and would not be subject to land acquisition costs, leasing arrangements, and associated time delays.

Alternative 1C: Alternative 1C better meets the in-place and in-kind objectives when compared to existing conditions. However, the use of Little White Salmon, which is the farthest down river, would be returning fish to the Bonneville pool, which is outside of the area impacted by construction of John Day and The Dalles. The existing facilities are well maintained and maintenance costs would likely be equal to or slightly higher than the Alternative 1B site, which requires all new facilities. Alternative 1C would be environmentally sound considering that new land would not be disturbed and in-water work would not be needed for intake construction. There is the possibility that hazardous materials handling could be an issue with the demolition of the existing 60-year old lab buildings.

2.5. Selection of the Preferred Alternative

Based on the evaluation and comparison of the alternatives provided above, and coordination with the Production Advisory Committee, Alternative 1B would best meet the criteria and objectives of the JDM program and has been identified as the preferred alternative. This alternative meets 107,000 adult returns for an escapement of 30,000 Chinook, meets a production ratio of 75% URB and 25% tule fall Chinook salmon, provides for in-place and in-kind mitigation of lost spawning areas above John Day Dam, and is economically efficient and environmentally sound in meeting the higher production capacity, while minimizing potential adverse effects on wild populations and ESA-listed fish species.

2.6. Preferred Alternative

The preferred alternative is a combination of actions, which include an expansion of facilities at RSH to allow for the production and release of 10,400,000 juvenile URB fall Chinook. In addition to an increase in on-station production, the RSH facility would also be modified to support production of an additional 3,400,000 smolt for intermediate rearing. This would bring the total production at RSH for incubation and intermediate rearing to 13.8 million. The preferred alternative also includes construction of acclimation facilities at the I-182 site, which would be used for acclimation and release of the 3.4 million smolts produced at the expanded RSH. The existing facilities at the Little White Salmon and Umatilla hatcheries would continue to be used for URB fall Chinook production rearing and release. The Spring Creek hatchery would continue to be used to produce tule fall Chinook; however, overall production of tule would be reduced such that the total production of both stocks would total approximately 26,000,000. This production and ratio would best meet in-place and in-kind mitigation.

2.6.1. Ringold Hatchery Expansion

The existing RSH site is approximately 1,000 acres owned and operated by the WDFW and has the following components: 9-acre rearing pond, 5-acre rearing pond, 14 vinyl raceways, and adult trap and holding pond. Water for the facilities is supplied by an existing water right of 70 cubic feet per second (cfs), which provides year-round water. Figure 7 shows an aerial view of RSH.

Figure 7. Aerial View of Ringold Hatchery

An overview of the facility improvements at RSH is provided below and shown on Figures 8 and 9.

- Replace the existing fish ladder with a structure meeting current NMFS design criteria. This new structure will consist of a lower fish ladder extending into a sufficiently deep section of the Columbia River and an upper fish ladder connecting to the fish trap and presort holding pond.
- Install pre-engineered metal buildings to be used as a sorting facility, spawning shelter, and incubation building.
- Construct six dual-use ponds, each 20 feet wide by 200 feet long by 8 feet deep, in the southern end of the existing 9-acre rearing pond to be used for rearing and adult holding. Thirty rearing ponds will be constructed north of the dual use ponds. The rearing ponds will be rectangular concrete structures, each 100 feet long by 10 feet wide by 5 feet deep. The ponds will be covered with a metal roof for shade, and avian protection using tensioned bird netting will completely surround the ponds.
- Replace the existing above-grade corrugated metal supply line from the main (spring) intake. The new supply line will be a 42-inch high-density polyethylene pipe (HDPE) that will be covered by an earthen berm to reduce the effect of solar heating; it will be connected to the existing 42-inch supply line from the lower (spring) intake.
- Construct a river intake in the Columbia River to supply additional river water to the system. The intake screen and pipe will be under water; a trench will be excavated into the river for the intake pipe and backfilled.
- Provide a new domestic well for potable water.
- Grading will be required for facility installation. The proposed earthwork at the site requires 12,000 cubic yards of net fill.
- New paving and building impervious surfaces will create stormwater runoff that will be captured in four bio-infiltration swales sized to store the first 6 inches of runoff. These will serve as temporary silt removal ponds during construction.
- Construct a 24-foot wide road to provide access to the rearing ponds. All paved areas will be covered with a 3-inch-thick asphalt surface, underlain by an 8-inch-thick crushed base course.
- Construct a reinforced concrete pollution control pond (120 by 160 feet) to be used to decant the uneaten food and fish feces vacuumed from the bottom of the rearing ponds. The decanted fluid outflow from the pollution abatement pond is discharged through the process water discharge system. At the end of the rearing season, the pond is drained and the solid matter is allowed to dry. Once dry, it is removed and disposed of in an approved disposal facility.
- Install onsite septic system to treat sewage from the bathrooms in the incubation building.
- Construction will occur during the in-water work period from 1 December to 28 February.

2.6.1.1. Geotechnical Considerations

Ten test pits were dug in April 2012 to determine existing soil and groundwater characteristics at the RSH site. Subsurface conditions consist of predominately loose sand/silt deposits overlying dense coarse gravels. The top levels of loose sand/silt will likely be difficult to compact, and over-excavation of grades and import of structural fill may be required in some locations. Native sand/silt soils are acceptable for retaining wall backfill. During April testing, groundwater was found a few feet below the surface west of the pond with high rates of horizontal groundwater flow within the test pits. The RSH site has a high level of horizontal ground water flow. Groundwater flow on the site is typically from the east edge of the site towards the creek on the southwest of the site and west towards the Columbia River. A pumping test is currently being performed to confirm the groundwater flow.

Figure 8. Ringold Site Plan

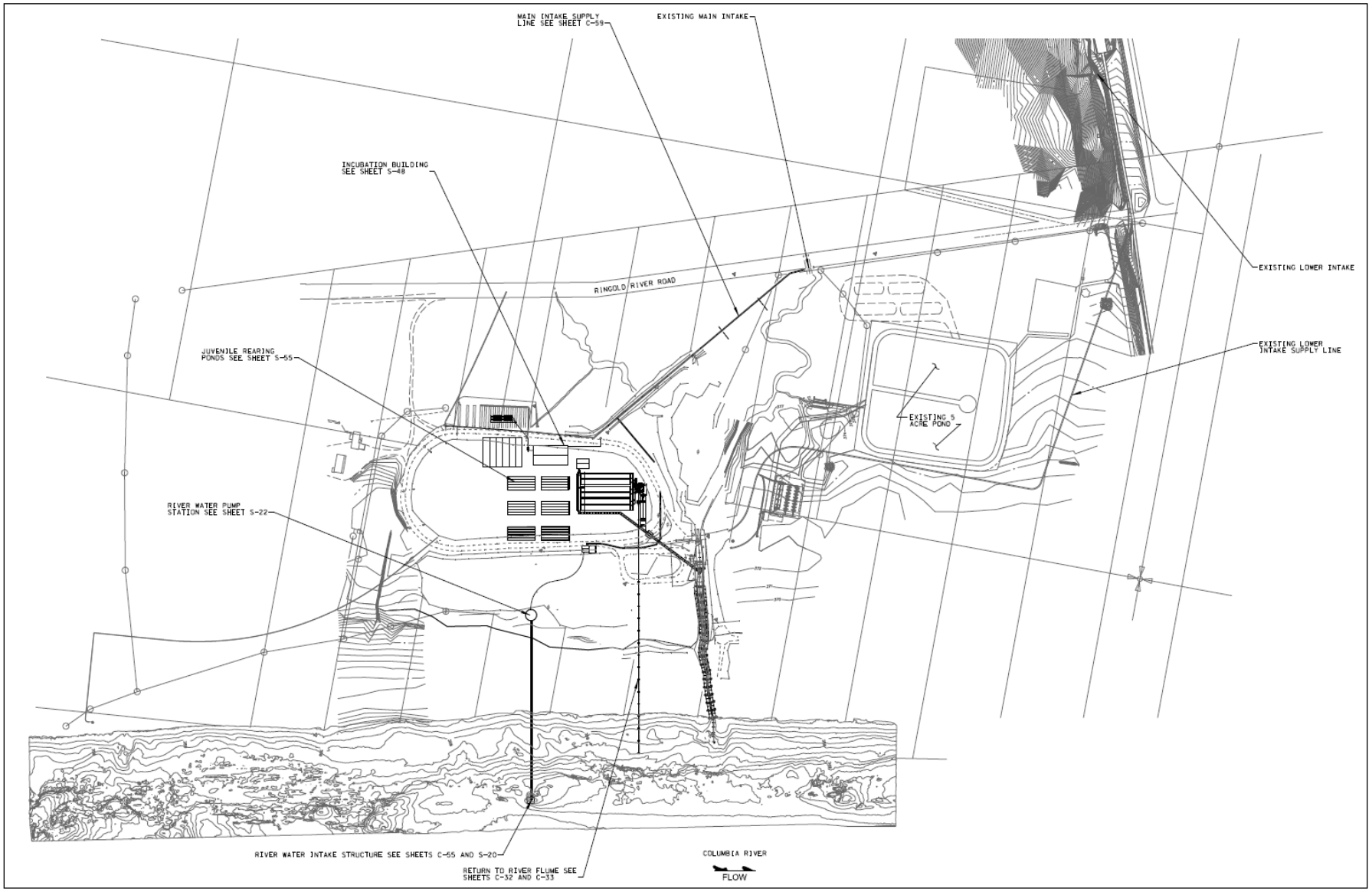
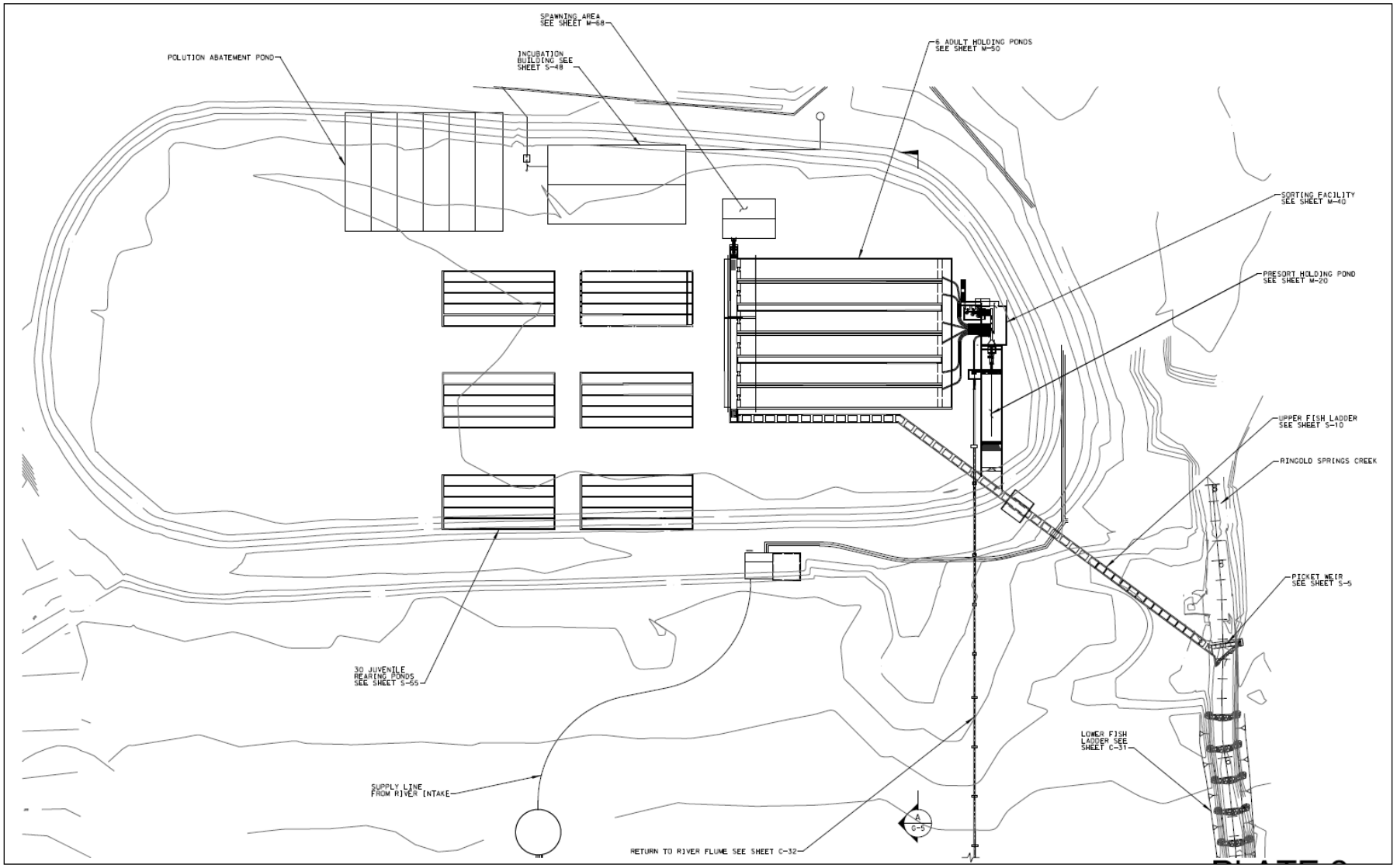


Figure 9. Ringold General Arrangement



Temporary dewatering during construction may be necessary to prevent the loose sands from becoming quick and making excavation below grade challenging. Below-grade structures will be constructed during late winter and early spring and not during timeframes when the rearing pond is being used. Due to high lateral groundwater flow, it is anticipated that high capacity sumps and pumps along with dewatering ditches will be needed for construction of below-grade structures. It is unknown at this time the requirements for permanent dewatering systems and the seasonal variations of groundwater levels. It may be necessary to install gravity cutoff trenches and ditches on the uphill (eastern) side of the facilities to provide long-term drainage depending on seasonal groundwater levels.

2.6.1.2. Site Design

The current water supply does not meet the demand for the expanded RSH facilities and fish production. Water demands vary throughout the year, up to a maximum of 90 cfs of river and spring water, plus an additional 5 cfs of groundwater, which is used for incubation. The amount of water available from the existing springs is limited by the amount of water available and the capacity of the water supply lines to convey it to the distribution tower. In March, only 5.6 cfs of spring water is available from the existing springs, and the remainder will be drawn from the proposed river water intake. A non-consumptive water right will be obtained for the expanded uses.

The proposed river water intake will be located approximately 2,000 feet south of the existing river intake and placed in a deeper portion of the Columbia River to provide a more reliable water supply. This intake will consist of a submerged screen structure, located at a low point in the river, which provides a gravity flow back to a pump station located on the bank. Water supply pumps in the pump station are sized to supply a flow of up to 90 cfs to the distribution tower. Portions of the pipeline in the river will be located in a shallow trench in the riverbed and covered with riprap to protect it from damage.

A groundwater well field will be installed to collect groundwater and pump it to the distribution tower. This water will be aerated and then used for incubation.

The existing water supply pipeline from the main intake will also be upgraded by the installation of new, buried HDPE pipe segments. This new HDPE line will also increase its capacity during the months when there is sufficient spring water available to do so.

The distribution tower will provide a steady water pressure to each of the facilities, regardless of which source is being used to supply it. Its design consists of three sets of supply pipelines, which allow water from the spring water, river water, and groundwater to be routed to the facilities and mixed separately. When there is more water available from any of the supplies than is required, such as when the river intake pumps are started, the excess water will discharge through an HDPE overflow pipe into Ringold Springs Creek, at a point chosen to provide an attraction flow to the lower fish ladder.

A single HDPE pipe will discharge the process water from all the facilities into Ringold Springs Creek, near the location of the existing fish trap, where it will also serve as attraction flow into the lower ladder. At the end of the rearing season, this discharge pipe will also serve as the juvenile salmon release, transporting them into Ringold Springs Creek.

The pollution abatement pond is a reinforced concrete pond with six treatment cells used to settle pollutants and treat discharge water before leaving the site and being discharged to Ringold Springs Creek.

A new potable water supply well will be provided to supply the residence, shop, and bathrooms. Sewage treatment from facility bathrooms will be provided by a conventional onsite septic system. Stormwater will be collected and treated in bio-infiltration swales with overflows discharging to the Columbia River and Ringold Springs Creek.

