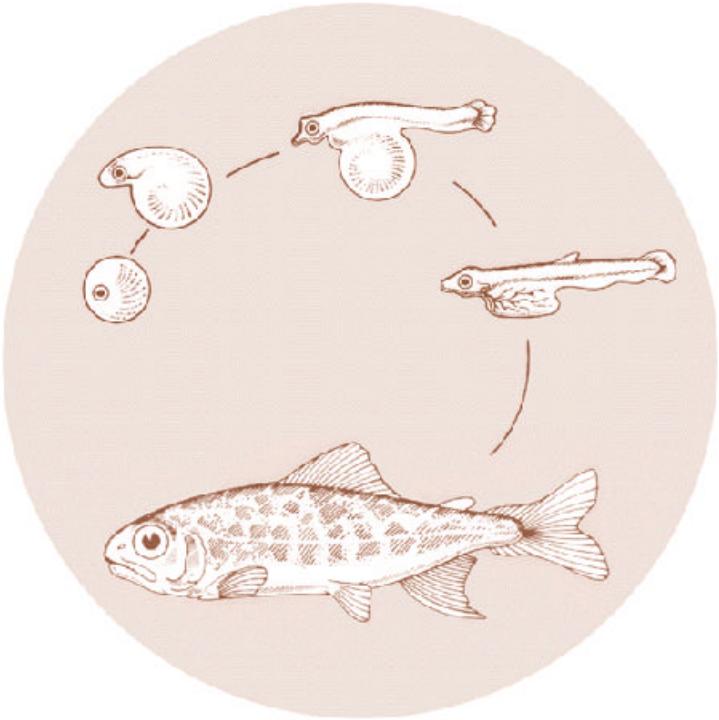
June 1996

OPERATION PLANS FOR ANADROMOUS FISH PRODUCTION FACILITIES IN THE COLUMBIA RIVER BASIN

Volume I - Idaho

Annual Report 1995



DOE/BP-60629-9

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Portland, OR 97208-3621

Please include title, author, and DOE/BP number in the request.

OPERATION PLANS FOR ANADROMOUS FISH PRODUCTION FACILITIES IN THE COLUMBIA RIVER BASIN

Volume I - Idaho

Annual Report 1995

Prepared by:

Idaho Department of Fish and Game
U.S. Fish and Wildlife Service
Nez Perce Tribe

Prepared for:

U.S. Department of Energy
Bonneville Power Administration
Environment, Fish and Wildlife
PO Box 3621
Portland, Oregon 97208

Project No. 92-043
Contract No. DE-BI79-91BP60629

June 1996

INTEGRATED
HATCHERY
OPERATIONS
TEAM

Operation Plans for Anadromous Fish Production Facilities in the Columbia River Basin Volume I—Idaho

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Codes, Acronyms, and Abbreviations Used in This Report

Species Codes

CHF	Fall Chinook
CHS	Spring Chinook
CHR	Summer Chinook
COH	Coho
CT	Cutthroat Trout (Resident)
RB	Rainbow Trout
SCT	Sea-run Cutthroat Trout
SOC	Sockeye
STS	Summer Steelhead
STU	Sturgeon
STW	Winter Steelhead
Type-N	Late-run Coho
Type-S	Early-run Coho
URB	Upriver Bright Fall Chinook

Disease/Pathogen Codes

BS	Bacterial Septicemia
BGD	Bacterial Gill Disease
BKD	Bacterial Kidney Disease
C. shasta	*Ceraomyxa shasta*
CAD	Coho Anemia Disease
Colum.	Columnaris (*Flexibactor columnaris*)
COS	*Costia*
CWD	Cold Water Disease
EGD	Environmental Gill Disease
EIBS	Erthrocytic Inclusion Body Syndrome
ERM	Enteric Red Mouth
FAT	A test for bacterial kidney disease
Furunc.	Furunculosis
Ich	*Ichthyophthirius multifilis*
IHN	Infectious Hematopoietic Necrosis
IPN	Infectious Pancreatic Necrosis
MAS	Motile Aeromonas Septicemia
M. cere.	*Myxosoma cerebralis*
PKD	Proliferative Kidney Disease
SAP	*Saprolegnia*
TRI	Trichodiniasis
VHS	Viral Hemorrhagic Septicemia
WHD	Whirling Disease

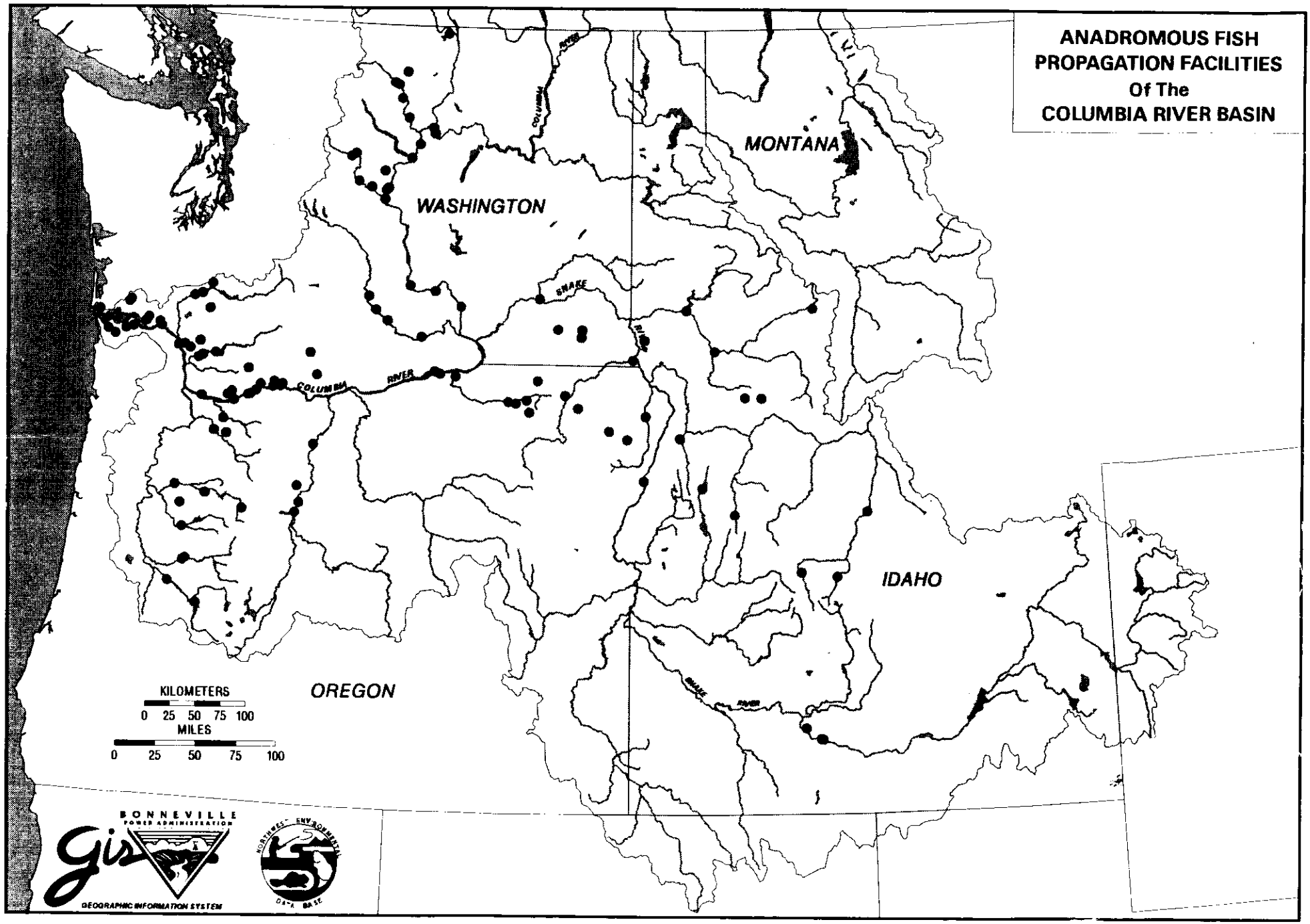
Water Supply Codes

CS	Surface water with no fish present
G	Ground water
S	Surface water
SA	Surface water containing anadromous fish
SR	Surface water with only resident fish
ST	Treated surface water, depurated
SW	Salt water

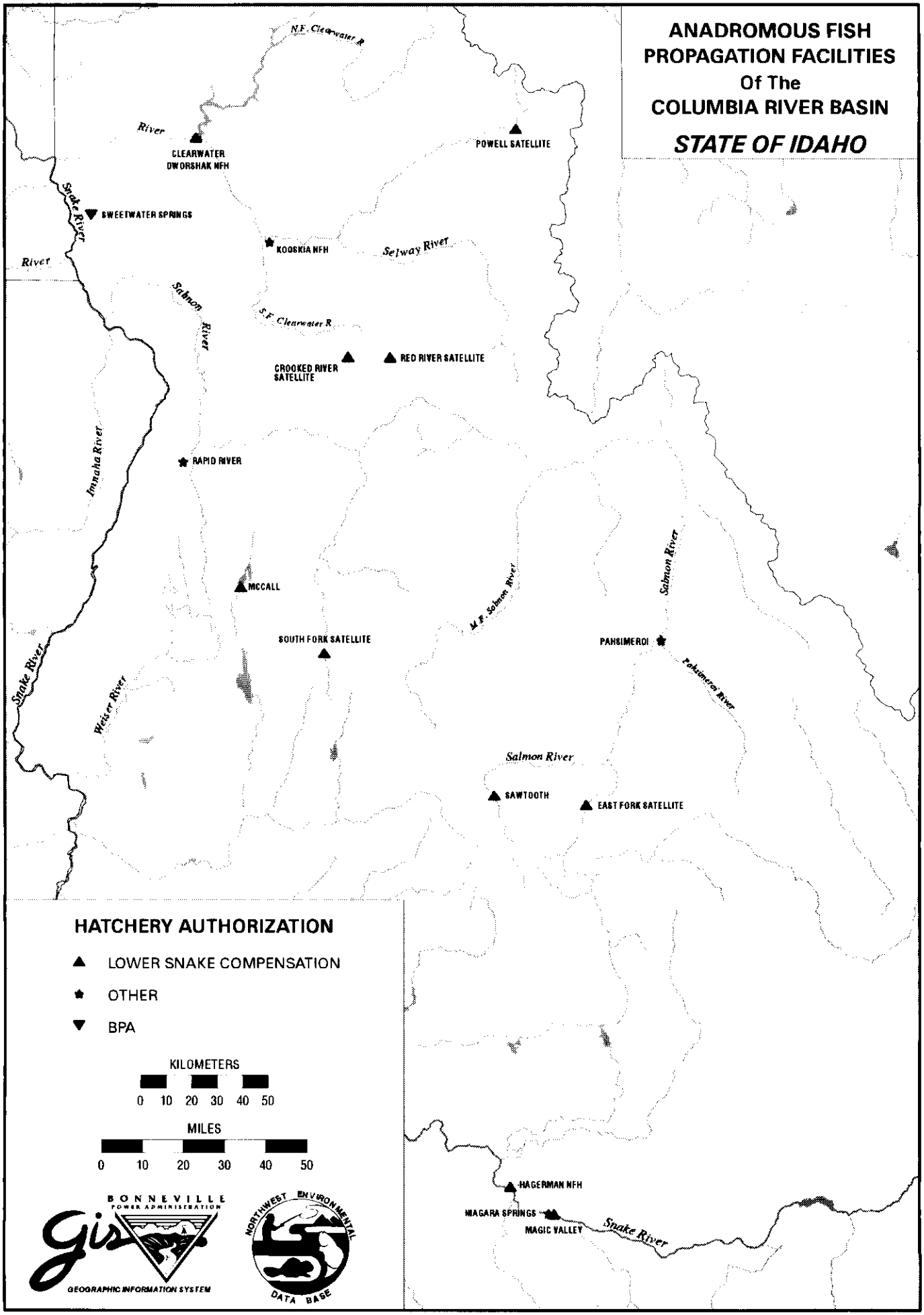
Acronyms and Abbreviations

BPA	Bonneville Power Administration
CIS	Coordinated Information System
COE	Corps of Engineers
CRITFC	Columbia River Inter-Tribal Fish Commission
CTWSRO	Confederated Tribes of the Warm Springs Reservation of Oregon
CWT	Coded-Wire Tag
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FTE	Full Time Equivalent
IDFG	Idaho Department of Fish and Game
IHOT	Integrated Hatchery Operations Team
LSRCP	Lower Snake River Compensation Plan
NFH	National Fish Hatchery
NMFS	National Marine Fisheries Service
NPPC	Northwest Power Planning Council
ODFW	Oregon Department of Fish and Wildlife
PAC	Production Advisory Committee
PNFHPC	Pacific Northwest Fish Health Protection Committee
PP&L	Pacific Power and Light
PUD	Public Utility District
TAC	Technical Advisory Committee
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife (formerly Washington Department of Fisheries and Washington Department of Wildlife)
YIN	Yakama Indian Nation

Anadromous Fish Production Facilities in the Columbia River Basin


ANADROMOUS FISH
PROPAGATION FACILITIES
Of The
COLUMBIA RIVER BASIN
MONTANA
WASHINGTON
IDAHO
OREGON
COLUMBIA RIVER
SNAKE RIVER
KILOMETERS
0 25 50 75 100
MILES
0 25 50 75 100
BONNEVILLE
POWER ADMINISTRATION
gis
GEOGRAPHIC INFORMATION SYSTEM
NORTHWEST ENVIRONMENTAL
DATA BASE

Anadromous Fish Production Facilities in Idaho


ANADROMOUS FISH
PROPAGATION FACILITIES
Of The
COLUMBIA RIVER BASIN
STATE OF IDAHO
N.F. Clearwater R.
River
CLEARWATER
DWORSHAK NFH
POWELL SATELLITE
Snake River
SWEETWATER SPRINGS
KOOSKIA NFH
Selway River
River
Salmon River
S.F. Clearwater R.
CROOKED RIVER
SATELLITE
RED RIVER SATELLITE
Imnaha River
RAPID RIVER
MCCALL
M.F. Salmon River
Salmon River
SOUTH FORK SATELLITE
PAHSIMEROI
Pahsimeroi River
Snake River
Weiser River
Salmon River
SAWTOOTH
EAST FORK SATELLITE
HATCHERY AUTHORIZATION
LOWER SNAKE COMPENSATION
OTHER
BPA
KILOMETERS
0 10 20 30 40 50
MILES
0 10 20 30 40 50
BONNEVILLE
POWER ADMINISTRATION
GEOGRAPHIC INFORMATION SYSTEM
NORTHWEST ENVIRONMENTAL
DATA BASE
HAGERMAN NFH
NIAGARA SPRINGS
MAGIC VALLEY
Snake River

INTEGRATED
HATCHERY
OPERATIONS
TEAM

Idaho Department of Fish and Game Hatchery Operation Plans

Clearwater Hatchery and Satellites
(Red River, Crooked River, and Powell)

INTRODUCTION

Clearwater Hatchery is located on the north bank of the North Fork of the Clearwater River, downstream from Dworshak Dam. It is approximately 72 miles from Lower Granite Dam, and 504 miles from the mouth of the Columbia River. Site elevation is approximately 994 feet above sea level. The hatchery is staffed with 8 FTE's.

Clearwater Hatchery has two pipelines from Dworshak Reservoir. One is attached to a floating platform and is capable of providing various temperatures at varying depths. The other is a stationary intake about 245 feet below the top of the dam. All water is gravity fed to the hatchery. An 18-inch intake pipe provides an estimated 10 cfs with temperature remaining constant at approximately 40°F. The primary 42-inch intake pipe can draw water from 5 to 45 feet in depth with temperatures ranging from 55° to 60°F and 70 cfs of flow.

The hatchery facility consists of 11 chinook raceways, 24 steelhead raceways, 2 adult holding ponds, a covered spawning area with 2 live wells and 60 concrete rearing vats. There are 40 double stacks of Heath-type incubators and each vat also has an incubation jar. All facility units are in excellent condition. Clearwater Hatchery also supports satellite facilities at Red River, Crooked River and Powell.

The Red River satellite facility is located approximately 15 miles east of Elk City, Idaho. It is approximately 186 miles upstream from Lower Granite Dam and 618 miles from the mouth of the Columbia River. It was first built in 1974 by the Columbia River Project and then remodeled by the U.S. Army Corps of Engineers in 1986.

Red River is supplied by gravity flow from an intake located at the bottom of the South Fork of Red River, 225 yards upstream from the facility. Water rights allow for 8.18 cfs and during low flows in the summer about 5 cfs is available. Temperatures range from 40°F in the spring to 71°F in early August. The facility consists of two adult holding ponds, a removable tripod and panel weir, and a rearing pond. All units are in good condition due to the recent remodeling.

The Crooked River satellite facility is located 20 miles downstream of Red River satellite facility. The trap is located 0.5 miles upstream of the mouth of Crooked River, a tributary of the South Fork of the Clearwater River. The rearing ponds are 10 miles upstream from the Crooked River adult trap.

Rearing Facilities at Clearwater Hatchery and Satellites

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
Clearwater										
Steelhead Rwy.	300	10	4	12,000	24	288,000	Concrete	4	Good	
Chinook Rwy.	200	10	4	8,000	11	88,000	Concrete	4	Good	
Early Rear. Vat	40	4	3	480	60	28,800	Concrete	4	Good	
Adult Ponds	100	10	4	4,000	2	8,000	Concrete	4	Good	
Heath Incubators					40		Fiberglass	4	Good	16 trays each
Incubat. Jars					60		Plastic	4	Good	
Crooked River										
Trap	12	10	4	480	1	480	Concrete	5	Good	
Raceways	145	20	4	11,600	2	23,200	Concrete	5	Good	
Powell										
Trap	12	6	4	288	1	288	Concrete	6	Good	
Adult Ponds	80	16	4	4,800	2	9,600	Concrete	6	Good	
Rearing Pond	165	65	5	53,625	1	53,625	Concrete	6	Good	Hypalon
Red River										
Adult Trap	16	16	4	512	1	512	Concrete	10	Good	
Adult Ponds	45	10	3.7	1,700	2	3,400	Concrete	10	Good	
Rear. Pond	170	70	4.6	54,740	1	54,740	Concrete	5	Good	Hypalon

Crooked River water is supplied by gravity flow by an intake 200 yards upstream of the facility raceways. Water rights allow for 10 cfs at the rearing facility and 10 cfs at the trapping facility. Water temperatures range from 42° to 70°F. The trap and weir are located at the mouth of Crooked River. Ten miles upstream from the mouth are two raceways, a cleaning waste pond and final settling pond. All facility units are in good condition.

The Powell satellite facility is located 122 miles east of the Clearwater Hatchery at the headwaters of the Lochsa River, the confluence of the Crooked Fork Creek and White Sands Creek. Powell is 192.5 miles from Lower Granite Dam and 624 miles from the mouth of the Columbia River.

The Powell Facility receives gravity flow water from Walton Creek at a rate of 7 cfs with the intake located 100 yards upstream from the facility. Powell also has a pumped supply from White Sands Creek at 3 cfs. Water temperature ranges from 45.8° to 50.2°F from the Walton Creek intake and 41° to 65°F from the White Sands pump station.

The facility consists of one rearing pond, a diversion and intake screen, two adult holding ponds, a floating weir, and an open bay spawning shelter. All facility units are in good condition.

PURPOSE

Clearwater Hatchery was constructed in 1992. It is the final facility to be built by the U.S. Army Corps of Engineers as part of the Lower Snake River Compensation Plan (LSRCP)—a program to mitigate for anadromous fishery losses caused by the four federal dams constructed on the lower Snake River. The hatchery is used for rearing spring chinook and summer steelhead. Adult collection and spawning occurs at the satellite facilities. The satellite ponds are also used for final rearing and release of spring chinook. Clearwater Hatchery has reared rainbow trout, summer steelhead and spring chinook. The three satellite facilities have reared spring chinook only.

GOALS

The LSRCP mitigation goals are to return 11,915 adult spring chinook and 14,000 adult steelhead above Lower Granite Dam, for the Clearwater River.

OBJECTIVES

Objective 1: Hatchery Production

<u>Summer Steelhead</u>
Produce 2.3 million smolts (350,000 pounds) for release in the Clearwater River drainage.

<u>Spring Chinook</u>
Produce 300,000 smolts (15,000 pounds) for final rearing and on-station release at Red River satellite facility.

Produce 800,000 smolts (40,000 pounds) for final rearing and on-station release at Crooked River satellite facility.

Produce 300,000 smolts (15,000 pounds) for final rearing and on-station release at the Powell satellite facility.

Provide surplus eggs to other hatchery programs in the Clearwater River Basin.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

Spring Chinook: Clearwater Hatchery has no adult collection facilities. However, the satellite facilities are equipped to trap, hold and spawn adult spring chinook. Eggs are transported to the hatchery for incubation and rearing. The intent of adult collection at the satellite facilities is to collect enough adults to maintain the hatchery mitigation program and supply eggs for other programs. Adults return to the satellite facilities from June through mid-September. Spawning occurs during August and early September. Because of poor smolt survival, there are seldom sufficient numbers of adults to meet the hatchery mitigation goals.

Summer Steelhead: Clearwater Hatchery has no adult collection facilities. Eggs are received from Dworshak National Fish Hatchery.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Interactions between hatchery fish and other fish populations can have a negative effect on both total production from a watershed (through competition with naturally produced fish) and genetic integrity of wild fish (through crossbreeding). Specific hatchery practices such as fish size at release, time of release, acclimation, and the use of volitional release can all play a role in minimizing these interactions. For example, one important strategy for minimizing interactions is to rear fish to sufficient size so that smoltification occurs within nearly the entire population. This will help reduce the retention time in the downstream migration. Acclimating smolts to the parent stream water prior to their release can help reduce straying when they return as adults as well as increase survival to adulthood. The use of volitional release can help ensure that only actively migrating fish are released from the hatchery pond. Following are the specific rearing and release strategies used at this hatchery.

<u>Spring Chinook</u>

- Rear 300,000 fish to size of approximately 20 fish / pound and transfer to the Red River rearing pond for final acclimation and release. Fish will be released on-station in April / May at a size of approximately 20 fish / pound. All fish will be marked prior to release.

- Rear 800,000 fish to size of approximately 20 fish / pound and transfer to the Crooked River rearing pond for final acclimation and release. Fish will be released on-station in April / May at a size of approximately 20 fish / pound. All fish will be marked prior to release.

- Rear 300,000 fish to size of approximately 20 fish / pound and transfer to the Powell rearing pond for final acclimation and release. Fish will be released on-station in April / May at a size of approximately 20 fish / pound. All fish will be marked prior to release.

