



**APPENDIX C.2 METHOW REARING FACILITIES
 PROPOSED PLAN SITE DESCRIPTIONS AND CAPITAL COSTS
 Yakama Nation Fisheries Resource Management**

CONTENTS

CONTENTS 1

List of Figures 1

List of Tables 1

I. INTRODUCTION..... 2

II. PROPOSED REARING FACILITIES..... 3

A. CONSTRUCTED HABITATS..... 3

 1. HABITAT DESIGN 3

 2. EIGHTMILE 4

 3. HEATH RANCH 11

B. WINTHROP NATIONAL FISH HATCHERY 15

III. CAPITAL COSTS 17

A. Cost Estimate..... 17

B. Basis for the Cost Estimate..... 19

IV. REFERENCES 19

List of Figures

Figure 1. Location Map..... 2

Figure 2. Typical Constructed Habitat 4

Figure 3. Eightmile Water and Space Programming..... 5

Figure 4. Eightmile USGS Map..... 6

Figure 5. Eightmile Intake..... 7

Figure 6. Eightmile Aerial Photo 8

Figure 7. Eightmile Conceptual Design..... 9

Figure 8. Heath Ranch Water and Space Programming..... 11

Figure 9. Heath Ranch USGS Map..... 12

Figure 10. Heath Ranch Aerial Photo..... 13

Figure 11. Winthrop NFH Site Plan..... 15

Figure 12. Winthrop NFH Location Map..... 16

Figure 13. Winthrop NFH Photo..... 16

List of Tables

Table 1. Methow Rearing Locations and Numbers..... 3

Table 2. Eightmile Hydrology..... 7

Table 3. Constructed Habitat Capital Cost Summary 17

Table 4. Eightmile Capital Cost Detail..... 18

Table 5. Heath Capital Cost Detail..... 19

I. INTRODUCTION

This report presents site information for proposed Mid-Columbia Coho Reintroduction Plan (MCCRP) rearing facilities that will be producing fish for release in the Methow. A separate report describes proposed Wenatchee watershed rearing facilities. It includes a description of the Cascade Hatchery which will rear fish for both basins. Other reports describe acclimation facilities. Following is a list of master plan facility appendices, with this appendix highlighted.

- A. FISH CULTURE GUIDELINES
- B. ALTERNATIVE AND PROPOSED PLAN EVALUATIONS
 - B.1 REARING FACILITIES
 - B.2 ACCLIMATION FACILITIES
- C. PROPOSED PLAN SITE DESCRIPTIONS AND CAPITAL COSTS
 - C.1. WENATCHEE REARING FACILITIES
 - C.2. METHOW REARING FACILITIES**
 - C.3. WENATCHEE ACCLIMATION FACILITIES
 - C.4. METHOW ACCLIMATION FACILITIES
- D. PROJECT SCHEDULE AND COSTS

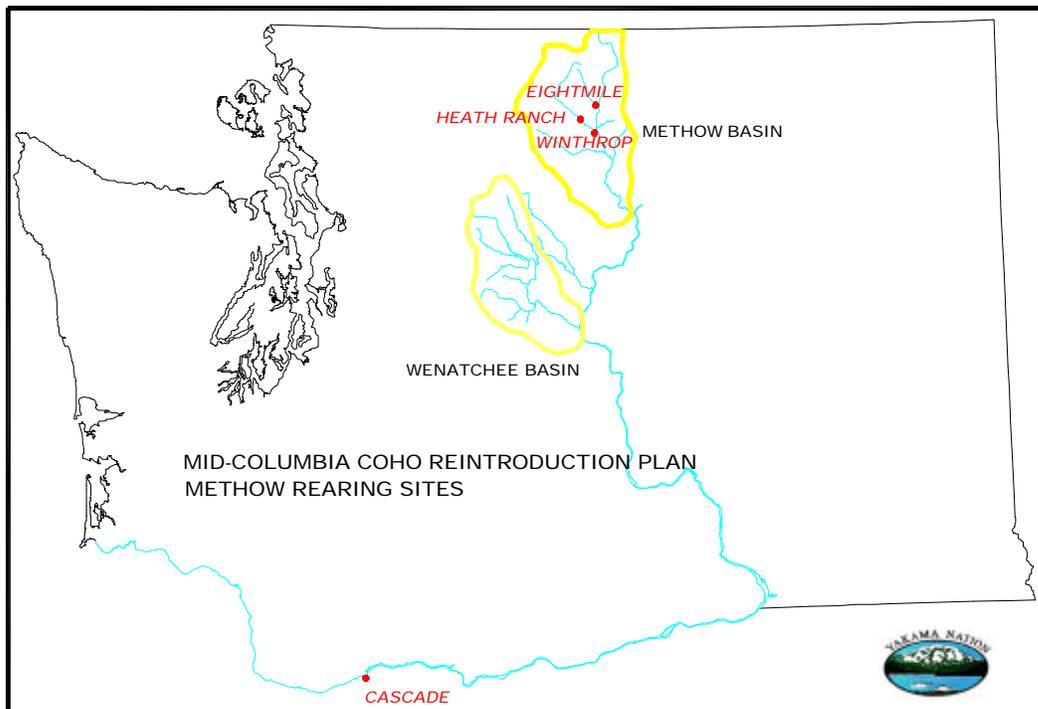


Figure 1. Location Map

II. PROPOSED REARING FACILITIES

Fish are proposed to be reared at the existing Cascade and Winthrop hatcheries and at two constructed habitats. The total reared per year at the hatcheries for Methow release is shown in the table below.

Table 1. Methow Rearing Locations and Numbers

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
EXISTING HATCHERIES																					
Cascade	0.25	0.25	0.25	0.25	0.25	0.25	0.45	0.45	0.45	0.24	0.24	0.24	0.24	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Winthrop	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
CONSTRUCTED HABITATS																					
Eightmile							0.20	0.20	0.20	0.14	0.14	0.14	0.14	0.14	0.14	0.07	0.07	0.07	0.07	0.07	0.07
Heath Ranch							0.10	0.10	0.10	0.07	0.07	0.07	0.07	0.07	0.07	0.04	0.04	0.04	0.04	0.04	0.04
TOTAL	0.50	0.50	0.50	0.50	0.50	0.50	1.00	1.00	1.00	0.70	0.70	0.70	0.70	0.70	0.70	0.35	0.35	0.35	0.35	0.35	0.35

A. CONSTRUCTED HABITATS

1. HABITAT DESIGN

The basic principles of the constructed habitats are described in Appendix B.1, REARING FACILITIES ALTERNATIVES and in the literature (Smith et al. 2004). They consist of pools, runs, riffles, alcoves, and ponds (see Figure 2) and include woody debris and overhead cover. Constructed habitat is a rearing environment that mimics natural conditions.

The program proposes to use Winthrop National Fish Hatchery (WNFH) to hold all adults that return to Methow constructed habitats, to incubate their eggs and rear them to fingerling size. Fingerlings are moved to the habitats after tagging in June. They are reared in the habitats to smolt size and released in April. Migrations out of the habitat will be prevented until fish are fully smolted. Exit fish screens will be maintained throughout the 10-month production cycle. These habitats function as both rearing and acclimation/release sites.

Predation control will be an important feature of the habitats. Fences will be used where possible and heavy tree cover will limit access by birds with long landing flight paths such as mergansers. Other bird predation will be controlled by deterrence through human presence, a technique that has been used effectively at sites currently operated by the MCCRCP as well as at federal and state hatcheries..