2.6.1.3. Facility Design

Hatchery facilities were designed based on biological criteria to meet production goals and as established by regulatory agencies. The adult holding and sorting facilities were sized based on an adult rack return run of 14,093 each year. A new half-Ice Harbor fish ladder will be constructed from Ringold Springs Creek to the presort holding pond. This ladder will contain 14 ladder pools and pass returning adults 14 vertical feet from Ringold Springs Creek to the presort pond water surface elevation.

The presort pond is a concrete rectangular pond located at the top of the fish ladder. The presort pond provides the capacity to hold 3,000 returning adults. The presort pond includes a V-trap at the downstream end to prevent adults from escaping back down the ladder. In addition to the V-trap, the presort pond includes a mechanical fish crowder, false weir, and vertical brail net to route and move fish into the electro-anesthesia baskets. At the end of the presort pond is the sorting facility. The sorting facility is a 30-foot by 40-foot single-story pre-engineered metal building containing an electro-anesthesia assembly, sorting table, 11 fish sorting flumes, fish totes, and a coded wire tag detector. Adult fish pass from the presort pond into the electro-anesthesia assembly, then to the sorting table. Fish are then sorted for delivery to several destinations, which include the adult holding ponds, the surplus totes, or the recovery tank. The recovery tank is located adjacent to the presort pond, and functions as a temporary holding pond for anesthetized fish recovery before returning to the river.

The six dual-use ponds have an average water depth of 8 feet and can hold a maximum of 3,200 returning adults each, or 1,300,000 juvenile fish at 50 fish per pound in each pond. A crowding channel is aligned perpendicular to the end of the six adult holding ponds allowing fish to be crowded to the fish lift, which will move fish to the spawning area.

The spawning area is an enclosed 50-foot by 40-foot concrete slab located between the dual use ponds and the hatchery building. The spawning area is 4,000 square feet and houses a spawning table, two stunners, and a fertilization station. Fish are lifted out of the dual-use ponds and onto a small sorting table in the spawning area. Fish are spawned, and then the eggs delivered directly to the hatchery building into the incubation stacks. In addition to the incubation area, the hatchery building also includes a meeting room, break room, restrooms, and offices.

Initial rearing will occur in 10-foot by 100-foot concrete raceways. There will be six banks of five raceways, for a total of 30 raceways. The raceways have the capacity to hold 14,400,000 juveniles at 200 fish per pound. Fish are marked at that size, and 4,000,000 are transferred offsite to an acclimation facility; 10,400,000 are held onsite in the raceways and the dual-use ponds. The onsite total holding capacity for the raceways is approximately 2,700,000 fish at the 50 fish per pound release size, and the dual-use pond is approximately 7,700,000 fish at 50 fish per pound. Each bank will be covered by a roof to provide shade and control water temperatures, and bird netting will be attached to the roof, enclosing the ponds to prevent avian predation. Each bank of raceways and the dual-use ponds will have a pond vacuum system for cleaning fish waste and uneaten food from the bottom of the pond. The wastewater will be routed to the pollution abatement pond. All of the pond structures will have a screened inlet and outlet structure and will include a stoplog structure for water surface control.

2.6.2. I-182 Site

For additional URB rearing and acclimation, a new acclimation facility would be developed at the I-182 site. There are currently no fisheries facilities at this site, which is owned by the USACE. It is planned that 3,400,000 smolts will be acclimated and released from the I-182 site. Adult long-term holding facilities are not required since returning adults will be surplused, and the adult return pond is adequate for that purpose. An overview of the I-182 facility is provided below and shown on Figure 10.

- Three dual-use ponds will be constructed. The dual-use ponds will be rectangular concrete structures, each 200 feet long by 20 feet wide by 8 feet deep.
- A tee-screen river intake will be constructed in the Yakima River; the associated pump station will be located on shore.
- A new concrete fish ladder will be constructed.
- The existing dirt road would be improved with gravel surfacing near the entrance to the facility.
- A two-cell settling pond designed to the latest technology standards will be designed to meet the water quality standards.

2.6.2.1. Fish Transportation

Transport of fish from RSH to the I-182 site will take approximately 45 minutes one way, and the total round trip time will be approximately 3 hours included loading, unloading, and breaks. Based on the use of one 1,800-gallon fish truck, it will take 5 days to transport all of the 4,000,000 fish from RSH. Two trucks will require approximately 3 days, and three trucks would take approximately 2 days.

2.6.2.2. Water Supply

The proposed water supply for the acclimation facilities at the I-182 site would be an intake screen and pump station drawing flow from the Yakima River. River temperatures will most likely follow Columbia River trends, and be favorable for rearing in March through May when fish would be in the ponds onsite. Returning adults will not be held in the long term, and will most likely be surplused; thus, the higher river water temperatures in the fall would not be an issue. The intake will consist of a submerged cylindrical tee screen and pump station designed to meet NMFS guidelines and criteria, sized to supply a maximum flow of 27 cfs.

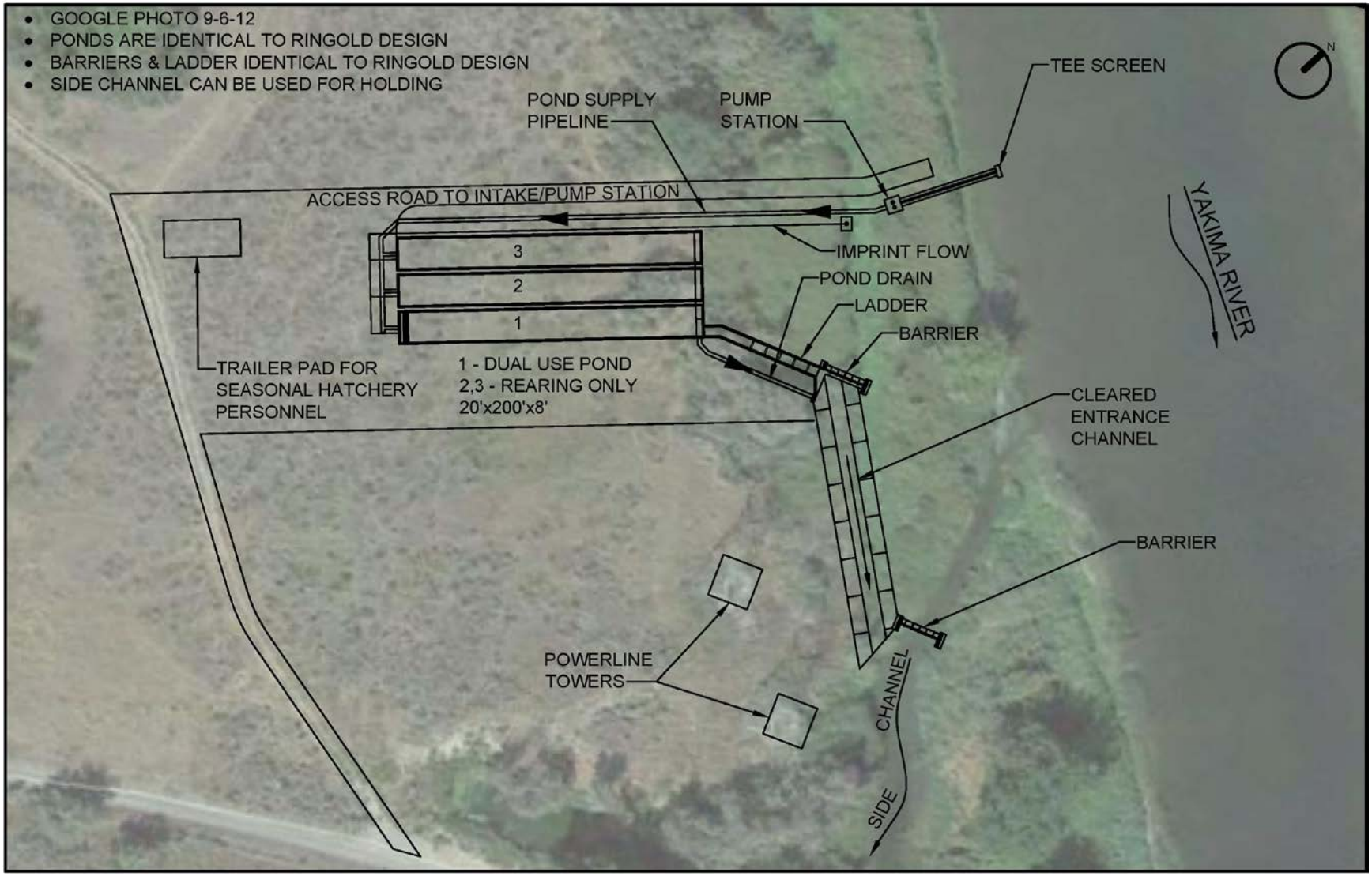
2.6.2.3. Rearing Facilities

Fish would be moved from RSH at 200 fish per pound after they are marked and will need 83,950 cubic feet of rearing volume for grow out and release at 50 fish per pound. Three dual-use ponds at the I-182 site will provide 96,000 cubic feet of rearing volume. Fish would be released volitionally from the ponds directly to the Yakima River. Future refinement of this alternative may consider fish release to a side channel slough for rearing benefit. The ponds would be covered or enclosed for bird predation and security.

2.6.2.4. Pollution Abatement Facilities

Pollution abatement facilities would be required at the I-182 site to meet National Pollutant Discharge Elimination System requirements for drain water released to the Yakima River. A two-cell settling pond designed to the latest technology standards would be designed to meet the water quality standards. The rearing ponds would be cleaned using a vacuum system similar to the design for the RSH facility.

Figure 10. I-182 Site Plan



3. AFFECTED ENVIRONMENT

3.1. Physical Characteristics

3.1.1. Geology and Soils

The majority of the RSH project site sets on somewhat of a gentle sloping terrace and does not appear to have been flooded in recent historical times. Some 12,000 ± 3,000 years ago, repeated catastrophic flooding around the end of the Pleistocene Epoch scoured a channel that essentially cut and formed the relatively steep slope that borders the eastern edge of the site. This scour uniformly exposed a relatively permeable confined aquifer, thus forming a remarkably linear spring system along the side slope that produces substantial volumes of water; the volume increases substantially (on the order of a factor of three) with the annual agricultural irrigation cycle, which peaks in early fall.

The near surface aquifer at the RSH site is called the Ringold formation (Newcomb 1958) and generally consists of coarse alluvium, with the lower portions of the unit containing several sequences of blue-grey clay that form intermediate aquatards (material of low permeability that slows groundwater movement). The result is a highly porous, confined system. Observation of the spring volume produced along the short, relatively steep slope overlooking the RSH site leads to the conclusion that gravel and cobble zones exist within the formation. In the vicinity of the hatchery, the Ringold formation is present at depth, if not directly beneath the surface sand deposit, and a characteristic clay deposit was noted on a well log at a depth of 85 feet. It is expected that the older coarse alluvium underlying the RSH site is hydraulically well-connected to the Ringold formation aquifer, if not the same formation. During periods of high flow in the Columbia River, some river-sourced water may intermingle with the spring-sourced groundwater along the western edge of the site for short periods of time.

At the I-182 site, the near surface soils are alluvial and consist of unconsolidated sand with varying amounts of cobble and gravel. Shallow groundwater conditions may be encountered at the site especially when Yakima River levels are high (McMillen 2012).

3.1.2. Hydrology

3.1.2.1. Columbia River

No existing hydrologic model of the span of the Columbia River near RSH was found to exist; however, Grant County Public Utility District was able to provide flow and water surface elevation data at certain points along the Columbia River between Priest Rapids Dam and McNary Dam, including a point at RM 354.27, located near the RSH site. A regression analysis of this data was performed to establish a backwater curve at the site. The backwater curve is shown in Figure 11.

The Columbia River average daily flow rate was determined based on measurements of the average daily flow from USGS gage 12472800, which is located directly below the Priest Rapids Dam. Gage data for a 10-year period was used (3/26/1992 to 4/24/2012). The minimum, average, and maximum daily flow rate for each month were calculated. The minimum, average, and maximum water surface elevation values were then determined using the backwater curve shown in Figure 12. The resulting range of Columbia River water surface elevations is shown in Figure 13. The results shown represent an approximate range of the Columbia River water surface elevations at the RSH site. It is intended to cover the flow range, which is expected when the site is in operation and does not include unusual or extreme (flood) events.

Figure 11. Columbia River Backwater Curve at Ringold Hatchery

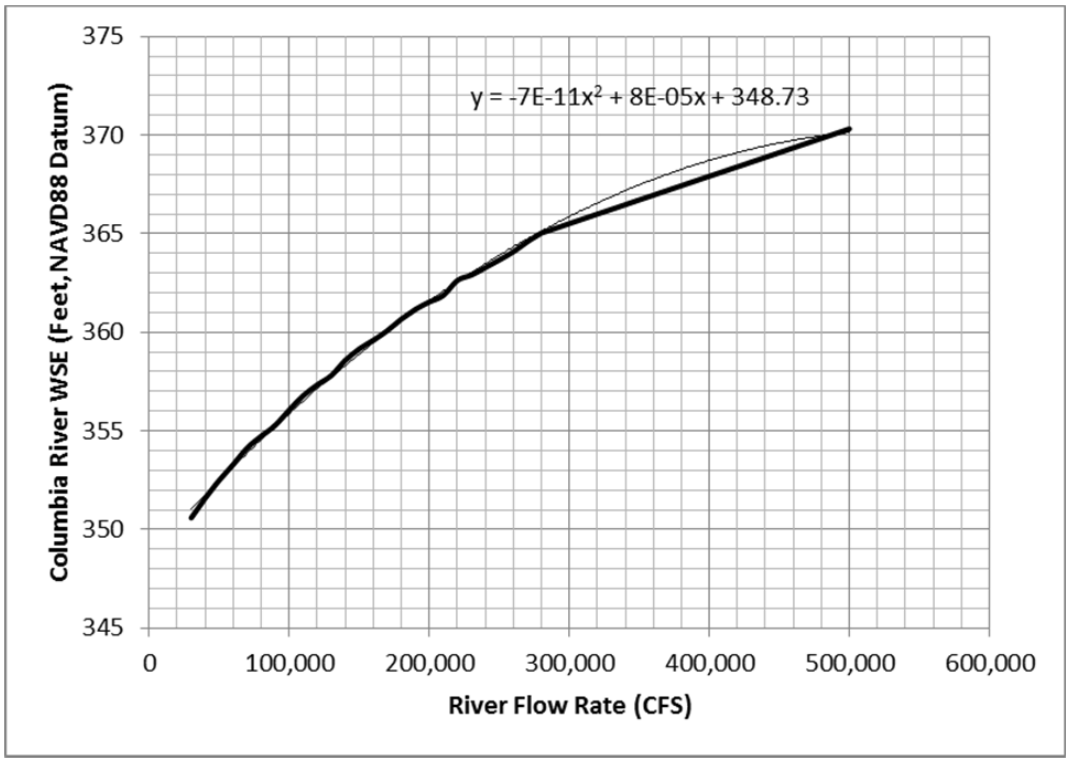
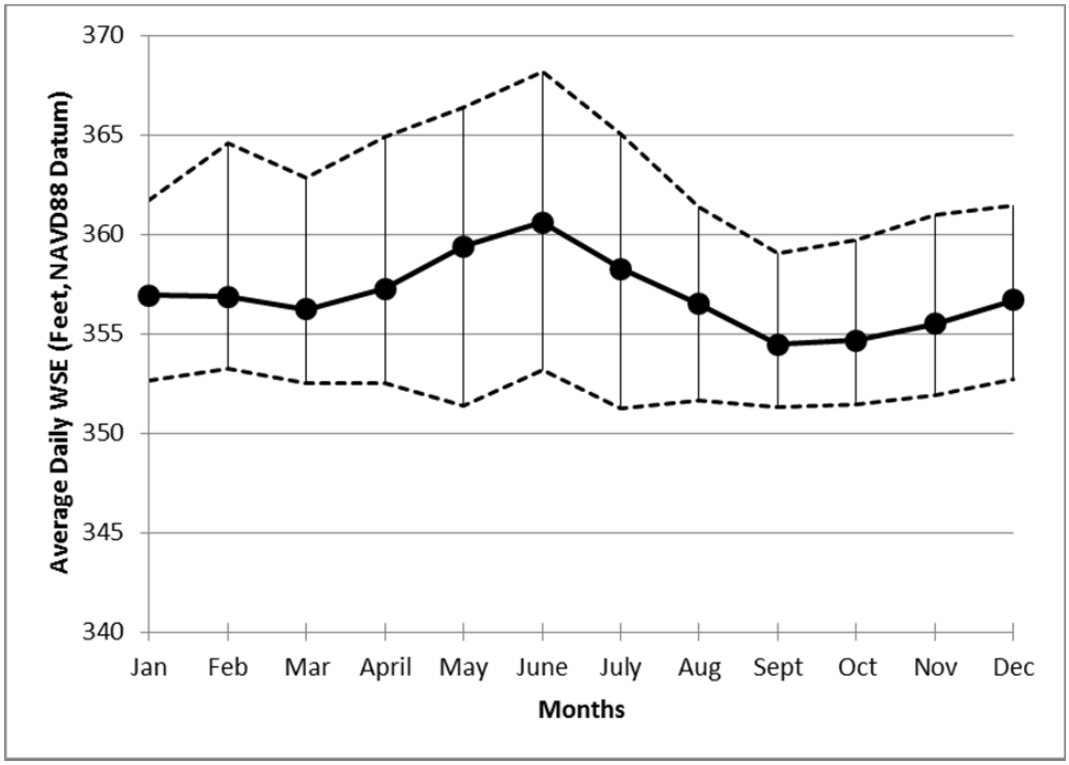