<u>Summer Steelhead</u>

- Rear 2.3 million smolts to a size of approximately 6.5 fish / pound and release at various locations in the Clearwater River drainage during April. All fish will be marked prior to release.

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection and Spawning

Spring Chinook: Due to low numbers of returning adults, all spring chinook collected are used for basin-wide hatchery programs. Adults are mated randomly and gametes from the entire run are used. Adults are spawned at a 1:1 male-to-female ratio. Surplus eggs provided to other facilities are collected throughout the entire run to maximize genetic integrity.

Summer Steelhead: There are no adult steelhead collected at this facility. All eggs are received from Dworshak National Fish Hatchery.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs—All Stocks

The primary objective of fish health management programs at all IDFG hatcheries is to produce quality, healthy fish that will survive to adults. Equally important is to prevent the introduction, amplification or spread of fish pathogens which might adversely affect the health of both hatchery and wild / natural fish.

IDFG has disease control and prevention programs at all of its facilities in an effort to achieve these objectives. These programs include the following standard elements:

Disease Control

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.
- Prescribe appropriate treatments and remedies to disease.
- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.
- Conduct applied research on new and existing techniques to control disease epidemics.

Disease Prevention

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.

- Implement disease preventative strategies in all aspects of fish culture to produce a quality, healthy fish. Prescribe optimal nutritional feeds and environmental conditions in the hatchery rearing containers. Use vaccines or antibiotics prophylactically in order to prevent disease.

- Restrict the introduction of infected stocks into facilities which may result in the introduction of new diseases.

- Use sanitation procedures which prevent introduction of pathogens into or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

Fish Health Activities at Clearwater Hatchery and Satellites

Health Monitoring

- At least monthly, each fish lot is given an extensive health exam.

- Prior to release, fish are given an extensive health exam.

- Whenever abnormal behavior or mortality is detected, fish pathologists will examine the affected fish, make a diagnosis and recommend appropriate treatment.

- Adults are sampled for viral and bacterial pathogens through out the spawning period.

Therapeutic and Prophylactic Treatments

- Adult spring chinook are injected with antibiotics to control bacterial diseases.

- As eggs are collected from adults, they are water-hardened in iodophor as a treatment for viral and bacterial diseases.

- Juvenile fish are administered antibiotics, as needed, for the control of bacterial infections.

- Anti-fungal compounds are administered, as needed, to adults, eggs and juveniles for control of fungus and parasites.

- Only FDA-approved therapeutants are used.

Sanitation

- All eggs entering or leaving the facility are disinfected with an iodophor solution.

- All equipment (nets, waders, brooms, etc.) is disinfected between different rearing units.

- All tank trucks are disinfected prior to and after hauling fish to release sites.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

Environmental monitoring is conducted at all IDFG facilities, as required, to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit administered by the Environmental Protection Agency.

Objective 6: Communicate effectively with other fish producers, managers and the public.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communication for Fish and Egg Transfers: Communication between IDFG, the U.S. Fish and Wildlife Service and Nez Perce Tribe takes place each year to coordinate fish and egg transfers in an effort to meet basin-wide goals.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development of Annual Reports

A report documenting run timing, sex composition, mortality and egg-take is submitted annually. Brood-year reports documenting all fish culture activities (diseases, mortalities, growth, etc.) and research activities are produced once the entire brood year is released.

PERFORMANCE STANDARDS—CLEARWATER HATCHERY AND SATELLITES

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Adult Prespawn. Survival	CHS	90%	N/A	N/A	
	STS	90%	N/A	N/A	
Egg-take	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Green Egg-to-Fry Survival	CHS	90%	N/A	N/A	
	STS	90%	N/A	N/A	
Fry-to-Smolt Survival	CHS	90%	N/A	N/A	
	STS	90%	N/A	N/A	
Fish Releases	CHS	1,400,000	N/A	N/A	
	STS	2,300,000	N/A	N/A	
Egg Transfers	CHS	Surplus	N/A	N/A	
	STS	Surplus	N/A	N/A	
Fish Transfers	CHS	Surplus	N/A	N/A	
	STS	Surplus	N/A	N/A	
Adults Passed Upstream	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Percent Survival	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolt Size at Release (fish/lb.)	CHS	20.0	N/A	N/A	
	STS	6.5	N/A	N/A	
Acclimation	CHS	Yes	N/A	N/A	
	STS	Yes	N/A	N/A	
Volitional Release	CHS	Yes	N/A	N/A	
	STS	No	N/A	N/A	

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults	CHS	Yes	N/A	N/A	
Throughout Run	STS	Yes	N/A	N/A	
Spawning Pop.	CHS	Yes	N/A	N/A	
>500	STS	Yes	N/A	N/A	
Spawning Ratio	CHS	1:1	N/A	N/A	
Male:Female	STS	1:1	N/A	N/A	

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to	CHS	Yes	Yes	--	
Disease Policy	STS	Yes	Yes	--	

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Clearwater Hatchery	SR	SR				
CHS/Clearwater R.				+		
CHS/Crooked River						BS
STS/Crooked River						
CHS/Dworshak Res.						
STS/Dworshak Res. 'B'			IHN			
CHS/Kooskia						
CHS/Lochsa						
STS/N.F. Clearwater 'B'				+		COL, MAS
CHS/Powell						CWD, MAS
CHS/Rapid River				+		BS, MAS
CHS/Red River			IHN	+		
CHS/Selway R.				+		
STS/Selway R. 'A'						
CHR/Selway R.				+		

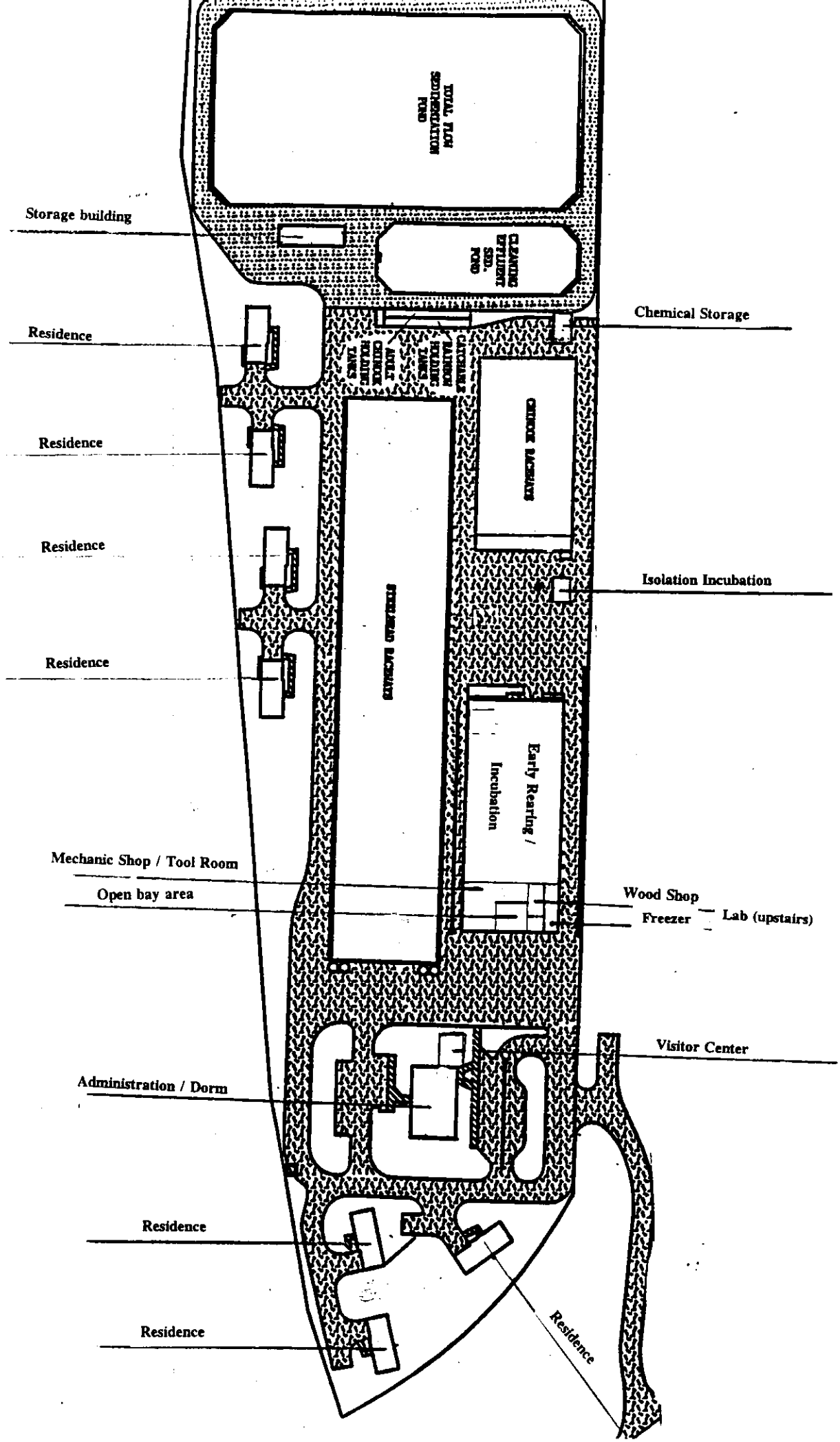
(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the Idaho Department of Fish and Game.)

Objective 5

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
TSS Effluent (net non-harvest)	All	N/A	N/A	N/A	
TSS Max Effluent (net harvest)	All	N/A	N/A	N/A	
SS Effluent	All	N/A	N/A	N/A	

Constraints/Comments—Clearwater Hatchery

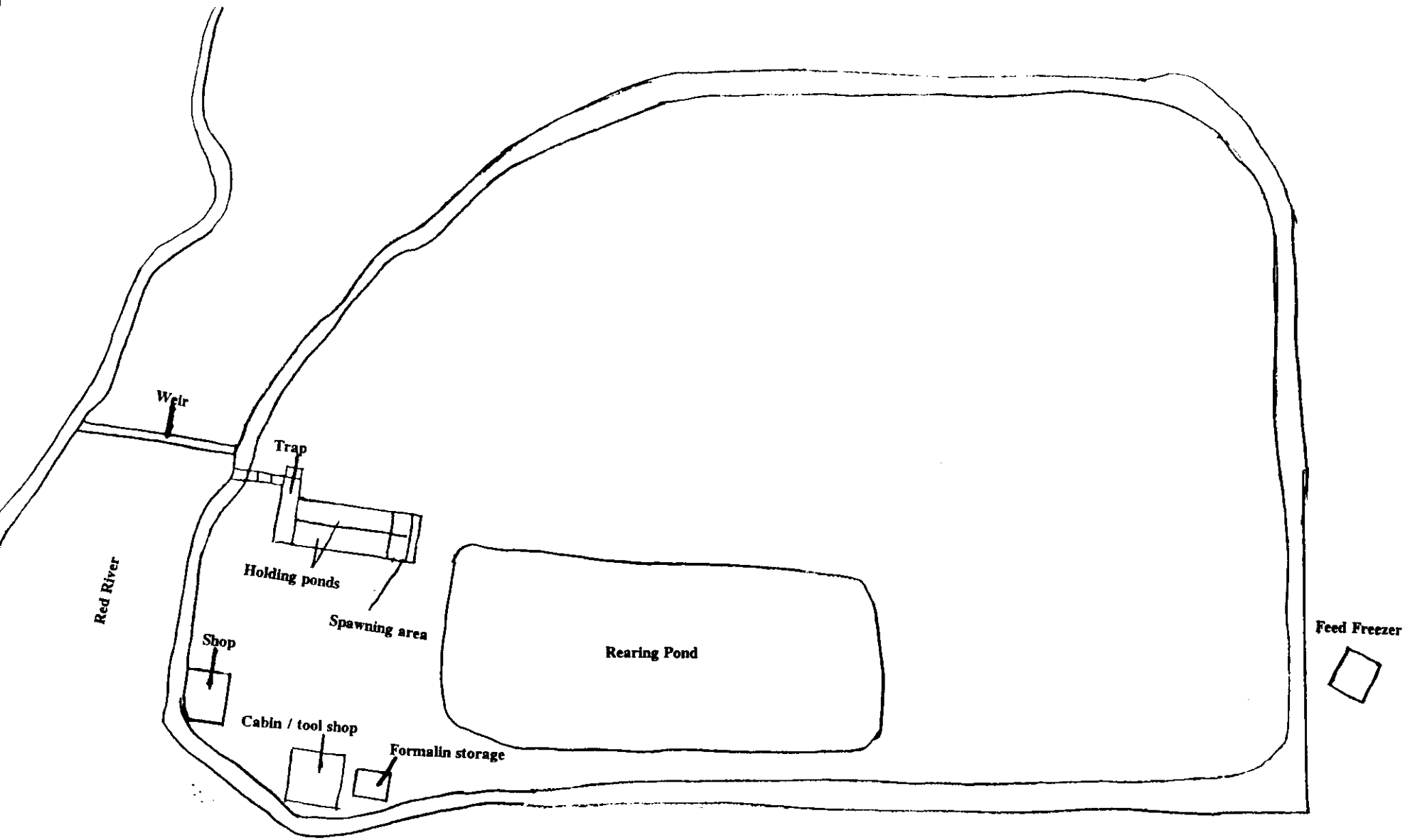
Hatchery operating constraints will not become evident until the hatchery has operated for several years.



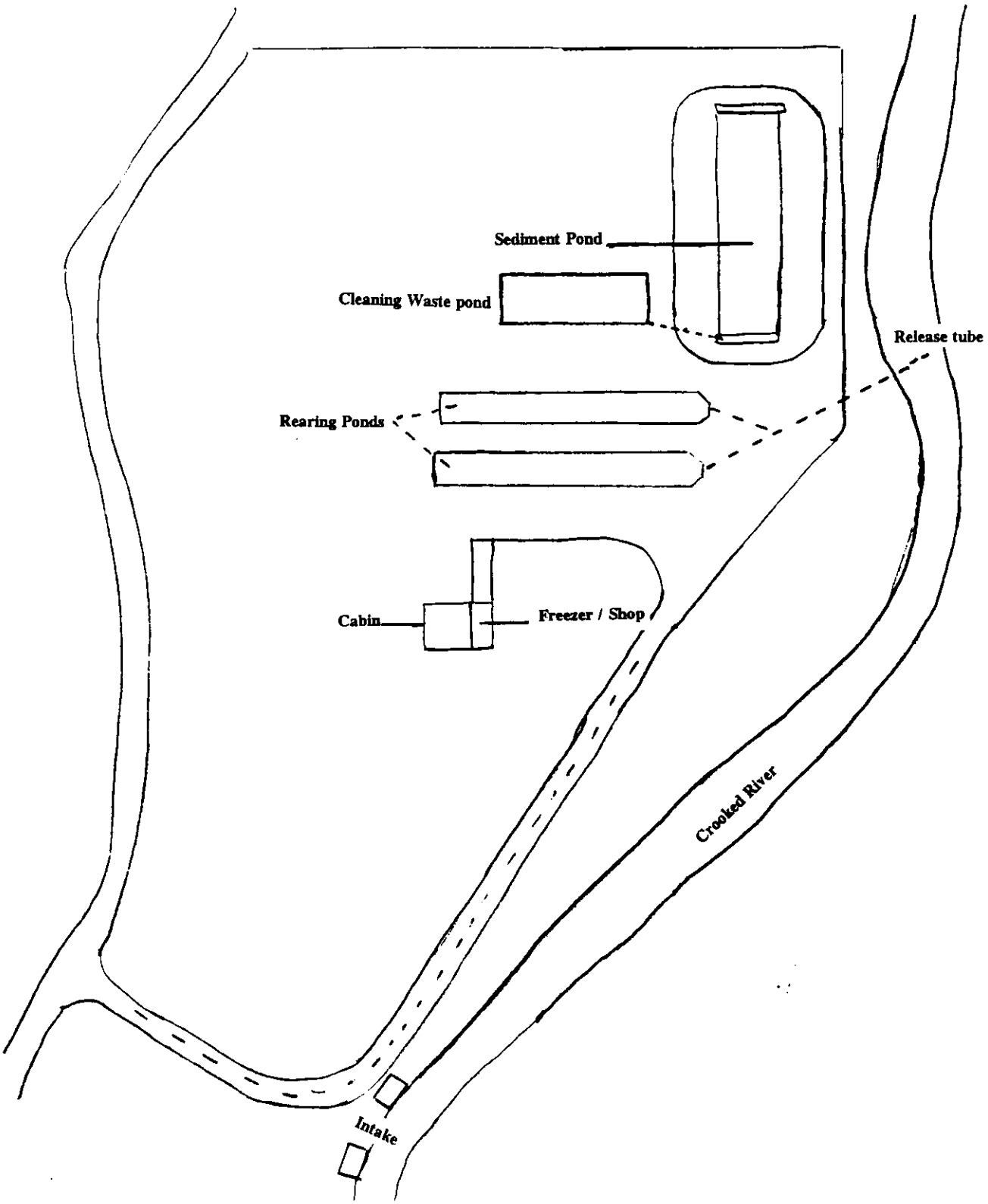
NORTH FORK OF THE CLEARWATER RIVER

Clearwater Hatchery

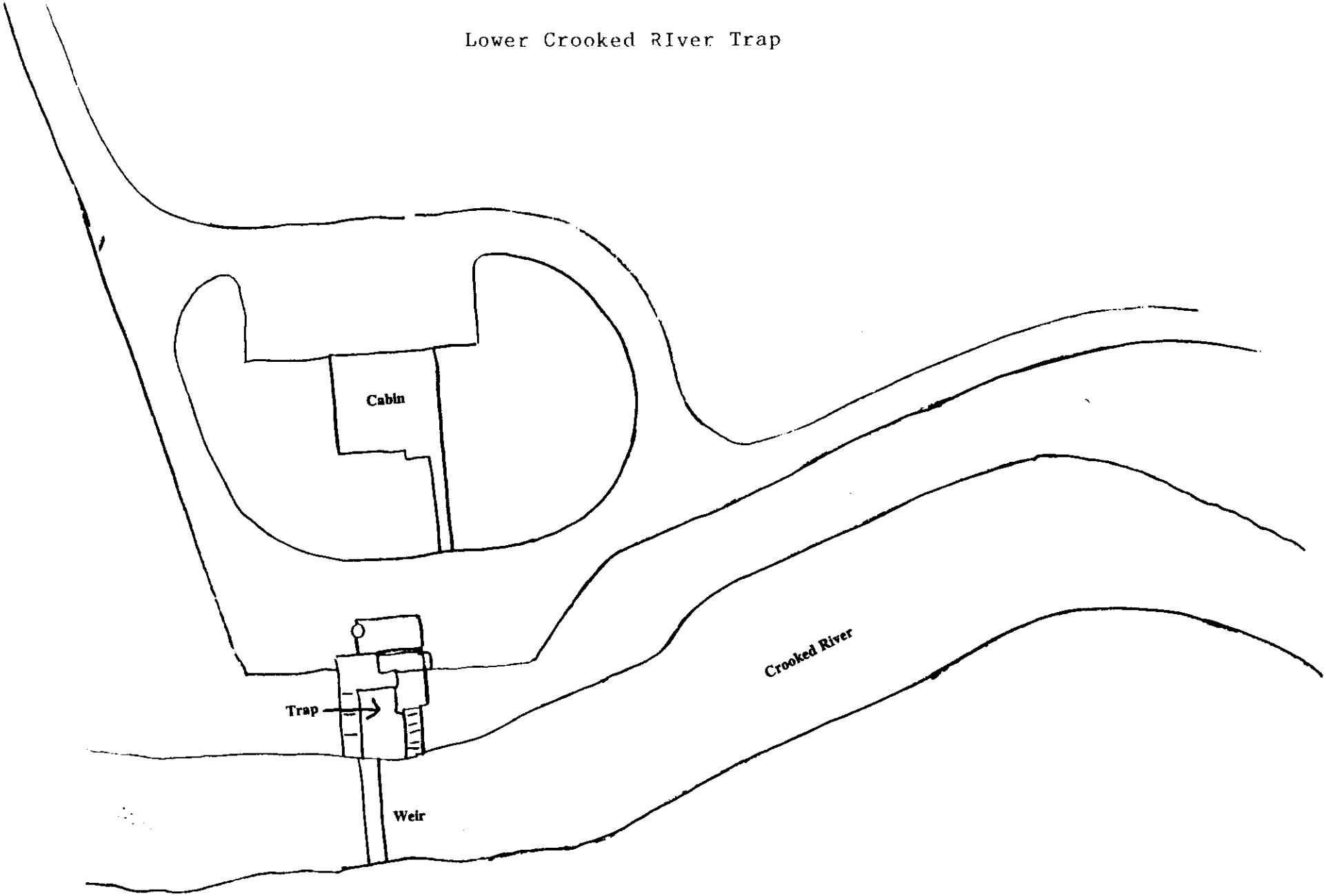
Red River


Weir
Trap
Holding ponds
Spawning area
Red River
Shop
Cabin / tool shop
Formalin storage
Rearing Pond
Feed Freezer

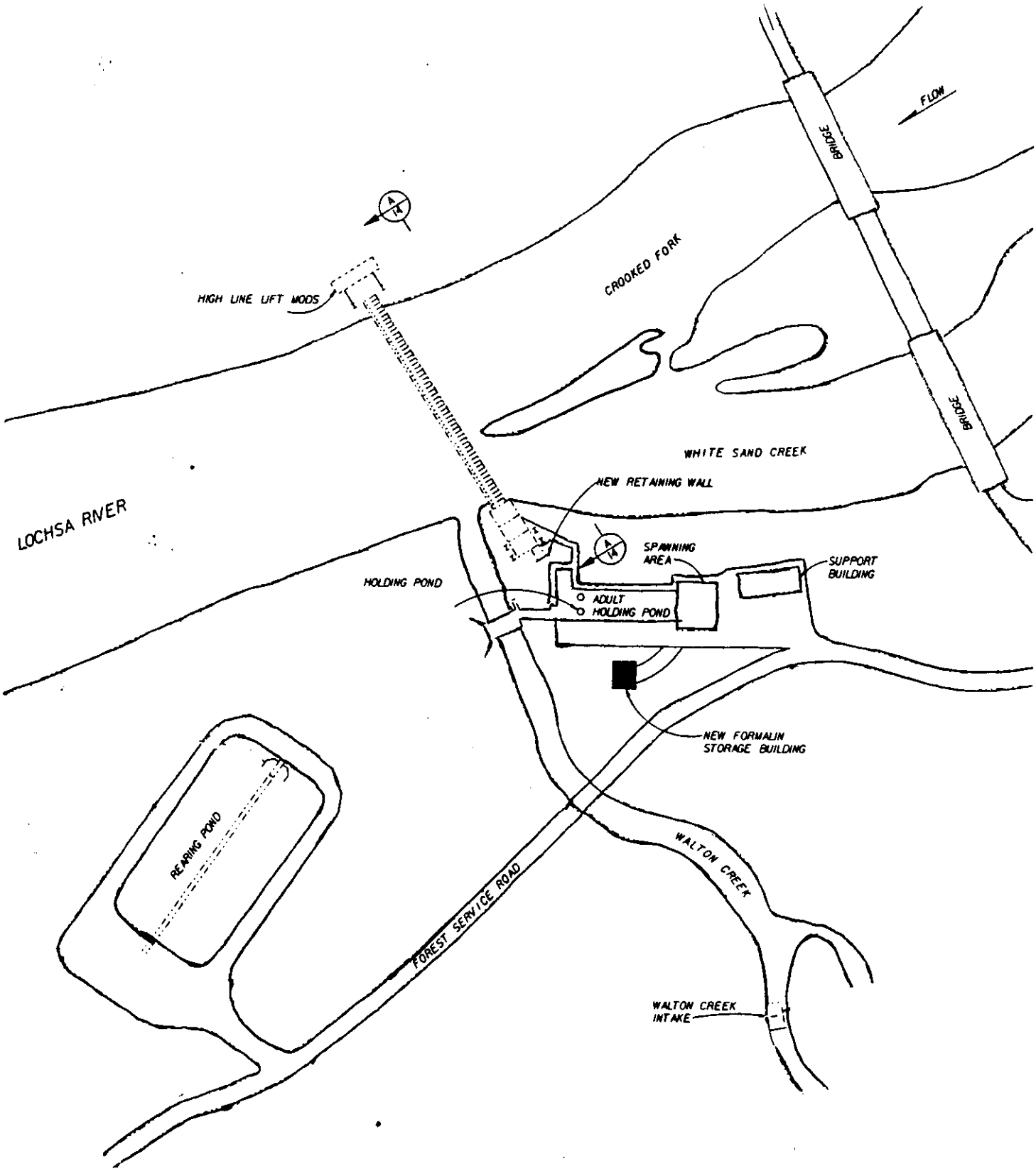
Upper Crooked River Rearing facility



Lower Crooked RIver Trap



POWELL SATELLITE FACILITY



Eagle Hatchery

INTRODUCTION

Eagle Hatchery was renovated in 1991 for rearing Endangered Species Act (ESA)-listed Snake River sockeye salmon captive broodstock and the resulting progeny. The site is shared with the Eagle Fish Health Laboratory located near Eagle, Idaho. Eight broodstocks have been developed from smolts, anadromous adults, and residual stocks for recovery from near extinction.