Natural foods (aquatic insects and macro-invertebrates) will be produced in the habitats, but the mass is not expected to be enough to meet nutritional demands. Therefore, supplemental hatchery fish food will be provided.

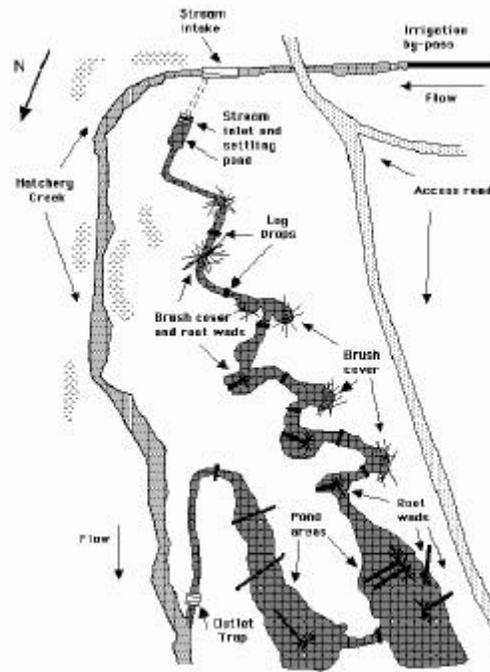


Figure 2. Typical Constructed Habitat
(from Smith et al. 2004)

2. EIGHTMILE

A potential constructed habitat site has been identified near the mouth of Eightmile Creek, a tributary of the Chewuch River, on U.S. Forest Service property at Eightmile Ranch. A combination of surface water from Eightmile Creek and well water is proposed for the water supply.

a. Facility Requirements

- ? Fish numbers: 200,000 are proposed in the MCCRCP master plan.
- ? Water and space programming: Space requirements have been developed through experience with a test site on the Dungeness River (Smith et al. 2004). Minimum water flow rates are determined using standard hatchery procedures (Piper et al. 1982). Higher water flows may be used to provide additional hydraulic complexity. The figure below details water and space needs at assumed water temperatures.
- ? Land requirement: Assuming that the water surface area takes up 33% of the site, 15 acres of land are required.
- ? Development timing: Current plans call for releases to begin as early as 2010. Construction and testing would then need to be completed by the summer of 2009.

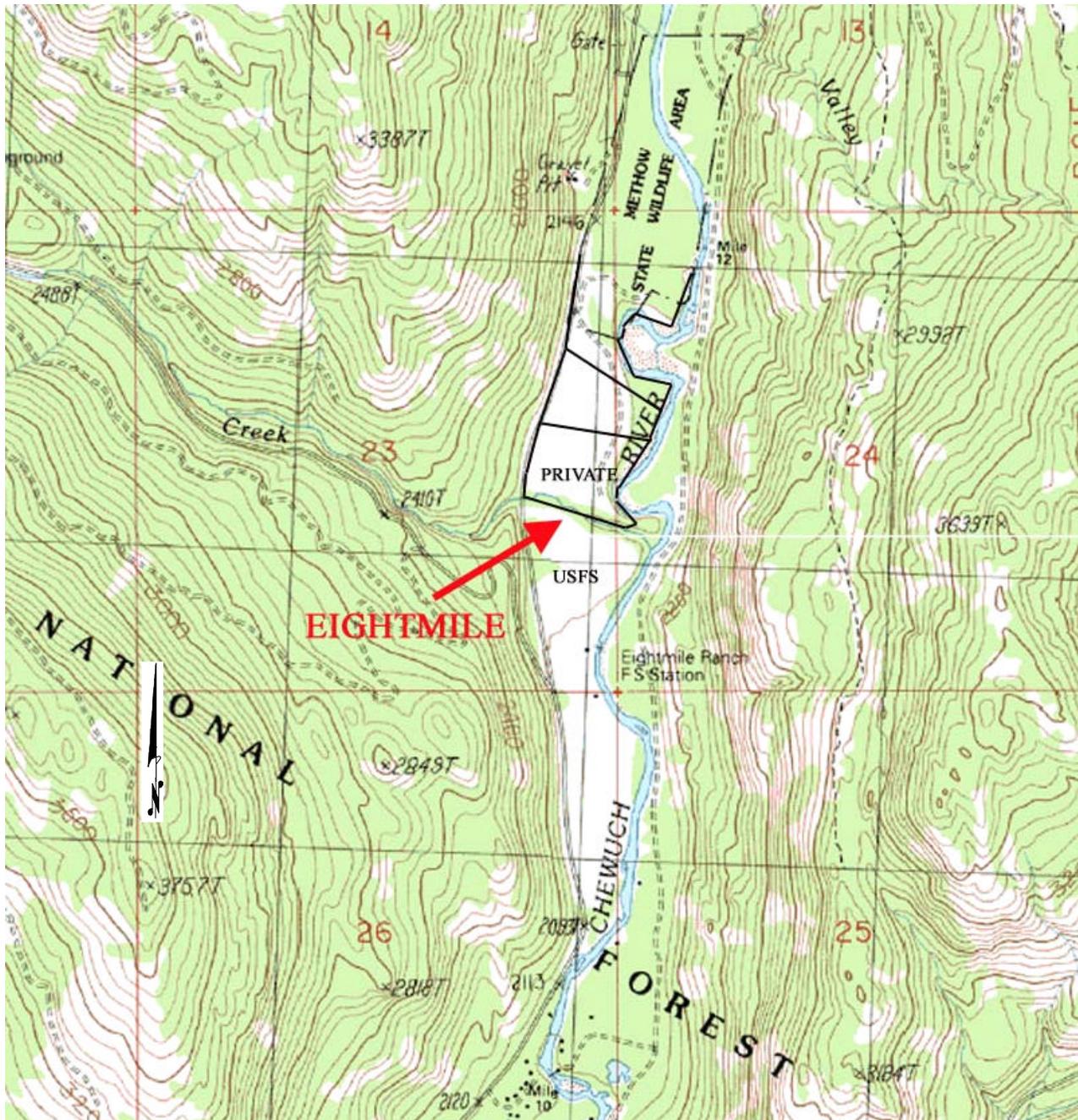


Figure 4. Eightmile USGS Map

c. Water Supplies

- ? Surface water flow: The site has 2 potential surface water sources, an abandoned irrigation intake on Eightmile Creek (Figure 5) and existing wells on the Eightmile Ranch. Mean monthly runoff volumes per square mile for analog gages and resulting Eightmile Creek mean monthly flow estimates (Smith 2005) are shown in Table 2. The proposed peak withdrawal of 6.5 cfs in September would result in about half the flow being removed from the creek between the intake and discharge location.
- ? Surface water temperature: Data is not available but will be collected.
- ? Surface water quality: Excellent due to the undeveloped nature of the watershed.