Figure 12. Range of Columbia River Water Surface Elevations



3.1.2.2. Yakima River

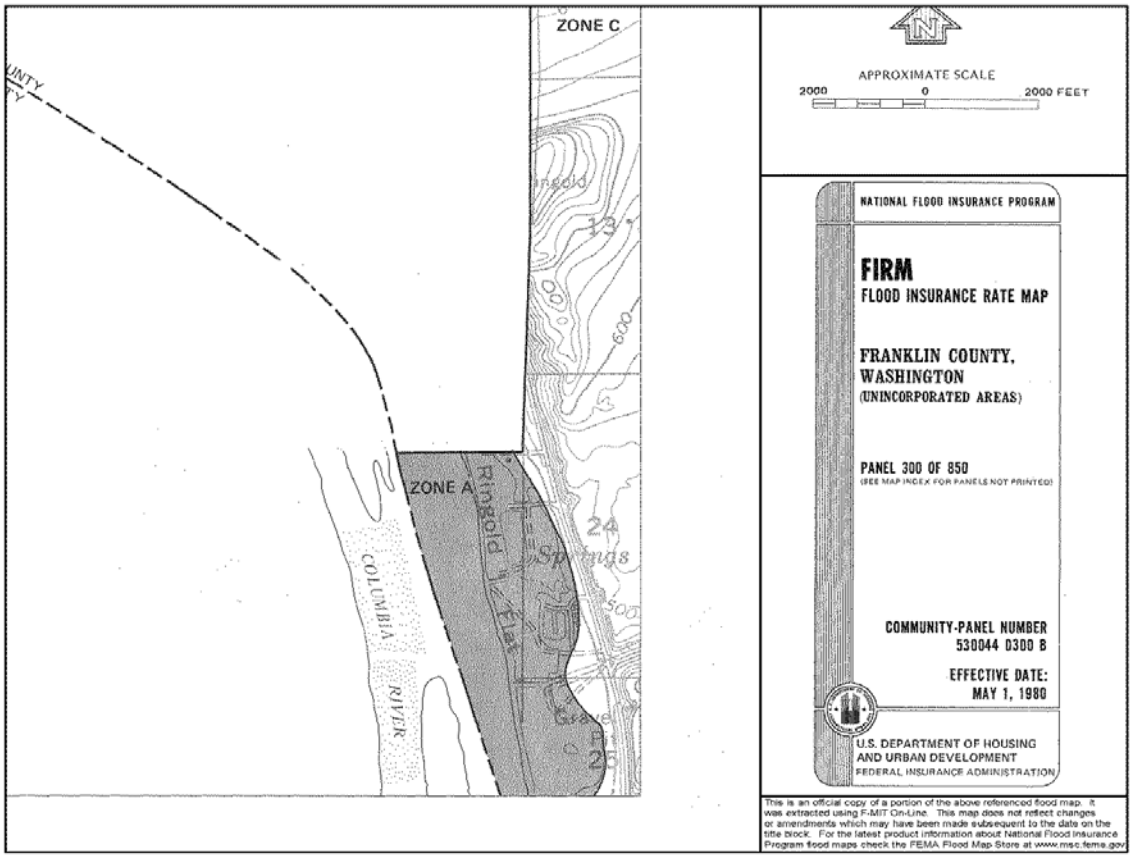
The Yakima River flows 215 miles out of Keechelus Lake in the Cascade Mountains to the Columbia River near Richland, draining an area of 6,155 square miles. Snowmelt feeds streams and rivers and recharges groundwater aquifers. Average annual runoff in the basin is about 3.4 million acre-feet per year. Mean annual precipitation ranges from 140 inches in the mountains to less than 10 inches in the eastern regions. The lower Yakima River Valley is a fairly broad, flat, ancient floodplain of fertile soils, where agriculture has flourished since irrigation was established. The hydrologic system has been greatly modified by human activities to provide more dependable dry-season surface water supplies for agricultural use (WDOE 2007).

At the I-182 site, the Yakima River channel is low gradient, flowing from northwest to southeast along the east side of the property. There is a small side channel along the right bank of the river at the eastern edge of the property (McMillen 2012).

3.1.3. Floodplains

The RSH is located in the portion of Franklin County shown on Flood Insurance Rate Map (FIRM) panel number 530044 0300 B, dated May 1, 1980 (Figure 13). This map identifies a portion of the site as being in flood Zone A, described as, "Areas of 100-year flood; base flood elevations and flood hazard factors not determined."

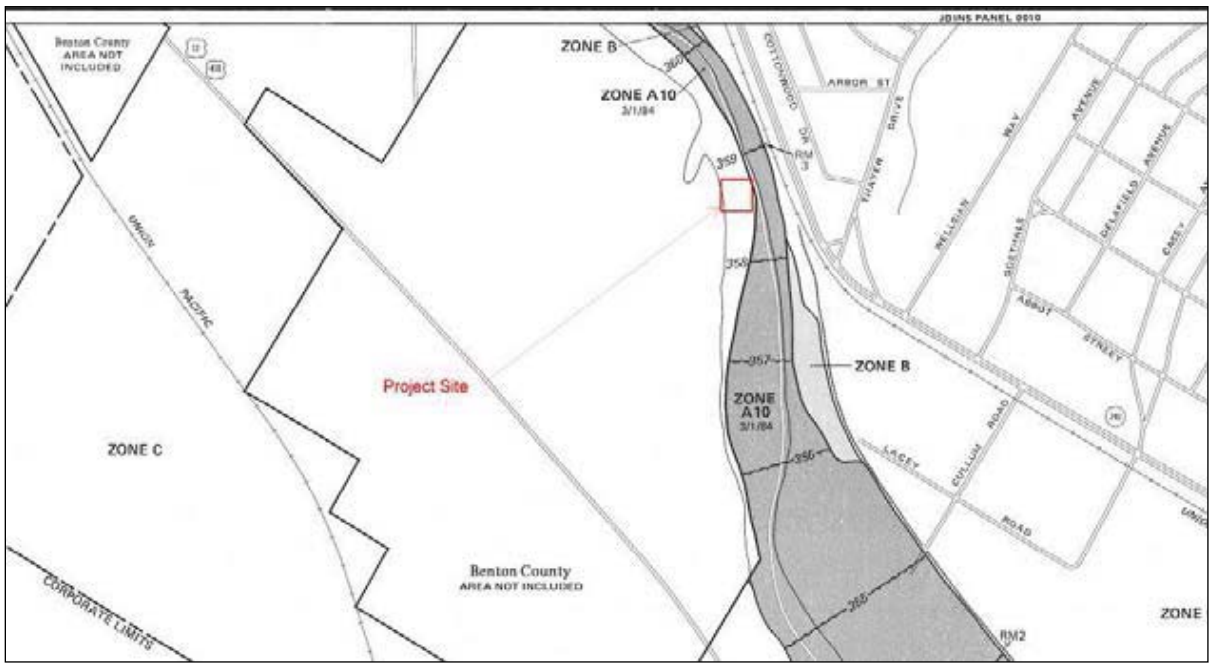
Figure 13. Flood Insurance Rate Map Showing 100-year Floodplain at Ringold Hatchery



Source: https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1

For the I-182 site, the area of the proposed acclimation ponds and adult holding and sorting facility is above the 100-year floodplain (Figure 14); the intake and outfall and fish ladder would be within the floodplain but would not create an increase in the flood elevation (McMillen 2012).

Figure 14. Location of I-182 Site in Relation to FEMA 100-year Floodplain



Darker-shaded area denotes 100-year floodplain and lighter-shaded area (Zone B) refers to 500-year floodplain.

3.1.4. Water Quality

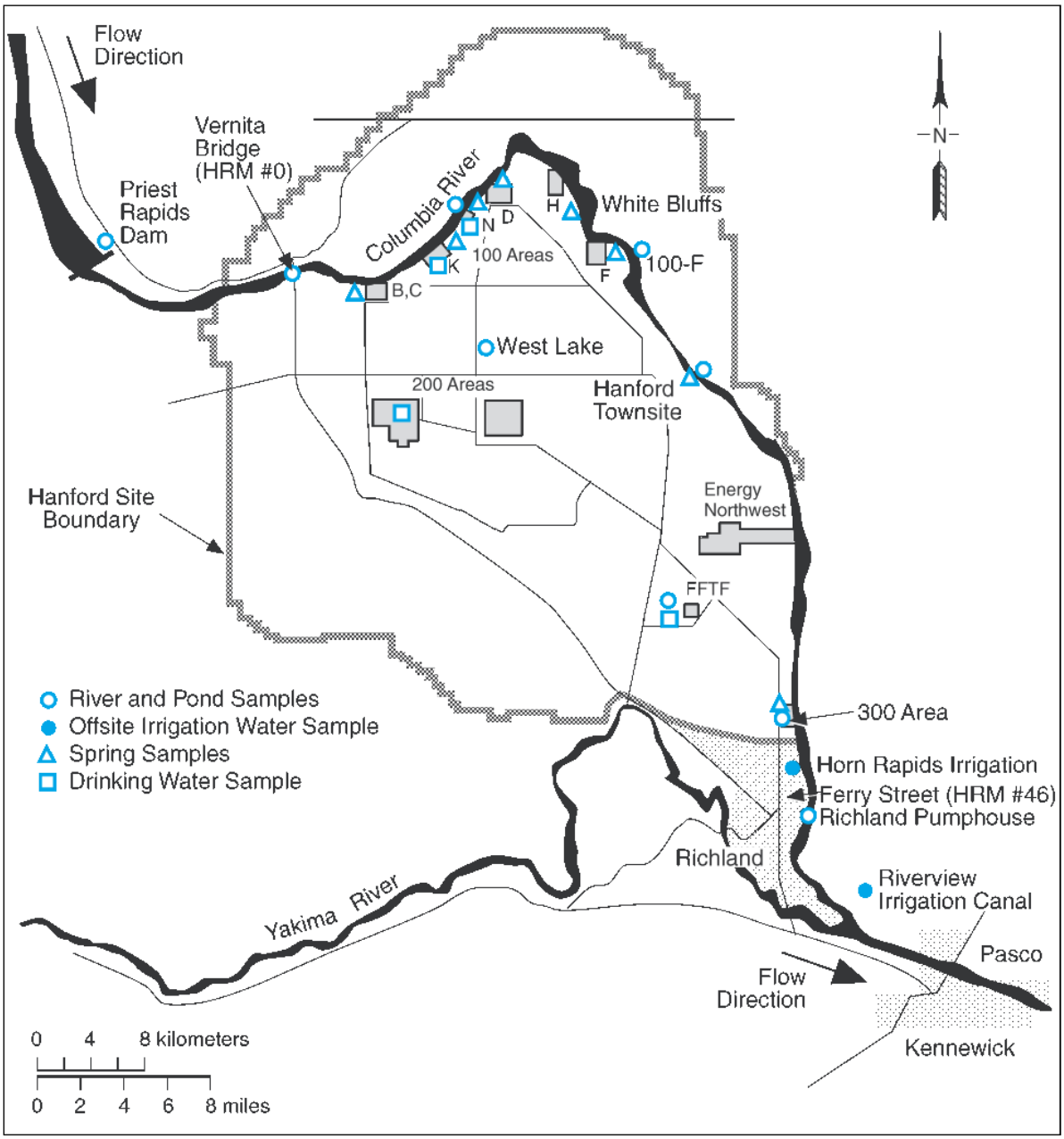
3.1.4.1. <u>Columbia River</u>

According to the USFWS (2008a), Washington has designated the water quality of the Columbia River from Grand Coulee Dam to the Washington-Oregon border, which includes the Hanford Reach, as Class A, Excellent. Class A waters are suitable for essentially all uses, including raw drinking water, primary-contact recreation, and wildlife habitat. During 2002, the U.S. Geological Survey measured several water quality parameters at Vernita Bridge (State Route 24) upstream of the Monument and at the Richland Pumphouse downstream of the Monument (Figure 15). Total dissolved solids, dissolved nitrogen, and dissolved oxygen measured near the Monument during 2002 were well within U.S. Environmental Protection Agency (EPA) and Washington state standards. There was no statistical difference between upstream and downstream samples for these parameters (Poston et al. 2005 in USFWS 2008a).

The Pacific Northwest National Laboratory measured radiological and non-radiological constituents in Columbia River water in 2002 as part of a continuing monitoring program (Poston et al. 2003 in USFWS 2008a). Cumulative water samples are collected at Priest Rapids Dam and at Richland Pumphouse. Additional samples were taken at river transects and at near-shore locations at Vernita Bridge, 100-F Area, 100-N Area, Hanford Town sites, and 300 Area (Figure 15). These water samples were collected at frequencies varying from quarterly to annually. The data show a statistical increase in tritium, nitrate,

uranium and iodine-129 along the Hanford Reach. All these constituents are known to be entering the river from contaminated groundwater beneath the Hanford Site. Measurements of strontium-90 at the Richland Pumphouse were not statistically higher than those at the Vernita Bridge, even though strontium-90 is known to enter the river through groundwater inflow at 100-N Area. Measurements of tritium along transects showed higher concentrations near the shoreline relative to mid-river for samples from the 100-N Area, Hanford Town sites, 300 Area, and Richland Pumphouse (USFWS 2008a).

Figure 15. Water Sampling Sites in Hanford Reach of Columbia River



Source: Peterson and Patton 2009

Other sources of pollutants entering the Columbia River are irrigation return flows and groundwater seepage associated with irrigated agriculture (USFWS 2008a). The U.S. Geological Survey (1995) documented nitrate groundwater contamination in Franklin County, which also seeps into the river along the Hanford Reach. Dilution in the river results in contaminant concentrations that are below drinking water standards (Poston et al. 2003 in USFWS 2008a).

3.1.4.2. Yakima River

As required by the CWA, the state of Washington has an EPA-approved list of impaired water bodies (based on a specific number of exceedance measurements of state water quality criteria in a specific segment of a water body). The freshwater 303(d) list from 2008 (approved January 2009) lists the lower Yakima River as impaired for temperature, pH, dissolved oxygen, dieldrin, DDT, bacteria, 4,4'-DDE, and 4,4'-DDD. Lake Umatilla (above McNary Dam) on the Columbia River is listed as impaired for water temperature. For many water quality parameters, the quality of irrigation return flows largely determines the quality of water in the lower Yakima River. Agricultural drains in the mid and lower valleys have been found to be a substantial source of nutrients, suspended sediment, fecal coliform bacteria, and pesticides. The highest detection frequencies and concentrations of pesticides generally occur during irrigation season. Pesticides that persist in soil, such as DDT, continue to be transported in streams and drains throughout the year, especially during storm runoff or snowmelt (WDOE 2007).