Up to seven artesian wells, producing 7 cfs are available for fish culture. The water supply was renovated in 1994 to add pumping capability and an intertie between two rearing areas. All culture is with first-use water in semi-square fiberglass tanks.

Rearing capacity for broodstock is limited by the capacity of the chiller and is limited to 650 adults per year. Production capacity has yet to be determined, but should be about 150,000 presmolts per year with two size/time products which will be released into Redfish Lake or other lakes in the Stanley Basin.

Rearing Facilities at Eagle Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
R & D		2.2	1.2	3.2	48	154	Fiberglass		Excellent	
Semi-squares (1M)		3.4	1.3	10.7	52	556	Fiberglass		Excellent	
Semi-squares (2M)		6.5	1.8	50.2	34	1,707	Fiberglass		Excellent	
Semi-squares (3M)		10.5	3	255	38	9,690	Fiberglass		Excellent	
Semi-squares (4M)		12.6	2.7	314	4	1,256	Fiberglass		Excellent	
Incubator				0.5	0.33	1,370	Plastic		Good	

PURPOSE

Eagle Hatchery was reconstructed in 1991 by Idaho Department of Fish and Game in conjunction with the National Marine Fisheries Service (NMFS) and the Bonneville Power Administration (BPA) as part of an ESA effort toward the restoration of Snake River sockeye salmon using captive broodstock technology. This facility is used for rearing sockeye salmon to adults and for the producing juvenile sockeye for release into Redfish Lake, Idaho. The facility is funded by BPA, but owned and operated by Idaho Department of Fish and Game.

GOALS

Program goals are defined by carrying capacity of the receiving lakes with the critical habitat and the genetic nature of the indigenous *O. nerka* populations. At this time progeny of the captive broodfish have been planted into Redfish and Pettit lakes of the Stanley Basin. Presmolts are either directly released into the lakes or are reared from June through October in net pens placed in Redfish Lake. This program is for a single generation to limit the potential effects of long-term culture on the fitness of the parental stock.

Recovery goals for Snake River sockeye have not been finalized. The draft *Recovery Plan for Snake River* by NMFS will deal with recovery goals by stock and lake. Currently, the draft goal is for at least 1000 naturally produced adults returning to Redfish Lake and at least 500 naturally produced adults returning to each of two other lakes in the Stanley Basin.

OBJECTIVES

Objective 1: Hatchery Production

<u>Sockeye Salmon</u>
Maintain broodstocks separately with identification of individuals as to genetic origin so spawning can be done to maximize diversity and minimize inbreeding.

Define best management plans for Eagle Hatchery to be used for recovery of listed species.

Produce 150,000 pre-smolts for release into Redfish Lake with defined groups of progeny for evaluation of release strategies, appropriate size/time targets, and genetic origin to maximize smolt performance and adult return.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

Sockeye Salmon: All broodstocks originating from anadromous adults are duplicated at the Big Beef Creek (BBC) facility, NMFS, in case of a total facility disaster. Progeny from the BBC program are returned to Eagle Hatchery (EAG) as eyed eggs.

Up to 20 adults returning to the weir on Redfish Lake Creek are to be used for hatchery broodstock. All adults in excess of 20 are to be released upstream for natural spawning.

Juvenile Rearing

Maintain densities at or below 8 kg/m^3 (0.5 lb/ft^3) at least through smolt size. Fin-clip all production fish released to Stanley Basin lakes for identification as enhanced upon return as adults. Appropriate numbers of progeny are PIT tagged for evaluation of smolt performance at migration.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

All anadromous sockeye adults have been taken into captivity since 1991. The only progeny in Redfish Lake with direct anadromous origin are the result of enhancement. A small population of "residual" sockeye exists in Redfish Lake which continues to produce a few hundred smolts annually. Release strategies for

enhanced progeny are designed to maximize migration of smolts and minimize residualization of enhanced progeny. Control effort targeting the existing kokanee population are to reduce competition with *O. nerka* with anadromous capability. Our goal is to allow for enhanced fish to reside in Redfish Lake over winter and migrate volitionally.

Following are the specific rearing and release strategies employed for Redfish and Pettit lakes to date:

Early Summer Direct Release: Approximately one-third of progeny with equal representation of all genetic types are released directly into Redfish Lake in late June after the spring smolt migration is complete. All are fin clipped and a representative number are PIT tagged. Size goal is 5 g (90 fish / lb).

Net Pen Production and Release: Approximately one-third of progeny with equal representation of all genetic types are reared in net pens in Redfish Lake from early July through mid-October. These are released into the lake before ice-up and after all have been fin-clipped and representative numbers PIT tagged. Size goal is 12 g (38 fish / lb).

Fall Direct Release: Approximately one-third of progeny with proportional representation of each genetic type are reared at Eagle after chilled incubation to produce a size equal to that obtained from the net pens. All are fin clipped and representative numbers PIT tagged. Release to coincide with release from the net pens and a size goal of 12 g (38 fish / lb).

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection and Spawning

Sockeye Salmon: Propagation permit #795 requires that IDFG consult with NMFS annually to establish a spawning matrix for those groups which are expected to mature. The goal of this consultation is to evaluate how groups can be spawned to maximize diversity and minimize inbreeding with the limited genetic base available in this program. This has been done since the initiation of maturity.

Each broodfish held in this program has been PIT tagged and can be traced back to the origin of both parents. This is used to direct mate selection to reduce the probability of inbreeding.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs—All Stocks

The primary objective of fish health management programs at all IDFG hatcheries is to produce quality, healthy fish that will survive to adults. Equally important is to prevent the introduction, amplification or spread of fish pathogens which might adversely affect the health of both hatchery and wild/natural fish.

IDFG has disease control and prevention programs at all of its facilities in an effort to achieve these objectives. These programs include the following standard elements:

Disease Control

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.
- Prescribe appropriate treatments and remedies to disease.
- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.
- Conduct applied research on new and existing techniques to control disease epidemics.

Disease Prevention

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.
- Implement disease preventative strategies in all aspects of fish culture to produce a quality, healthy fish. Prescribe optimal nutritional feeds and environmental conditions in the hatchery rearing containers. Use vaccines or antibiotics prophylactically in order to prevent disease.
- Restrict the introduction of infected stocks into facilities which may result in the introduction of new diseases.
- Use sanitation procedures which prevent introduction of pathogens into or within a facility.
- Conduct applied research on new and existing disease prevention techniques.

Fish Health Activities at Clearwater Hatchery and Satellites

Health Monitoring

- At least monthly, each fish lot is given an extensive health exam.
- Prior to release, fish are given an extensive health exam.
- Whenever abnormal behavior or mortality is detected, fish pathologists will examine the affected fish, make a diagnosis and recommend appropriate treatment.
- Adults are sampled for viral and bacterial pathogens through out the spawning period.

Therapeutic and Prophylactic Treatments

- Adult spring chinook are injected with antibiotics to control bacterial diseases.
- As eggs are collected from adults, they are water-hardened in iodophor as a treatment for viral and bacterial diseases.
- Juvenile fish are administered antibiotics, as needed, for the control of bacterial infections.
- Anti-fungal compounds are administered, as needed, to adults, eggs and juveniles for control of fungus and parasites.
- Only FDA-approved therapeutants are used.

Sanitation

- All eggs entering or leaving the facility are disinfected with an iodophor solution.
- All equipment (nets, waders, brooms, etc.) is disinfected between different rearing units.
- All tank trucks are disinfected prior to and after hauling fish to release sites.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

Environmental monitoring is conducted at all IDFG facilities, as required, to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit administered by the Environmental Protection Agency.

Objective 6: Communicate effectively with other fish producers, managers and the public.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communication for Fish and Egg Transfers: Communication between IDFG, the U.S. Fish and Wildlife Service and Nez Perce Tribe takes place each year to coordinate fish and egg transfers in an effort to meet basin-wide goals.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. It

will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development of Annual Reports

A report documenting run timing, sex composition, mortality and egg-take is submitted annually. Brood-year reports documenting all fish culture activities (diseases, mortalities, growth, etc.) and research activities are produced once the entire brood year is released.

PERFORMANCE STANDARDS—EAGLE HATCHERY AND NET PENS

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	SOC - A	20	2.8	0-8	1
Adult Prespawn. Survival	SOC - A	100%	100%	100%	
	SOC - C	90%	75%	Varied	
Egg-take	SOC - A	40,000	2,000	0-3600	1
	SOC - C	200,000	215,000	13K-407K	
Green Egg-to-Fry Survival	SOC - A	90%	97%	87-100%	
	SOC - C	80%	17%	0-65%	2,3
Fry-to-Smolt Survival	SOC - A	90%	95%	94-97%	
	SOC - C	80%	91%	84-97%	4
Fish Releases	SOC - A	35,000	2,000	1600-2800	1
	SOC - C	180,000	50,000	15K-85K	5
Egg Transfers	SOC - A	650	800	470-1250	
	SOC - C	N/A			
Adults Released	SOC - A	N/A			
	SOC - C	40	42	24-64	
Percent Survival	SOC - A	0.2%	0.2%	0.2%	1
	SOC - C	N/A			

SOC - A = anadromous
SOC - C = captive

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
June Presmolt Size (ffp)	SOC - C	100	90	N/A	5
Oct Net Pen Size (ffp)	SOC - A	45	75	N/A	5
	SOC - C	45	75	N/A	5
Oct Presmolt Size (ffp)	SOC - A	45	75	N/A	5
	SOC - C	45	60	N/A	5,6
Smolt Spring Release (ffp)	SOC - A	7	7	N/A	5
	SOC - C	7	7	N/A	5,6

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect All Adults	SOC - A	Yes	Yes	N/A	1
Spawning Pop. >500	SOC - A	No	No	N/A	1
	SOC - C	Yes	No	N/A	5
Spawning Ratio Male:Female	SOC - A	3:1	5:1	3:1-8:1	1
	SOC - C	2:1	2:1	1:1-3:1	

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to Disease Policy	SOC - A	Yes	Yes		
	SOC - C	Yes	Yes		

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Eagle Hatchery	G	G				
SOC/Alturas				+		BS, MAS
SOC/Fish Hook Creek						
SOC/Red Fish Lake				+		BS, CWD, MAS

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the Idaho Department of Fish and Game.)

Objective 5

NODES effluent samples are not taken at Eagle Hatchery because production poundage does not exceed 20,000 pound upper limit. Net pens operated in Redfish Lake in 1994 and 1995 under IDEQ permit are subject to water quality sampling and reporting. Results of samples reported to agency.

Constraints/Comments—Eagle Hatchery and Net Pens

1. Poor survival rates limit smolt to adult returns.

2. Ambient well water temperature of 13^0C may cause poor egg quality and low fertilization.

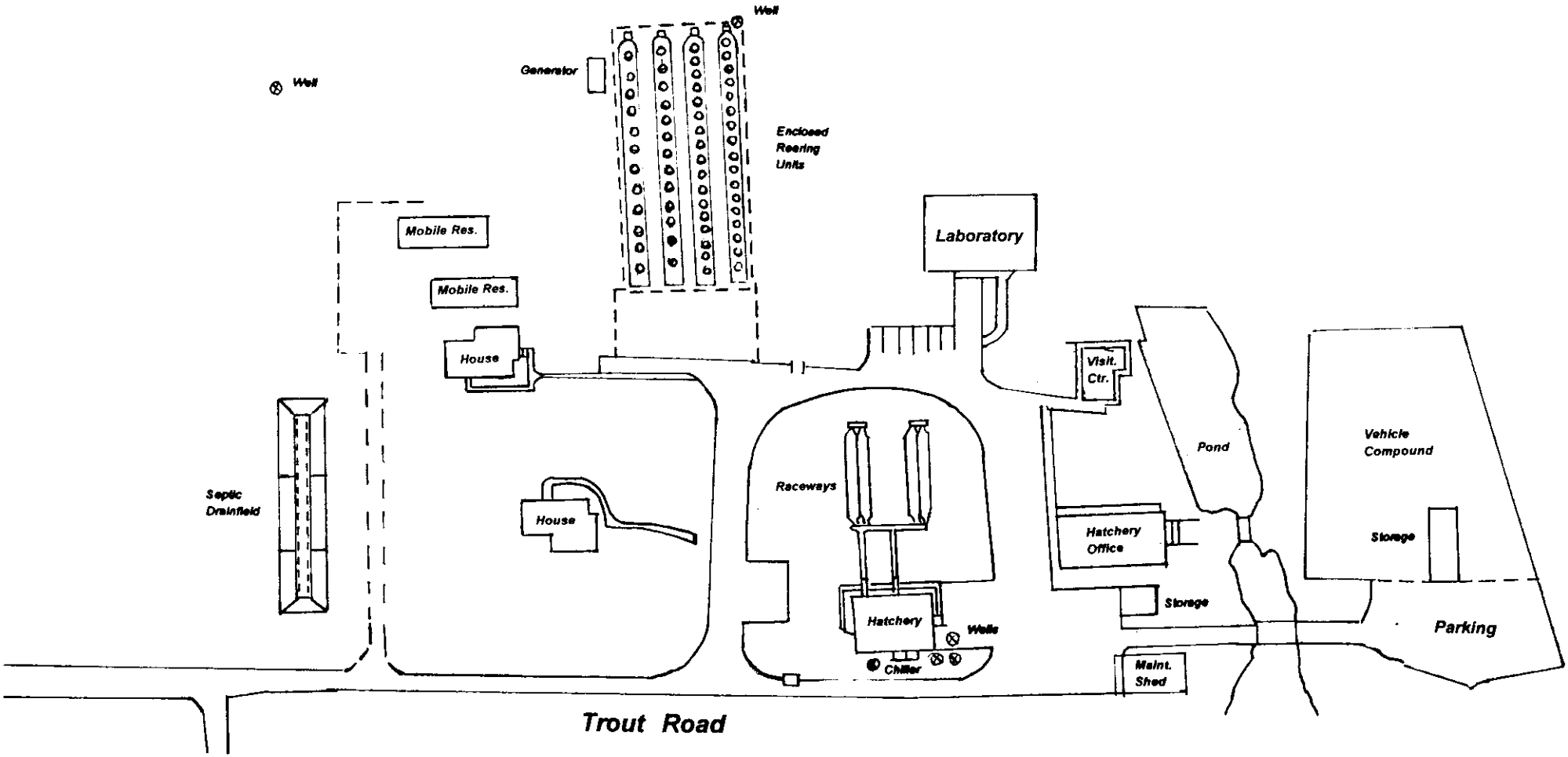
3. Egg quality from captive females very poor, may be due to high ambient water temperature, inadequate nutrition, limited genetic variability, etc. Remedy unknown but being examined.

4. Survival affected by high level of developmental anomalies, losses occur from fry to presmolt stages.

5. Production program has only two-year history.

6. Some presmolts resulted from odd-timed spawnings which affected size-at-release.

7. Anadromous smolt releases made to reduce numbers at Eagle Hatchery to those which can be held on chilled water, size affected by growth rate used for broodstock.



EAGLE HATCHERY SITE PLAN

Magic Valley Hatchery

INTRODUCTION

Magic Valley Hatchery is located on the Snake River, approximately 7 miles northwest of the town of Filer in the Snake River Canyon. Elevation of the facility is 3,000 feet above sea level. The facility is staffed with 4 FTE's.

The hatchery is located on the south shore of the Snake River, while the Crystal Springs water supply is on the north side. Water is delivered to the hatchery by gravity flow at an average flow rate of 125 cfs (51,000 gpm). Water temperature is a constraint 58°F from Crystal Springs.

The hatchery rearing units consist of 32 raceways, 20 starting tanks and upwelling incubators. All units are in good condition.

Rearing Facilities at Magic Valley Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
Raceways	206	10	2.9	5,974	32	191,168	Concrete	2	Good	
Start. Raceways	39	4	2.75	429	20	8,580	Concrete	2	Good	
Upwell. Incub.		1	1.33		40		Plexiglas	2	good	27" height

PURPOSE

Magic Valley Hatchery was constructed in 1987 by the U.S. Army Corps of Engineers as part of the Lower Snake River Compensation Plan (LSRCP)—a program to mitigate for anadromous fishery losses caused by the four federal dams constructed on the lower Snake River. The hatchery is funded by the U.S. Fish and Wildlife Service and operated by the Idaho Department of Fish and Game. This facility is used for egg incubation and rearing of summer steelhead. No adult fish are collected at this facility, eyed-eggs are received from other hatcheries. Fish are reared at Magic Valley Hatchery and then released off-station into various Salmon River tributaries. The station has reared rainbow trout and summer steelhead.

GOALS

The LSRCP mitigation goal is to return 11,660 adult steelhead above Lower Granite Dam.

OBJECTIVES

Objective 1: Hatchery Production

Summer Steelhead
Produce 2.0 million A- and B-strain smolts (400,000 pounds) for release into the Salmon River and its tributaries.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 4: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 5: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

No adults are collected at this facility. The hatchery receives approximately 2.5 million eyed steelhead eggs from other hatcheries each year.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Rearing and release strategies are designed to limit the amount of ecological interactions occurring between hatchery and naturally produced fish. Fish are reared to sufficient size that smoltification occurs within nearly the entire

population, which will reduce the retention time in downstream migration. Rearing on parent river water, or acclimation to parent river water for several weeks can be used to ensure strong homing to the hatchery, thus reducing the stray rate to natural populations. Various release strategies can also be used to ensure that fish migrate from the hatchery with least amount of interaction with native populations. The specific rearing and release strategies used at this hatchery are outlined below.

Summer Steelhead: Rear 2.0 million A and B steelhead smolts to a size of 5 fish/pound and release into the Salmon River during the month of April. All fish are marked prior to release. Hatchery operation goals are to not exceed 0.30 density index and 1.25 flow index during rearing.

Objective 3: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs—All Stocks

The primary objective of fish health management programs at all IDFG hatcheries is to produce quality, healthy fish that will survive to adults. Equally important is to prevent the introduction, amplification or spread of fish pathogens which might adversely affect the health of both hatchery and wild/natural fish.

IDFG has disease control and prevention programs at all of its facilities in an effort to achieve these objectives. These programs include the following standard elements:

Disease Control

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.
- Prescribe appropriate treatments and remedies to disease.
- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.
- Conduct applied research on new and existing techniques to control disease epidemics.

Disease Prevention

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.

- Implement disease preventative strategies in all aspects of fish culture to produce a quality, healthy fish. Prescribe optimal nutritional feeds and environmental conditions in the hatchery rearing containers. Use vaccines or antibiotics prophylactically in order to prevent disease.

- Restrict the introduction of infected stocks into facilities which may result in the introduction of new diseases.

- Use sanitation procedures which prevent introduction of pathogens into or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

Fish Health Activities at Magic Valley Hatchery

Health Monitoring

- At least monthly, each fish lot is given an extensive health exam.

- Prior to release, fish are given an extensive health exam.

- Whenever abnormal behavior or mortality is detected, fish pathologists will examine the affected fish, make a diagnosis and recommend appropriate treatment.

Therapeutic and Prophylactic Treatments

- As eggs are collected from adults, they are water-hardened in iodophor as a treatment for viral and bacterial diseases.

- Juvenile fish are administered antibiotics, as needed, for the control of bacterial infections.

- Anti-fungal compounds are administered, as needed, to adults, eggs and juveniles for control of fungus and parasites.

- Only FDA-approved therapeutants are used.

Sanitation

- All eggs entering or leaving the facility are disinfected with an iodophor solution.

- All equipment (nets, waders, brooms, etc.) is disinfected between different rearing units.

- All tank trucks are disinfected prior to and after hauling fish to release sites.

Objective 4: Conduct environmental monitoring.

Environmental Monitoring

Environmental monitoring is conducted at all IDFG facilities, as required, to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit administered by the Environmental Protection Agency.

Objective 5: Communicate effectively with other steelhead producers and managers.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communication for Fish and Egg Transfers: Communication between IDFG and the U.S. Fish and Wildlife Service takes place each year to coordinate fish and egg transfers in an effort to meet basin-wide goals.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development of Annual Reports

A report documenting run timing, sex composition, mortality and egg-take is submitted annually. Brood-year reports documenting all fish culture activities (diseases, mortalities, growth, etc.) and research activities are produced once the entire brood year is released.