Table 2. Eightmile Hydrology

Gage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Chewuch River (cfs/mi ²)	0.13	0.13	0.21	0.79	2.65	2.82	0.94	0.29	0.14	0.19	0.19	0.16
Andrews Creek (cfs/mi ²)	0.19	0.16	0.19	0.78	4.93	6.79	2.05	0.64	0.39	0.33	0.30	0.23
Average (cfs/mi ²)	0.16	0.15	0.20	0.79	3.79	4.81	1.49	0.46	0.27	0.26	0.25	0.19
Eightmile estimate (cfs)	7.5	7.0	9.1	36.6	176.6	223.9	69.5	21.7	12.5	12.0	11.5	9.0



Figure 5. Eightmile Intake

(2/27/2005)

- ? Icing potential: High for Eightmile Creek, groundwater pumped to the intake will reduce icing problems.
- ? Flood levels: Above flood elevations.
- ? Groundwater availability: The US Forest Service has developed a well field on the Eightmile Ranch property for irrigation. Two new production wells were constructed and one existing well was reconditioned in 2002. Pump test results show potential yields of up to a total of 875 gpm. The availability of part of this capacity for operation of the constructed habitat has not yet been discussed or evaluated with stakeholders (USFS, Washington Dept. of Ecology, and irrigators), One new well is proposed for the location that will be dedicated to the habitat operation and potentially to mitigate impacts of surface water withdrawal.
- ? Groundwater temperature: Unknown but will be determined in the future.

d. Proposed Design

The conceptual design shown in Figure 7 was developed in cooperation with Dave Smith of C.P. Cramer and Associates.

- ? The habitat will require approximately 10 acres of water surface area in a variety of sizes and shapes.
- ? Construction will involve balancing cut and fill. Material excavated to form the water environments will be used to construct the surrounding land areas. No fill will be removed from the site.
- ? Surface water for the habitat will be withdrawn from the abandoned irrigation intake upstream (the location is shown in Figure 6) of the road culvert. To reduce the impact of this withdrawal from Eightmile Creek, water will be pumped from the discharge of the habitat up to a point close the intake during low flow periods.

- ? Ground water from the existing and new wells will be used in the winter to add water supply security and to reduce icing conditions on the intake. It will also be used in the summer to reduce discharge water temperatures.
- ? Tree, brush, and grass plantings will provide shade and stabilize habitat shorelines. Large, woody debris will be hauled to the site and strategically placed throughout the system.
- ? The discharge channel will be constructed with log sills to allow passage of adults into spawning areas below the habitat.
- ? Outlet structures will prevent premature downstream movement and will include fish counters to enumerate migration.

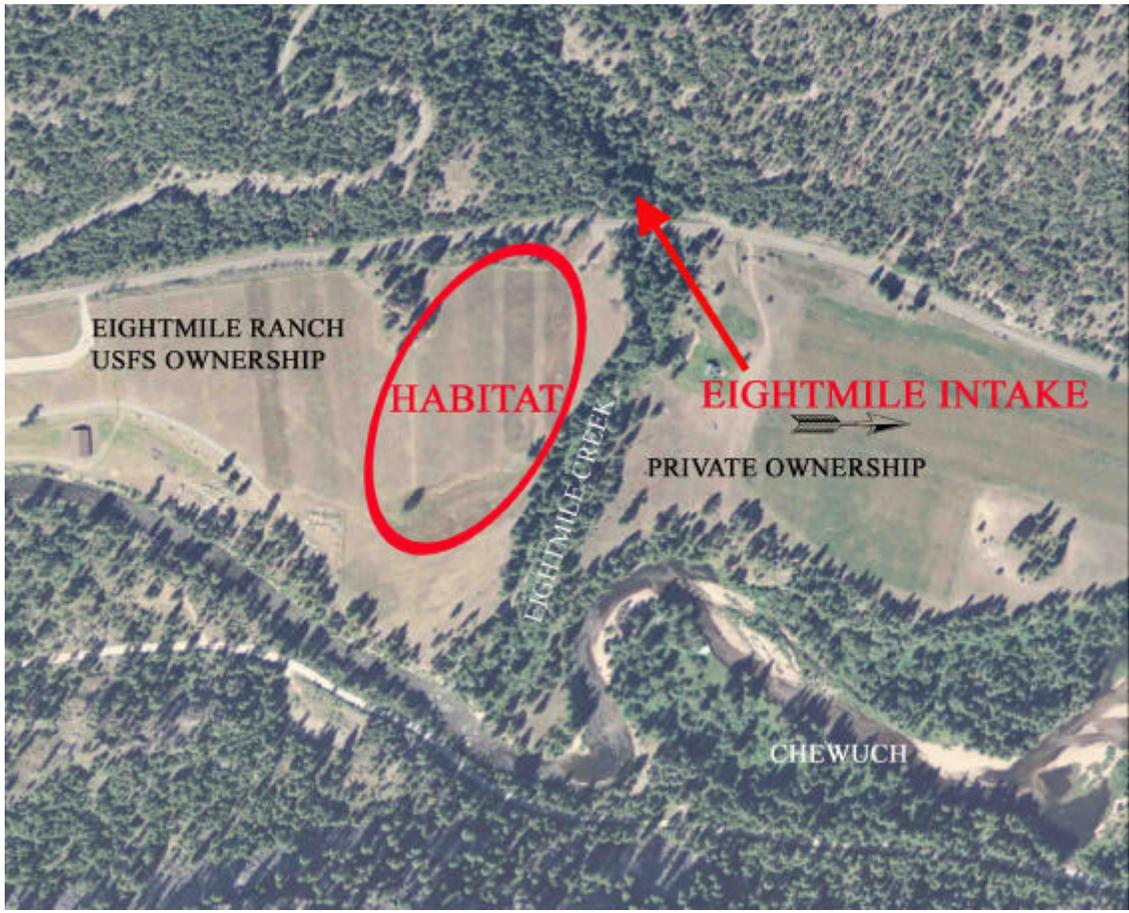


Figure 6. Eightmile Aerial Photo
(7/22/2004)