3.1.4.3. Ringold Springs Hatchery

A water quality monitoring program for all potential sources of hatchery water supply was implemented to ensure that the water quality is suitable for fish rearing and holding. Monthly samples were taken from April through October 2012 for water temperature, agricultural waste products, and seasonal pathogens. Water samples were taken at the sites shown in Table 8 and on Figure 16. An additional site was a standpipe located to the west of the 9-acre pond. In-situ measurements for sites A-E included dissolved oxygen, temperature, conductivity, and pH. Tests also included water temperature measurements at sites A-C. Samples for laboratory analysis were collected at sites A-D and included nutrients, pesticides, herbicides, carbamates, total and dissolved metals, cyanide, iron, manganese, polychlorinated biphenyls (PCBs), hydrocarbons, solids, total dissolved gas, and dissolved nitrogen.

Table 8. Ringold Hatchery Water Quality Sampling Plan

Site	Location	Analyses Conducted
A	Lower Diversion (Upper Spring)	In-situ, laboratory, continuous temperature
B	Main Intake (Lower Spring)	In-situ, laboratory, continuous temperature
C	River Intake (Columbia River near hatchery)	In-situ, laboratory, continuous temperature
D	North Deep Well	In-situ, laboratory
E	South Shallow Well (Domestic Well)	In-situ
	Standpipe	Temperature

Source: USACE June 2012

A summary of the in-situ measurements collected for the sample sites is provided in Table 9. Both the deep and shallow well sites had very low dissolved oxygen concentrations. A summary of the minimum and maximum water temperature measurements collected at the data logger sites is provided in Table 10. Many of the laboratory results were below detection limits. There were no detected levels of pesticides, carbamates, PCBs, or oil and grease at any of the sites for the first sampling event (4/3/2012). The herbicide Dacthal was detected at both the lower diversion and main intake sites at very low concentrations of 0.21 μg/L and 0.294 μg/L, respectively. Otherwise, no other herbicides were detected.

Figure 16. Water Quality Sampling Locations at Ringold Hatchery

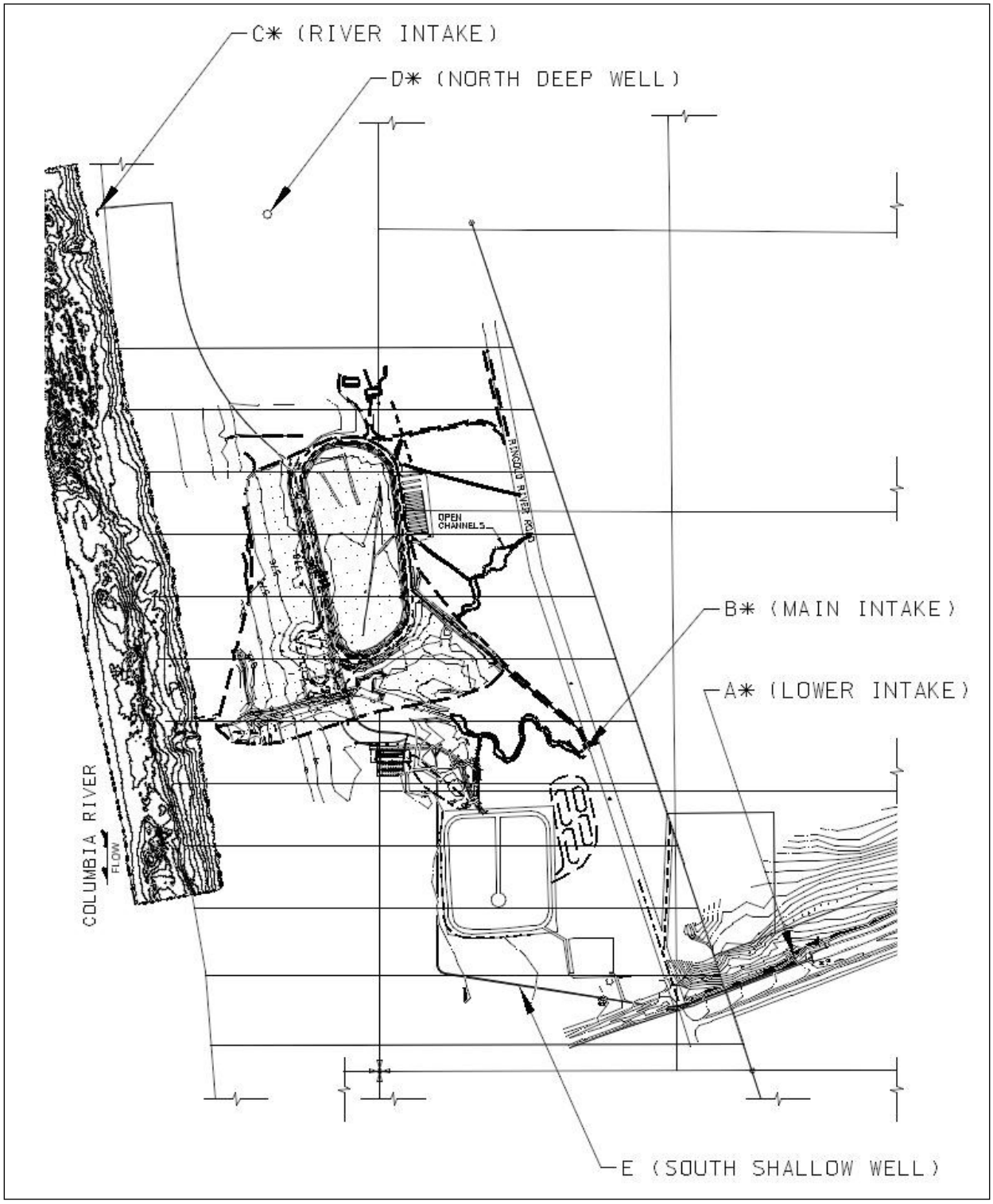


Table 9. Range of In-situ Water Quality Data at RSH

Site	Temperature (°C)	Dissolved Oxygen (mg/L)	pH	Conductivity (mS/cm)
Lower Diversion	15.8 - 16.1	7.8 - 10.5	7.6 - 8.3	0.73 - 0.77
Main Intake	16.4 - 16.9	8.6 - 9.4	7.6 - 8.3	0.7
River Intake	5.5 - 9.5	11.7 - 13.0	8.0	0.14 - 0.15
Deep Well	18.2 - 18.6	0.9 - 1.5	7.8 - 8.4	0.39 - 0.4
Shallow Well	17.4 - 18.9	0.9 - 2.4	8.7 - 9.2	0.46 - 0.47

Note: Based on data collected on 4/3/2012 and 4/27/2012. mg/L = milligrams per liter; mS/cm = millisiemens per cm.

Table 10. Summary of Daily Water Temperature Data at RSH

Site	Minimum Temperature (°C)	Maximum Temperature (°C)
Lower Diversion	15.0	16.6
Main Intake	15.7	16.8
River Intake	5.3	12.8
Standpipe	11.2	11.4

Note: Based on data collected through 5/23/2012. °C = degrees centigrade.

All biological analyses were negative except for at the lower diversion site which was positive for bacteria. The range of nutrients detected at the four sites is summarized in Table 11. Different metals were detected at different sites and some metals not detected at any sites. Nickel was the only metal detected at all sites. Arsenic, lead, and zinc were detected at all stations except for the river intake site. Chromium and manganese were detected at both the lower diversion and deep well sites. Cadmium was detected only at the main intake station and iron was only detected at the river intake station. Test values exceeding the Washington State water quality standards for toxics are shown in Table 12.

Table 11. Summary of Nutrient Data at RSH

Site	Nitrate (mg/L)	Nitrate (mg/L)	Ammonium (mg/L)	Total Nitrogen (mg/L)	Phosphorus (mg/L)	Orthophosphate (mg/L)
Lower Diversion	1.82	ND	ND	1.12	ND	ND
Main Intake	1.78	ND	ND	0.71	ND	ND
River Intake	2.12	ND	ND	ND	ND	ND
Deep Well	ND	ND	ND	ND	ND	ND

Note: Based on data collected on 4/3/2012. mg/L = milligrams per liter; ND= Not detected.

Table 12. Data Exceeding Washington Chronic Toxic Substances Criteria at RSH

Site	Date	Parameter	Measurement (µg/L)	Standard (µg/L)
Main Intake	4/3/2012	Dissolved Cadmium	4	2.4
Deep Well	4/3/2012	Dissolved Lead	3	0.9

Note: Based on data collected on 4/3/2012. µg/L = micrograms per liter.

3.1.5. Climate Change

The climate is warming due to human activities and this is affecting hydrologic patterns and water temperatures. Regionally averaged air temperature rose about 1.5°F over the past century, with some areas experiencing increases up to 4°F, and is projected to increase another 3°F to 10°F during this century. Increases in winter precipitation and decreases in summer precipitation are projected by many climate models, although these projections are less certain than those for temperature (USGCRP 2009).

Higher temperatures in the cool season (October through March) are likely to increase the percentage of precipitation falling as rain rather than snow, and to contribute to earlier snowmelt. The amount of snowpack measured on April 1, a key indicator of natural water storage available for the warm season, has already declined substantially throughout the region. The average decline in the Cascade Mountains, for example, was about 25% over the past 40 to 70 years, with most of this due to the 2.5°F increase in cool season temperatures over that period. Further declines in Northwest snowpack are likely due to additional warming this century, varying with latitude, elevation, and proximity to the coast. April 1 snowpack is likely to decline as much as 40% in the Cascades by the 2040s (USGCRP 2009).

High and base streamflows are likely to change with warming. Increasing winter rainfall is likely to increase winter flooding in relatively warm watersheds on the west side of the Cascade Mountains. Earlier snowmelt, and increased evaporation and water loss from vegetation, will increase stream flows during the warm season (April through September). On the western slopes of the Cascade Mountains, reductions in warm season runoff of 30% or more are likely by mid-century. In some sensitive watersheds, both increased flood risk in winter and increased drought risk in summer are likely due to warming of the climate (USGCRP 2009).

In areas where it snows, a warmer climate means major changes in the timing of runoff: increased stream flows during winter and early spring, and decreases in late spring, summer, and fall. Flow timing has shifted over the past 50 years, with the peak of spring runoff shifting from a few days earlier in some places to as much as 25 to 30 days earlier in others. This trend is likely to continue, with runoff shifting 20 to 40 days earlier within this century. Major shifts in the timing of runoff are not likely in areas dominated by rain rather than snow (ISAB 2007, USGCRP 2009).

Habitat changes due to climate change are likely to create a variety of challenges for ESA-listed fish species. Higher winter stream flows can scour streambeds, damaging spawning redds and washing away incubating eggs (USGCRP 2009). Earlier peak stream flows could flush young salmon and steelhead from rivers to estuaries before they are physically mature enough for the transition, increasing a variety of stresses and the risk of predation (USGCRP 2009). Lower summer stream flows and warmer water temperatures will degrade summer rearing conditions in many parts of the Pacific Northwest for a variety of salmon and steelhead species (USGCRP 2009), and are likely to reduce the survival of steelhead fry in streams with incubation in early summer. Other likely effects include alterations to migration patterns, accelerated embryo development, premature emergence of fry, and increased competition and predation risk from warm-water, non-native species (ISAB 2007). The increased prevalence and virulence of diseases and parasites that tend to flourish in warmer water will further stress salmon and steelhead (USGCRP 2009). Overall, about one-third of the current habitat for the Pacific Northwest's coldwater fish may well no longer be suitable for them by the end of this century as key temperature thresholds are exceeded (USGCRP 2009).

Climate change is also likely to affect conditions in the Pacific Ocean. Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances (USGCRP 2009). It is likely that, as

ocean conditions change, abundances of salmon and steelhead will continue to change accordingly, resulting in changes in abundance of adults returning to freshwater to spawn.

For streams and rivers fed by glaciers and snow melt, climate change may reduce the snow pack and summer-time flows may reduce suitable habitat for salmon and steelhead yearling rearing, decreasing their abundance. Climate change may also increase the frequency of major flood events that can scour redds for salmon and steelhead spawning and rearing in the rivers and their tributaries.

Lower summer flows due to a reduced winter snow pack may increase water temperatures that may lead to an increase in the abundance of non-native warm water species that can compete and prey on ESA-listed salmon and steelhead. Warmer water temperatures may also increase the incidence of disease outbreaks and virulence in both the natural-origin and hatchery-origin juveniles.

If climate change contributes to a substantial decline in the abundance of listed salmon and steelhead populations though impacts on habitat and from changes in ocean conditions, the hatchery programs may be used as a "safety net" program to maintain genetic resources. Hatchery programs are somewhat protected from the possible increase in disease prevalence from warmer water temperatures because much of the rearing occurs using well water and the fish are tested at spawning, during rearing, and prior to release to limit disease transmission to the natural-origin populations.

While climate change may well have impacts on the abundance and/or distribution of ESA-listed salmonids, hatchery management and the associated monitoring provide the ability to evaluate hatchery program impacts as abundances change, leading to adjustments accordingly.

3.1.6. Hazardous, Toxic, and Radioactive Waste

No hazardous, toxic or radioactive wastes were found during soils testing conducted at RSH and the I-182 site. The two locations are not within the boundaries of a site designated by the EPA or state of Washington for a response action under Comprehensive and Environmental Response, Compensation and Liability Act, nor are they part of a National Priority List site. There is no indication that any hazardous, toxic, and radioactive wastes are in the project areas.

3.2. Vegetation

Uncultivated sites in the project area at RSH and I-182 are typified by stands of big sagebrush *(Artemesia tridentata)* underlain by bluebunch wheatgrass *(Agropyron spicatum)*, brome *(Bromus tectorum)*, Idaho fescue *(Festuca idahoensis)*, common mullein *(Verbascum thapsus)*, yarrow *(Achillea millefolium)*, Russian knapweed *(Centaurea repens)*, dock *(Rumex* spp.), and buckwheat *(Eriogonum* spp.). Intensive agriculture is typical of a majority of the land base near the sites. Cultivars include mint, asparagus, melon, potatoes, and cereal crops, as well as several orchard varieties. The Ringold hatchery site itself was previously in orchard and feed crops.

At the RSH site, Ringold Spring drains to the Hanford Reach of the Columbia River. Numerous springs, resulting from irrigation run-off, occur throughout the area. A USBR irrigation waste-water canal flows through the area, crossing the hatchery property and draining to the Columbia River. Vegetation in the vicinity of the water supply diversion includes cattail *(Typha latifolia)*, reed canarygrass *(Phalaris arundinacea)*, dense sedge *(Carex densa)*, and woolly sedge *(Carex /anuginosa)* within the spring and main channel. Riparian vegetation along the Columbia River shoreline includes willow species *(Salix* spp.) with occasional Russian olive *(Elaeagnus angustifolia)*.

The portion of the I-182 site identified for development of the acclimation facility is a fairly level grass and sagebrush field. The frontage along the Yakima River is a heavily vegetated riparian zone (McMillen 2012).

3.3. Aquatic Resources and Wildlife

3.3.1. Aquatic Resources

3.3.1.1. Columbia River

The Columbia River is the dominant aquatic ecosystem in the RSH area and supports a large and diverse array of plankton, benthic invertebrates, fish and other communities. All major freshwater benthic taxa are represented in the Columbia River (USFWS 2008a). Insect larvae such as caddisflies, midge flies, and black flies dominate. Peak larval insect densities are found in late fall and winter, and the major emergence is in spring and summer. Stomach contents of fish collected in the Hanford Reach reveal that benthic invertebrates are important food items for nearly all juvenile and adult fish. Aquatic insects are a key element supporting the salmon population in the Hanford Reach. Other benthic organisms include clams, limpets, snails, sponges and crayfish (USFWS 2008a).

Forty-five species of fish are known to exist in the Hanford Reach of the Columbia River (USFWS 2008a). The Hanford Reach is noteworthy for the remaining habitat it provides several species of anadromous salmonids. The Hanford Reach is the only remnant of the major mainstem spawning habitat complex in the Columbia River system for fall Chinook salmon (*Oncorhynchus tshawytscha*). The Hanford Reach serves as a migration corridor for other species and stocks of anadromous salmonids—sockeye salmon (*O. nerka*), spring/summer Chinook salmon, coho salmon (*O. kisutch*) and steelhead (*O. mykiss*)—and provides important rearing habitat for juvenile steelhead and sockeye salmon from upstream production areas. American shad (*Alosa sapidissima*), another anadromous fish species, may also spawn in the Hanford Reach. The Hanford Reach also provides important breeding habitat for white sturgeon (*Acipenser transmontanus*; USFWS 2008a).