PERFORMANCE STANDARDS—MAGIC VALLEY HATCHERY

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	STS	N/A	N/A	N/A	
Adult Prespawning Survival	STS	N/A	N/A	N/A	
Egg-take	STS	N/A	N/A	N/A	
Eggs Received	STS	2.5M	2,605,982	2.4-2.8 M	
Eyed Egg-to-Fry Survival	STS	90%	85.7%	74-99%	
Fry-to-Smolt Survival	STS	90%	78.7%	75-92%	
Fish Releases	STS	2,000,000	1,959,741	1,731K-2,160K	
Egg Transfers	STS	0	0	0	
Fish Transfers	STS	0	0	0	
Adults Passed Upstream	STS	N/A	N/A	N/A	
Percent Survival	STS	1%	Unknown	Unknown	

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolt Size at Release (fish/lb)	STS	4.5	4.3	4.1-4.5	
Acclimation	STS	No	No	--	
Volitional Release	STS	No	No	--	

N/A=Not applicable.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to Disease Policy	STS	Yes	Yes	--	

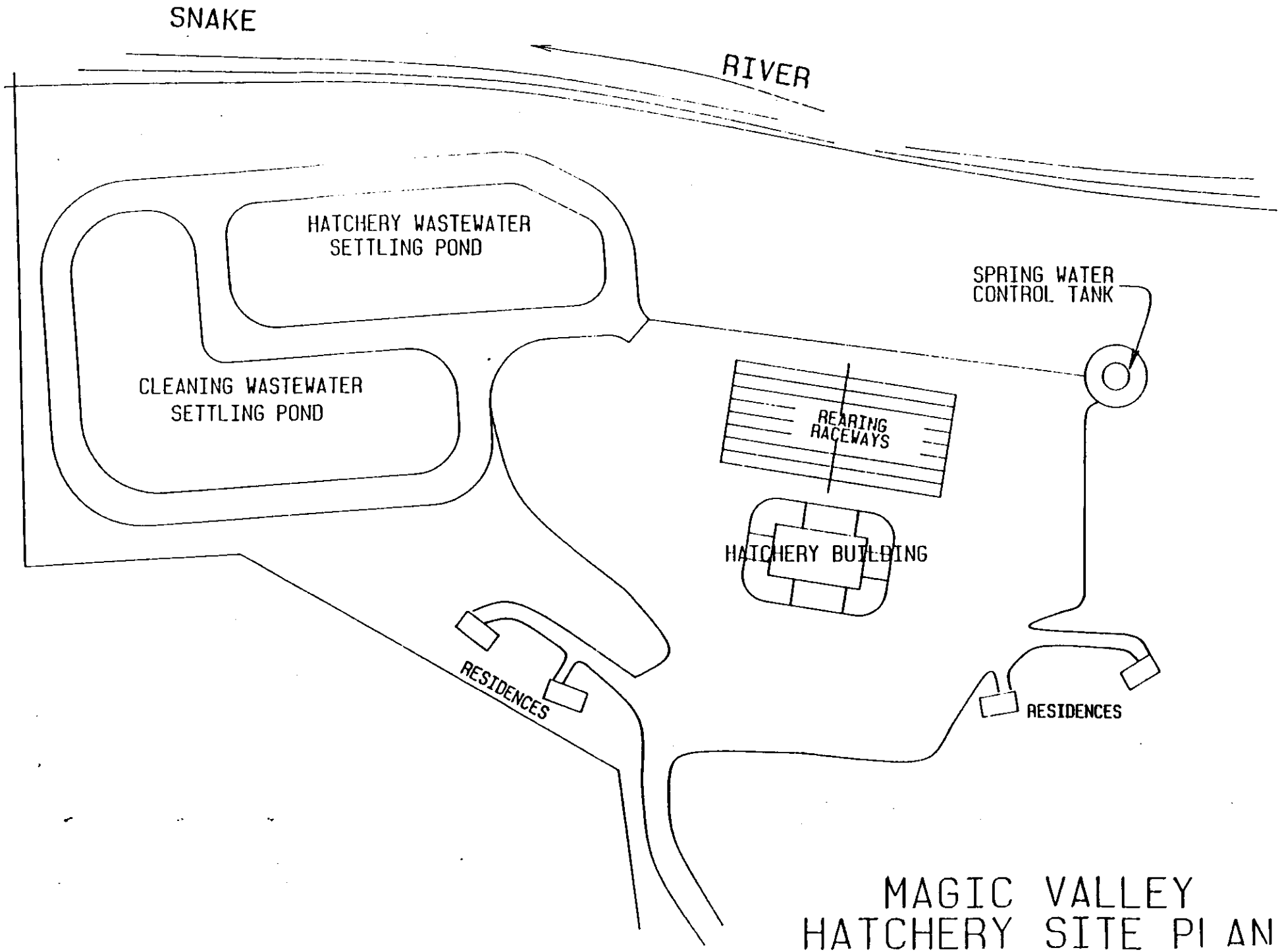
History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Magic Valley Hatchery	G	G				
STS/Clearwater 'B'			IPN			
STS/Dworshak 'B'						CWD, MAS
STS/Dworshak Res. 'B'						CWD
STS/East Fork 'A'						
STS/East Fork 'B'						
STS/Hells Canyon 'A'						
STS/Pahsimeroi R. 'A'						BS
STS/Pahsimeroi R. 'B'			IPN			

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the Idaho Department of Fish and Game.)

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
TSS Effluent	All	N/A	N/A	N/A	
TSS Max Effluent	All	100 mg/L daily max.	1.25 mg/L	0.3-3.3 mg/L	
SS Effluent	All	1.0 ml/L	<0.1 ml/L	<0.05-0.1 ml/L	



MAGIC VALLEY
HATCHERY SITE PLAN

McCall Hatchery

INTRODUCTION

McCall Hatchery is located within the city limits of McCall, Idaho on the North Fork Payette River, approximately 0.25 mile downstream from Payette Lake. Site elevation is 4,980 feet above sea level. The hatchery is staffed with 3 FTE's. An adult summer chinook trapping and spawning satellite facility is located on the South Fork Salmon River near Warm Lake, approximately 26 miles east of Cascade, Idaho. Water is supplied to the hatchery from Payette Lake through two inlets, one at the lake surface and the other at a depth of 50 feet. This permits some control over water temperatures throughout the year. Water flow to the hatchery is 8,977 gpm gravity flow with water temperatures that range from 37°F in winter to 53°F during mid-summer (average 43°F). The satellite facility utilizes 8,977 gpm of gravity flow water from the South Fork of the Salmon River. Water temperatures at this facility range from 43°F in the winter to 70°F in late summer (average 55°F).

Rearing facilities at the main hatchery are in good condition and consist of 14 indoor rearing tanks, 2 outdoor rearing ponds, and 6 stacks of 8-tray Heath type incubators. The satellite facility has two adult holding ponds, a removable fish weir, a fish ladder and trap, and a covered spawning area. All are in good condition.

Rearing Facilities at McCall Hatchery and Satellite

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
McCall										
Rearing Ponds	196	40.5	3	23,814	2	47,628	Concrete	16	Good	
Raceways	40	4	2	320	14	4,480	Concrete	16	Good	
FAL Incubator/ Heath Incubator					208		Plastic	5	Excellent	8/stack
South Fork Trap										
Adult Holding Pond	90	10	4.5	4,050	2	8,100	Concrete	12	Good	

PURPOSE

McCall Hatchery was constructed in 1979 by the U.S. Army Corps of Engineers as part of the Lower Snake River Compensation Plan (LSRCP)—a program to mitigate for anadromous fishery losses caused by the construction of the four hydroelectric dams on the lower Snake River. It was the first hatchery built to enhance the salmon runs into Idaho authorized by Congress through the Water Resources Development Act of 1976. The hatchery is funded by the U.S. Fish and Wildlife Service and operated by Idaho Department of Fish and Game. It is used for egg incubation and

rearing summer chinook. Adult summer chinook are trapped and held at the satellite facility; all eggs are shipped to McCall Hatchery. The station has reared rainbow trout, westslope cutthroat, grayling, golden trout, brown trout, lake trout, and summer chinook.

GOALS

The LSRCP mitigation goal is to return 8,000 adult summer chinook above Lower Granite Dam.

OBJECTIVES

Objective 1: Hatchery Production

Summer Chinook
Produce 1.0 million smolts (50,000 pounds) for release into the South Fork Salmon River.

Provide surplus summer chinook eggs and / or fish to other hatchery programs in the state.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

The intent of adult collection procedures at McCall Hatchery is to collect enough summer chinook adults to maintain the hatchery production goals and supply any surplus eggs to other basin-wide programs. Adult summer chinook return to the trapping facility on the South Fork Salmon River from late June through mid-September and are held there until they are spawned during August and early September. There are usually a sufficient number of eggs taken to meet the hatchery mitigation goals and supply other programs. At least one-third (by sex) of all returning adults are released above the weir for natural spawning.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Interactions between hatchery fish and other fish populations can have a negative effect on both total production from a watershed (through competition with naturally produced fish) and genetic integrity of wild fish (through crossbreeding). Specific hatchery practices such as fish size at release, time of release, acclimation, and the use of volitional release can all play a role in minimizing these interactions. For example, one important strategy for minimizing interactions is to rear fish to sufficient size so that smoltification occurs within nearly the entire population. This will help reduce the retention time in the downstream migration. Acclimating smolts to the parent stream water prior to their release can help reduce straying when they return as adults as well as increase survival to adulthood. The use of volitional release can help ensure that only actively migrating fish are released from the hatchery pond. The specific rearing and release strategies used at this hatchery are outlined below.

Summer Chinook: Rear 1 million smolts to a size of approximately 20 fish / pound; release off-station at Knox Bridge on the South Fork of the Salmon River from late March through the first of April. All fish are marked prior to release.

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection and Spawning

All summer chinook collected are used for basin-wide hatchery programs. Adults are collected throughout the entire run. At least one-third of the fish (by sex) are released upstream for natural spawning. Adults are mated randomly using a 1:1

male-to-female ratio. Gametes from the entire run are used. Surplus eggs provided to other facilities are collected throughout the entire run to maximize genetic integrity.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs All Stocks

The primary objective of fish health management programs at all IDFG hatcheries is to produce quality, healthy fish that will survive to adults. Equally important is to prevent the introduction, amplification or spread of fish pathogens which might adversely affect the health of both hatchery and wild/natural fish.

IDFG has disease control and prevention programs at all of its facilities in an effort to achieve these objectives. These programs include the following standard elements:

<u>Disease Control</u>

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.
- Prescribe appropriate treatments and remedies to disease.
- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.
- Conduct applied research on new and existing techniques to control disease epidemics.

<u>Disease Prevention</u>

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.
- Implement disease preventative strategies in all aspects of fish culture to produce a quality, healthy fish. Prescribe optimal nutritional feeds and environmental conditions in the hatchery rearing containers. Use vaccines or antibiotics prophylactically in order to prevent disease.
- Restrict the introduction of infected stocks into facilities which may result in the introduction of new diseases.

- Use sanitation procedures which prevent introduction of pathogens into or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

Fish Health Activities at McCall Hatchery and South Fork Satellite

Health Monitoring

- At least monthly, each fish lot is given an extensive health exam.

- Prior to release, fish are given an extensive health exam.

- Whenever abnormal behavior or mortality is detected, fish pathologists will examine the affected fish, make a diagnosis and recommend appropriate treatment.

- Adults are sampled throughout the spawning period for viral and bacterial pathogens.

Therapeutic and Prophylactic Treatments

- As eggs are collected from adults, they are water-hardened in iodophor as a treatment for viral and bacterial diseases.

- Juvenile fish are administered antibiotics, as needed, for the control of bacterial infections.

- Anti-fungal compounds are administered, as needed, to adults, eggs and juveniles for control of fungus and parasites.

- Only FDA-approved therapeutants are used.

Sanitation

- All eggs entering or leaving the facility are disinfected with an iodophor solution.

- All equipment (nets, waders, brooms, etc.) is disinfected between different rearing units.

- All tank trucks are disinfected prior to and after hauling fish to release sites.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

Environmental monitoring is conducted at all IDFG facilities, as required, to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit administered by the Environmental Protection Agency.

Objective 6: Communicate effectively with other fish producers, managers and the public.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communication for Fish and Egg Transfers: Communication between IDFG and the U.S. Fish and Wildlife Service takes place each year to coordinate fish and egg transfers in an effort to meet basin-wide goals.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. It

will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development of Annual Reports

A report documenting run timing, sex composition, mortality and egg-take is submitted annually. Brood-year reports documenting all fish culture activities (diseases, mortalities, growth, etc.) and research activities are produced once the entire brood year is released.

PERFORMANCE STANDARDS MCCALL HATCHERY AND SATELLITE

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	CHR	8,000	1,673	938-2,848	4
Adult Prespawn. Survival	CHR	90%	77.7%	69.7-94.0%	1,2
Egg-take	CHR	1,400,000	1,375,984	704K-2,834K	1,4
Green Egg-to-Fry Survival	CHR	90%	90.9%	84.4-97.2%	3,
Fry-to-Smolt Survival	CHR	90%	89.5%	81.1-97.1%	4
Fish Releases	CHR	1,000,000	1,211,161	709K-1,732K	1
Egg Transfers	CHR	Surplus	--[1]	--[1]	
Fish Transfers	CHR	0	0	0	
Adults Passed Upstream	CHR	1/3 adults trapped	699	237-1,802	1,6
Percent Survival	CHR	--	Unknown	Unknown	4

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolt Size at Release (fish/lb)	CHR	20	21.6	18.7-23.8	
Acclimation	CHR	No	No	--	
Volitional Release	CHR	No	No	--	

N/A=Not applicable.
[1] Not estimated for this report.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults Throughout Run	CHR	Yes	Yes	--	
Spawning Pop. >500	CHR	Yes	735	274-1,507	4
Spawning Ratio Male:Female	CHR	1:1	1:1	--	7

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to Disease Policy	CHR	Yes	Yes	--	

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
McCall Hatchery	SR	SR				
CHS/S.F. Salmon R.				+		CSH
CHR/S.F. Salmon R.				+		BS, CSH, Ich, MAS
CHR/Salmon R.						BGD

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the Idaho Department of Fish and Game.)

Objective 5

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
TSS Effluent (net value)	All	5.0 mg/L	0.054 mg/L	-0.7-0.7 mg/L	
TSS Max Effluent (gross value)	All	5.0 mg/L	0.66 mg/L	0.1-1.2 mg/L	
SS Effluent (bimonthly)	All	0.1 ml/L	<0.1 ml/L	<0.1 ml/L	

Constraints/Comments—McCall Hatchery

1. Poor adult survival caused by high water temperatures in the river.

2. Handling stress during transport from the trap to holding ponds, and during routine checks for ripeness.

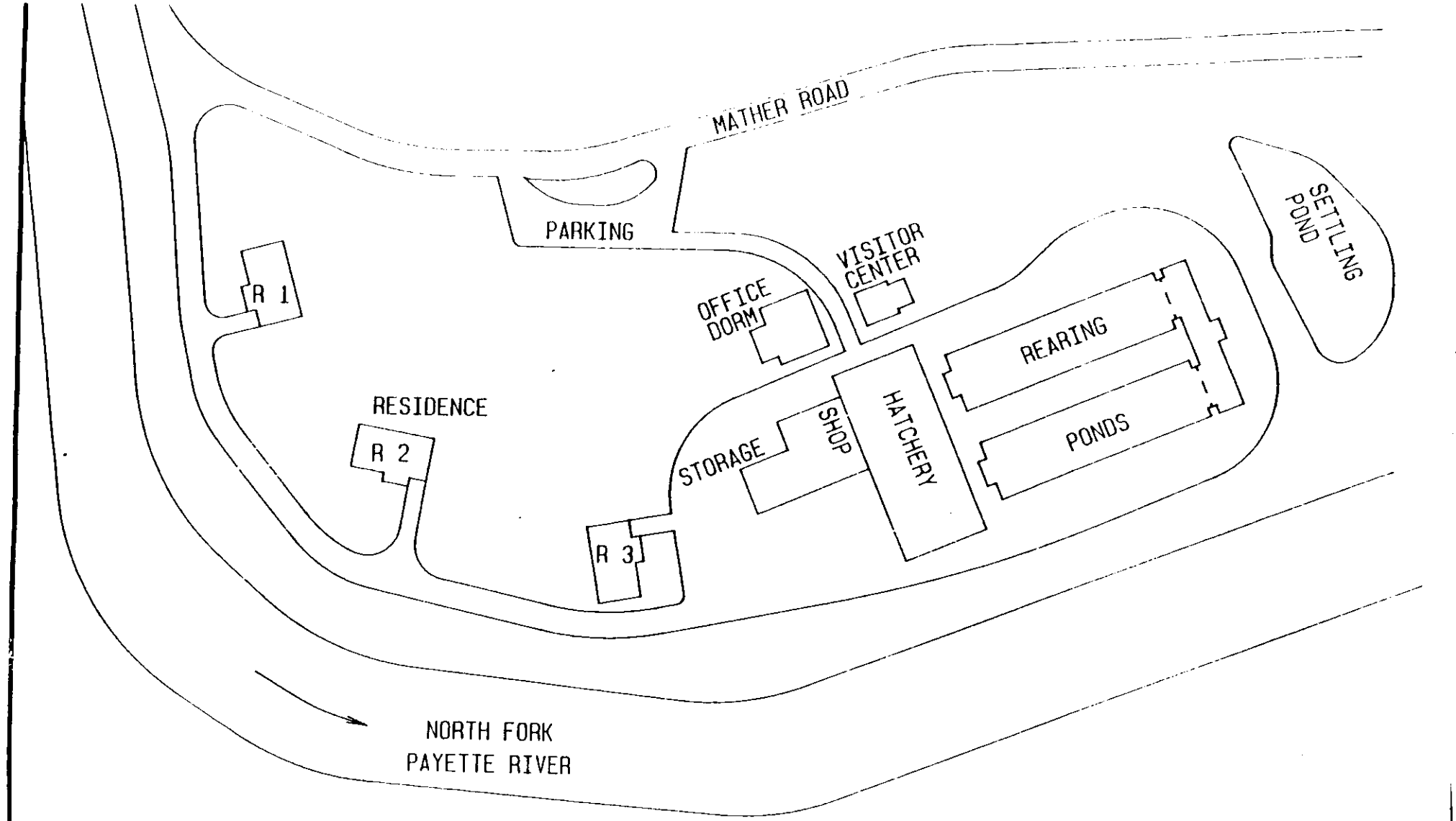
3. Cold river temperatures during early rearing.

4. Mortality in reservoirs during smolt and adult migrations.

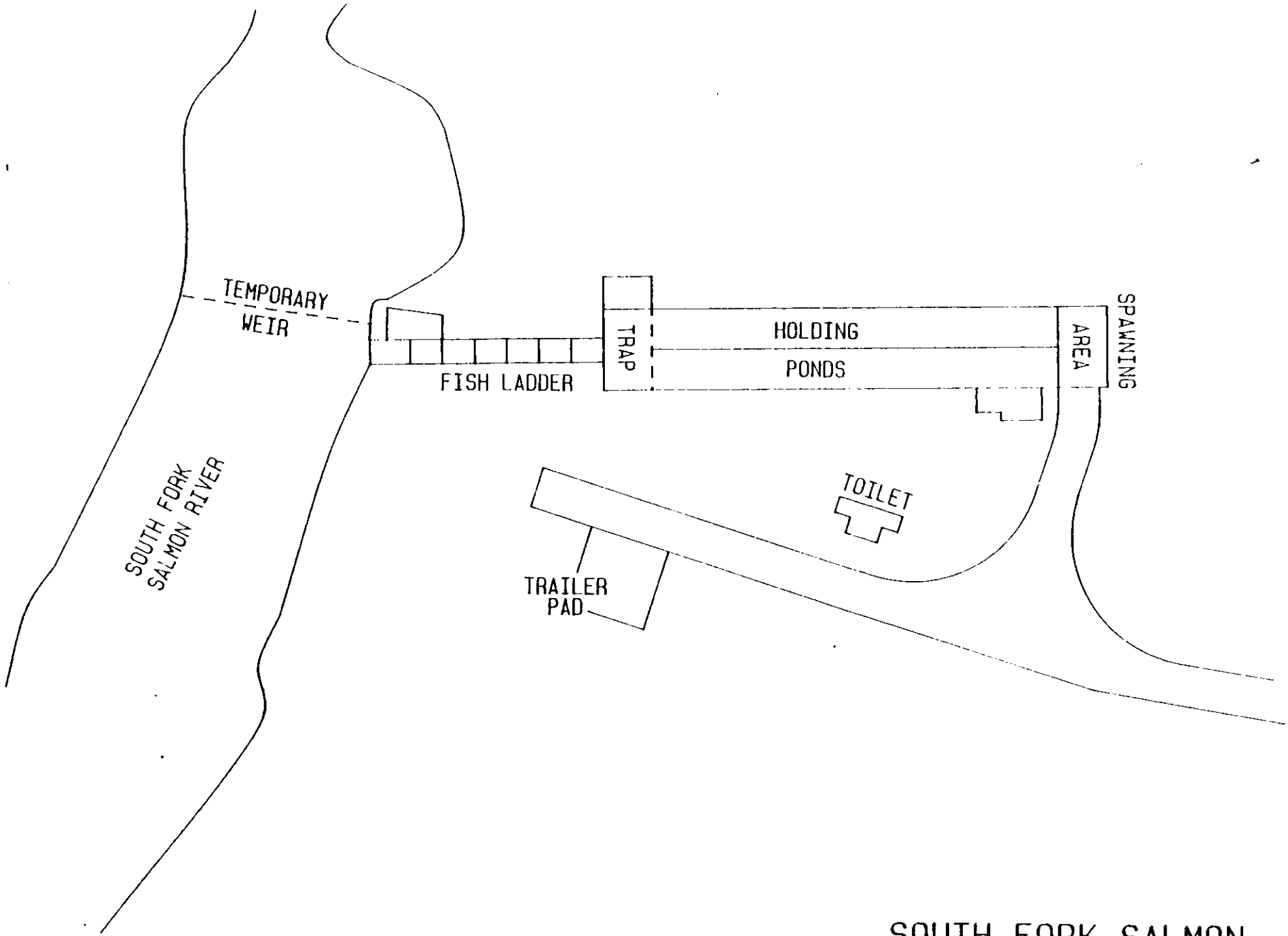
5. Reduced green egg-to-fry survival is caused by handling stress when fish are transported from the spawning facility to the hatchery.

6. Increased mortality caused by handling stress and high water temperatures in the river.

7. Historically, higher numbers of returning females have resulted in some males being spawned more than once.



McCALL HATCHERY
SITE PLAN



SOUTH FORK SALMON
RIVER SATELLITE FACILITY

Niagara Springs Hatchery

INTRODUCTION

Niagara Springs Hatchery is located in the Snake River Canyon, 10 miles south of the town of Wendell, Idaho. Elevation of the facility is 3,000 feet above sea level. The facility is staffed with 4 FTE's.