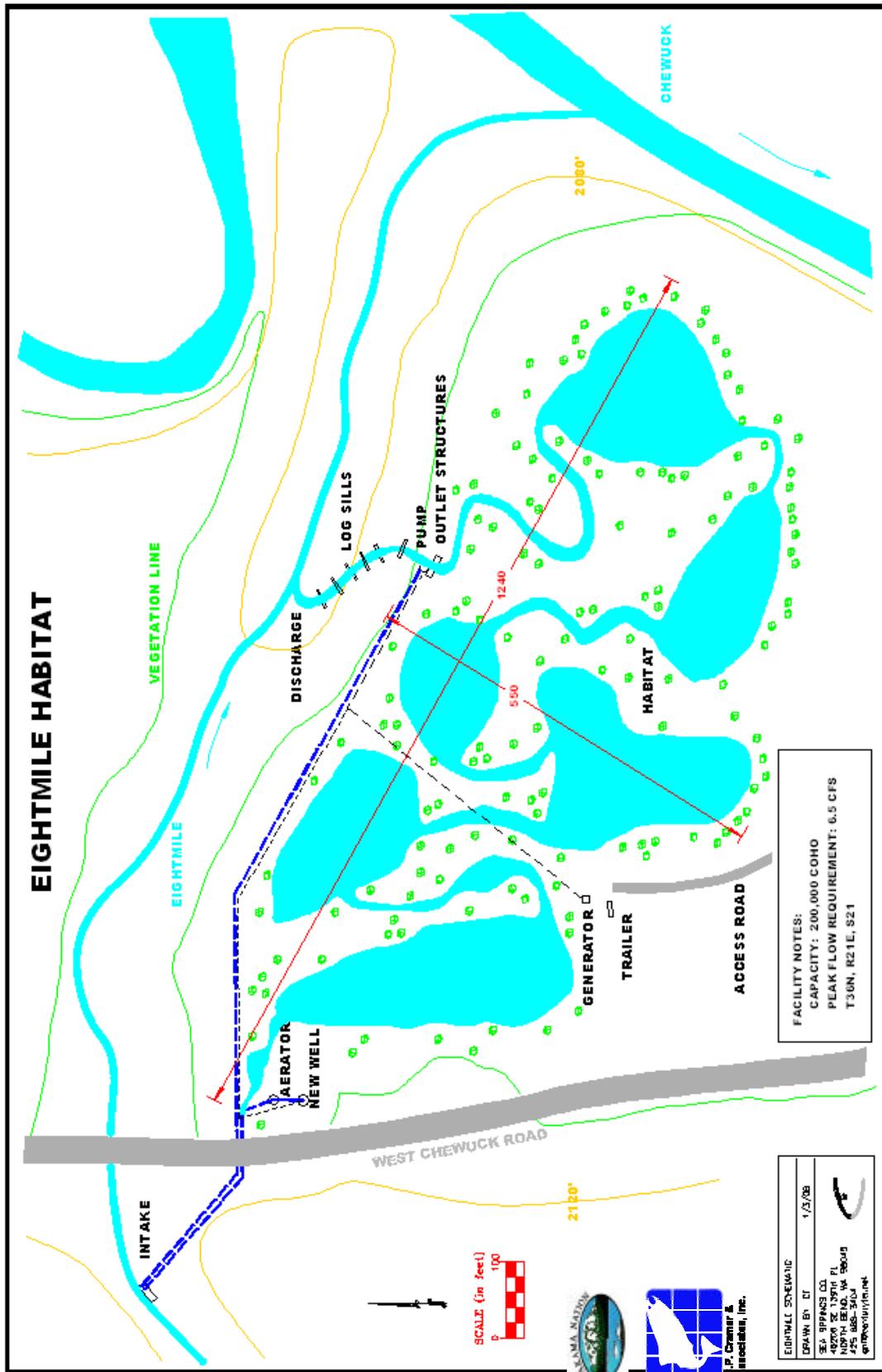


Figure 7. Eightmile Conceptual Design

e. Environmental Issues

- ? Listed species: The area is potential wolf, lynx, grizzly bear, bald eagle, spotted owl, Nelsons checker-mallow, and Ute ladies'-tresses habitat. Bull trout, steelhead, and spring chinook exist in the Chewuch River. Steelhead and bull trout use the lower section of Eightmile Creek.
- ? Water rights: Withdrawal of surface water from a section of Eightmile Creek has potential impacts on migration conditions for area fish. Passage improvements in Eightmile Creek may be necessary to mitigate for changed flow conditions. This could entail strategically placing or rearranging boulders and woody debris and adding rock filled gabions to establish reliable flows for passage.
- ? Water temperature: Increasing the retention time of Eightmile Creek water by holding it in a constructed habitat will increase water temperatures in the summer. However, groundwater from wells will be added to the habitat to reduce temperature impacts.

f. Development Risks

- ? Water rights: Obtaining the rights to withdraw water from Eightmile Creek and changing the period of use of the groundwater may be issues.
- ? Land availability: Negotiations with the U.S. Forest Service (USFS) for use of the property have not been conducted. The development of a constructed habitat would reduce the pasture land available for Eightmile Ranch.
- ? Local opposition: The re-introduction of coho into the Methow and construction of a habitat at Eightmile may be opposed by local citizens for a variety of reasons, which will be addressed during NEPA scoping and document reviews.

g. Next Steps

- ? Discuss plan details with the USFS. Obtain land use agreements.
- ? Meet with Department of Environment (DOE) to determine the steps necessary to obtain surface water rights, a new ground water right, and to extend the period of use of the existing ground water right.
- ? Schedule cultural resources, wetlands, plant, survey and manage species, environmental land audit, discharge impact, and Endangered Species Act (ESA) species evaluations.
- ? Submit water rights permit applications.
- ? Conduct topographic and soil surveys.
- ? Complete design details and final cost estimates.
- ? Submit construction and operation permit applications.

h. Alternatives

Alternatives to the Eightmile site are located on other Chewuch tributaries. Boulder and Ramsey creeks are potential water sources for constructed habitats. Another option is to use the existing Eightmile ponds that are on property adjacent to the Eightmile Ranch. This alternative would not provide all the benefits of constructed habitats but is a low-cost alternative if the primary options are not possible.

3. HEATH RANCH

A potential constructed habitat site has been identified on the Heath Ranch, with a very small portion of the continuous waterway at the southern boundary of Big Valley Ranch, in the Methow watershed. Existing spring water is the proposed water source. Much of the habitat currently exists and is planned to be used by this project.

a. Facility Requirements

- ? Fish numbers: A 100,000 smolt release is proposed for this site..
- ? Water and space programming: Space requirements have been developed through experience with a test site on the Dungeness River (Smith et al. 2004). Minimum water flow rates are determined using standard hatchery procedures (Piper et al. 1982). Higher water flows may be used to provide additional hydraulic complexity. The figure below details water and space needs at assumed water temperatures.
- ? Development timing: Current plans call for releases to begin as early as 2013. Construction and testing would then need to be completed by the summer of 2012.