Other fish of importance in the Hanford Reach are mountain whitefish (*Prosopium williamsoni*), smallmouth bass (*Micropterus dolomieu*), crappie, catfish, walleye (*Sander vitreus*), and yellow perch (*Perca flavescens*; (USFWS 2008a). In addition to white sturgeon, mountain whitefish and sandroller (*Percopsis transmontana*) are two native species that may be present in much higher numbers in the Hanford Reach than in impounded areas. Large populations of rough fish are also present, including carp, redside shiner (*Richardsonius balteatus*), suckers, and northern pikeminnow (*Ptychocheilus oregonensis*; USFWS 2008a).

3.3.1.2. Yakima River

The Yakima River Basin supports anadromous, resident native, and introduced fish species. Anadromous salmonids include Chinook salmon, steelhead and coho. Adult coho currently return to the basin as a result of hatchery smolt releases conducted pursuant to the Columbia River Fish Management Plan. Resident salmonids native to the basin include rainbow trout (*Oncorhynchus mykiss*), cutthroat trout (*O. clarkii*), bull trout (*Salvelinus confluentus*), and mountain whitefish. Some of the introduced species include brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), smallmouth bass, bluegill, crappie, carp, channel catfish (*Ictalurus punctatus*), bullhead, and walleye.

3.3.2. Wildlife

According to the USFWS (2008a), the Hanford Reach of the Columbia River: (1) provides important stop-over habitat for migratory land and water birds; (2) is wintering habitat for bald eagles, white pelicans, and many waterfowl species, such as mallard, green-winged teal, pintail, goldeneye and gadwall; (3) provides important nesting and breeding habitat for shorebirds, waterfowl, and other aquatic birds; and (4) is a designated Important Bird Area (sites that provide essential habitat for one or more species of birds). Composed of the Columbia River and the near-shore environment, this area extends approximately 1/4-mile inland from the river between Vernita Bridge and RSH.

Wildlife use of the RSH project area is limited with occasional sighting or evidence of raccoon, coyote, jackrabbit and rodents. Bird use is also limited but more numerous including sparrow, starling, blackbird, robin, raven and crows. Waterfowl include scoter, ruddy duck and bufflehead resting and feeding in the rearing ponds. Gulls, terns, great blue herons and cormorants frequent the ponds attempting to feed on fingerlings. Various non-lethal deterrent methods are employed by hatchery staff.

3.4. Threatened and Endangered Species

3.4.1. NMFS Protected Species

3.4.1.1. Columbia River

Table 13 shows the federally listed salmon and steelhead species that may be migrating through the Columbia River in the project area. Critical habitat for these species (Table 14) was designated by NMFS on September 2, 2005 (70 FR 52630). Critical habitat in the project area generally extends from bank-to-bank to the ordinary high-water line on each side of the Columbia River.

Table 13. NMFS Protected Salmon and Steelhead Species

ESU/DPS	Listing Status	Life History Type	Recovery Planning Domain
Chinook Salmon (*Oncorhynchus tshawytscha*)			
Upper Columbia River Spring ESU	E – 6/28/05 (70 FR 37160)	Stream	Interior/Columbia River Basin
Steelhead (*Oncorhynchus mykiss*)			
Upper Columbia DPS	T – 1/5/06 (71 FR 834)	Stream	Interior/Columbia River Basin

ESU = Evolutionarily Significant Unit; DPS = Distinct Population Segment. Listing status: 'T' means listed as threatened under the ESA; 'E' means listed as endangered. FR = Federal Register.

Table 14. Critical Habitat Descriptions

Species	Description of Critical Habitat
Upper Columbia River Spring Chinook	Columbia River to Rock Island Dam and tributaries
Upper Columbia River Steelhead	Columbia River to Chief Joseph Dam and tributaries

The Upper Columbia River (UCR) spring Chinook salmon ESU includes all natural-origin, stream-type Chinook salmon from river reaches above Rock Island Dam and downstream of Chief Joseph Dam, including the Wenatchee, Entiat, and Methow River basins. The spring-run components of the following hatchery stocks are also listed: Chiwawa, Methow, Twisp, Chewuch, and White rivers and Nason creeks.

The UCR spring Chinook salmon ESU is not currently meeting viability criteria in the Upper Columbia Salmon Recovery Plan. Increases in natural-origin abundance relative to the extremely low spawning levels observed in the mid-1990s are encouraging; however, average productivity levels remain extremely low. Large-scale directed supplementation programs are underway in two of the three extant populations in the ESU. These programs are intended to mitigate short-term demographic risks while actions to improve natural productivity and capacity are implemented (WDFW 2013).

The Upper Columbia River steelhead DPS includes all natural-origin populations of steelhead in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S./Canada border. The DPS includes all naturally spawned steelhead populations below natural and man-made impassable barriers in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border, as well six artificial propagation programs: the Wenatchee River, Wells Hatchery (in the Methow and Okanogan Rivers), Winthrop Hatchery, Omak Creek, and the Ringold steelhead hatchery programs. The UCR steelhead populations have increased in natural-origin abundance in recent years, but productivity levels remain low. The proportions of hatchery-origin returns in natural spawning areas remain extremely high across the DPS, especially in the Methow and Okanogan river populations. The modest improvements in natural returns in recent years are probably primarily the result of several years of relatively good natural survival in the ocean and tributary habitats (WDFW 2013).

3.4.1.2. Yakima River

The Middle Columbia River Steelhead DPS includes steelhead populations in Oregon and Washington drainages upstream of the Hood and Wind River systems, up to and including the Yakima River. Major drainages in this ESU are the Deschutes, John Day, Umatilla, Walla Walla, Yakima, and Klickitat river systems. Almost all steelhead populations within this ESU are summer-run fish; the exceptions are winter-run components returning to the Klickitat River and Fifteenmile Creek watersheds. The DPS includes all naturally spawning populations of steelhead using tributaries upstream and exclusive of the Wind River, Washington, and the Hood River, Oregon, excluding the upper Columbia River tributaries (upstream of Priest Rapids Dam) and the Snake River. This DPS of steelhead was listed as threatened by NMFS in 1999, with designation reaffirmed in 2006 (WDFW 2013).

3.4.2. USFWS Protected Species

The following federally listed wildlife, fish and plant species protected by the U.S. Fish and Wildlife Service (USFWS) that may occur in Franklin County (RSH) and Benton County (I-182 site) are discussed below (from http://www.fws.gov/wafwo/speciesmap_new.html).

- Bull trout *(Salvelinus confluentus*) – threatened; including designated Critical Habitat
- Gray wolf (*Canis lupus*) – endangered
- Pygmy rabbit (*Brachylagus idahoensis*, Columbia Basin DPS) – endangered
- Ute ladies'-tresses orchid (*Spiranthes diluvialis*) – threatened

The Columbia River DPS of bull trout occurs throughout the entire Columbia River Basin. The Columbia River population segment is composed of 141 subpopulations. The Middle Columbia Recovery Unit encompasses the Yakima River Basin to the confluence with the Columbia River. A single core area encompassing the Yakima River Basin has been identified and includes 13 extant local populations of bull trout, with the mainstem Columbia River considered to contain core habitat, which may be important for full recovery to occur (WDFW 2013). Bull trout may be found in the Columbia River (RSH) and Yakima River (I-182) portions of the project area.

Bull trout, salmon, and steelhead can occur in similar aquatic habitat types. However, bull trout are more sensitive than salmon and steelhead to increased water temperatures, poor water quality, habitat conditions, and low flow conditions; thus, they more often occur in higher elevations with less disturbed habitats. Bull trout also require colder water temperatures than other salmon and trout and are more likely to occur in headwater streams where temperatures tend to be cooler. Because bull trout feed primarily on fish as subadults and adults, they can be a substantial predator of young salmon and steelhead. Juvenile bull trout feed on similar prey as salmon and steelhead (USFWS 2008b). The Columbia and Yakima Rivers are considered Critical Habitat for bull trout (http://www.fws.gov/pacific/bulltrout/pdf/BTCHFR101810.pdf).

The gray wolf was once common throughout most of Washington, but declined rapidly from being aggressively killed during the expansion of ranching and farming between 1850 and 1900. Wolves were eliminated as a breeding species from the state by the 1930s, although infrequent reports of animals continued in the following decades, suggesting that small numbers of individuals continued to disperse into Washington from neighboring states and British Columbia. Reliable reports of wolves began increasing in Washington in about 2005 due in part to the recent recovery of wolf populations in Idaho, Montana, and Wyoming. Washington now has a small breeding population of wolves in the initial stages of recovery. Five packs are present in the state as of December 2011. The first of these was discovered in Okanogan County in 2008. Single additional packs were found in Pend Oreille County in 2009 and 2010 and in Kittitas and Stevens Counties in 2011. In December 2011, the Washington Fish and Wildlife Commission approved a wolf conservation and management plan for Washington. The plan has two major components: (1) recovery objectives and strategies for downlisting and delisting wolves at the state level, and (2) management strategies to reduce and address conflicts with livestock and big game herds (taken from http://wdfw.wa.gov/conservation/gray_wolf/). The gray wolf is not known to occur in the vicinity of the RSH and I-182 site.

The pygmy rabbit is the smallest rabbit in North America. It is the only rabbit to dig its own burrows, using the deep loamy soils of habitat dominated by sagebrush, which also makes up most of its diet. For over 100,000 years pygmy rabbits have lived in the Columbia Basin in Washington and the Columbia Plateau and Great Basin of the western U.S. (Oregon, California, Nevada, Utah, Idaho, Montana, and Wyoming). The Columbia Basin pygmy rabbits have been isolated from the rest of the population for at least 10,000 years, which has led to genetic differences between the rabbits in Washington and the other states. The pygmy rabbit was state and federally listed because of population and distribution declines due to habitat changes. Except for a remnant population on the state's Sagebrush Flats Wildlife Area, it was considered near extinct by 2001. A captive breeding program was initiated by WDFW and USFWS in 2001 with the intent of reintroducing rabbits to the wild. In spring 2011, a collaborative recovery effort was renewed with the Oregon Zoo, Washington State University, Northwest Trek Wildlife Park, USFWS and other state wildlife agencies. In spring 2012, 42 wild rabbits from Nevada and Utah and more captive-born rabbits from Oregon Zoo boosted the local population. The recovery plan for the species includes: (1) reintroducing captive-bred individuals, (2) translocating wild-caught animals from neighboring states, and (3) breeding wild and captive animals together on site (taken from http://wdfw.wa.gov/conservation/pygmy_rabbit/). The pygmy rabbit is not known to occur in the vicinity of the RSH and I-182 site.

Ute ladies'-tresses is a perennial, terrestrial orchid with stems 8-20 inches tall arising from tuberously thickened roots. Its narrow (0.39 inches) leaves can reach 11 inches in length. The flowering stalk consists of small white or ivory flowers clustered into a spike arrangement at the top of the stem. It blooms generally from late July through August. The orchid occurs along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. It typically occurs in

stable wetland and seepy areas associated with old landscape features within historical floodplains of major rivers. It also is found in wetland and seepy areas near freshwater lakes or springs. In north-central Washington, Ute ladies'-tresses have been found at Wannacut Lake in Okanogan County (Okanogan watershed) and along a reservoir bordering the Columbia River in Chelan County (Chief Joseph watershed); it is not known to occur in the vicinity of the RSH and I-182 site (taken from http://www.fws.gov/mountain-prairie/species/plants/uteladiestress/).

3.5. Cultural and Historic Resources

The project areas for this undertaking (RSH and I-182) are located within the southern Plateau cultural group (Walker 1978, 1998). The Columbia and Yakama Rivers traverse this area and have been the focus of occupation for millennia as evidenced by the number of documented archaeological sites. Village sites were commonly located along rivers and occupied during the winter. During the warmer months, people moved along, and away from the rivers to exploit various resources. Village sites were often occupied repeatedly over time, resulting in extensive cultural deposits. These types of sites have been documented throughout the Columbia River area. Historic sites are also common and themes include exploration, mining, transportation, and European settlement. Historic sites related to farming are particularly common along the rivers due to the proximity to water and good soils. There are a number of detailed culture histories and cultural chronologies available for this region, such as Daugherty 1960, Leonhardy and Rice 1970, Ames and Marshall 1980, Jennings 1985, Reid 1991, and Ames and Dumond 1998, to name a few.

The RSH is located along the east shore of the Columbia River on a flat terrace. The area was farmland and orchards prior to the construction of McNary Dam. The hatchery itself was constructed sometime between 1962 and 1968 to rear and release juvenile spring Chinook and coho. Previous archaeological investigations of the area indicate that the ground surface has been extensively modified by agriculture, orchards and construction of the hatchery. Despite this, the terrain and proximity to the river make this area likely to contain prehistoric and historic archaeological sites.

The RSH was surveyed for historic properties in the mid-1990s prior to upgrades of the facility. One prehistoric archaeological site was documented during this survey. The site was later excavated to verify the presence of subsurface cultural deposits and evaluate the site for eligibility to the National Register of Historic Places (NRHP). The excavations indicated that the site was in poor condition and lacked characteristics that would allow for meaningful future study; thus, and the site was recommended as not eligible. Despite this, the Washington State Historic Preservation Office (SHPO) lists the site as unevaluated to the NRHP.

The I-182 site is located on the western shore of the Yakama River, immediately north of I-182. This land is owned by the USACE Walla Walla District and is managed as wildlife habitat. There have been two small surveys for historic properties within the I-182 project area footprint, which documented one historic archaeological site. There are other archaeological sites located outside of the project area on similar landforms, indicating that there is the potential for subsurface cultural deposits.

3.6. Socioeconomics

Socioeconomics is defined as the study of the relationship between economics and social interactions with affected regions, communities, and user groups. In addition to providing fish for harvest, hatchery programs directly affect socioeconomic conditions in the local area where the hatchery facilities operate. Hatchery facilities generate economic activity (personal income and jobs) by providing employment opportunities and through local procurement of goods and services for hatchery operations.

The RSH is located in Franklin County, Washington. The estimated population of Franklin County in 2011 was 83,455, or about 1.2% of the total state population. The median household income in the county ($50,731) was lower than that ($58,890) for the state of Washington (USCB 2012). The percent of persons below the poverty level in the county (20.9%) was higher than that (12.5%) for the state of Washington (USCB 2012).

The I-182 site is located in Benton County, Washington. The estimated population of Benton County in 2011 was 180, 678, or about 2.6% of the total state population. The median household income in 2011 ($59,974) was higher than that ($58,890) for the state of Washington (USCB 2012). The percent of persons below the poverty level in the county (12.2%) was slightly lower than that (12.5%) for the state of Washington in 2011 (USCB 2012).

Located adjacent to the southern boundary of the Hanford Reach National Monument, RSH plays an important role in providing visitor access to the Hanford Reach (USFWS 2008a). The RSH provides a primitive launching area on the north shore. Open year-round, this area also allows overnight use, although no improvements are provided. This site serves as a motorboat launch and is also used by non-motorized boaters, primarily as a take-out for floating the Hanford Reach. The Hanford Reach attracts anglers from around the Northwest, providing excellent opportunities to catch fall Chinook salmon, steelhead, sturgeon, whitefish, and smallmouth bass (USFWS 2008a).

As compared to Washington State revenue for 2006 ($289 billion; USCB 2012), total fishing expenditures in Washington accounted for less than 0.2 percent ($534 21 million) of the total state revenue, and salmon and steelhead angling only accounted for only a portion of that.

4. ENVIRONMENTAL CONSEQUENCES

4.1. Physical Characteristics

4.1.1. Geology and Soils

4.1.1.1. Preferred Alternative

Ringold Springs Hatchery Construction. Expansion of the facilities at RSH will require soil disturbance. The construction plan calls for roadway paving, foundation work for the ponds and pre-fabricated structures, and construction of new fish ladder. There will be no effect on the geology of the area as a result of the construction, as all disturbances are within the surface soil layer.

I-182 Acclimation Site Construction. Construction at the I-182 site will have soil disturbance for site preparation, foundation work for all elements of the new facility, and gravel re-surfacing for the entrance roadway. The construction will have little or no effect on the geology of the area as all disturbance is within the surface soil layer.

Hatchery Operations. Hatchery operations are not expected to have any impact on the geology or soils at RSH or the I-182 site.