The hatchery's water supply is by gravity flow from Niagara Springs, with a constant water temperature of 58°F. Flow increases from 50 cfs in June to 120 cfs in March. Water (120 cfs) may also be diverted from the spring since the Rim View Hatchery diversion is adjacent to the diversion for this hatchery.

The hatchery consists of 19 raceways (300' x 10' x 3'); ten of these set up to accommodate 15-foot nursery sections providing a total of 3,750 ft^3 of early fry rearing space. The inserts are removed after the fry stage and ponds are used as standard raceways. Twenty upwelling incubators and 20 circular vats are also used during hatching. All facility units are in fair to good condition.

Rearing Facilities at Niagara Springs Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
Raceways	300	10	2.6	3,000	5	57,000	Concrete	12	Good	
Raceways	300	10	2.6	3,000	14	57,000	Concrete	24-36	Good	
Circular Vats		6	3		20		Fiberglass	Fry	Good	

PURPOSE

Niagara Springs is owned and financed by Idaho Power Company as required under the terms of their Federal Energy Regulatory Commission license for the operation of the Hells Canyon hydroelectric complex. The facility is operated by Idaho Department of Fish and Game. The purposes of the hatchery are to 1) mitigate for losses in production and fishing opportunity resulting from construction of hydroelectric dams in Hells Canyon, 2) relocate a portion of the Snake River steelhead run into the Salmon River, and 3) enhance the steelhead run in the Snake River below Hells Canyon Dam. No steelhead adults are collected or spawned at this facility. Eggs are transferred in from other hatcheries for incubation and rearing. Half the production is released into the Snake River below Hells Canyon Dam. The remaining production is released in different locations in the upper and lower Salmon River. This station has reared summer steelhead.

GOALS

The Idaho Power Company's mitigation goals are to 1) enhance the steelhead run in the Snake River below Hells Canyon Dam, and 2) relocate part of this run to the Salmon River and its tributaries.

OBJECTIVES

Objective 1: Hatchery Production

Summer Steelhead
Produce 900,000 smolts (200,000 pounds) for release into the Salmon River and its tributaries.

Produce 900,000 smolts (200,000 pounds) for release in the Snake River below Hells Canyon Dam.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 4: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 5: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

No adults are collected at this facility; eggs are transferred in from other hatcheries. Hatchery rearing conditions (i.e., hatchery design and size, water availability, and water quality conditions) are currently limiting hatchery production to 400,000 pounds.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Interactions between hatchery fish and other fish populations can have a negative effect on both total production from a watershed (through competition with naturally produced fish) and genetic integrity of wild fish (through crossbreeding). Specific hatchery practices such as fish size at release, time of release, acclimation, and the use of volitional release can all play a role in minimizing these interactions. For example, one important strategy for minimizing interactions is to rear fish to sufficient size so that smoltification occurs within nearly the entire population. This will help reduce the retention time in the downstream migration. Acclimating smolts to the parent stream water prior to their release can help reduce straying when they return as adults as well as increase survival to adulthood. The use of volitional release can help ensure that only actively migrating fish are released from the hatchery pond. The specific rearing and release strategies used at this hatchery are outlined below.

<u>Summer Steelhead</u>

- Rear 900,000 smolts to a size of 4.5 fish / pound and release off-station into the upper Salmon River in early April. All fish are marked prior to release.

- Rear 900,000 smolts to a size of 4.5 fish / pound and release off-station into the Snake River below Hells Canyon Dam in late April. All fish are marked prior to release.

Objective 3: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs—All Stocks

The primary objective of fish health management programs at all IDFG hatcheries is to produce quality, healthy fish that will survive to adults. Equally important is to prevent the introduction, amplification or spread of fish pathogens which might adversely affect the health of both hatchery and wild / natural fish.

IDFG has disease control and prevention programs at all of its facilities in an effort to achieve these objectives. These programs include the following standard elements:

Disease Control

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.
- Prescribe appropriate treatments and remedies to disease.
- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.
- Conduct applied research on new and existing techniques to control disease epidemics.

Disease Prevention

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.
- Implement disease preventative strategies in all aspects of fish culture to produce a quality, healthy fish. Prescribe optimal nutritional feeds and environmental conditions in the hatchery rearing containers. Use vaccines or antibiotics prophylactically in order to prevent disease.
- Restrict the introduction of infected stocks into facilities which may result in the introduction of new diseases.
- Use sanitation procedures which prevent introduction of pathogens into or within a facility.
- Conduct applied research on new and existing disease prevention techniques.

Fish Health Activities at Niagara Springs Steelhead Hatchery

Health Monitoring

- At least monthly, each fish lot is given an extensive health exam.
- Prior to release, fish are given an extensive health exam.
- Whenever abnormal behavior or mortality is detected, fish pathologists will examine the affected fish, make a diagnosis and recommend appropriate treatment.

Therapeutic and Prophylactic Treatments

- As eggs are collected from adults, they are water-hardened in iodophor as a treatment for viral and bacterial diseases.
- Juvenile fish are administered antibiotics, as needed, for the control of bacterial infections.
- Anti-fungal compounds are administered, as needed, to adults, eggs and juveniles for control of fungus and parasites.
- Only FDA-approved therapeutants are used.

Sanitation

- All eggs entering or leaving the facility are disinfected with an iodophor solution.
- All equipment (nets, waders, brooms, etc.) is disinfected between different rearing units.
- All tank trucks are disinfected prior to and after hauling fish to release sites.

Objective 4: Conduct environmental monitoring.

Environmental Monitoring

Environmental monitoring is conducted at all IDFG facilities, as required, to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit administered by the Environmental Protection Agency.

Objective 5: Communicate effectively with other fish producers, managers and the public.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communication for Fish and Egg Transfers: Communication between IDFG, the U.S. Fish and Wildlife Service and Idaho Power Company takes place each year to coordinate fish and egg transfers in an effort to meet basin-wide goals.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development of Annual Reports

A report documenting run timing, sex composition, mortality and egg-take is submitted annually. Brood-year reports documenting all fish culture activities (diseases, mortalities, growth, etc.) and research activities are produced once the entire brood year is released.

PERFORMANCE STANDARDS NIAGARA SPRINGS HATCHERY

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	STS	N/A	N/A	N/A	
Adult Prespawn. Survival	STS	N/A	N/A	N/A	
Egg-take	STS	N/A	N/A	N/A	
Eggs Received	STS	2,300,000	2,370,000	2,000K-2,900K	1
Eyed Egg-to-Fry Survival	STS	90%	86%	74-92%	2,6,7
Fry-to-Smolt Survival	STS	95%	84%	74-97%	2,3,4,5,7
Fish Releases	STS	1,800,000	1,710,000	1,450K-1,900K	1-8
Egg Transfers	STS	0	0	0	
Fish Transfers	STS	0	0	0	
Adults Passed Upstream	STS	N/A	N/A	N/A	
Percent Survival	STS	--	Unknown	Unknown	

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolt Size at Release (fish/lb)	STS	4.5	4.12	3.65-4.43	2,3,5,7
Acclimation	STS	No	No	--	
Volitional Release	STS	No	No	--	

N/A=Not applicable.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to Disease Policy	STS	Yes	Yes	--	1,3,5,6,7

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Niagara Spr. Hatchery	SR	SR				
STS/"A"/Hells Canyon			IHN	+	Furunc.	CWD, MAS
STS/"B"/Hells Canyon						
STS/"A"/Hells Canyon/Pahsimeroi						CWD
STS/"A"/Henry's Lake						MAS
STS/"A"/Pahsimeroi R.					Furunc.	BGD, BS, CWD, MAS
STS/"A"/Wallawa						

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the Idaho Department of Fish and Game.)

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
TSS Effluent	All	85% removal	>90%	90-99.9%	8
TSS Max Effluent	All	5 mg/L 15 mg/L (instantaneous maximum)	1.4 mg/L	4-0 mg/L	8
SS Effluent	All	0.1 mg/L	<0.1 mg/L	<0.1 mg/L	8

Constraints/Comments—Niagara Springs Hatchery

1. Spawning station has insufficient number of eggs.

2. Water quantity and quality from spring has deteriorated with prolonged drought.

3. Environmental stress caused by high densities with corresponding bacterial, fungal, and viral epizootics can be expected.

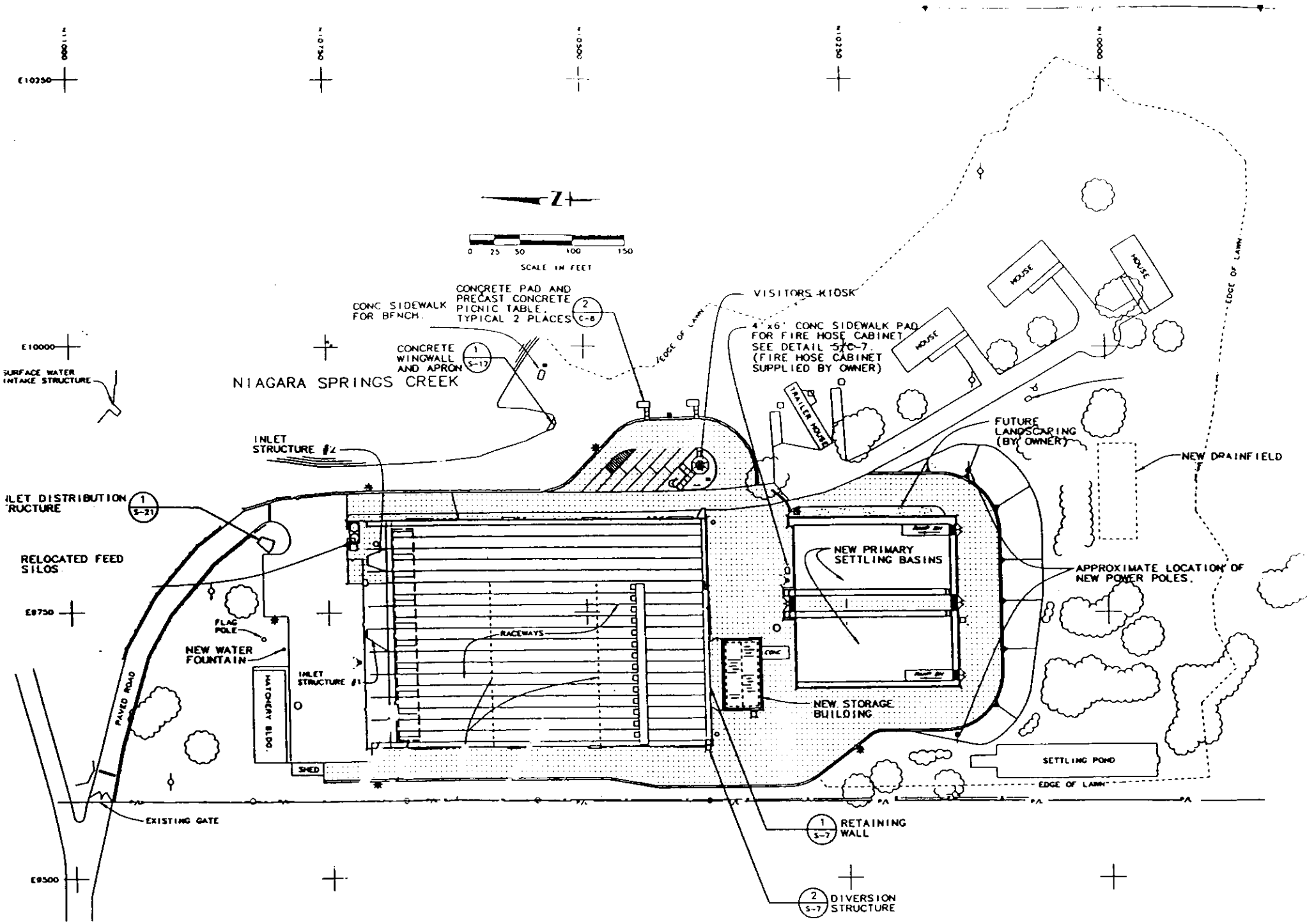
4. Predation during outside rearing.

5. Introduction of disease pathogens by avian predators and environmental introduction through intake from neighboring hatcheries.

6. Early rearing conditions are deficient because of lack of space and low water volumes.

7. Disease losses caused by viruses and lack of virus-control methods.

8. Effluent must be monitored for nutrients, nitrates, nitrites, ammonia, and phosphorus.



NIAGARA SPRINGS STEELHEAD HATCHERY

Oxbow Hatchery

INTRODUCTION

Oxbow Hatchery is located in Oregon near the Oxbow hydroelectric facility on the Snake River. Facility elevation is 1,689 feet above sea level. The facility is staffed with 1 FTE.

Water used at Oxbow Hatchery is obtained by pumping it from either the Snake River or an on-site well. Two production pumps produce approximately 15 cfs (6,750 gpm). Two incubation wells produce another 0.25 cfs (100 gpm) each for a total of 200 gpm. River water temperatures range from a winter low of 33°F to a late summer high of 75°F (average of 54°F). One incubation well's water temperature is 52°F and the other incubation well is 56°F.

Hatchery facilities include 4 adult holding ponds, 6 raceways, and 14 double-stack incubators. Adult fish are trapped at Hells Canyon Dam and transported, via tank truck, 23 miles upstream to Oxbow Hatchery. The hatchery facilities are in poor to fair condition with raceways in need of major repair or replacement.

Rearing Facilities at Oxbow Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
Holding Ponds	105	29.5	5	15,487	2	30,974	Concrete	32	Fair	Repairs
Holding Ponds	54	29.5	5	7,965	2	15,930	Concrete	32	Fair	Repairs
Raceways	100	6	2.25	1,350	6	8,100	Cinder block	24	Poor	Unusable
Starter Vats	7.5	2	0.83	12	1	12	Fiberglass	14	Poor	Unusable
Starter Vats	15.5	2	0.67	21	1	21	Fiberglass	14	Poor	Unusable
Heath Incubator					96		Fiber./Plastic	25	Poor	6 Dbls
FAL					576		Fiber./Plastic	2	Good	18 Dbls

PURPOSE

Oxbow Hatchery began operating in 1962 as part of the Idaho Power Company's mitigation for fishery losses caused by construction of hydroelectric dams on the Snake River in Hells Canyon. Facilities are owned and funded by Idaho Power Company, but operated by Idaho Department of Fish and Game. The hatchery is utilized for trapping sufficient numbers of returning adult summer steelhead and spring chinook to fulfill Idaho Power's anadromous fish mitigation requirements.

Smolts are not normally reared or released at this facility. The station has reared smallmouth bass, summer steelhead, fall and spring chinook.

GOALS

Mitigation goals are to 1) produce 1.5 million eyed steelhead eggs to be shipped to Niagara Springs Fish Hatchery, and 2) ship all adult spring chinook trapped to Rapid River Fish Hatchery.

OBJECTIVES

Objective 1: Hatchery Production

Summer Steelhead
Trap and spawn adult steelhead; incubate eggs to the eyed stage for transfer to other hatcheries.

Rear available excess steelhead eggs to the fry stage for release in the Snake River and Salmon River basins.

Spring Chinook
Trap and hold returning adults for eventual transfer to the Rapid River Hatchery.

Objective 2: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 3: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 4: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 5: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

Summer Steelhead: The intent of adult collection procedures at Oxbow Hatchery is to collect enough steelhead adults to maintain the hatchery production goals and supply any surplus eggs to other basin-wide programs. Adult steelhead are trapped from the first of October through December, then again from March through April. Fish are held at the hatchery until they are spawned. Spawning occurs from the end of March through April. There is usually a sufficient number of eggs taken to contribute to hatchery production goals for Idaho Power's mitigation responsibility.

Spring Chinook: The intent of spring chinook adult collection is to transfer all trapped fish to Rapid River Hatchery for spawning and rearing.

Objective 2: Maintain stock integrity and genetic diversity.

Broodstock Selection and Spawning

All steelhead collected are used for basin-wide programs. Adults are mated randomly and gametes from the entire run are used. Adults are spawned at a 1:1 male-to-female ratio provided sufficient numbers are available. Surplus eggs provided to other facilities are collected throughout the entire run to maximize genetic integrity.

Objective 3: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs All Stocks

The primary objective of fish health management programs at all IDFG hatcheries is to produce quality, healthy fish that will survive to adults. Equally important is to prevent the introduction, amplification or spread of fish pathogens which might adversely affect the health of both hatchery and wild/natural fish.

IDFG has disease control and prevention programs at all of its facilities in an effort to achieve these objectives. These programs include the following standard elements:

Disease Control

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.

- Prescribe appropriate treatments and remedies to disease.

- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.

- Conduct applied research on new and existing techniques to control disease epidemics.

Disease Prevention

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.

- Implement disease preventative strategies in all aspects of fish culture to produce a quality, healthy fish. Prescribe optimal nutritional feeds and environmental conditions in the hatchery rearing containers. Use vaccines or antibiotics prophylactically in order to prevent disease.

- Restrict the introduction of infected stocks into facilities which may result in the introduction of new diseases.

- Use sanitation procedures which prevent introduction of pathogens into or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

Fish Health Activities at Oxbow Hatchery

Health Monitoring

- Adult broodstock are examined periodically for disease pathogens.

- Whenever abnormal behavior or mortality is detected, fish pathologists will examine the affected fish, make a diagnosis and recommend appropriate treatment.

- Adults are sampled for viral and bacterial pathogens through out the spawning period.

Therapeutic and Prophylactic Treatments

- Adult spring chinook and steelhead are injected with antibiotics for the control of bacterial diseases.

- Eggs are held in separate family units until disease status known. Viral-positive eggs are culled.

- As eggs are collected from adults, they are water-hardened in iodophor as a treatment for viral and bacterial diseases.

- Juvenile fish are administered antibiotics, as needed, for the control of bacterial infections.

- Anti-fungal compounds are administered, as needed, to adults, eggs and juveniles for control of fungus and parasites.

- Only FDA-approved therapeutants are used.

Sanitation

- All eggs entering or leaving the facility are disinfected with an iodophor solution.

- All equipment (nets, waders, brooms, etc.) is disinfected between different rearing units.

- All tank trucks are disinfected prior to and after hauling fish to release sites.

Objective 4: Conduct environmental monitoring.

Environmental Monitoring

Environmental monitoring is conducted at all IDFG facilities, as required, to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit administered by the Environmental Protection Agency.

Objective 5: Communicate effectively with other fish producers, managers and the public.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communication for Fish and Egg Transfers: Communication between IDFG, Oregon Department of Fish and Wildlife, the U.S. Fish and Wildlife Service and Idaho Power Company takes place each year to coordinate fish and egg transfers in an effort to meet basin-wide goals.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development of Annual Reports

A report documenting run timing, sex composition, mortality and egg-take is submitted annually. Brood-year reports documenting all fish culture activities (diseases, mortalities, growth, etc.) and research activities are produced once the entire brood year is released.

PERFORMANCE STANDARDS OXBOW HATCHERY

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	CHS	Supplement Rapid River Hatchery	300	22-912	1,2,11
Adult Returns	STS	Fall 1,200 Spring 400	2,170	1,151-2,729	1,2,11
Adult Prespawning Survival	CHS	90%	86%	78-97%	2,3,4,5,7
	STS	>90%	85.2%	64.7-96.0%	2,3,4,5,7
Egg-take	CHS	N/A	N/A	N/A	
	STS	1,500,000	2,900,000	1.3-4.9 million	6,8
Green Egg-to-Fry Survival	CHS	N/A	N/A	N/A	
	STS	>90%	58.6%	5.1-86.8%	6,9,10
Fry-to-Smolt Survival	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Fish Releases	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Egg Transfers	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Fish Transfers	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Adults Back to River	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Percent Survival	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	

N/A=Not applicable.

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults	CHS	Yes	Yes	--	
Throughout Run	STS	Yes	Yes	--	
Spawning Pop.	CHS	No	No	--	
>500	STS	Yes	Yes	--	
Spawning Ratio	CHS	1:1	1:1	0.8:1 -1:1	12,13
Male:Female	STS	1:1	0.9:1	0.4:1-1.2:1	

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to	CHS	Yes	Yes	--	
Disease Policy	STS	Yes	Yes	--	

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Oxbow Hatchery	SR	SR				
CHF/Bonneville						
STS/Hells Canyon 'A'						CSH, CWD, MAS
STS/Oxbow 'A'						

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the Idaho Department of Fish and Game.)

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
TSS Effluent	All	N/A	N/A	N/A	
TSS Max Effluent	All	N/A	N/A	N/A	
SS Effluent	All	N/A	N/A	N/A	

Constraints/Comments—Oxbow Hatchery

1. Poor attraction water; fish are attracted to water flows at the turbine outlets.

2. Poor adult survival caused by high water temperatures.

3. Handling stress during fish loading and transport from fish trap, and from routine checks for ripeness.

4. *Certomyxa shasta* and *Aeromonas pseudomonas* infections associated with high water temperatures in the river.