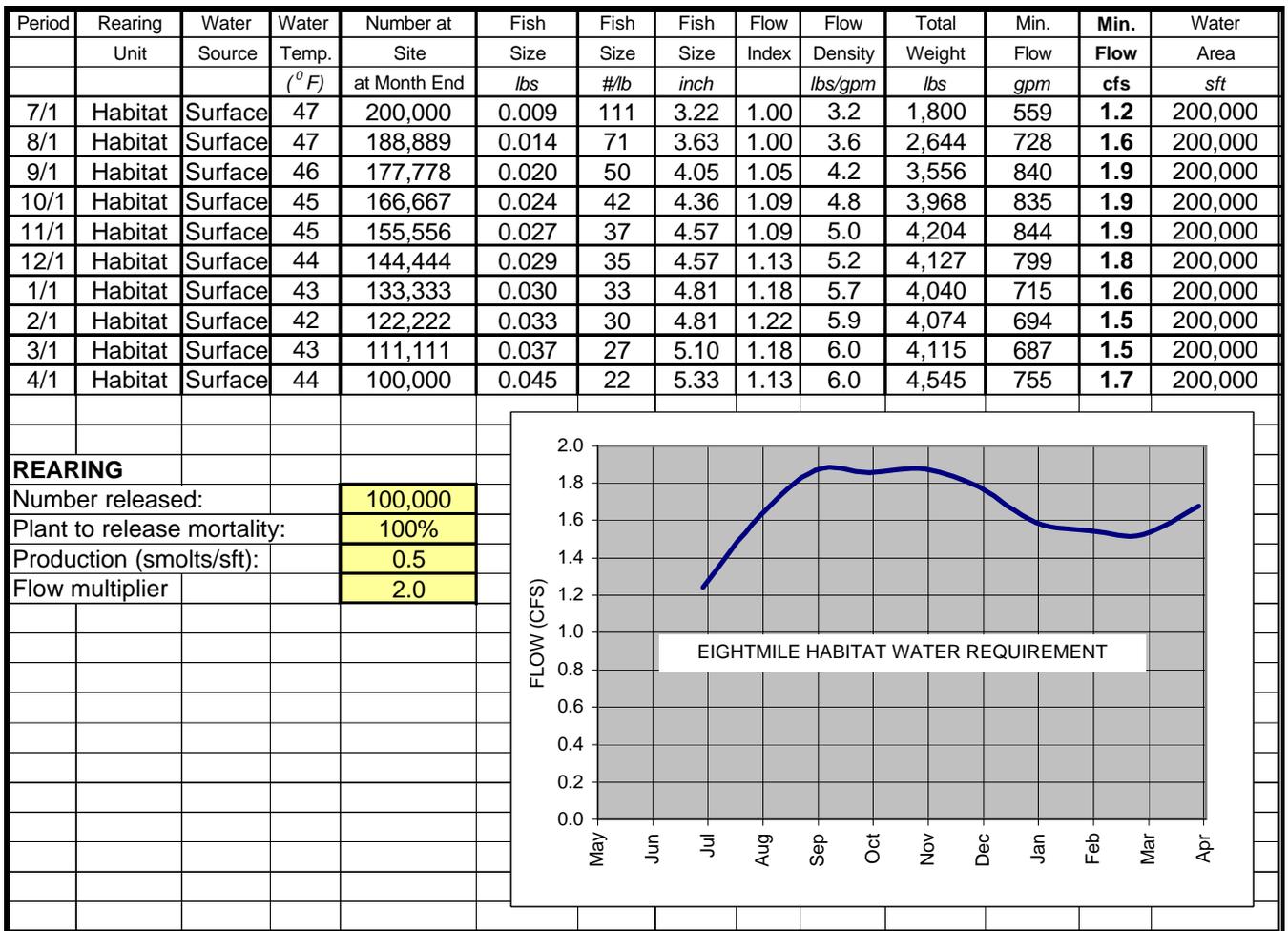


Figure 8. Heath Ranch Water and Space Programming

b. Site Information

- ? Location, elevation: T35N, R21E, SE ¼ of S30 in Okanogan County; elevation 1,800 feet.
- ? Tributary of: The Methow at river mile 54.
- ? Ownership: Big Valley Ranch – Washington Department of Fish and Wildlife (WDFW), Heath Ranch – private.
- ? Zoning: Rural Residential.
- ? Shoreline designation: Rural Development.
- ? Comprehensive plan designation: Big Valley Ranch – state land; Heath Ranch – agricultural.
- ? Wetlands designation: Palustrine in the National Wetlands Inventory.
- ? Current land use: Wildlife management, recreation.
- ? Access: Plowed, paved road (Hwy 20) to within 1,000 feet of the site, gravel road access road.
- ? Expansion capability: Land may be available for expansion.
- ? Trucking distances: None.