4.1.1.2. No Action Alternative

The no action alternative would have no effect on the geology and soils of the areas in and around RSH, and the I-182 site would remain undeveloped and unchanged.

4.1.2. Sediment Quality

4.1.2.1. Preferred Alternative

Ringold Springs Hatchery Construction. One element of the proposed construction is a new water intake structure that will require in-water work, such as trenching to bury the intake pipe, and the placement of pilings to create a foundation for the water intake box. Disturbance of sediment in the Columbia River will be required for installation of these in-water features. The sediment at this site is primarily gravel and cobble. The activity associated with the excavation of a trench, placement of the pipe and pilings, and replacement of sediments back over the top of the pipe will have no effect on sediment quality in the area. The lower section of the adult fish ladder will be modified and this construction has the potential to disturb sediment in Spring Creek. However, this disturbance is not expected to impact sediment quality.

I-182 Acclimation Site Construction. The I-182 site will require a water in-take structure. The fine-grained sediment found in this area is more likely to have higher contaminant burden due to the agriculture upstream in the Yakima River Basin. Sediment testing prior to the excavation for the water intake structure will determine if clean fill is necessary for backfill over the pipe. This activity should not have a negative effect on the sediment quality of this site.

Hatchery Operations. The effluent from the hatchery facilities will be treated to meet state and federal water quality standards as prescribed by the National Pollutant Discharge Elimination System (NPDES) permit that must be obtained for each operation. However, even with wastewater treatment prior to discharge, the wastewater will likely contribute some particulates to the receiving water bodies that could cause a negative impact to the sediment quality downstream of the facilities.

4.1.2.2. No Action Alternative

The no action alternative would not impact sediment quality in the Columbia River adjacent to RSH nor in the Yakima River adjacent to the I-182 site.

4.1.3. Hydrology

4.1.3.1. Preferred Alternative

Ringold Springs Hatchery Construction. The construction work to expand the facilities at RSH will have no impact on groundwater or surface water hydrology. Construction of the water intake and well may have very minor or no impacts on surface or groundwater hydrology.

I-182 Acclimation Site Construction. Construction of the facility at the I-182 site will have no impact on groundwater and only minor impacts on surface water hydrology with the construction of the lower fish ladder.

Hatchery Operations. The expanded hatchery facilities at RSH will require increased groundwater withdrawals and surface water withdrawals from the Columbia River. Those withdrawals will have some effect on the groundwater hydrology. However, surface water hydrology impacts are expected to be inconsequential relative to the volume of water flow in the Columbia River. Groundwater withdrawals from the Ringold formation aquifer may have some affect on flows in Spring Creek, particularly in the dry season. Hatchery operations are considered a non-consumptive use and most of the water withdrawals are returned to the river.

4.1.3.2. No Action Alternative

The no action alternative would have no effects on groundwater or surface water hydrology at either of the sites. Current conditions would not be impacted in any way.

4.1.4. Climate Change

4.1.4.1. Preferred Alternative

Ringold Springs Hatchery Construction. The construction to expand the facilities at RSH is not expected to have an impact on climate change. Also, climate change is not expected to have an effect on the hatchery construction.

I-182 Acclimation Site Construction. Construction at the I-182 site is not expected to have an impact on climate change. Also, climate change is not expected to have an effect on the hatchery construction.

Hatchery Operations. Hatchery operations are not expected to impact climate change. However, operations of the hatcheries may be impacted by climate change in several ways. If drought conditions should result, groundwater and surface water resources may become scarce and withdrawals may have to be curtailed which would greatly impact the ability of the hatcheries to function as proposed. Another possible impact of climate change could be flash-flood events that in extreme cases could flood the facilities. Another possibility is that increased warming will mean that hatchery water will need additional cooling before it can be used which will increase operational costs and energy consumption in order to maintain the proposed production levels.

4.1.4.2. No Action Alternative

If no action is taken, RSH and the I-182 site would continue to be managed essentially as they are now; there would be no impacts to climate change.

4.1.5. Floodplains

4.1.5.1. Preferred Alternative

Ringold Springs Hatchery Construction. The expansion of and modifications to existing facilities at the RSH will be almost entirely above the 100-year floodplain. Only the lower portion of the adult fish ladder and the surface water intake will be within the floodplain. Neither of these features will be adversely impacted by flood water. In addition, due to the insignificant size of these features relative to the floodplain, neither is expected to create or exacerbate flooding of other property.

I-182 Acclimation Site Construction. Some features of the new facility will be located within the 100-year floodplain. These features include the rearing ponds and water intake structure. Walls of the rearing ponds will be high enough that the ponds are not flooded by a 100-year flood and access to the ponds will be via elevated walkways that are also above the floodplain. Buildings will be located on higher ground outside of the floodplain to prevent their flooding. No effects would be expected on localized flooding due to the construction of the ponds in the floodplain. Relative to the lower Yakima River floodplain, the ponds are insignificant in size and the removal of the small area from the available floodplain is not expected to result in increased flood effects to the surrounding area.

Hatchery Operations. The hatchery operations are not expected to have any impact on floodplains, and will not create or exacerbate flooding on other property.

4.1.5.2. No Action Alternative

Under the no action alternative, no change to floodplains in the vicinity of RSH and the I-182 site would occur, and there would be no potential for increased flooding or flood damage to other property.

4.1.6. Water Quality

4.1.6.1. Preferred Alternative

Ringold Springs Hatchery Construction. The expansion of and modifications to existing facilities at the RSH will be almost entirely upland. Only the construction of the lower portion of the adult fish ladder and the surface water intake would have the potential to impact water quality in the Columbia River or Spring Creek. Construction of the new water intake in the Columbia River will require in-water work such as trenching to bury the intake pipe, and the placement of pilings to create a foundation for the water intake box. Disturbance of sediment within the Columbia River will be required for installation of these in-water features. The sediment at this site is primarily gravel and cobble, so disturbance is not likely to create a considerable amount of turbidity that would remain suspended in the water column, as might be expected with fine-grained sediments. Although there will be some turbidity during and immediately after construction disturbance, it is expected to be intermittent over the short construction period (likely 2-4 weeks or less), and small in size relative to the available riverine habitat. Turbidity monitoring downstream of the work will be required to ensure that the construction does not cause exceedances of the state water quality standards. Construction of the lower fish ladder will take place within Spring Creek and the impacts to water quality would be primarily due to sediment disturbance during construction.

This disturbance would occur only during lower ladder construction for the portion within the creek, and would occur over a short construction period. In addition, all in-water work will take place during the designated in-water work window to minimize the effects of the turbidity on fish within the affected water bodies.

I-182 Acclimation Site Construction. Construction of facilities at the I-182 site will be almost entirely upland. Only the construction of the lower portion of the adult fish ladder and the surface water intake would have the potential to impact water quality in the Yakima River. Construction of the new water intake will require in-water work, such as trenching to bury the intake pipe and construction or placement of a water intake structure box. Disturbance of sediment in the Yakima River will be required for installation of these in-water features. The sediment at this site is finer-grained materials than is found in the Columbia, so disturbance is more likely to create a turbidity plume in the water column. The turbidity caused by disturbing the sediment during construction would be intermittent and for a short duration while construction is underway, and small in size relative to the available riverine habitat. In addition, all in-water work will take place during the designated in-water work window to minimize impacts to fish within the affected water bodies.

Hatchery Operations. By concentrating large numbers of fish, the proposed hatchery and acclimation facility operations could affect several water quality parameters in the Columbia and Yakima rivers. Effluent from the facilities could have elevated temperature and elevated levels of ammonia, organic nitrogen, total phosphorus, biological oxygen demand, pH, and suspended solids (Sparrow 1981, WDOE 1989, Michael 2003). Chemical use within hatcheries could result in the release of antibiotics, fungicides, and disinfectants into receiving waters (Boxall et al. 2004, Pouliquen et al. 2008, Martinez-Bueno et al. 2009). Other chemicals and organisms that could potentially be released by hatchery operations are polychlorinated biphenyls, pathogens (HSRG 2005, HSRG 2009), steroids (Kolodziej et al. 2004), anesthetics, pesticides, and herbicides. The direct discharge of hatchery facility effluent is regulated by the EPA under the Clean Water Act (CWA) through NPDES permits for discharges from hatcheries located on federal lands within the state of Washington.

Fish hatcheries are approved by several federal agencies to use a broad spectrum of commercial antibiotics, fungicides, and disinfectants to control bacterial and fungal diseases associated with aquaculture. The use of the federally regulated products requires hatchery personnel to follow manufacturer's instructions in conditions that are suitable for their safe and effective use. Any departure from the directions and conditions on the product labeling or on special state labels is considered a violation of the law. The use of hatchery treatment chemicals is closely regulated by EPA, and each hatchery has reporting requirements concerning their use.

While the hatchery expansion at RSH and the I-182 site will potentially contribute substances to these rivers, the contribution of substances from these facilities would be small relative to the contribution of these substances from activities such as agriculture and industry. Although there may be a slight degradation of water quality under the preferred alternative over the no action alternative, the facilities would comply with all applicable NPDES permits and wastewater plans to minimize the effects to the adjacent surface and groundwater.

4.1.6.2. No Action Alternative

No changes to the water quality of the Yakima or Columbia rivers would occur under the no action alternative. There would be no potential for increased degradation to any 303(d) listed parameters above existing conditions.

4.1.7. Hazardous, Toxic, and Radioactive Waste

4.1.7.1. Preferred Alternative

Ringold Springs Hatchery Construction. Soils testing has been conducted at the Ringold site and no hazardous, toxic or radioactive wastes were discovered. Construction of the expanded facilities will not disturb nor produce hazardous, toxic, or radioactive waste.

I-182 Acclimation Site Construction. Soils testing has been conducted at the I-182 site and no hazardous, toxic or radioactive wastes were discovered. Construction of the facility will not disturb nor produce hazardous, toxic, or radioactive waste.

Hatchery Operations. Operation and maintenance of the hatchery facilities will not produce nor disturb hazardous, toxic, or radioactive waste. All hatchery waters must be treated to meet the state and federal CWA standards before being released from the facilities.

4.1.7.2. No Action Alternative

Under the no action alternative, there would continue to be no contaminant threats to resources at RSH and the I-182 site because of hazardous, toxic, or radioactive waste.

4.2. Vegetation

4.2.1.1. Preferred Alternative

Ringold Springs Hatchery Construction. Construction will have some impact on upland vegetation within the hatchery facility boundaries; however, much of the development will be within an existing 9-acre pond that is not vegetated. There will also be some disturbance to riparian vegetation along the Columbia River where the water intake pipe and pump will be placed. The adult fish ladder modifications may impact a small area of riparian vegetation along Spring Creek. There is a pipe replacement that will be take place in an existing wetland on the site. This will temporarily disturb wetland vegetation along the length of the pipe.

I-182 Acclimation Site Construction. Clearing of upland vegetation (grass and sagebrush) would occur in an approximately 5-acre area needed for construction of the acclimation facilities. Riverine shoreline vegetation and wetland vegetation will be removed and/or disturbed for minor portions of the construction including the installation of the surface water intake pipe and the lower part of the adult fish ladder.

Hatchery Operations. Hatchery operations would not be expected to impact vegetation.

4.2.1.2. No Action Alternative

If no action is taken, RSH and the I-182 sites would continue to be managed essentially as they are now; there would be no additional effects to vegetation from construction activities.

4.3. Aquatic Resources and Wildlife

4.3.1. Aquatic Resources

4.3.1.1. Preferred Alternative

Ringold Springs Hatchery Construction. Most of the construction at RSH will occur in upland areas and would not impact aquatic resources. However, there is a pipe scheduled for replacement that is within a wetland. This pipe replacement will cause temporary and localized impacts to flora and fauna within the wetland. Re-colonization by the aquatic organisms would be expected to begin immediately after the disturbance. Construction of the lower fish ladder and the water intake structure would have some impact on aquatic resources in the Columbia River and Spring Creek, primarily due to substrate disturbance, which would directly impact benthic organisms and indirectly impact aquatic organisms as a result of turbidity created within the water column. This turbidity could impact fish and invertebrates in the water column and bury benthic organisms when the particulates settle out downstream of the construction. Construction activity would be expected to elicit avoidance behavior from more mobile species, and drifting species would be subjected to turbidity for a short duration and in a small area relative to the available aquatic habitat. Construction impacts are not be expected to have a permanent, negative effect on aquatic resources.

I-182 Acclimation Site Construction. Construction of the upland portion of the I-182 site will have no impact on aquatic resources. Construction of the fish ladder and the water intake structure will have some impact on riparian and wetland aquatic resources near the Yakima River's edge primarily due to substrate disturbance, which would directly impact benthic organisms and indirectly impact aquatic organisms as a result of turbidity created within the water column. This turbidity could impact fish and invertebrates in the water column and bury benthic organisms when the particulates settle out downstream of the construction. Construction activity would be expected to elicit avoidance behavior from more mobile species, and drifting species would be subjected to turbidity within the water column. Construction effects would be temporary in the immediate vicinity of the construction and downstream. As the turbidity moves downstream, particulates will settle out of the water column and the more turbid water will mix with the less turbid river water, which would lessen the effect to aquatic organisms as they drift or swim away from the impact area. The disturbed area would be expected to re-populate with benthic organisms by recruitment from upstream undisturbed areas. Construction impacts are not expected to have a permanent, negative effect on aquatic resources.

Hatchery Operations. Water withdrawals from the Columbia and Yakima rivers could result in entrainment of small fish and invertebrates. However the intake openings will be fitted with fish-friendly screening 1/8 inch or smaller in size to minimize this effect. Water withdrawal quantities are regulated by the state of Washington and hatcheries are considered non-consumptive, so effects to fish due to diminished stream flow would be negligible relative to the baseline flow conditions. Effluent from the facility must meet federal water quality criteria for release into the rivers. However, there is the possibility that contaminants, antibiotics, or nutrients from the hatchery operation would reach the river in some measurable quantity resulting in a localized degradation of water quality.

4.3.1.2. No Action Alternative

If no action is taken, RSH and the I-182 sites would continue to be managed essentially as they are now; there would be no additional effects to aquatic resources or aquatic habitat from construction activities.

4.3.2. Wildlife

4.3.2.1. Preferred Alternative

Ringold Springs Hatchery Construction. Construction will have little effect on upland wildlife species that occur at RSH such as birds, coyote, rodents, jackrabbits, and raccoons. Much of the construction will occur within an existing 9-acre pond that does not provide habitat for these species. Some riparian habitat would be impacted by construction of the water intake and temporarily displace any wildlife and birds that may be in this area. Construction of the adult fish ladder should have little impact on wildlife. Migratory waterfowl will be temporarily displaced by construction within the 9-acre pond and possibly by pipe replacement in the wetland area.

I-182 Acclimation Site Construction. The 87-acre I-182 site is currently managed for wildlife use by the USACE Walla Walla District. Clearing of grass and sagebrush in an approximately 5-acre site for construction of the acclimation facilities would displace wildlife and birds by permanently removing habitat. Riverine shoreline vegetation and wetland vegetation would be removed and/or disturbed for minor portions of the construction (surface water intake pipe and the lower part of adult fish ladder). Relative to the size of the 87-acre parcel, removal of this small area of habitat would not be expected to have a negative effect on wildlife in the area.

Hatchery Operations. Hatchery operations would not be expected to affect wildlife except for the non-lethal deterrence of piscivorous birds such as gulls, cormorants, herons, and terns that attempt to feed on fingerling salmon.

4.3.2.2. No Action Alternative

If no action is taken, RSH and the I-182 sites would continue to be managed essentially as they are now; there would be no additional effects to wildlife or their habitats from construction activities.

4.4. Threatened and Endangered Species

The WDFW operates the RSH and will continue to do so after the proposed expansion of facilities. They will also operate the I-182 facility upon its completion. In anticipation of operational changes, the WDFW is preparing a Hatchery and Genetic Management Plan (HGMP) for the Ringold Springs Rearing Facility Fall Chinook Program. The HGMP addresses, in detail, the effects of proposed operations at RSH and the I-182 site on all applicable NMFS and USFWS managed ESA species (see Section 3.4). In particular, the HGMP addresses potential impacts on salmonids from the collection of adults and the release of juveniles into the Columbia River ecosystem. Provided below is a summary of the potential impacts to applicable ESA species as found in the draft HGMP (WDFW 2013). The draft HGMP is not yet available for public review, but WDFW will provide the opportunity for public comment, and evaluation by NMFS and USFWS before the document is finalized for use at the facility.