5. Adults are injured during upriver migrations.

6. High water temperatures during adult holding period affects egg quality.

7. Water quality standards are at or above maximum limits for salmonid aquaculture.

8. Egg culling due to viral diseases attributed to positive disease results of spawned females.

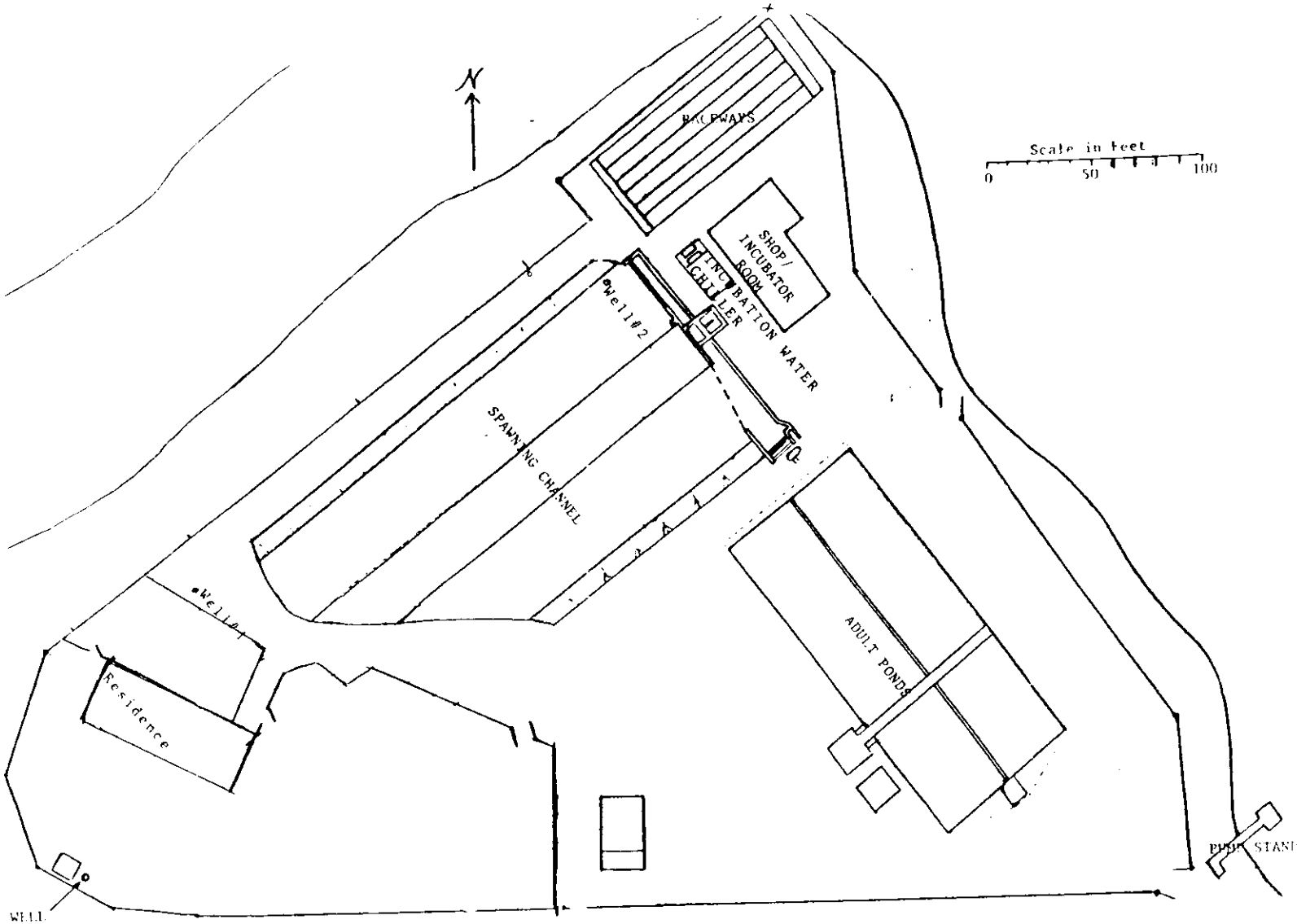
9. Facility design exposes green eggs to adverse environmental conditions during spawn collection.

10. Adults suffer internal organ damage from handling stress during routine checks for ripeness.

11. High water flows hinder or prohibit operation of the adult collection facility.

12. Male fish tend to become sexually mature later than female fish.

13. Handling stress during routine checks for ripeness causes elevated prespawning mortality.



Oxbow Hatchery
Site Plan

Pahsimeroi Hatchery

INTRODUCTION

Pahsimeroi Hatchery is located on the Pahsimeroi River near Ellis, Idaho. The hatchery is divided into two locations with the lower facility 1 mile upstream and upper facility 7 miles upstream from the river mouth. Elevation of the lower facility is 4,669 feet and the upper site is 4,760 feet above sea level. The facility is staffed with 2 FTE's.

The main hatchery receives its water directly from the Pahsimeroi River using both gravity and pump delivery methods. Temperatures vary from 32°F in winter to 67°F in the summer (average 48°F). Water flows are 17,953 gpm (40 cfs). Water is also obtained from a series of nearby springs (0.5 cfs) which have a temperature variance from 52°F in winter to 55°F in summer (average of 54°F).

The main hatchery facility contains an adult trap with three concrete pens, spawning area, a 55-foot long weir crossing the Pahsimeroi River, four concrete raceways for early rearing of salmon and steelhead fry, and an egg incubation area. Facilities are in fair condition.

The satellite rearing facility is in good condition and consists of two earthen rearing ponds used to rear summer chinook fingerlings. River flows here vary from 10 to 20 cfs depending on time of year.

Rearing Facilities at Pahsimeroi Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition Comment
Raceways	100	4	2.5	1,000	4	4,000	Concrete	0-6	Good
Trap/Adult Holding Ponds	75	15	5	5,625	3	16,875	Concrete	Adult	Good
Upper Ponds	300	40	4.5	55,000	2	110,000	Earthen	6-18 mo.	Fair
Heath Incubators					320		Fiber./Plastic	25	Fair

PURPOSE

The hatchery began operation in 1969. It is owned and funded by Idaho Power Company as mitigation for fishery losses caused by construction of hydroelectric dams on the Snake River in Hells Canyon. The hatchery is used for adult collection and spawning of summer steelhead (eggs are shipped to other hatcheries for fish rearing and release). This facility is also used for adult collection, spawning, rearing

and release of summer chinook. The station has reared summer steelhead, spring chinook and summer chinook.

GOALS

To relocate steelhead and chinook salmon runs from the Snake River (which was blocked by Hells Canyon, Oxbow and Brownlee dams) to the Salmon River drainage.

OBJECTIVES

Objective 1: Hatchery Production

Summer Chinook
Produce 1 million smolts for release into the Pahsimeroi River and Salmon River drainage.

Provide surplus eggs to other hatchery programs in the state.

Summer Steelhead
Provide green and eyed eggs to Niagara, Magic Valley and Hagerman hatcheries.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

Summer Chinook: The intent of spring chinook adult collection procedures at Pahsimeroi Hatchery is to trap all adult summer chinook and release at least one-third (by sex) of the fish upstream for natural production. Adult summer chinook return to the hatchery from June through September and are held at the hatchery until they are spawned. Spawning occurs during August and September. Because of low numbers of returning adults, there are seldom sufficient adults to meet the hatchery mitigation goals.

Summer Steelhead: The intent of adult collection procedures is to trap all steelhead and release all wild fish upstream for natural production. Adult steelhead return to the hatchery from late February through mid-May and are held at the hatchery until they are spawned. Spawning occurs from early March to mid-May. There are usually sufficient numbers of adults collected to meet the hatchery mitigation goals and supply surplus eggs for other programs in the basin.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Interactions between hatchery fish and other fish populations can have a negative effect on both total production from a watershed (through competition with naturally produced fish) and genetic integrity of wild fish (through crossbreeding). Specific hatchery practices such as fish size at release, time of release, acclimation, and the use of volitional release can all play a role in minimizing these interactions. For example, one important strategy for minimizing interactions is to rear fish to sufficient size so that smoltification occurs within nearly the entire population. This will help reduce the retention time in the downstream migration. Acclimating smolts to the parent stream water prior to their release can help reduce straying when they return as adults as well as increase survival to adulthood. The use of volitional release can help ensure that only actively migrating fish are released from the hatchery pond. The specific rearing and release strategies used at this hatchery are outlined below.

Summer Chinook: Rear 1 million smolts to a size of approximately 20 fish / pound and release on-station from mid-March through the first of April. All fish are marked prior to release.

Summer Steelhead: There is no extended rearing of steelhead at this facility. Eggs are incubated for a short period and then transferred to other facilities.

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection and Spawning

Summer Chinook: All summer chinook collected are used for basin-wide programs. Adults are mated randomly using a 1:1 male-to-female ratio and gametes from the entire run are used. Surplus eggs provided to other facilities are collected throughout the entire run to maximize genetic integrity.

Summer Steelhead: All hatchery steelhead collected are used for basin-wide hatchery programs. Adults are mated randomly and gametes from the entire run are used. The goal is to spawn adults at a 1:1 male-to-female ratio. However, the spawning ratio is often skewed and some males are used more than once. Surplus eggs provided to other facilities are collected throughout the entire run to maximize genetic integrity.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs All Stocks

The primary objective of fish health management programs at all IDFG hatcheries is to produce quality, healthy fish that will survive to adults. Equally important is to prevent the introduction, amplification or spread of fish pathogens which might adversely affect the health of both hatchery and wild / natural fish.

IDFG has disease control and prevention programs at all of its facilities in an effort to achieve these objectives. These programs include the following standard elements:

Disease Control

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.

- Prescribe appropriate treatments and remedies to disease.

- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.

- Conduct applied research on new and existing techniques to control disease epidemics.

Disease Prevention

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.

- Implement disease preventative strategies in all aspects of fish culture to produce a quality, healthy fish. Prescribe optimal nutritional feeds and environmental conditions in the hatchery rearing containers. Use vaccines or antibiotics prophylactically in order to prevent disease.

- Restrict the introduction of infected stocks into facilities which may result in the introduction of new diseases.

- Use sanitation procedures which prevent introduction of pathogens into or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

Fish Health Activities at Pahsimeroi Hatchery

Health Monitoring

- At least monthly, each fish lot is given an extensive health exam.

- Prior to release, fish are given an extensive health exam.

- Whenever abnormal behavior or mortality is detected, fish pathologists will examine the affected fish, make a diagnosis and recommend appropriate treatment.

- Adults are sampled for viral and bacterial pathogens through out the spawning period.

Therapeutic and Prophylactic Treatments

- As eggs are collected from adults, they are water-hardened in iodophor as a treatment for viral and bacterial diseases.

- Juvenile fish are administered antibiotics, as needed, for the control of bacterial infections.

- Anti-fungal compounds are administered, as needed, to adults, eggs and juveniles for control of fungus and parasites.

- Only FDA-approved therapeutants are used.

Sanitation

- All eggs entering or leaving the facility are disinfected with an iodophor solution.

- All equipment (nets, waders, brooms, etc.) is disinfected between different rearing units.

- All tank trucks are disinfected prior to and after hauling fish to release sites.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

Environmental monitoring is conducted at all IDFG facilities, as required, to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit administered by the Environmental Protection Agency.

Objective 6: Communicate effectively with other fish producers, managers and the public.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communication for Fish and Egg Transfers: Communication between IDFG, Oregon Department of Fish and Wildlife, the U.S. Fish and Wildlife Service and Idaho Power Company takes place each year to coordinate fish and egg transfers in an effort to meet basin-wide goals.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development of Annual Reports

A report documenting run timing, sex composition, mortality and egg-take is submitted annually. Brood-year reports documenting all fish culture activities (diseases, mortalities, growth, etc.) and research activities are produced once the entire brood year is released.

PERFORMANCE STANDARDS PAHSIMEROI HATCHERY

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	CHR	750	405	30-838	1-9
	STS	100% of run	1,689	719-2,092	
Adult Prespawning Survival	CHR	100%	94.3%	79.8-98.8%	
	STS	100%	99.3%	98.0-99.9%	
Egg-take	CHR	1,250,000	527,746	0-1,072K	10
	STS	9,000,000	4,586,103	1,856K-5,847K	
Green Egg-to-Fry Survival	CHR	90%	90.8%	82.0-95.0%	
	STS	N/A	N/A	N/A	
Fry-to-Smolt Survival	CHR	95%	90%	65-95%	
	STS	N/A	N/A	N/A	
Fish Releases	CHR	1,000,000	701,240	146K-1,058K	1,2,3,4,
	STS	N/A	N/A	N/A	5,10
Egg Transfers	CHR	N/A	N/A	N/A	
	STS	All	N/A	N/A	
Fish Transfers	CHR	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Adults Passed Upsteam	CHR	All Natural Adults	122	43-260	
			30.1%	23.6-32.8%	
	STS	N/A	N/A	N/A	
Percent Survival to Adult	CHR	0.5%	0.31%	0.02-0.75%	1,2,6,7,8,9
	STS	N/A	N/A	N/A	

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolt Size at Release (fish/lb)	CHR	20.0	15.8	10.4-16.9	
	STS	N/A	N/A	N/A	
Acclimation	CHR	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	
Volitional Release	CHR	Yes	Yes	--	
	STS	N/A	N/A	N/A	

N/A=Not applicable.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults	CHR	Yes	Yes	--	
Throughout Run	STS	Yes	Yes	--	
Spawning Pop.	CHR	Yes	No	--	
>500	STS	Yes	Yes	--	
Spawning Ratio	CHR	1:1	0.94:1	1:1-0.7:1	8,9,10
Male:Female	STS	1:1	1:1	1:1	

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to	CHR	Yes	Yes	--	
Disease Policy	STS	Yes	Yes	--	

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Pahsimeroi Hatchery	SA	SA				
STS/Pahsimeroi R. 'A'				+		EIBS
CHR/Pahsimeroi R.						BGD, COS, CSH, MAS, SAP, TRI, WHD

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the Idaho Department of Fish and Game.)

Objective 5

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
TSS Effluent (net non-harvest)	All	<15.5 mg/L	3.82 mg/L	-3.5-16.2 mg/L	
TSS Max Effluent (net harvest)	All	<15.5 mg/L	-1.8 mg/L	-14.5-13.0 mg/L	
SS Effluent	All	<0.1 ml/L	<0.1 ml/L	<0.1 ml/L	

Constraints/Comments—Pahsimeroi Hatchery

1. Poor river flows due to prolonged drought have impacted the smolt migration in the Salmon and Snake rivers.

2. Whirling disease has impacted the quality of smolts and adult fish.

3. Heavy silt load is affecting fry production in the Pahsimeroi River during winter months.

4. Constant bird predation in the rearing ponds.

5. Predation and harassment by otter while in the rearing pond.

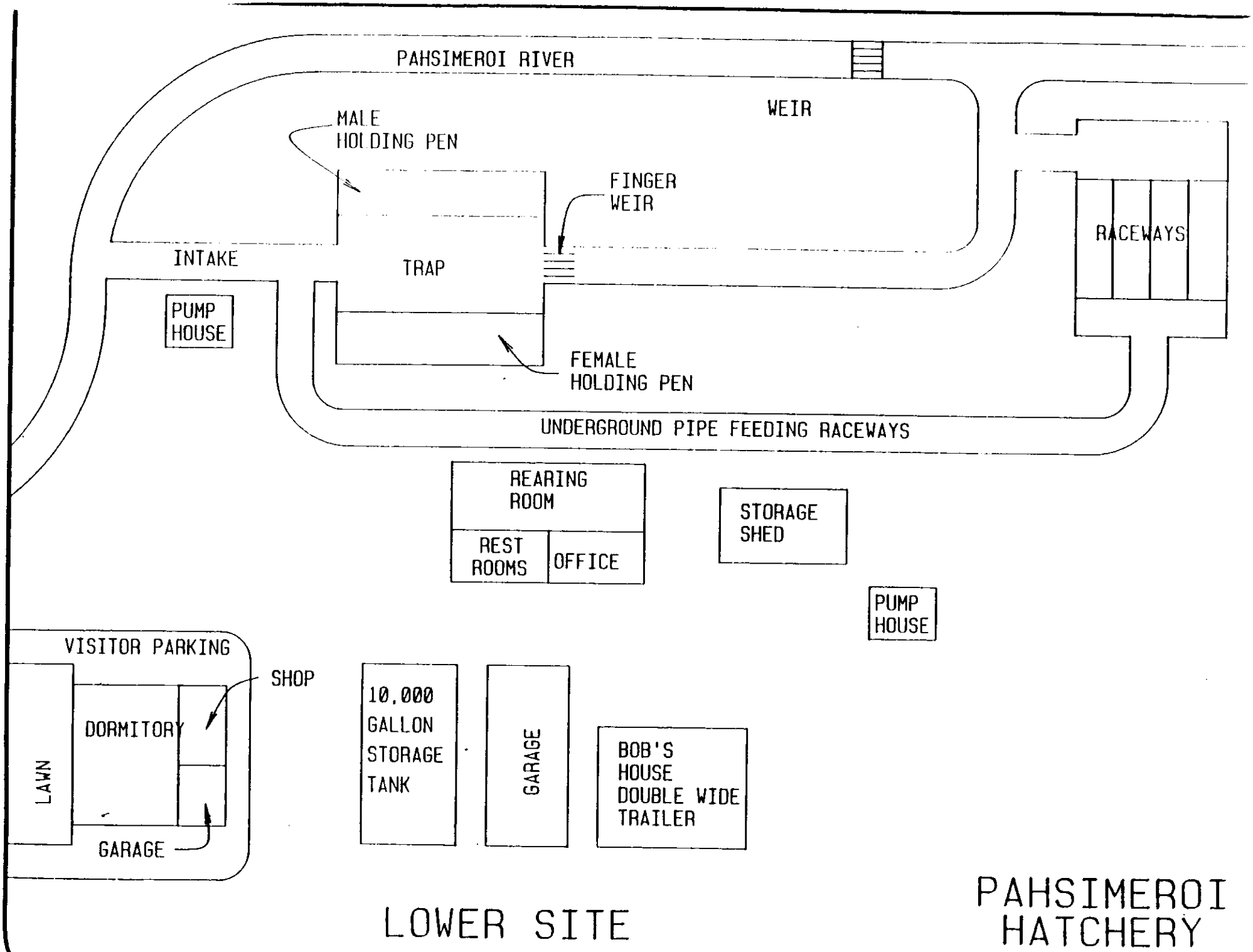
6. Predation in the lower Snake and Columbia rivers during migration.

7. Low river flows through the lower Snake River hinder smolt migration.

8. Fish harvests in the ocean and lower Columbia River.

9. Low river flows and warm water temperatures during summer adult passage.

10. Insufficient adult returns for egg-take as directed by NMFS.


PAHSIMEROI RIVER
WEIR
MALE
HOLDING PEN
FINGER
WEIR
RACEWAYS
INTAKE
TRAP
PUMP
HOUSE
FEMALE
HOLDING PEN
UNDERGROUND PIPE FEEDING RACEWAYS
REARING
ROOM
REST
ROOMS
OFFICE
STORAGE
SHED
PUMP
HOUSE
VISITOR PARKING
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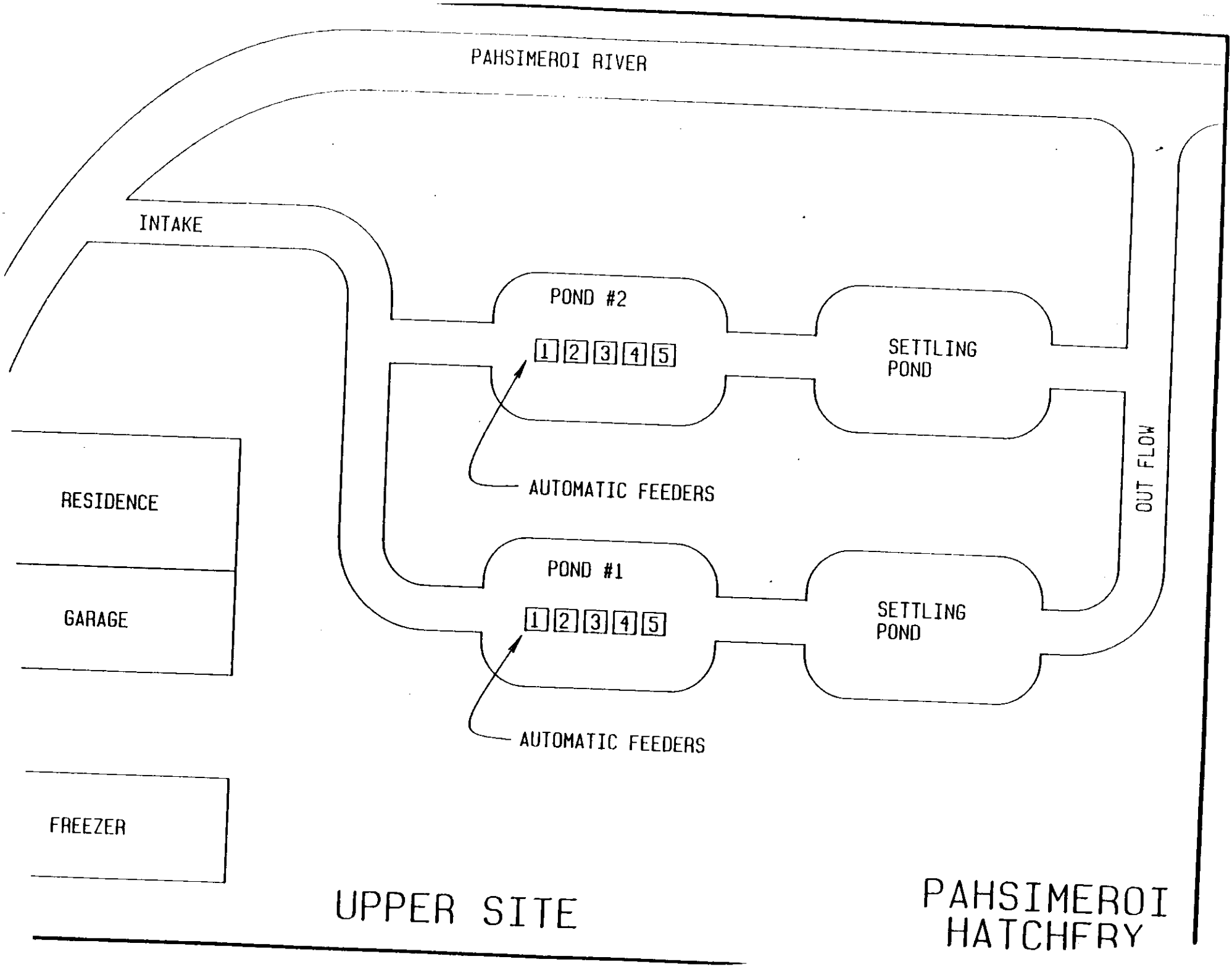
HOUSE
DOUBLE WIDE
TRAILER
LOWER SITE
PAHSIMEROI
HATCHERY


PAHSIMEROI RIVER
INTAKE
POND #2
1 2 3 4 5
SETTLING POND
AUTOMATIC FEEDERS
OUT FLOW
RESIDENCE
GARAGE
POND #1
1 2 3 4 5
SETTLING POND
AUTOMATIC FEEDERS
FREEZER
UPPER SITE
PAHSIMEROI HATCHERY

Rapid River Hatchery

INTRODUCTION

Rapid River Hatchery is located along Rapid River in the lower Snake River Basin near Riggins, Idaho. It is approximately 606 river miles from the mouth of the Columbia River at an elevation of 2,185 feet above sea level. The hatchery is staffed with 3 FTEs.

Rearing units are in poor to good condition and consist of 12 raceways, 5 rearing ponds and 3 adult holding ponds. A fish barrier and trap are located approximately 1.5 miles downstream from the hatchery.

Water is supplied to the hatchery from Rapid River. All water is gravity flow with the hatchery receiving 12,567 gpm and the trap receiving 8,348 gpm.