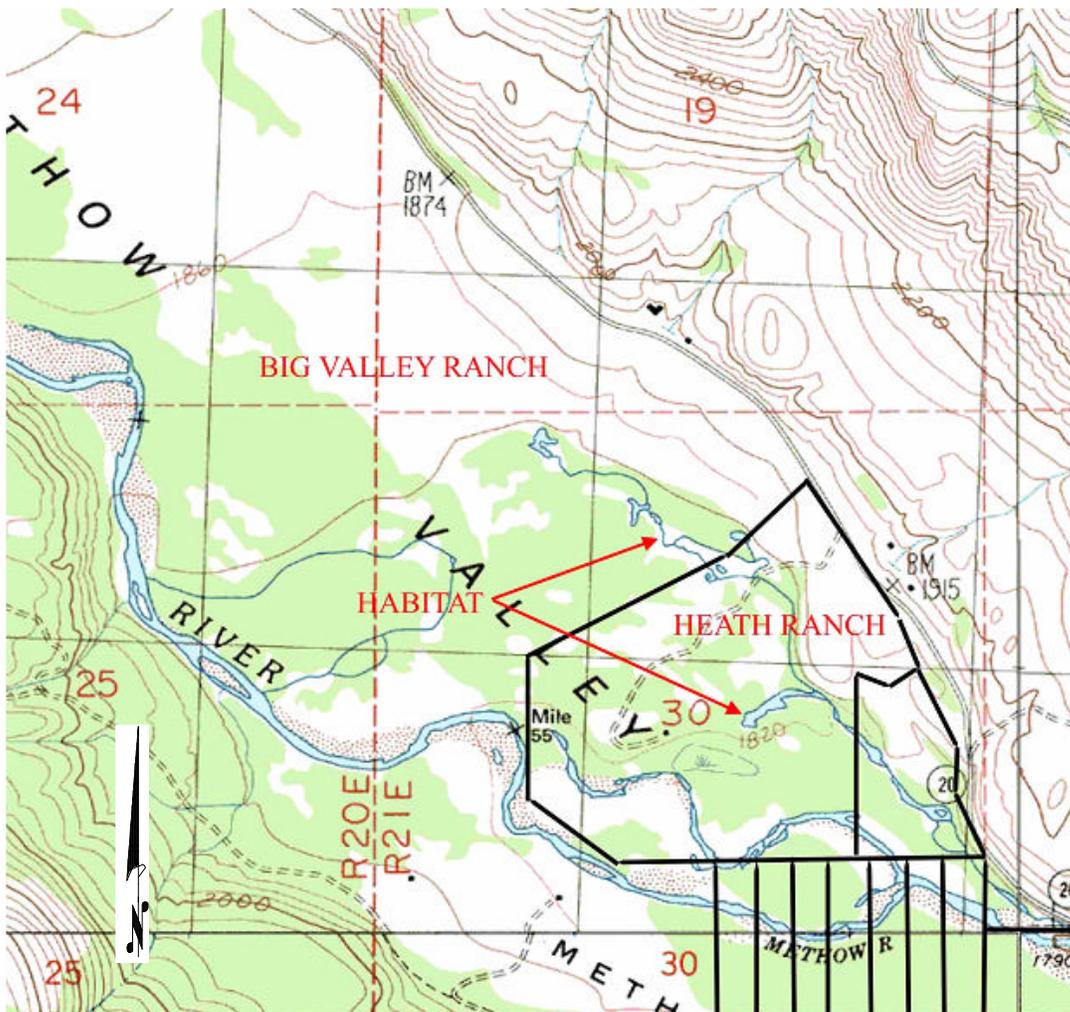


Figure 9. Heath Ranch USGS Map

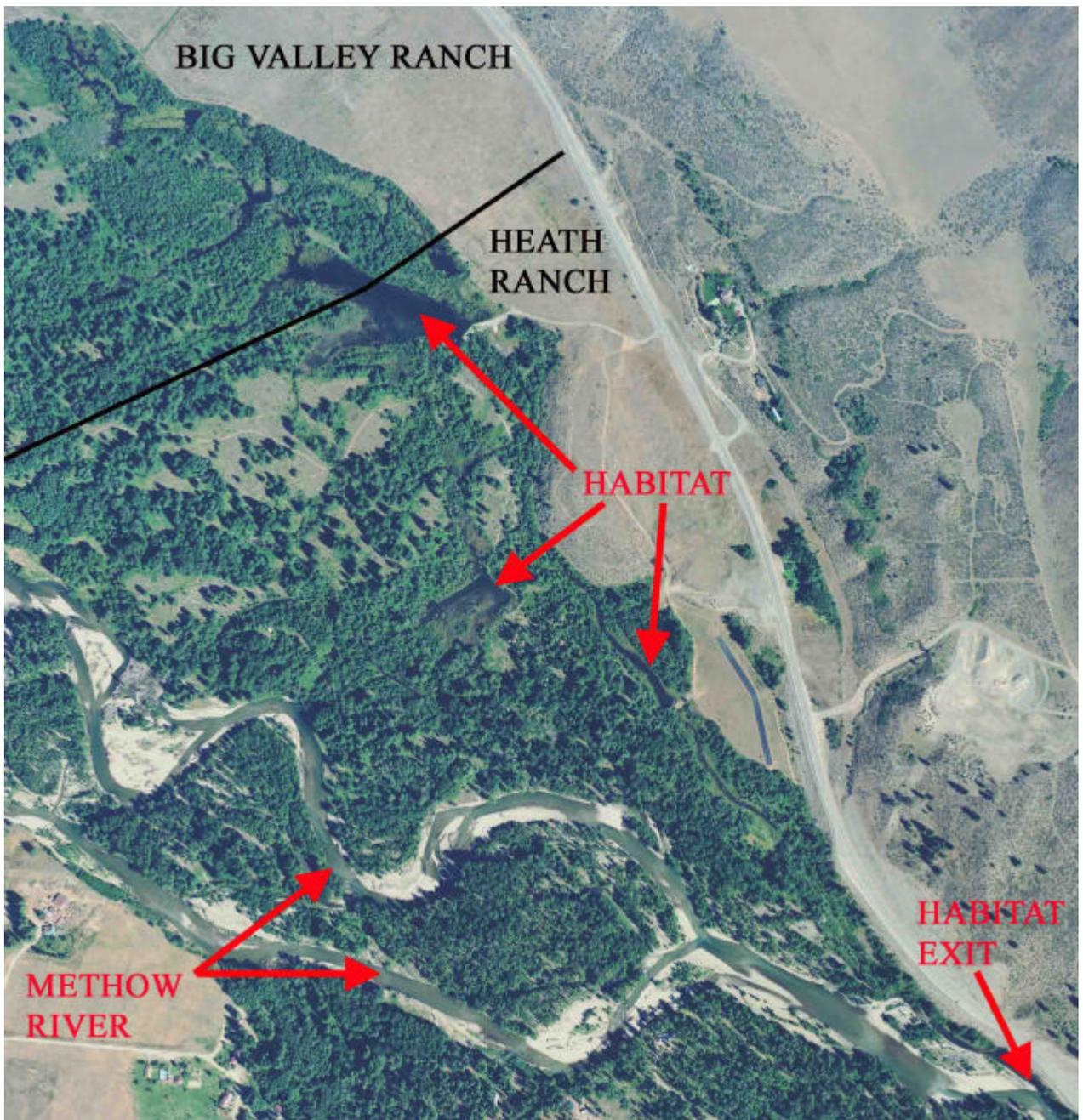


Figure 10. Heath Ranch Aerial Photo
(8/10/2000)

c. Water Supplies

- ? Water flow: Flows have not been measured but will be in the future.
- ? Water temperature: Data not available but will be collected in the future.
- ? Surface water quality: Likely excellent.
- ? Icing potential: Low.
- ? Flood levels: The site is within the 100-year flood elevation boundary.

d. Proposed Design

- ? Spring water flows through the series of ponds and wetlands. Additional water supply development is not planned.
- ? The spring channel is 1.5 miles long. To have the required 200,000 square feet of water surface area, the spring channel needs to average over 3 feet in width, which is the case. A detailed survey will allow a more precise estimate of surface area. Some minor construction may be planned to improve habitat conditions. Access to the habitat by migratory fish may not be possible now (Bob Jateff, WDFW biologist, personal communication, 2005), so barriers may need to be removed.
- ? Fencing may not be possible on the Big Valley section of the habitat due to WDFW wildlife management preferences (open range). Though optimal, fencing is not necessary for meeting the site's objectives for producing quality coho smolts. Other predation reduction options could include human presence for extended periods of time and/or using only the portion of the habitat that is on Heath property where fencing may be allowed.
- ? A downstream fish barrier would be constructed to prevent early migration of coho out of the system. The barrier will also include fish counting systems.

e. Environmental Issues

- ? The area is potential wolf, lynx, grizzly bear, bald eagle, spotted owl, Nelsons checker-mallow, and Ute ladies'-tresses habitat. Bull trout, steelhead, and spring chinook exist in the Methow River. Listed and other fish species currently do not have access to this off channel habitat. This project would link it to the river, making the habitat accessible when channel outlet traps and intake screens are removed after release of the coho smolts. Some non-target species may residualize until the next brood year of coho is introduced, but this could benefit those fish by increasing prey density and by providing supplemental feed.
- ? Impacts to wildlife on the Big Valley Ranch from site operation must be minimized. Disturbances from construction and/or operation will need to be controlled to meet wildlife management objectives.

f. Development Risks

- ? Land availability: Negotiations with the WDFW and the private land owners for use of the property have not been conducted.
- ? Local opposition: The re-introduction of coho into the Methow may be opposed by local citizens for a variety of reasons.

g. Next Steps

- ? Survey the existing spring channel system. Determine flow rates, water volumes, and evaluate migration blockages.
- ? Discuss use of the habitat with WDFW and private land owners.
- ? Schedule survey and manage species, discharge impact, and ESA species evaluations.
- ? Complete design details and final cost estimates.
- ? Submit construction and operation permit applications.

h. Alternatives

Alternatives to the Heath Ranch site include digging wells or infiltration galleries to supply water to a constructed habitat in the area. This option does not require a surface water stream, which increases the number of land options for the project. A third option is to use part of the existing Heath spring complex as a simple pond acclimation site. Coho would be enclosed in a net barrier in all or in parts of a pond and released into the Methow after smolting in the spring.

B. WINTHROP NATIONAL FISH HATCHERY

The MCCRП master plan calls for the continued production of 250,000 pre-smolts from the Winthrop Hatchery. Starting with Broodstock Development Phase 2 (BDP2), only part of this production will continue to be released on station. The removal of fish prior to reaching full smolt size will reduce hatchery loadings.

Plans also call for Winthrop to hold all captured Methow broodstock. With minor modifications of less than \$5,000 to the water delivery system, adult holding area, and incubation system, this facility will hold the 1,300 adults (600 gpm and 5,000 cft of adult holding water volume), and incubate up to the eyed stage, the 1,300,000 eggs that this plan requires.

The Winthrop National Fish Hatchery was originally authorized as part of the Grand Coulee Fish Maintenance Project. It began operation in 1942 to compensate for fish losses in the upper Columbia River drainage caused by the construction of Grand Coulee Dam. The funding agency is the U.S. Bureau of Reclamation and the operating agency is the U.S. Fish and Wildlife Service.

The following information is from Integrated Hatchery Operations Team (IHOT) 1998 and the Hatcheries and Genetics Management Plan (HGMP) 2002 and represents current conditions at the hatchery. The hatchery has water rights totaling 29,930 gpm from the Methow River, Spring Branch Spring, and two infiltration galleries (6,000 gpm total capacity). Water use ranges from 8,528 to 27,686 gpm, with the Methow River providing the majority of the flow. Rearing systems include:

Adult Holding Ponds: 2 concrete ponds at 25,000 cft each that are not currently being used.