For the proposed modifications to production at Little White Salmon Hatchery, the HGMP for that hatchery will be modified prior to implementation of changes to the JDM program; the revised HGMP will be submitted for public review and evaluated by NMFS and USFWS for effects to ESA-listed species.

4.4.1.1. Preferred Alternative

Ringold Springs Hatchery Construction. Construction of the water intake will require the use of pilings to create the foundation for the river intake box, digging a trench to place the pipe that connects the intake box to the on-shore pump, and then covering the pipe once it is installed. The intake openings will be covered with the appropriate fish-friendly mesh size as required by NMFS to minimize the potential for entrainment of small fish. Vibratory pile insertion will be used to prevent barotrauma to fish as a result of pile driving. All in-water work will be conducted within the in-water work window, if possible, to minimize impacts to migratory salmonid species (Chinook salmon, steelhead and bull trout). The adult fish ladder modifications will be done during the in-water work window so that there will be no impact to URB adult upstream migration. It should be noted that no ESA-listed species are known to spawn in the Spring Creek, which will be directly impacted by the adult ladder modification work. No effects are expected to gray wolf, pygmy rabbit, or the Ute ladies'-tresses orchid, which are not known to occur in the vicinity of the hatchery.

I-182 Acclimation Site Construction. Construction of the adult ladder will result in minor, short-term impacts to riparian vegetation, water quality, and aquatic organisms in and along the Yakima River. Impacts include the possibility of some increase in turbidity and some noise disturbance to migratory salmonid species in the vicinity. To minimize impact of the construction, all in-water work will be conducted during the in-water work window. No effects are expected to gray wolf, pygmy rabbit, or the Ute ladies'-tresses orchid, which are not known to occur in the vicinity of the I-182 site.

Hatchery Operations. No ESA-listed salmonid populations will be directly affected by hatchery operations. The four ESUs that may be incidentally affected by hatchery operations are Upper Columbia River steelhead, Middle Columbia River steelhead, Upper Columbia River spring-run Chinook, and Snake River fall Chinook salmon. Bull trout may also be incidentally affected by hatchery adult trapping operations. The following hatchery operations may lead to take of listed salmonids.

- Broodstock trapping operations. In the past, observations of trapped ESA-listed fish species have been low for RSH. Wild steelhead and Snake River fall Chinook strays have been detected, and when possible, removed and returned unharmed to the Columbia River. Returning fall Chinook may contribute to spawning in the Hanford Reach, but stocks are not listed. Impacts to listed spring Chinook and steelhead stocks located in upriver tributaries are unlikely due to stock and habitat characteristics (Peven 2003). Bull trout have also been encountered in the RSH trap. To reduce the potential for lethal take, the trap is checked at least once a day and, as with other ESA species, bull trout are removed the trap and then quickly and safely returned to the river.

- Rearing programs. Effluent from the rearing operations and facilities must meet Clean Water Act Section 402 NPDES Permit requirements specific to each facility. Indirect take from effluent discharge is unknown. To address concerns about the potential for disease transmission from hatchery to natural fish, a number of policies and procedures have been put into place that have greatly reduced disease outbreaks. Indirect take from disease is unknown.

- Release. Hatchery production/density-dependent effects of an increase in fish production from the current level of approximately 3.5 million smolts to 14.0 million smolts (both Ringold and I-182 combined) for annual release is similar to the production/releases from the Spring Creek National Fish Hatchery prior to 2009. Listed steelhead and spring Chinook spawning and rearing habitat occurs in the major and minor tributaries upstream of the release site. Fish produced in these areas would migrate past the hatchery location from spring to late summer. In the area below Bonneville Dam, Lower Columbia River listed smolts will be co-mingles and would be

migration over the same timeline along with the up-river stocks. Impacts to ESA-listed fish are unknown.

- Studies conducted in other areas indicate this program size is likely to pose a minimal risk of competition due to the migration speed that smolted fish can travel, especially once in the Columbia mainstem. PIT tagging studies (Bumgarner et al, 2000) have indicated that URB releases from RSH moved past McNary Dam within the first two weeks (mean travel days - 14) after volitional release, with some of these fish reaching Bonneville Dam (almost 200 miles downstream) in 2 weeks. In the Columbia River, studies indicate that fish appear to travel quickly. Median travel time of sub-yearling Chinook on the mainstem Columbia River, from McNary to Bonneville Dam, was estimated to average 8 days (18.1 miles/day) during the years 1997 to 2003 (unpublished WDFW data from 2003). In a study designed to define the migrational characteristics of Chinook salmon, coho salmon, and steelhead trout in the Columbia River estuary, Dawley et al (1984), found the average migration rates for sub-yearling Chinook, yearling Chinook, coho salmon, and steelhead were 13.8, 11.2, 10.6, and 21.7 miles/day, respectively.

- Predation risk factors. Releases from RSH for the past 5 years have occurred in late June to early July. This is generally after listed steelhead and spring Chinook smolts from the Upper Columbia River region have past. Steelhead smolts originating above McNary Dam and representing upper Columbia and Snake river origin populations exhibit average peak passage at McNary Dam from May 7 through May 26 (1984-1986 observations reported by the Fish Passage Center, http://www.fpc.org/). The RSH program proposes to release 10.0 million smolts annually. As smolts, they are less likely to compete for food or habitat with listed stocks emigrating downriver. The NMFS has incorporated a Columbia River hatchery production ceiling of 197.4 million fish in their recent hatchery biological opinions to address potential mainstem corridor and ocean effects, as well as other potential ecological effects from hatchery fish.

- Monitoring. Through a comprehensive research, monitoring and evaluation program WDFW will be able to determine if risks to listed stocks are acceptable. If necessary, harvest timing, location, and gear restrictions will be adjusted.

- Homing and straying of released fall Chinook salmon. On average, about 6.4% of the RSH fall Chinook salmon returns have strayed into non-target hatcheries. Less than 1%, on average, have strayed into non-target spawning areas.

- Overall increases in URB production would be off-set by a 25% decrease in downstream Tule production.

4.4.1.2. No Action Alternative

If no action is taken, RSH and the I-182 sites would continue to be managed essentially as they are now; there would be no additional effects to NMFS and USFWS managed ESA species or their habitats from construction activities.

4.5. Cultural and Historic Resources

4.5.1.1. Preferred Alternative

Ringold Springs Hatchery Construction. Corps of Engineers archaeologists have determined that the preferred alternative has the potential to affect historic properties. The previously documented cultural site at RSH is located well outside of the area proposed for construction, and would not be affected by the proposed project. However, the RSH facility itself may be over 50 years old and thus, may be considered a historic property. The RSH facility will need to be reviewed in order to determine the exact nature of effects on this historic property.

I-182 Acclimation Site Construction. The I-182 site will be surveyed to determine if there are subsurface cultural deposits present and if so, to determine the effects of proposed project on those deposits. The previously recorded historic site will be visited to verify if it is in the project area and if the proposed project would affect this site.

Hatchery Operations. Hatchery operations would not be expected to have an effect on any known or unknown cultural or historic resources once construction is completed.

The USACE has initiated consultation with the Washington SHPO and interested Tribes and is in the process of determining the effects of the preferred alternative on historic properties. The effects determination will be completed prior to a decision on the National Environmental Policy Act process. Although consultation is ongoing, the USACE expects the preferred alternative to have minimal effects on historic properties.

4.5.1.2. No Action Alternative

Under the no action alternative, the existing conditions in the project areas would continue. The RSH would continue to be used to rear and release fish, and the I-182 site would continue to be managed for wildlife. These activities would have no effect on historic properties.

4.6. Socioeconomics

4.6.1.1. Preferred Alternative

Ringold Springs Hatchery Construction. The construction will provide temporary contract jobs for design and construction of the facility. The labor and procurement of goods required for construction will provide a short-term increase in local economic activity. Once completed, the improved RSH (and I-182) facility will employ additional full- and part-time staff. The increased economic activity is expected to have a positive impact on the socioeconomics of the area. In addition, the access provided at RSH to the Hanford Reach of the Columbia River would not be affected by construction. There are no negative socioeconomic impacts anticipated for facility construction.

I-182 Acclimation Site Construction. Construction at the I-182 site will provide temporary contract jobs for design and construction of the facility. The labor and procurement of goods required for construction will provide a short-term increase in local economic activity. The increased economic activity is expected to have a positive impact on the socioeconomics of the area. There are no negative socioeconomic impacts anticipated for facility construction.

Hatchery Operations. Hatchery operations will require additional full-time and part-time personnel beyond those currently employed at RSH. The additional employment will contribute to the economics of the region through personal income and jobs, as well as goods, services, and housing demands of the new employees. Fishing and associated expenditures are expected to increase with the increased number of adult fish returns to the Zone 6 fishery. There are no negative socioeconomic impacts anticipated for hatchery operations.

4.6.1.2. No Action Alternative

If no action is taken, RSH and the I-182 sites would continue to be managed essentially as they are now; there would be no additional temporary construction jobs or employment opportunities, and no short-term increase to local economic activity.

4.7. Cumulative Effects

Cumulative effects are defined as, "The impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 *Code of Federal Regulations* Section 1508.7). Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

Impacts of the construction of the proposed project are expected to be only minor. Effects of the hatchery operations, with the increased numbers of URB fall Chinook salmon being introduced to the system, are the largest concern related to the proposed project. Those effects are also expected to be minor, however there are other Federal, tribal and state actions expected to occur within the action area and outside of the action area but within the Columbia River basin migratory corridor and out into the Pacific Ocean. Federal, state, and tribal fisheries will still occur in the Columbia River. Land management and water-use decisions are made by multiple agencies that affect these populations. Development within the watershed will continue, although regional programs are being developed that designate priority watershed and facilitate the development of watershed management plans. There are overarching concerns and legal mandates for the recovery of listed salmon and steelhead populations in the Columbia and Snake River basins; while at the same time, there are social and cultural needs for sustainable fisheries and a sustainable economic use of resources. NMFS currently distributes funds under the Mitchell Act to operate 62 hatchery programs that annually produce more than 71 million fish. Historically production levels have been as high as 128.6 million juvenile fish annually, but these levels have been substantially reduced as inflation, maintenance, and other costs have eroded the amount of funding available for fish production.

The hatchery programs and associated fisheries that may impact listed salmon and steelhead within the action area would be managed based on their impacts on ESA-listed fish that are returning to the Columbia River. If the cumulative effects of other hatchery programs, fisheries, pinniped and avian predation on salmonids, habitat restoration projects, ocean conditions and conservation efforts do not allow sufficient escapement of returning adult salmon and steelhead to the action area and above, to meet recovery goals while providing for the operation of the proposed hatchery programs, adjustments to fisheries and to the hatchery production levels may be proposed.

If the cumulative effects of salmon management efforts fail to provide for recovery of listed species, then impacts due to the hatchery programs and fishing in the action area would be substantially diminished. Therefore, the cumulative impacts of the Proposed Action on recovery actions are expected to be minor because of reporting and monitoring requirements that would ensure compatibility with recovery

planning. Management of the hatchery programs and of fishing opportunity is only one element of a large suite of regulations and environmental factors that may influence the overall health of listed salmon and steelhead populations and their habitat. The proposed hatchery program includes a monitoring component so that the hatchery plans can be modified in response to changes in the status of affected listed species. Monitoring and adaptive management would help ensure that listed species are adequately protected and would help counter-balance any potential adverse cumulative impacts.

The climate in the Pacific Northwest is changing due to human activities, and this is affecting hydrologic patterns and water temperatures. Regionally averaged air temperature rose about 1.5°F over the past century (with some areas experiencing increases up to 4°F) and is projected to increase another 3°F to 10°F during this century. Increases in winter precipitation and decreases in summer precipitation are projected by many climate models, although these projections are less certain than those for temperature (USGCRP 2009).

Higher temperatures in the cool season (October through March) are likely to increase the percentage of precipitation falling as rain rather than snow, and to contribute to earlier snowmelt. The amount of snowpack measured on April 1, a key indicator of natural water storage available for the warm season, has already declined substantially throughout the region. The average decline in the Cascade Mountains, for example, was about 25 percent over the past 40 to 70 years, with most of this due to the 2.5°F increase in cool season temperatures over that period. Further declines in Northwest snowpack are likely due to additional warming this century, varying with latitude, elevation, and proximity to the coast. April 1 snowpack is likely to decline as much as 40 percent in the Cascades by the 2040s (USGCRP 2009).

High and base stream flows are likely to change with warming. Increasing winter rainfall is likely to increase winter flooding in relatively warm watersheds on the west side of the Cascade Mountains. Earlier snowmelt, and increased evaporation and water loss from vegetation, will increase stream flows during the warm season (April through September). On the western slopes of the Cascade Mountains, reductions in warm season runoff of 30 percent or more are likely by mid-century. In some sensitive watersheds, both increased flood risk in winter and increased drought risk in summer are likely due to warming of the climate (USGCRP 2009).

In areas where it snows, a warmer climate means major changes in the timing of runoff, increased stream flows during winter and early spring, and decreases in late spring, summer, and fall. Flow timing has shifted over the past 50 years, with the peak of spring runoff shifting from a few days earlier in some places to as much as 25 to 30 days earlier in others. This trend is likely to continue, with runoff shifting 20 to 40 days earlier within this century. Major shifts in the timing of runoff are not likely in areas dominated by rain rather than snow (ISAB 2007; 15 USGCRP 2009).

Fish habitat changes due to climate change are likely to create a variety of challenges for ESA-listed species of fish. Higher winter stream flows can scour streambeds, damaging spawning redds and washing away incubating eggs (USGCRP 2009). Earlier peak stream flows could flush young salmon and steelhead from rivers to estuaries before they are physically mature enough for the transition, increasing a variety of stresses and the risk of predation (USGCRP 2009). Lower summer stream flows and warmer water temperatures will degrade summer rearing conditions in many parts of the Pacific Northwest for a variety of salmon and steelhead species (USGCRP 2009), and are likely to reduce the survival of steelhead fry in streams with incubation in early summer. Other likely effects include alterations to migration patterns, accelerated embryo development, premature emergence of fry, and increased competition and predation risk from warm-water, non-native species (ISAB 2007). The increased prevalence and virulence of diseases and parasites that tend to flourish in warmer water will further stress salmon and steelhead (USGCRP 2009). Overall, about one-third of the current habitat for the Pacific

Northwest's coldwater fish may no longer be suitable for them by the end of this century as key temperature thresholds are exceeded (USGCRP 2009).

Climate change is also likely to affect conditions in the Pacific Ocean. Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances (USGCRP 2009). It is likely that, as ocean conditions change, abundances of salmon and steelhead will continue to change accordingly, resulting in changes in abundance of adults returning to freshwater to spawn.

If climate change contributes to a substantial decline in the abundance of listed salmon and steelhead populations through impacts to habitat and from changes in ocean conditions, the proposed hatchery program may be used as a "safety net" program to maintain genetic resources. The proposed hatchery programs are somewhat protected from the possible increase in disease prevalence from warmer water temperatures because much of the rearing occurs using well water and the fish are tested at spawning, during rearing, and prior to release to limit disease transmission to the natural-origin populations.

While climate change may well have impacts on the abundance and/or distribution of ESA-listed salmonids that may be impacted by the Proposed Action, the proposed hatchery management described in the HGMP and the associated monitoring provide the ability to evaluate the hatchery program's impacts as abundances change, leading to adjustments in the hatchery management plans.

5. COORDINATION

5.1. *U.S. v Oregon* Parties and Strategic Work Group

Agency and stakeholder involvement for the proposed changes to the JDM program have been coordinated through *U.S. v. Oregon* Production Advisory Committee meetings; the committee also assisted with the development and review of alternatives. The *U.S. v. Oregon* Production Advisory Committee meets monthly.

In August 2011, as a part of the Columbia River Fish Mitigation Program, the USACE formally initiated studies to address adjustments in the JDM program that are necessary to achieve in-kind and in-place mitigation objectives. In February 2012, the USACE developed a draft John Day Alternative Study, which presented mitigation objectives, feasibility level alternatives, conceptual designs, and cost estimates for recommended adjustments to the program. In June 2012, the USACE received comments from the *US v. Oregon* parties. These comments included the recommendation that USACE use the total adult production method and actual smolt-to-adult ratio data to calculate the production level required to produce the 30,000 adult spawners, which constitute the authorized mitigation program for John Day. The USACE accepted this methodology and revised the alternatives study to reflect the change. Comments received on the draft alternatives study were included in the final study report published in October 2012 (USACE 2012).