Rearing Facilities at Rapid River Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
Holding Pond 1	80	25	4	8,000	1	8,000	Concrete	29	Fair	ply. div.
Holding Pond 2	150	40	4	24,000	1	24,000	Dirt	27	Poor	
Holding Pond 3	250	80	4	80,000	1	80,000	Dirt	23	Poor	abandoned
Raceways	90	6	3	1,620	12	19,440	Concrete	27	Fair	11 usable
Rearing Pond 1	193.7	100	3.58	69,345	1	69,345	Cement/gravel	23	Good	
Rearing Pond 2A,D	197.3	335	3.41	23,551	2	47,102	Cement/gravel	7	Good	
Rearing Pond 2B,C	171.4	39.5	3.41	23,087	2	46,174	Cement/gravel	7	Good	Width varies
Heath Incubators					800		Fiber./Plastic	27	Fair	16 trays/stk

PURPOSE

Rapid River Hatchery was constructed in 1964 to mitigate for fishery losses caused by Idaho Power Company's construction of hydroelectric dams on the Snake River in Hells Canyon. The hatchery is used for adult collection, egg incubation and rearing of spring chinook. It also provides surplus spring chinook eggs to other hatchery programs in the basin. This station has reared spring chinook only.

GOALS

The mitigation agreement with Idaho Power Company requires an annual production of 3 million spring chinook smolts.

OBJECTIVES

Objective 1: Hatchery Production

Spring Chinook
Produce 2.5 million smolts for on-station release.

Produce 500,000 smolts for release into the Snake River below Hells Canyon Dam.

Provide surplus eggs to other non-listed hatchery programs in the basin.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

Spring Chinook: The intent of adult collection procedures at Rapid River Hatchery is to collect enough spring chinook adults to maintain the hatchery production goals and supply any surplus eggs to other basin-wide programs. Adult spring chinook return to the hatchery from mid-April through mid-September and are held at the hatchery until they are spawned. Spawning occurs during August and early September. There are usually a sufficient number of eggs taken to meet the hatchery production goals and supply the other facilities.

Summer Chinook: A native run of summer chinook is also trapped at Rapid River Hatchery. These fish usually arrive from early July through mid-September. These fish are distinguished from spring chinook through morphological characteristics and are released above the trap to spawn naturally in Rapid River.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Interactions between hatchery fish and other fish populations can have a negative effect on both total production from a watershed (through competition with naturally produced fish) and genetic integrity of wild fish (through crossbreeding). Specific hatchery practices such as fish size at release, time of release, acclimation, and the use of volitional release can all play a role in minimizing these interactions. For example, one important strategy for minimizing interactions is to rear fish to sufficient size so that smoltification occurs within nearly the entire population. This will help reduce the retention time in the downstream migration. Acclimating smolts to the parent stream water prior to their release can help reduce straying when they return as adults as well as increase survival to adulthood. The use of volitional release can help ensure that only actively migrating fish are released from the hatchery pond. The specific rearing and release strategies used at this hatchery are outlined below.

Spring Chinook

- Rear 2.5 million fish to a size of approximately 20 fish / pound and release on-station from mid-March through the first of April. All fish are marked prior to release.

- Rear 500,000 fish to a size of approximately 20 fish / pound and release off-station into the Snake River directly below Hells Canyon Dam in late March. All fish are marked prior to release.

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection and Spawning

Due to low numbers of returning adults, all spring chinook collected are used for basin-wide hatchery programs. Adults are mated randomly and gametes from the entire run are used. Adults are spawned at a 1:1 male-to-female ratio. Surplus eggs provided to other facilities are collected throughout the entire run to maximize genetic integrity. Native summer chinook collected at the trap are released above the trap to spawn naturally.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs All Stocks

The primary objective of fish health management programs at all IDFG hatcheries is to produce quality, healthy fish that will survive to adults. Equally important is to prevent the introduction, amplification or spread of fish pathogens which might adversely affect the health of both hatchery and wild / natural fish.

IDFG has disease control and prevention programs at all of its facilities in an effort to achieve these objectives. These programs include the following standard elements:

<u>Disease Control</u>

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.

- Prescribe appropriate treatments and remedies to disease.

- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.

- Conduct applied research on new and existing techniques to control disease epidemics.

Disease Prevention

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.

- Implement disease preventative strategies in all aspects of fish culture to produce a quality, healthy fish. Prescribe optimal nutritional feeds and environmental conditions in the hatchery rearing containers. Use vaccines or antibiotics prophylactically in order to prevent disease.

- Restrict the introduction of infected stocks into facilities which may result in the introduction of new diseases.

- Use sanitation procedures which prevent introduction of pathogens into or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

Fish Health Activities at Rapid River Hatchery

Health Monitoring

- At least monthly, each fish lot is given an extensive health exam.

- Prior to release, fish are given an extensive health exam.

- Whenever abnormal behavior or mortality is detected, fish pathologists will examine the affected fish, make a diagnosis and recommend appropriate treatment.

- Adults are sampled for viral and bacterial pathogens through out the spawning period.

Therapeutic and Prophylactic Treatments

- Adult spring chinook are injected with antibiotics to control bacterial diseases.

- As eggs are collected from adults, they are water-hardened in iodophor as a treatment for viral and bacterial diseases.

- Juvenile fish are administered antibiotics, as needed, for the control of bacterial infections.

- Anti-fungal compounds are administered, as needed, to adults, eggs and juveniles for control of fungus and parasites.

- Only FDA-approved therapeutants are used.

Sanitation

- All eggs entering or leaving the facility are disinfected with an iodophor solution.

- All equipment (nets, waders, brooms, etc.) is disinfected between different rearing units.

- All tank trucks are disinfected prior to and after hauling fish to release sites.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

Environmental monitoring is conducted at all IDFG facilities, as required, to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit administered by the Environmental Protection Agency.

Objective 6: Communicate effectively with other fish producers, managers and the public.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to

monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communication for Fish and Egg Transfers: Communication between IDFG, Oregon Department of Fish and Wildlife, the U.S. Fish and Wildlife Service and Idaho Power Company takes place each year to coordinate fish and egg transfers in an effort to meet basin-wide goals.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development of Annual Reports

A report documenting run timing, sex composition, mortality and egg-take is submitted annually. Brood-year reports documenting all fish culture activities (diseases, mortalities, growth, etc.) and research activities are produced once the entire brood year is released.

PERFORMANCE STANDARDS RAPID RIVER HATCHERY

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	CHS	2,450	1,766	127-4,468	
Adult Prespawn. Survival	CHS	>90%	80.5%	69.6-90.4%	1,2,3,4
Egg-take	CHS	4,000,000	3,639,857[1]	490,249-6,404K	
Green Egg-to-Fry Survival	CHS	>90%	89.6%	86.5-92.9%	5
Fry-to-Smolt Survival	CHS	>95%	88.7%	81.8-96.1%	6,7
Fish Releases	CHS	3,000,000	2,951,340	2,260K-3,286K	
Egg Transfers	CHS	Surplus	--[2]	--[2]	
Fish Transfers	CHS	N/A	N/A	N/A	
Adults Passed Upsteam	CHS	N/A	N/A	N/A	
Percent Survival	CHS	>0.5%	0.108%	0.170%	8,9,10

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolt Size at Release (fish/lb)	CHS	20.0	22.7	19.2-26.2	
Acclimation	CHS	Yes	Yes	--	
Volitional Release	CHS	Yes	Yes	--	

N/A=Not applicable.
[1] 1990-94 average.
[2] Not estimated for this report.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults Throughout Run	CHS	Yes	Yes	--	
Spawning Pop. >500	CHS	Yes	Yes	--	
Spawning Ratio Male:Female	CHS	1:1	1:1	1:1	

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to Disease Policy	CHS	Yes	Yes	--	

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Rapid River Hatchery	SA	SA				
CHS/Hells Canyon				+		
CHS/Rapid River			IHN	+		BS, CSH, FAT, MAS

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the Idaho Department of Fish and Game.)

Objective 5

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
TSS Effluent (Harvest)	All	N/A	6.24 mg/L	2.3-12.2 mg/L	
TSS Max Effluent (Non-harvest)	All	5.0 mg/L (monthly)	2.26 mg/L	1.5-3.4 mg/L	11
SS Effluent	All	<0.1 ml/L	<0.1 ml/L	<0.1 ml/L	11

Constraints/Comments—Rapid River Hatchery

1. Stress on adults during transport from the trap.

2. Design of holding pond results in stress on adults during sorting and handling during spawning.

3. Design of holding pond does not allow for segregation or easy accessibility to adults.

4. Elevated adult mortalities during the holding period caused by warm water temperatures.

5. Incubation and rearing water contains large amounts of sediment.

6. Raceways cannot be dried out or properly disinfected.

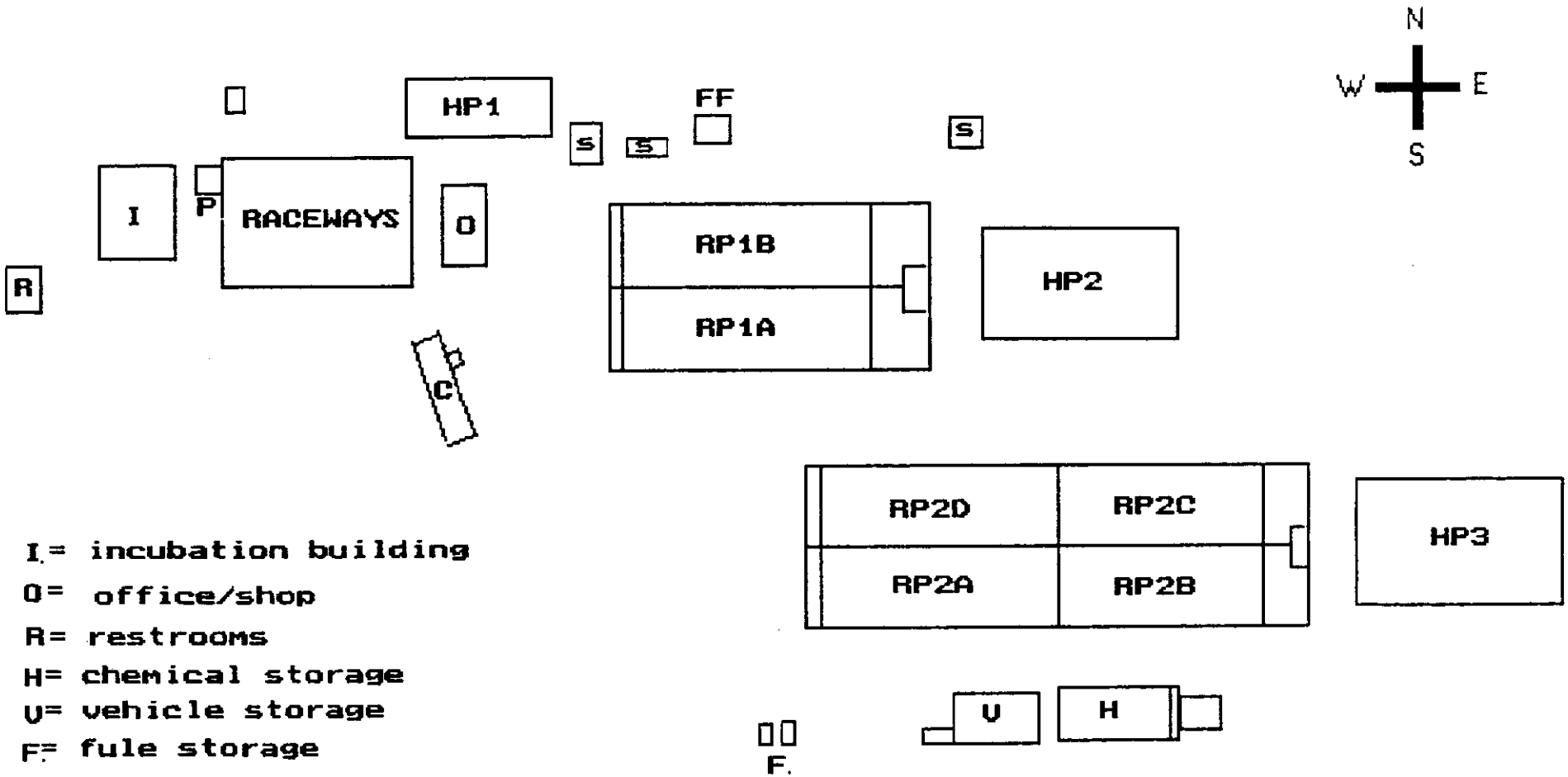
7. Cold water temperatures slow fry development.

8. Survival limited by sport and tribal fisheries.

9. Survival is limited by downstream harvest.

10. Mortality in reservoirs during smolt and adult migrations.

11. Hatchery does not have a viable settling pond.



I = incubation building
O = office/shop
R = restrooms
H = chemical storage
V = vehicle storage
F = fule storage
C = crew quarters
FF = feed freezer
S = storage
P = pump room

RAPID RIVER HATCHERY BASIC SITE LAYOUT

Sawtooth Hatchery

INTRODUCTION

Sawtooth Hatchery is located along the upper Salmon River near Stanley, Idaho. It is approximately 897 river miles from the mouth of the Columbia River at an elevation of 6,480 feet above sea level. A satellite facility is located on the East Fork Salmon River to trap adult chinook salmon and steelhead. Sawtooth Hatchery is staffed with 5 FTE's.

Water is supplied to the hatchery by gravity flow from the Salmon River and also pumped from three wells. Water from the river utilizes up to 15,709 gpm and the wells produce 1,700 gpm for incubation and early rearing. Water at the satellite facility is gravity flow from the East Fork Salmon River at 4,450 gpm (10 cfs) and is used for adult holding and trapping.

The hatchery consists of 100 stacks of incubators, 16 indoor rearing vats, 12 outside fry raceways, 28 final rearing raceways, a weir, fish trap, 2 adult holding ponds and a spawning area. The adult fish facility on the East Fork Salmon River consists of a weir, fish trap, three adult holding ponds and a spawning area located at the upper end of the holding ponds. No juvenile rearing occurs at the East Fork trap. All facility units are in good condition.

Rearing Facilities at Sawtooth Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
Sawtooth										
Adult Ponds	167	16	5	13,360	3	13,360	Concrete	10	Good-Fair	
Circulars		3.5	1.2	15	7	85	Plastic	1	Good	
Raceways	193	12	2.33	5,400	14	75,600	Concrete	10	Good	
Raceways	93	6	2.50	1,395	6	8,370	Concrete	10	Good	
Vats	42	4	2.3	391	16	6,263	Concrete	10	Good	
Display Vat	17	3.8	2.3		1	149	Concrete		Good	
Heath Incubators				.22	800	176	Fiber./Plastic	25	Good	
East Fork Trap										
Adult Holding Ponds	72	10	4	2,880	2	5,760	Concrete	10	Good	

PURPOSE

Sawtooth Hatchery was constructed in 1984-85 as part of the Lower Snake River Compensation Plan (LSRCP)—a program to mitigate for anadromous fishery losses caused by the construction of four hydroelectric dams on the lower Snake River. The hatchery is used for adult collection, egg incubation and rearing of spring chinook as well as adult collection and egg incubation of steelhead. The satellite facility is used for trapping and holding of adult chinook and steelhead (all eggs collected are shipped to Sawtooth Hatchery). Eyed steelhead eggs are shipped to hatcheries in southern Idaho where they are reared to smolts and returned to the upper Salmon River for release. The station has reared summer steelhead, spring chinook, sockeye, and kokanee

GOALS

The LSRCP mitigation goal is to return 19,445 spring chinook adults above Lower Granite Dam.

OBJECTIVES

Objective 1: Hatchery Production

<u>Spring Chinook</u>
Produce 1.6 million smolts (80,000 pounds) for on-station release.

Produce 700,000 smolts (35,000 pounds) for release into the East Fork Salmon River.

Provide surplus eggs to other hatchery programs in the basin.

<u>Summer Steelhead</u>
Trap and spawn adult steelhead to provide eggs to other hatcheries for the Lower Snake River Compensation Plan programs.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

Spring Chinook: The intent of adult collection procedures at Sawtooth Hatchery and the East Fork Satellite facility is to trap all returning adults and release up to 35 pairs upstream for natural spawning. Adult spring chinook return to the hatchery from mid-June through mid-September. Spawning occurs during August and early September. Because of low numbers of returning adults, there are seldom sufficient numbers of adults to meet hatchery mitigation goals.

Summer Steelhead: The intent of adult collection procedures at Sawtooth Hatchery and satellite facility is to trap and retain returning hatchery fish and release all wild / natural fish upstream for natural spawning. Adults return from early March through the end of April. Spawning occurs from the end of March through April. Eggs are held at the hatchery until they reach the eyed-stage. They are then shipped to other hatcheries for extended rearing.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Interactions between hatchery fish and other fish populations can have a negative effect on both total production from a watershed (through competition with naturally produced fish) and genetic integrity of wild fish (through crossbreeding). Specific hatchery practices such as fish size at release, time of release, acclimation, and the use of volitional release can all play a role in minimizing these interactions.

For example, one important strategy for minimizing interactions is to rear fish to sufficient size so that smoltification occurs within nearly the entire population. This will help reduce the retention time in the downstream migration. Acclimating smolts to the parent stream water prior to their release can help reduce straying when they return as adults as well as increase survival to adulthood. The use of volitional release can help ensure that only actively migrating fish are released from the hatchery pond. The specific rearing and release strategies used at this hatchery are outlined below.

Spring Chinook

- Rear 1.6 million spring chinook to a size of approximately 20 fish / pound and release on-station from mid-March through the first of April. All fish are marked prior to release.

- Rear 700,000 spring chinook to a size of approximately 20 fish / pound and release off-station into the East Fork of the Salmon River in late March. All fish are marked prior to release.

Summer Steelhead: No summer steelhead are reared at Sawtooth Hatchery, but some are volitionally released after acclimation.

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection and Spawning

Spring Chinook: Due to low numbers of returning adults, all spring chinook collected are used for basin-wide hatchery programs. Adults are collected throughout the entire run. Adults are mated randomly and gametes from the entire run are used. Adults are spawned at a 1:1 male-to-female ratio.

Summer Steelhead: Adults collected are utilized for spawning and eggs taken are shipped to other LSRCP facilities. All wild fish are released to spawn naturally, with additional hatchery adults outplanted for supplementation and reintroduction. Adults are spawned at a 1:1 male-to-female ratio.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs All Stocks

The primary objective of fish health management programs at all IDFG hatcheries is to produce quality, healthy fish that will survive to adults. Equally important is to

prevent the introduction, amplification or spread of fish pathogens which might adversely affect the health of both hatchery and wild / natural fish.

IDFG has disease control and prevention programs at all of its facilities in an effort to achieve these objectives. These programs include the following standard elements:

Disease Control

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.

- Prescribe appropriate treatments and remedies to disease.

- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.

- Conduct applied research on new and existing techniques to control disease epidemics.

Disease Prevention

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.

- Implement disease preventative strategies in all aspects of fish culture to produce a quality, healthy fish. Prescribe optimal nutritional feeds and environmental conditions in the hatchery rearing containers. Use vaccines or antibiotics prophylactically in order to prevent disease.

- Restrict the introduction of infected stocks into facilities which may result in the introduction of new diseases.

- Use sanitation procedures which prevent introduction of pathogens into or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

Fish Health Activities at Sawtooth Hatchery and Satellite

Health Monitoring

- At least monthly, each fish lot is given an extensive health exam.

- Prior to release, fish are given an extensive health exam.

- Whenever abnormal behavior or mortality is detected, fish pathologists will examine the affected fish, make a diagnosis and recommend appropriate treatment.

- Adults are sampled for viral and bacterial pathogens through out the spawning period.

Therapeutic and Prophylactic Treatments

- Adult spring chinook are injected with antibiotics to control bacterial diseases.

- As eggs are collected from adults, they are water-hardened in iodophor as a treatment for viral and bacterial diseases.

- Juvenile fish are administered antibiotics, as needed, for the control of bacterial infections.

- Anti-fungal compounds are administered, as needed, to adults, eggs and juveniles for control of fungus and parasites.

- Only FDA-approved therapeutants are used.

Sanitation

- All eggs entering or leaving the facility are disinfected with an iodophor solution.

- All equipment (nets, waders, brooms, etc.) is disinfected between different rearing units.

- All tank trucks are disinfected prior to and after hauling fish to release sites.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

Environmental monitoring is conducted at all IDFG facilities, as required, to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit administered by the Environmental Protection Agency.

Objective 6: Communicate effectively with other fish producers, managers and the public.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communication for Fish and Egg Transfers: Communication between IDFG the U.S. Fish and Wildlife Service takes place each year to coordinate fish and egg transfers in an effort to meet basin-wide goals.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development of Annual Reports

A report documenting run timing, sex composition, mortality and egg-take is submitted annually. Brood-year reports documenting all fish culture activities (diseases, mortalities, growth, etc.) and research activities are produced once the entire brood year is released.

PERFORMANCE STANDARDS—SAWTOOTH HATCHERY AND SATELLITE

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	CHS	2,000	625	96-1,488	9
	STS	2,100	992	261-1,705	9
Adult Prespawn. Survival	CHS	90%	96.9%	95.6-99.9%	1
	STS	90%	98%	96-99%	
Egg-take	CHS	2,850,000	793,756	29K-2,900K	6
	STS	5,000,000	893,447	133K-1,697K	6
Green Egg-to-Eye-Up Survival	CHS	90%	90%	87-94%	2
	STS	90%	88.7%	84.0-91.1%	
Fry-to-Smolt Survival	CHS	90%	82.9%	45.7-98%	8
	STS	N/A	N/A	N/A	
Fish Releases	CHS	2,300,000	961,943	214K-1,896K	3,5
	STS	N/A	N/A	N/A	
Egg Transfers	CHS	Surplus	--[1]	--[1]	
	STS	All	--[1]	--[1]	
Fish Transfers	CHS	0	0	0	
	STS	0	0	0	
Adults Passed Upstream	CHS	600	301	83-615	10
	STS	N/A	N/A	N/A	
Percent Survival	CHS	0.5%	0.143%[2]	0.039-0.433%	2
	STS	N/A	N/A	N/A	

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolt Size at Release (fish/lb)	CHS	20.0	25.2	22-30	3,5
	STS	N/A	N/A	N/A	
Acclimation	CHS	N/A	N/A	N/A	
	STS	N/A	N/A	N/A	3
Volitional Release	CHS	Yes	Yes	--	4,7
	STS	N/A	N/A	N/A	3

N/A=Not applicable.
[1] Not estimated for this report.
[2] Includes naturally produced fish.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults	CHS	Yes	Yes	--	
Throughout Run	STS	Yes	Yes	--	6,9
Spawning Pop.	CHS	Yes	448	117-894	6
>500	STS	Yes	482	71-669	6
Spawning Ratio	CHS	1:1	1:6:1	1:1-4:1	11
Male:Female	STS	1:1	1:1	1:1	11

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to	CHS	Yes	Yes	--	8
Disease Policy	STS	Yes	Yes	--	

History of Reportable Pathogens—1990-1995

	Water Supply				Furunc./	
Species/Stock	Inc.	Rear.	Virus	BKD	ERM	Other/Comments
Clearwater Hatchery	SA	SA				
CHF/E.F. Salmon R.				+		WHD
CHS/E.F. Salmon R.				+		BS, COS, CSH, FAT, MAS, WHD
STS/E.F. Salmon R. 'A'				+		
STS/E.F. Salmon R. 'B'				+		
STS/Pahsimeroi R. 'A'						WHD
CHS/Rapid R.						CWD
CHF/Sawtooth				+		
CHS/Sawtooth				+		BS, COS, CWD, MAS, SAP
STS/Sawtooth 'A'				+		CSH
STS/Sawtooth 'B'						
CHR/Sawtooth				+		WHD
CHR/South Fork				+		MAS

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the Idaho Department of Fish and Game.)