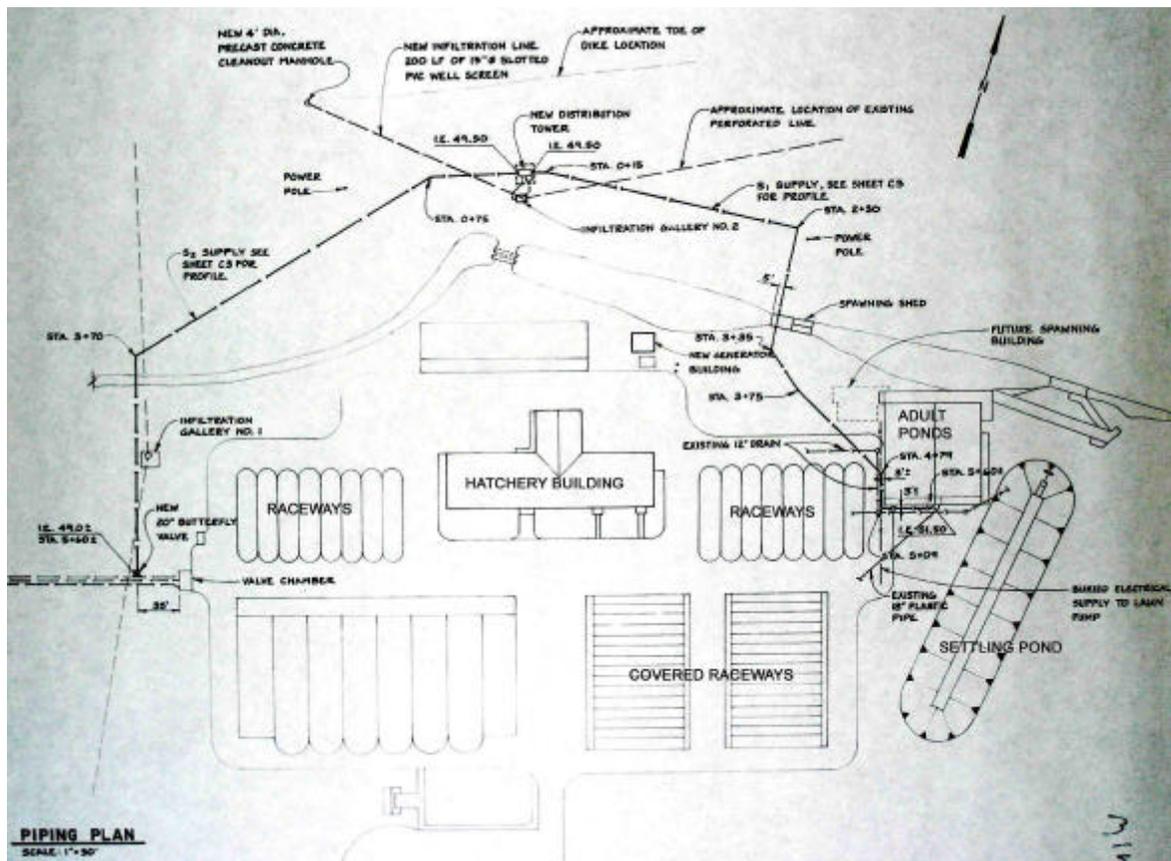
Incubation: 150 iso buckets and 150 vertical stack trays.

Early Rearing Tanks: 34 fiberglass, 16 feet x 2 feet x 2.8 feet.

Raceways: 30 at 80 feet x 8 feet x 2.3 feet — 1,470 cft each (design flow of 300 gpm).

Raceways: 7 at 100 feet x 12 feet x 1.8 feet — 2,200 cft each (design flow of 350 gpm).

Foster-Lucas Ponds: 7 at 2,750 cft each (design flow of 350 gpm).



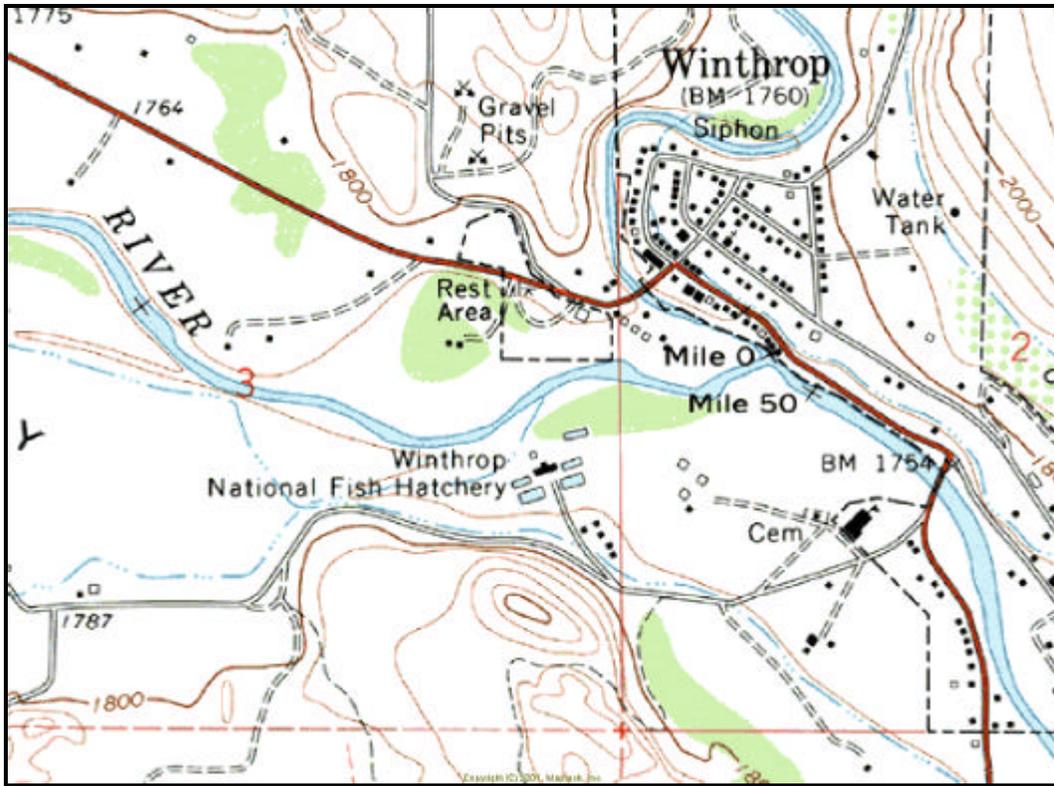


Figure 12. Winthrop NFH Location Map



Figure 13. Winthrop NFH Photo

The 2005 production goals are 600,000 spring chinook, 100,000 summer steelhead, and 250,000 coho for the MCCRCP. Coho stocking sizes average 18/lb (4,375 lbs/raceway) resulting in maximum volume densities in the raceways of 1.4 lbs per cft, typical for raceway culture but considerably higher than the target value for new pond-based hatcheries (0.3 lbs per cft).

The option to producing MCCRCP coho at Winthrop is Willard on the lower Columbia River near Cook, Washington, where the capacity exists to produce additional Methow coho. Winthrop is preferred due to the shorter hauling distances and more natural water temperatures and conditions.

III. CAPITAL COSTS

A. Cost Estimate

Following are construction, capital equipment, permitting, and land purchase costs for the proposed constructed habitats. Table 3 summarizes these costs which are detailed in Tables 4 and 5. All prices are in 2005 dollars.

Table 3. Constructed Habitat Capital Cost Summary

	Construction	Capital Equipment	Land Cost	Total
Eightmile	\$1,024,571	\$109,140	\$0	\$1,133,711
Heath	\$93,651	\$16,050	\$458,000	\$567,701
TOTAL	\$1,118,222	\$125,190	\$458,000	\$1,701,412

Because it is valuable habitat that would benefit from preservation, other agencies may help with this purchase. The Heath property abuts WDFW ownership (Big Valley ranch) and adding it to public ownership would increase the effective size of the Methow Wildlife Area.