The following entities participated in coordination and review of the alternatives study:

- Bonneville Power Administration (FCRPS BiOp, Accord partner)
- U.S. Bureau of Reclamation (FCRPS BiOp, Accord partner)
- U.S. Bureau of Indian Affairs (*U.S. v. Oregon* party)
- National Oceanic and Atmospheric Administration (FCRPS BiOp, *U.S. v. Oregon* party)
- U.S. Fish and Wildlife Service (*U.S. v. Oregon* party)
- Oregon Department of Fish and Wildlife (*U.S. v. Oregon* party)
- Washington Department of Fish and Wildlife (*U.S. v. Oregon* party)
- Idaho Department of Fish and Wildlife (*U.S. v. Oregon* party)
- Confederated Tribes of the Umatilla Indian Reservation (Accord Partner, *U.S. v. Oregon* party)
- Confederated Tribes of the Warm Springs Reservation of Oregon (Accord Partner, *U.S. v. Oregon* party)
- Confederated Tribes and Bands of the Yakama Nation (Accord partner, *U.S. v. Oregon* party)
- Nez Perce Tribe (Accord partner, *U.S. v. Oregon* party)
- Confederated Tribes of the Colville Indian Reservation (*U.S. v. Oregon* party)
- Shoshone-Bannock (*U.S. v. Oregon* party)
- Columbia River Intertribal Fish Commission (representing Treaty Tribes)

5.2. Public Review

This draft EA is being issued for a 30-day public review period. The draft EA will be provided to federal and state agencies, tribes, organizations and groups, and interested publics. Public concerns identified in comments will aid in determination of whether or not an Environmental Impact Statement (EIS) is necessary for the proposed action. If it is determined that an EIS is not required, a Finding of No Significant Impact (FONSI) will be signed, concluding the National Environmental Policy Act process.

6. COMPLIANCE WITH LAWS AND REGULATIONS

6.1. National Environmental Policy Act

As specified in the Procedures for Implementing NEPA (33 C.F.R. §230), this draft Environmental Assessment will receive a 30-day public and agency review comment period. Prior to finalization of the document, any comments received from this review would be considered and incorporated into the proposed project, as appropriate. After such time, the USACE will determine if the effects of the preferred alternative would reach a threshold that could significantly affect the quality of the human environment, and whether or not an Environmental Impact Statement is required, or conversely, if the analysis results in a Finding of No Significant Impact (FONSI).

6.2. Clean Air Act

This Act established a comprehensive program for improving and maintaining air quality throughout the United States. Its goals are achieved through permitting of stationary sources, restricting the emission of toxic substances from stationary and mobile sources, and establishing National Ambient Air Quality Standards. Title IV of the Act includes provisions for complying with noise pollution standards. The preferred alternative does not appear to be located in a non-attainment area for limited air quality.

There would be an intermittent, short-term, extremely localized reduction in air quality during construction of the preferred alternative due to emissions from construction equipment. Any emissions that do occur during construction from motor vehicles are expected to be *de minimus*. After construction, emissions from activities at RSH would be of a similar scope to those of the original facility. Total emissions from the operations of the I-182 facility will be an increase over current conditions, but all operating equipment will be required to meet state and federal emissions standards. There also would be an intermittent increase in noise levels from construction equipment. Efforts to avoid and minimize these effects have been considered when comparing and evaluating construction methods.

6.3. Clean Water Act

There are various sections of the CWA with which the USACE must comply. These sections include:

Section 404. Section 404 authorizes the Secretary of the Army to permit the discharge of dredged or fill material into waters of the United States, only at specified disposal sites. Disposal sites are evaluated and authorized through the application of the Section 404(b)(1) guidelines further described in 40 CFR 230. Although USACE Civil Works does not permit itself through Section 404, per 33 CFR 336.1(a) it complies with all applicable substantive legal requirements, including application of section 404 (b) (1) guidelines to evaluate compliance with the CWA. The construction contract will require that all material used as fill within waters of the U.S. be clean fill from a commercial source, or re-use of suitably clean excavated material returned to the same location as back-fill. A 404(b)(1) Evaluation will be prepared for this project and submitted to the WDOE along with the application for a CWA Section 401 Water Quality Certification.

Section 401. Section 401(a)(1) requires certification from the state in which a discharge would occur to waters of the U.S., and is applicable to construction and operation of facilities The state must certify that the discharge would not violate the states' water quality standards and is in compliance with established federal and state effluent limitations. The EPA retains jurisdiction in limited cases. Although the USACE does not permit itself, the USACE seeks a State Water Quality Certification per 33 CFR 336.1

(a)(1) when its activities result in a discharge. The required 401 Water Quality Certification would be obtained from the WDOE. The Section 404(b)(1) Evaluation, wetland delineation, and any additional necessary information, such as a Joint Aquatic Resources Permit Application (JARPA), would be submitted to the WDOE. This agency would be responsible for project review and issuance of the 401 Water Quality Certificate, which would likely include terms and conditions to avoid and/or ameliorate impacts from the preferred alternative including BMPs and turbidity monitoring requirements.

Section 402. Section 402 (a) (1) authorizes the EPA or states in which the EPA has delegated such authority to issue permits for the discharge of any pollutant or combination of pollutants under procedures established to implement the NPDES program. Regulated categories of discharges generally include point-source discharges and storm-water runoff, and permit conditions are usually required to ensure compliance with all applicable effluent and water quality standards. For this project, a NPDES permit would be required from the EPA and obtained prior to proposed disturbance and work.

Overall effects to water quality and effects from discharges and disposal into navigable waters, including wetlands, have been described in the pertinent sections of this draft Environmental Assessment, and will be further described in the Section 404 (b)(1) Evaluation.

6.4. Coastal Zone Management Act

This Act requires federal agencies to comply with the federal consistency requirement of the Coastal Zone Management Act. The proposed activities at RSH and the I-182 site do not occur within the regulatory boundaries of this Act and therefore, are not pertinent to this evaluation.

6.5. Marine Protection, Research, and Sanctuaries Act

There would be no transportation of dredged material for placement or disposal in ocean waters. For this reason, this Act is not applicable to the proposed project.

6.6. Endangered Species Act

In accordance with Section 7(a) (2) of this Act, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species. Information on federally listed species and designated critical habitat is presented in this draft Environmental Assessment. A Biological Assessment is being prepared for the proposed action for species under the jurisdiction of the NMFS. The USACE has determined that the proposed action may affect listed salmon and steelhead and their designated critical habitat. Based on the outcome of the Section 7 consultation, the NMFS will likely issue a biological opinion (BiOp) that will set forth terms and conditions to minimize impacts of the proposed action and issue an incidental take statement.

A no effect determination has been documented for most species under the jurisdiction of the USFWS. A preliminary determination of ‘may effect, but not likely to adversely affect’ bull trout has been made which will require informal consultation with USFWS. USFWS may concur with that determination or the agency may decide that formal consultation will be required which would require a Biological Assessment and a BiOp for that species.

The USACE does not anticipate that implementation of the preferred alternative would result in impacts to ESA-listed species that would jeopardize the existence of those species. All conservation measures, terms and conditions, and reasonable and prudent measures would be implemented to the maximum

extent practicable. Any deviations to the proposed plan would require a written variance from the Services. Long-term effects are expected to benefit aquatic species without detriment to waterfowl or other terrestrial species. These effects were described in detail in associated portions of this draft Environmental Assessment.

6.7. Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act of 1934 states that federal agencies involved in water resource development are to consult with the USFWS and state agencies administering wildlife resources concerning proposed actions or plans. This action is not a water-resource development project. Therefore, the Fish and Wildlife Coordination Act does not apply.

6.8. Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended by the Sustainable Fisheries Act of 1996, established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for fisheries regulated under a federal fisheries management plan. The amended Magnuson-Stevens Act establishes requirements for EFH for commercially important fish. Federal agencies must consult with NMFS on all proposed actions authorized, funded, or carried out by the agency that may adversely affect EFH.

Pursuant to the Magnuson-Stevens Act, an EFH consultation is necessary for the proposed action at RSH. Essential fish habitat is defined by the Act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Columbia River is designated as EFH for salmon species. An assessment for EFH was prepared and provided to the NMFS for review and consultation. There would be temporary, limited, short-term modifications to EFH during construction. With construction timing and techniques, best management practices and a Stormwater Pollution Prevention Plan for construction activities, potential impacts to EFH will be minimized. Long-term benefits from project implementation should conserve and improve EFH.

6.9. Marine Mammal Protection Act

The 1972 Marine Mammal Protection Act established a federal responsibility to conserve marine mammals. With certain specified exceptions, the Act establishes a moratorium on the taking and importation of marine mammals, as well as products taken from them, and establishes procedures for waiving the moratorium and transferring management responsibility to the states. This Act prohibits the take or harassment of marine mammals. The location of the proposed action is not within the vicinity of marine mammals or their critical habitat; therefore, this Act is not pertinent to this evaluation.

6.10. Migratory Bird Treaty Act

This Act requires that migratory birds not be harmed or harassed. Under this Act, "migratory birds" essentially includes all birds native to the U.S. and the Act pertains to any time of the year, not just during migration. Impacts of construction for the proposed project could temporarily displace birds by causing flushing, altering flight patterns, or causing other behavioral changes. However, it is not expected that effects would rise to the level of harm or harassment, and long-term effects are not expected to be harmful for migratory birds.

6.11. Bald and Golden Eagle Protection Act

This law provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The proposed project is not expected to have an adverse effect on eagles present in or flying through the project area.

6.12. National Historic Preservation Act, as amended

Section 106 of this Act requires that federal agencies or federally assisted or permitted projects take into account the effects of their actions on historic properties. Historic properties include prehistoric or historic sites, districts, buildings, structures, traditional cultural properties, historic landscapes, national historic landmarks or objects that are included in or eligible for inclusion in the National Register of Historic Places, as defined by 36 CFR 60, 63 and 65. Architectural and archaeological resources that are at least 50 years old, or those that have achieved significance within the past 50 years, may be viewed as potential historic properties. Traditional cultural properties, places of traditional religious and/or cultural importance to Indian tribes or Native Hawaiian organizations, may also be eligible for inclusion on the National Register.

Corps of Engineers archaeologists have determined that there is the potential for the proposed project to affect historic properties, and has initiated consultation with the Washington Department of Historic Preservation, the Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Tribe, the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Colville Reservation, and the Confederated Tribes of the Warm Springs. A letter explaining the project and inviting comments was sent to these parties on February 8, 2013. The Washington SHPO responded to the letter on February 11, 2013 and concurred with the proposed project's area of potential effects (APE). Consultation with the SHPO and Tribes is ongoing and will be completed prior to a decision on the National Environmental Policy Act process.

6.13. Archaeological Resources Protection Act, as amended

This Act protects materials of archaeological interest that are greater than 100 years old on public and Indian lands from unauthorized removal or destruction, and, requires that federal land managers develop plans and schedules to locate the most-scientifically important archaeological sites. This Act allows the federal land management agency to issue permits for the excavation or recovery of archaeological resources. Individuals who destroy, deface or remove archaeological resources from public lands are subject to severe penalties and fines under the Act's provisions. All of the cultural resources work undertaken for the proposed project will be completed by USACE archaeologists. The permits issued under this Act are not required for USACE-employed archaeologists to complete cultural resources activities on federal lands.

6.14. Native American Graves Protection and Repatriation Act

This Act, passed in 1990, provides for the protection, inventory and return of certain Native American cultural items – human remains, funerary objects, sacred objects and objects of cultural patrimony – to lineal descendents and culturally affiliated Indian tribes and Native Hawaiian organizations. This Act also includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items on federal and tribal lands, and penalties for noncompliance and illegal trafficking.

There are documented archaeological sites adjacent to the project areas that have the potential to contain Native American cultural items that are covered under this Act. The USACE has initiated a cultural resource survey to determine if these objects are present in the APEs. However, if human remains are discovered during construction, all work in the immediate vicinity of the discovery would cease, and the remains protected in place. The appropriate cultural resources staff would be contacted to initiate requirements of this Act.

6.15. Executive Order 12898 – Environmental Justice

This executive order requires federal agencies to consider and minimize potential impacts on subsistence, low-income, or minority communities. The goal is to ensure that no person or group of people shoulder a disproportionate share of any negative environmental impacts resulting from programs. The proposed action is within the confines of a state of Washington fish hatchery (RSH) and on federally owned land (I-182). There would be no "takings" associated with this project. The project is not expected to disproportionately affect low income and/or minority populations and is in compliance with this Executive Order.

6.16. Executive Order 11988 – Floodplain Management

Executive Order 11988 regarding floodplain management was signed May, 24, 1977. The order requires federal agencies to recognize the value of floodplains and consider the public benefits from their restoration and preservation. The objective is to avoid long and short-term adverse impacts to the base floodplain (100-year flood interval), and to avoid direct and indirect support of development in the base floodplain when there is a practicable alternative. This order directs federal agencies to evaluate the potential effects of proposed actions on floodplains and to avoid undertaking actions that directly or indirectly induce growth in the floodplain or adversely affect natural floodplain values. The RSH expansion will have no permanent impact on the floodplain. The proposed I-182 site will have some development of facilities within the floodplain. However, the development is relatively minor and will occur in a rural area where it will not result in a measureable diminishment of floodplain capacity nor induce growth and further development of the area.

6.17. Executive Order 11990 – Protection of Wetlands

Executive Order 11990 regarding protection of wetlands was signed May, 24, 1977. The order requires federal agencies to minimize the destruction, loss or degradation of wetlands. Wetland work for the Ringold site involves the replacement of a pipe that runs across a wetland area. Efforts will be made to minimize the impact of the work and the size of the area temporarily affected by the work. No permanent degradation of the wetland is expected to result from the action. At the I-182 site, riparian wetlands will be temporarily disturbed when the water in-take pipe in put into place. The area of impact there will be minimized as much as possible, and the site allowed to revegetate immediately after construction in completed. There will be no permanent loss of wetlands resulting from the proposed project.

6.18. Prime and Unique Farmlands

As a result of a substantial decrease in the amount of open farmland, the Farmland Protection Policy Act was put forth by Congress. In the statement of purpose, federal programs which contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses would be minimized. It follows that federal programs shall be administered in a manner that, as practicable, would be compatible with state and local government and private programs and policies to protect farmland. The proposed

action is within the confines of a state of Washington fish hatchery (RSH) and on federally owned land (I-182 site). No prime or unique farmlands would be affected.

6.19. Comprehensive Environmental Response, Compensation, and Liability Act and Resource Conservation and Recovery Act

The RSH and I-182 site are not within the boundaries of a site designated by the EPA or state of Washington for a response action under Comprehensive and Environmental Response, Compensation and Liability Act, nor are they part of a National Priority List site. There is no indication that any hazardous, toxic, and radioactive wastes are in the project areas. Any presence of these types of wastes would be responded to within the requirements of the law and USACE regulations and guidelines.

6.20. Wild and Scenic Rivers Act

Under this Act, a federal agency may not assist the construction of a water resources project that would have a direct and adverse effect on the free-flowing, scenic, and natural values of a federally designated wild or scenic river. There are no designated wild or scenic rivers in the project area.

6.21. Executive Order 13514 – Federal Leadership in Environmental, Energy and Economic Performance

This executive order requires federal agencies to increase energy efficiency; measure, report, conserve and reduce their greenhouse gas emissions from direct and indirect activities; conserve and protect water resources through efficiency, reuse, and stormwater management; eliminate waste, recycle, and prevent pollution; leverage agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services; design, construct, maintain, and operate high performance sustainable buildings in sustainable locations; strengthen the vitality and livability of the communities in which federal facilities are located; and inform federal employees about and involve them in the achievement of these goals.

The proposed action will have little effect on over-all energy efficiency or greenhouse gas emissions, and will incorporate measures to efficiently use and re-use water resources. The design will incorporate wastewater management that will prevent pollution to the adjacent waters. It will also have no adverse effect on the viability or livability of nearby communities. Therefore, this project is in compliance with this Executive Order.

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