Unlike traditional acclimation/release sites for salmon, constructed habitat serves both as a rearing/release site as well as enhancement of habitat for a watershed. When the constructed habitat is not used for acclimation/release; or when a production program is suspended, as the mid-Columbia coho master plan proposes; the enhanced habitat remains indefinitely to be used by multiple species as part of salmon restoration.

Table 4. Eightmile Capital Cost Detail

	Description	Quan.	Units	Unit Cost	Cost	Totals
CONSTRUCTION						
SITWORK		15	acre			\$ 61,900
Mobilization/demobilization		1	ls	\$ 30,000	\$ 30,000	
Erosion Control	Silt fences, vegetation mats	5	acre	\$ 3,500	\$ 17,500	
Roads	Gravel access road	800	lft	\$ 18	\$ 14,400	
EIGHTMILE WATER SUPPLY						
Intake structure improvements	Upgrade to NMFS/WDFW screen criteria	1	ls	\$ 40,000	\$ 40,000	
Screens	Structural aluminum	1	ls	\$ 10,000	\$ 10,000	
GROUND WATER SUPPLY						
New well	8" diameter, 100' deep	1	ea	\$ 25,000	\$ 25,000	
Aeration tower	Packed column	1	ea	\$ 2,500	\$ 2,500	
Piping	12" PVC SDR35, sand bedding, fittings	350	ft	\$ 61	\$ 21,350	
HABITAT						
Excavation	Excavate ponds and channel, regrading	56,240	cy	\$ 4.70	\$ 264,328	
Large woody debris	Cleaned LWD	390	ea	\$ 45	\$ 17,550	
Rock	Cleaned cobble	851	ton	\$ 15	\$ 12,765	
Overhead cover	Trees	500	ea	\$ 30	\$ 15,000	
OUTLET/DISCHARGE						
Screen and counting facility	Prefabricated steel structures	2	ea	\$ 10,000	\$ 20,000	
Water discharge channel	Channel construction, rock	2,500	cy	\$ 7	\$ 17,500	
Discharge ladder	Log and rock ladder, 12" drop per sill	6	sill	\$ 4,100	\$ 24,600	
Return flow pump vault	Concrete vault	1	ea	\$ 10,000	\$ 10,000	
Piping	12" PVC SDR35, sand bedding, fittings	1,100	ft	\$ 61	\$ 67,100	
MISC						
Alarm system	Alarms, conduit, autodialer	1	ea	\$ 10,000	\$ 10,000	
Site electrical	Well and return flow pumps, service drop, alarms	1	ls	\$ 10,000	\$ 10,000	
Conduit	To pumps	1,200	ft	\$ 15	\$ 18,000	
Revetation		5	acre	\$ 1,000	\$ 5,000	
CONSTRUCTION SUBTOTAL						
Unlisted item allowance	Contingencies	30%				\$ 195,778
Contractor overhead	Construction management, profit	20%				\$ 130,519
Sales tax		7.0%				\$ 45,682
CONSTRUCTION SUBTOTAL						
						\$ 1,024,571
CAPITAL EQUIPMENT						
Trailer	Office, storage, living quarters	2	ea	\$ 15,000	\$ 30,000	
Generators	14 Kw ea, 48 hour fuel tank	2	ea	\$ 24,000	\$ 48,000	
Return flow pumps	3.2 cfs, 10 hp each	2	ea	\$ 7,000	\$ 14,000	
Well pumps, controls	1 cfs ea, 40' head, 8 hp, sequential start, overloads	2	ea	\$ 5,000	\$ 10,000	
Sales tax		7.0%			\$ 7,140	
CAPITAL EQUIPMENT SUBTOTAL						
						\$ 109,140
TOTAL						
						\$ 1,133,711

KEY: LS = Lump Sum, EA = Each, LFT = Linear Feet, SFT = square feet, CFT = cubic feet, CY = Cubic Yards, MO = month, HRS = hours

Table 5. Heath Capital Cost Detail

	Description	Quan.	Units	Unit Cost	Cost	Totals
CONSTRUCTION						
SITWORK		20	acre			\$ 27,900
Mobilization/demobilization		1	ls	\$ 10,000	\$ 10,000	
Erosion Control	Silt fences, vegetation mats	1	acre	\$ 3,500	\$ 3,500	
Roads	Gravel access road	800	lft	\$ 18	\$ 14,400	
OUTLET/DISCHARGE						
Screen and counting facility	Prefabricated steel structures	3	ea	\$ 10,000	\$ 30,000	
Water discharge channel	Channel construction, rock	250	cy	\$ 7	\$ 1,750	
CONSTRUCTION SUBTOTAL						\$ 59,650
Unlisted item allowance	Contingencies	30%				\$ 17,895
Contractor overhead	Construction management, profit	20%				\$ 11,930
Sales tax		7.0%				\$ 4,176
CONSTRUCTION SUBTOTAL						\$ 93,651
CAPITAL EQUIPMENT						
Trailer	Office, storage, living quarters	1	ea	\$ 15,000	\$ 15,000	
Sales tax		7.0%			\$ 1,050	
CAPITAL EQUIPMENT SUBTOTAL						\$ 16,050
LAND PURCHASE						
Real estate appraisal		1	ea	\$ 5,000	\$ 3,000	
Land audit	Environmental appraisal, soils	1	ea	\$ 3,000	\$ 3,000	
Land purchase	Purchase from private owner	20	acre	\$ 20,000	\$ 400,000	
Real estate tax		13%			\$ 52,000	
LAND PURCHASE SUBTOTAL						\$ 458,000
TOTAL						\$ 567,701

KEY: LS = Lump Sum, EA = Each, LFT = Linear Feet, SFT = square feet, CFT = cubic feet, CY = Cubic Yards, MO = month, HRS = hours

B. Basis for the Cost Estimate

Construction cost estimates were developed in cooperation with Dave Smith of SP Cramer and Associates. Where applicable, they are based on the expenses of constructing the test habitat on the Dungeness River on the Olympic Peninsula. Estimates for capital equipment and construction costs that were not incurred at Dungeness but will be at the Eightmile and Heath sites were derived from vendor invoices and subcontractor budgets for similar projects completed by the MCCRP and Yakama Nation coho programs. These projects are listed in Appendix C1. In addition, the 2006 Heavy Construction Costs Estimating Software was used to confirm these costs from other sources and to produce estimates where needed.

Land costs were based on a review of recent real estate listings of property for sale in the area. Averages of values for comparable property were used to estimate the Heath Ranch land cost.

IV. REFERENCES

- Craftsman Book Company. 2005. National Estimator – 2006 Heavy Construction Costs.
- Hatchery and Genetics Management Plan (HGMP), Spring Chinook. 2002. Winthrop National Fish Hatchery, Leavenworth Hatchery Complex.
- Integrated Hatchery Operations Team (IHOT). 1998. Hatchery Evaluation Report Summary for Winthrop NFH – Spring Chinook, Summer Steelhead. July 1996.
- Piper, R., I. McElwain, L. Orme, J. McCraren, L. Fowler, J. Leonard. 1982. Fish Hatchery Management. U.S. Dept. of the Interior, Fish and Wildlife Service.
- Smith, D.L., E.L. Brannon, T.W. Bumstead, D.L. Mayer, D.M Rodgers, B.F. Russell. 2004. An Engineered Natural Channel for Coho Salmon Habitat Development and Rearing. In Review, Fisheries Bioengineering Symposium IV.
- Smith, D.L. 2005. Eightmile Creek Hydrology. Consultant report dated 12/6/05.