Objective 5

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
TSS Effluent	All	5.0 mg/L	0.73 mg/L	0.4-1.4 mg/L	
TSS Max Effluent	All	15 mg/L	N/A	N/A	
SS Effluent	All	<0.1 ml/L	<0.1 ml/L	<0.1 ml/L	

Constraints/Comments—Sawtooth Hatchery

1. Poor adult survival caused by high water temperatures in the settling pond and poor water quality.

2. High water temperatures during adult holding period affects egg quality.

3. Cold river water temperatures during the spring and early rearing.

4. Predation in the reservoirs during outmigration reduces fish survival.

5. Cold water during the spring hinders growth.

6. Egg-take is limited by the number of adults returning to the weirs.

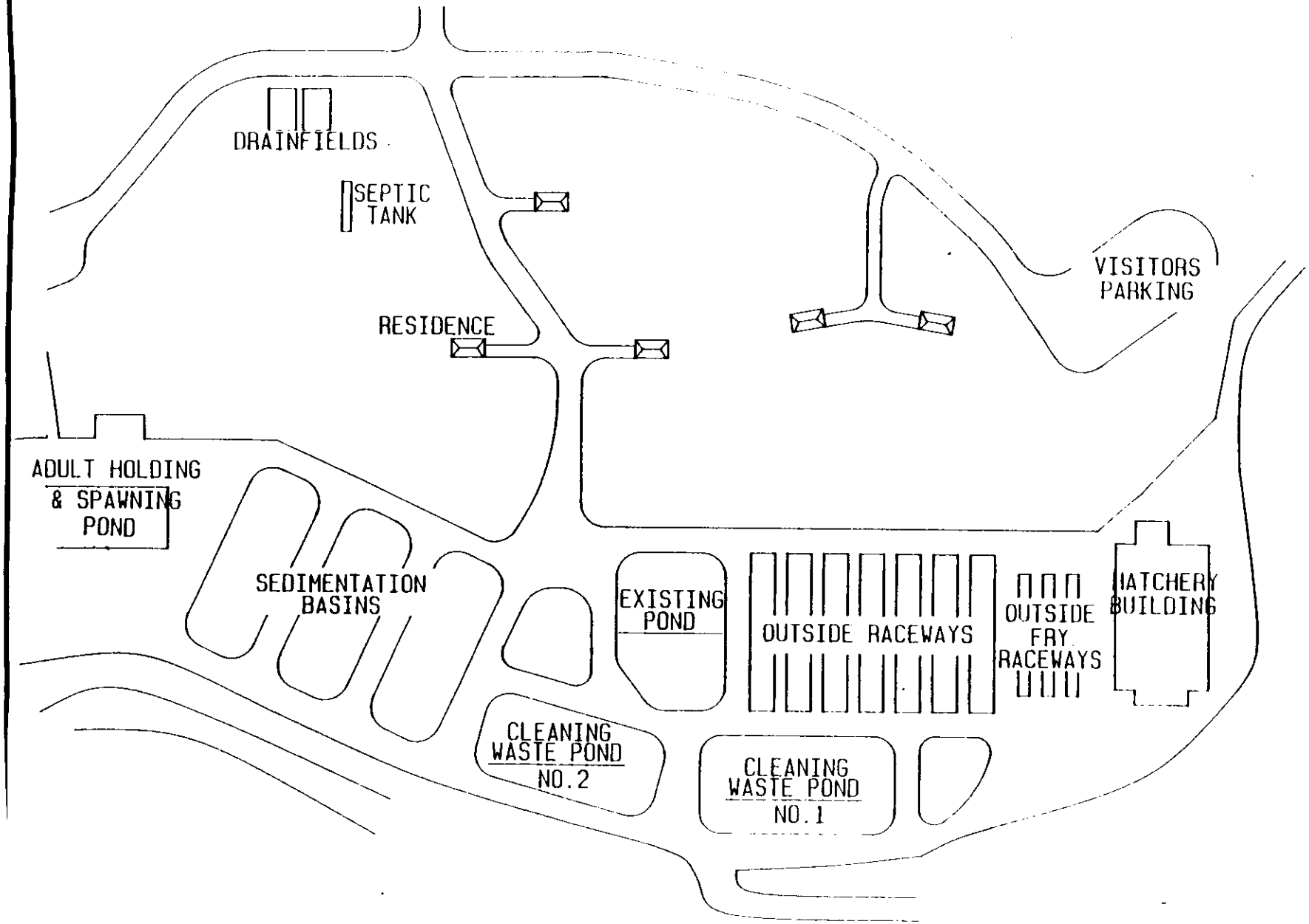
7. Lack of data to justify fall release, also ESA constraints.

8. Disease policy affected by lack of fish, ESA concerns, and politics.

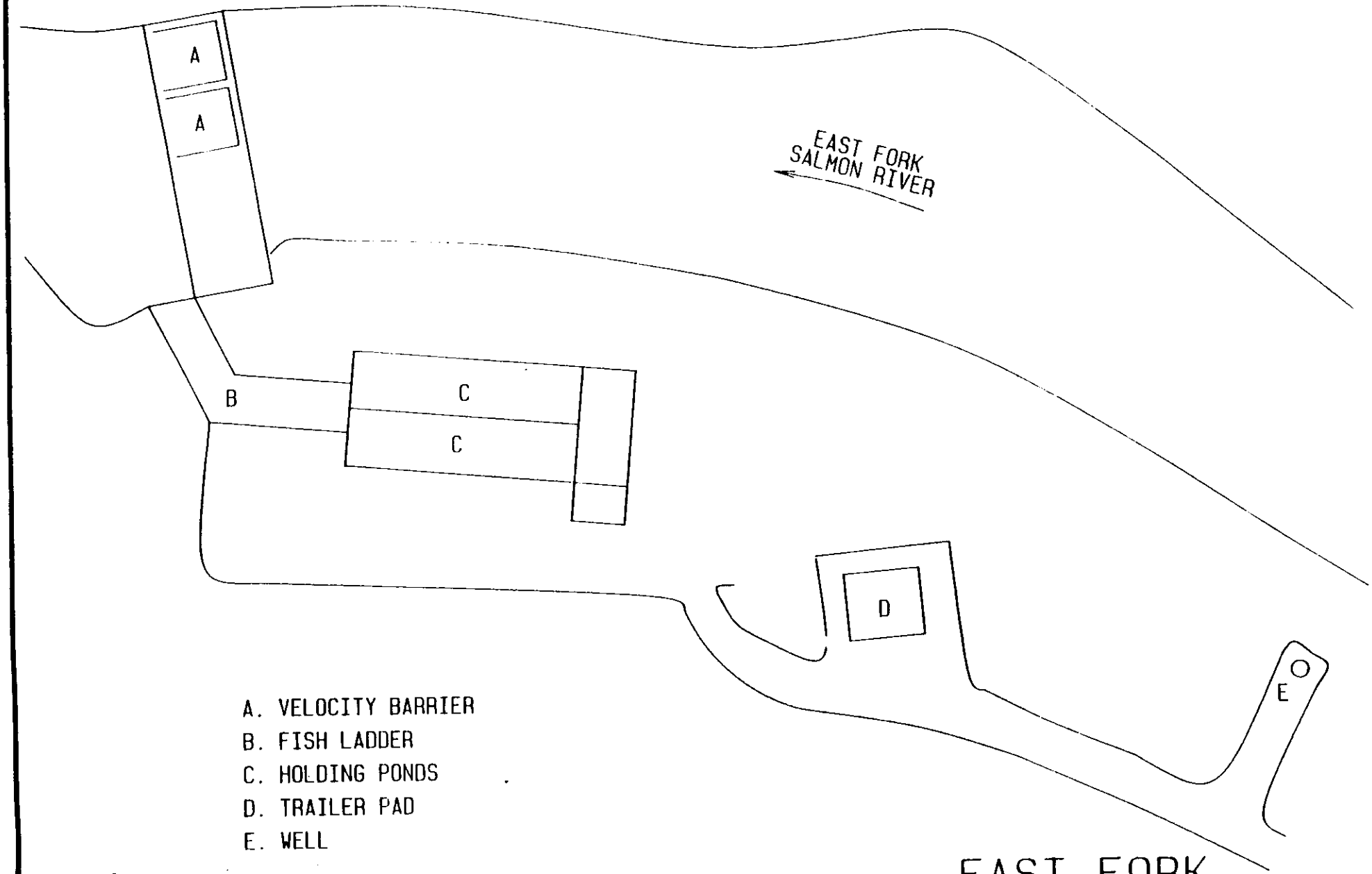
9. Weir location is too far up the drainage to capture the maximum number of adults.

10. Wild fish will be passed.

11. Poor survival rates limit smolt-to-adult returns.



SAWTOOTH
HATCHERY SITE PLAN



A. VELOCITY BARRIER
B. FISH LADDER
C. HOLDING PONDS
D. TRAILER PAD
E. WELL

EAST FORK SALMON RIVER SATELLITE FACILITIES

INTEGRATED
HATCHERY
OPERATIONS
TEAM

U.S. Fish and Wildlife Service Hatchery Operation Plans

Dworshak National Fish Hatchery

INTRODUCTION

Dworshak NFH is located at the confluence of the North Fork Clearwater River and the main stem Clearwater River near the unincorporated town of Ahsahka, in north-central Idaho. The site is 1,000 feet above sea level and is situated 3 miles west of Orofino, on the north bank of the Clearwater River and 1 mile downstream from the Dworshak Dam. The facility is authorized a staff level of 23 FTE's.

The facility consists of 84 Burrows ponds, 42 raceways, 3 adult holding ponds, 128 deep troughs and 45 stacks of vertical incubators. Water use ranges from 27,000 gpm to 83,000 gpm from the North Fork Clearwater River below Dworshak Dam.

Rearing Facilities at Dworshak National Fish Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
Brood Ponds	75	17	5	6,375	3	19,125	Concrete	25	Good	Adult holding only
Burrows Raceways	75	17	2.5	3.188	84	267,792	Concrete	25	Good	
Raceways	80	8	2.5	1,600	30	48,000	Concrete	14	Good	
Raceways	75	8	5	3,000	12	36,000	Concrete	25	Good	Adult holding/ rearing
Heath Incubators					45			15	Good	16 trays/stack
Starter Tanks	16	3	2.5	120	128	15,360	Concrete/ Fiberglass	25	Good	

PURPOSE

Dworshak NFH began operations in 1969 rearing summer steelhead and resident trout. Additional construction was completed in 1982 under the Lower Snake River Compensation Program (LSRCP) which expanded facilities to rear spring chinook salmon. The hatchery is to mitigate for loss of summer steelhead and resident trout habitat after the construction of Dworshak Dam on the North Fork Clearwater River. Spring chinook production is to mitigate for dams constructed on the lower Snake River.

GOALS

Produce adult summer steelhead and spring chinook salmon to the upper Clearwater River to compensate for fish losses caused by construction of Dworshak Dam and dams on the lower Snake River.

OBJECTIVES

Objective 1: Hatchery Production

Summer Steelhead (B-Strain)
Produce 1.2 million yearling smolts for on-station release.

Produce 1.1 million yearling smolts for off-station release.

Collect broodstock for the Clearwater Anadromous Fish Hatchery.

Spring Chinook
Produce 1.1 million yearlings smolts for on-station release.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other salmon producers and managers in the Columbia River Basin.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

The intent of the adult collection procedures at Dworshak NFH is to collect the adults necessary to maintain the hatchery production program and provide eggs to meet the needs of the LSRCP hatcheries in Idaho.

Summer Steelhead (B-Strain): Adult steelhead return to the hatchery rack from late October to May. Spawning occurs from late January to early May with a peak usually in March. Adults are captured at the hatchery weir.

Spring Chinook: Adult spring chinook return to the hatchery rack from early June to late August. Spawning occurs from late August to early September. Adults are captured at the hatchery weir.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Interactions between hatchery fish and other fish populations can have a negative effect on both total production from a watershed (through competition with naturally produced fish) and genetic integrity of wild fish (through crossbreeding). Specific hatchery practices such as fish size at release, time of release, acclimation, and the use of volitional release can all play a role in minimizing these interactions. For example, one important strategy for minimizing interactions is to rear fish to sufficient size so that smoltification occurs within nearly the entire population. This will help reduce the retention time in the downstream migration. Rearing smolts on parent river water can help reduce straying when they return as adults as well as increase their survival to adulthood. The use of volitional release can help ensure that only actively migrating fish are released from the hatchery pond. The specific rearing and release strategies used at this hatchery are detailed below.

Summer Steelhead: Rear 2.3 million fish to a size of 6 fish / pound; release 1.2 million fish on-station in May. Release 1.1 million smolts off-station into Clearwater River tributaries in April.

Spring Chinook: Rear 1.1 million fish to a size of 18 fish / pound and release on-station into the North Fork Clearwater River in mid-April.

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection—All Stocks

Adults are collected throughout the entire run to ensure that the run timing for these stocks is maintained. Fish identified as non-Clearwater origin are not used for spawning.

Spawning Protocol—All Stocks

The intent is to utilize a spawning population of at least 500 adults. Fish are randomly selected and spawned at 1:1 male-to-female ratio.

Acceptable Stocks

If numbers of returning broodstock are insufficient to meet the hatchery production goals, Rapid River stock has been used. However, no other broodstock is used and the hatchery production goals fall short.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs—All Stocks

The primary objective of fish health management programs at USFWS hatcheries is to produce healthy smolts that will contribute to the program goals of that particular stock. Equally important is to prevent the introduction, amplification or spread of certain fish pathogens which might negatively affect the health of both hatchery and naturally reproducing stocks.

The USFWS has Fish Health Policy and Implementation Guidelines as well as disease prevention programs at all of its facilities to try and achieve these objectives. These programs include the following standard elements:

<u>Disease Control</u>

- Perform necropsies to diagnose the cause of fish loss.
- Prescribe appropriate treatments and remedies to disease.
- Follow USFWS Fish Health Policy and Implementation Guidelines for restrictions on movements of diseased stocks.
- Conduct applied research on new and existing techniques to control disease epizootics.

Disease Prevention (Proactive)

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.

- Implement disease preventative strategies in all aspects of fish culture to produce a quality fish. This includes prescribing the optimal nutritional needs and environmental conditions in the hatchery rearing container based on historical disease events. It also involves the prophylactic use of vaccines in order to prevent a disease problem.

- Follow USFWS Fish Health Policy and Implementation Guidelines on the introduction of stocks into a facility which may result in the introduction of a new disease condition or mortality.

- Use sanitation procedures which prevent introduction of pathogens into and / or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

- Utilize pond management strategies (e.g., Density Index and Flow Index) to help optimize the quality of the aquatic environment and minimize fish stress which can induce infectious and noninfectious diseases. For example, the Density Index is used to estimate the maximum number of fish (of a given length) that can occupy a rearing unit based on the rearing unit's size. The Flow Index is used to estimate the rearing unit's carrying capacity based on water flows.

Fish Health Activities at Dworshak NFH

Health Monitoring

- On at least a monthly basis, both healthy and clinically diseased fish from each fish lot are given a health exam. The sample includes a minimum of 60 fish per lot.

- At spawning, a minimum of 60 ovarian fluids and 60 kidney / spleens are examined for viral pathogens from each species.

- Prior to transfer or release, fish are given a health exam. This exam may be in conjunction with the routine monthly visit. This sample consists of a minimum of 60 fish per lot.

- Whenever abnormal behavior or mortality is observed, the fish health specialist will examine the affected fish, make a diagnosis and recommend the appropriate remedial or preventative measures.

- Reporting and control of specific fish pathogens are conducted in accordance with the Co-Managers Fish Disease Control Policy and the USFWS Fish Health Policy and Implementation Guidelines.

Fish and Egg Movements

- Movements of fish and eggs are conducted in accordance with the Co-Managers Fish Disease Control Policy and the USFWS Fish Health Policy and Implementation Guidelines.

Therapeutic and Prophylactic Treatments

- At spawning, eggs are water-hardened in iodophor as a disinfectant.

- Juvenile fish are administered antibiotics orally when needed for the control of bacterial infections.

- Formalin (37% formaldehyde) is dispensed into water for the control of fungus on eggs and the control of parasites on juveniles and adult salmon. Treatment dosage and time of exposure varies with species, life-stage and condition being treated.

- Only therapeutants approved by the U.S. Food and Drug Administration or those under Investigative New Animal Drug permits are used for treatments.

Sanitation

- All eggs brought to the facility are surface-disinfected with iodophor as per the USFWS Fish Health Policy.

- All equipment (nets, tanks, rain gear) is disinfected with iodophor between different fish / egg lots.

- Different fish / egg lots are physically distinct and kept in separate ponds or incubation units.

- Tank trucks or tagging trailers are disinfected when brought onto the station.

- Foot baths containing iodophor are strategically located on the hatchery grounds (i.e., entrance to hatchery building) to prevent spread of pathogens.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

Primarily, environmental monitoring is conducted at USFWS facilities to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit. It is also used in managing fish health. On a short-term basis, monitoring helps identify when changes to hatchery practices are required. Long-term monitoring provides the ability to quantify water quality impacts resulting from changes in the watershed (e.g., logging, road building and urbanization). The following parameters are currently monitored at this hatchery:

- *Total Suspended Solids (TSS)*—1 to 2 times per month on composite effluent, maximum effluent and influent samples. Once per month on pollution abatement pond influent and effluent samples.

- *Settleable Solids (SS)*—1 to 2 times per month on effluent and influent samples. Once per week on pollution abatement pond influent and effluent samples.

- *In-hatchery Water Temperatures*—maximum and minimum daily.

- *In-hatchery Dissolved Oxygen*—as required by steam flow or weather conditions.

Objective 6: Communicate effectively with other salmon producers and managers.

Coordination/Communication within USFWS

The hatchery holds quarterly hatchery evaluation team (HET) meetings. These meetings include hatchery, management, and fish health representatives. Topics of concern include reports on current activities and accomplishments, present management programs, and future plans or studies that might affect, or be affected by hatchery operations. The hatchery evaluation team prepares an annual broodyear report for monitoring our progress at meeting hatchery objectives. Production is coordinated with the co-managers through the Production Advisory Committee, and with concurrence of the Regional office.

The hatchery also holds two coordination meetings each year. Cooperators and other interested parties are invited to hear reports on the accomplishments, review plans for the following six months, and present management programs that might affect, or be affected by hatchery operations. These meetings also serve as a forum to share technical information.

Interagency Coordination/Communication

The USFWS hatchery managers communicate through the regional "Fishery Resource Offices," and a basin-wide "Columbia River Fisheries Program Office" that participates in the following forums:

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

Record Keeping

This station reports through the Columbia River Information System (CRIS) of the U.S. Fish and Wildlife Service. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. The CIS development is being funded by Bonneville Power Administration. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development and Review of Brood Documents

The three brood documents are reviewed and agreed to annually. The Equilibrium Brood Document for the Columbia River and/or major tributaries has not yet been developed. It would document existing baseline production and current management. The Future Brood Document is a detailed listing of annual production

goals. This is reviewed and updated each spring, and is finalized by July. The Current Brood Document reflects actual production relative to the annual production goals. It is developed in the spring after eggs are taken. It is usually finalized by March.

PERFORMANCE STANDARDS—DWORSHAK N/ATION/AL FISH HATCHERY

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	STS	3,700	5,007	1,811-7,900	
	CHS	1,200	311	74-823	
Adult Prespawning Survival	STS	95%	89%	82-96%	
	CHS	90%	87%	80-90%	
Egg-take	STS	6.7M	8.3M	6.8M-11M	
	CHS	1.6M	561K[1]	76K-1.5M[1]	
Green Egg-to-Fry Survival	STS	85%	78%	70-83%	
	CHS	90%	88%	87-92%	
Fry-to-Smolt Survival	STS	81%	65%	53-76%	
	CHS	85%	80%	86-96%	
Fish Releases	STS	2.3M	2.3M	1.8M-2.4M	
	CHS	1.1M	1.2M	467K-1.7M	
Egg Transfers	STS	2.4M	2.05M	1.2-2.45M	
	CHS	0	0	0	
Fish Transfers	STS	0	0	0	
	CHS	0	0	0	
Adults Passed Upstream	STS	0	0	0	
	CHS	0	0	0	
Percent Survival	STS	1.2%	0.56%	0.3-0.9%	
	CHS	0.3%	0.06%	0.005-0.19%	

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolts Size at Release (fish/lb)	STS	5.9	6	5.2-7.5	
	CHS	20	17	16-19	
Acclimation	STS	Yes	Yes	--	
	CHS	Yes	Yes	--	
Volitional Release	STS	No	No	--	
	CHS	No	No	--	

[1] 1993-95 data. Prior to 1993, stock mixed with Kooskia NFH.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults	STS	Yes	Yes	--	
Throughout Run	CHS	Yes	Yes	--	
Spawning Pop.	STS	Yes	1,712[1]	1,450-2,059[1]	
>500	CHS	Yes	248[1]	27-666[1]	
Spawning Ratio	STS	1:1	1:2.38[1]	1:1.48-1:2.85[1]	2
Male:Female	CHS	1:1	1:2.04[1]	1:1.06-1:3.5[1]	

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to	STS	Yes	Yes	--	
Disease Policy	CHS	Yes	Yes	--	

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Dworshak Hatchery	SR	SA				
STS/Clearwater 'B' (adults)			IHN	+	ERM	*C. shasta*/EIBS
STS/Clearwater 'B' (juveniles)			IHN	+	ERM	EIBS
CHS/Clearwater (adults)			IHN	+	ERM	*C. shasta*
CHS/Clear Creek (adults)			IHN	+	ERM	*C. shasta*/EIBS
CHS/Clear Creek/Clearwater (juveniles)			IHN	+	ERM	EIBS

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the U.S. Fish and Wildlife Service.)

Objective 5

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Meet Requirements of NPDES Permit	All	Yes	Yes	--	

[1] 1993-95 data. Prior to 1993, stock mixed with Kooskia NFH.

Objective 6

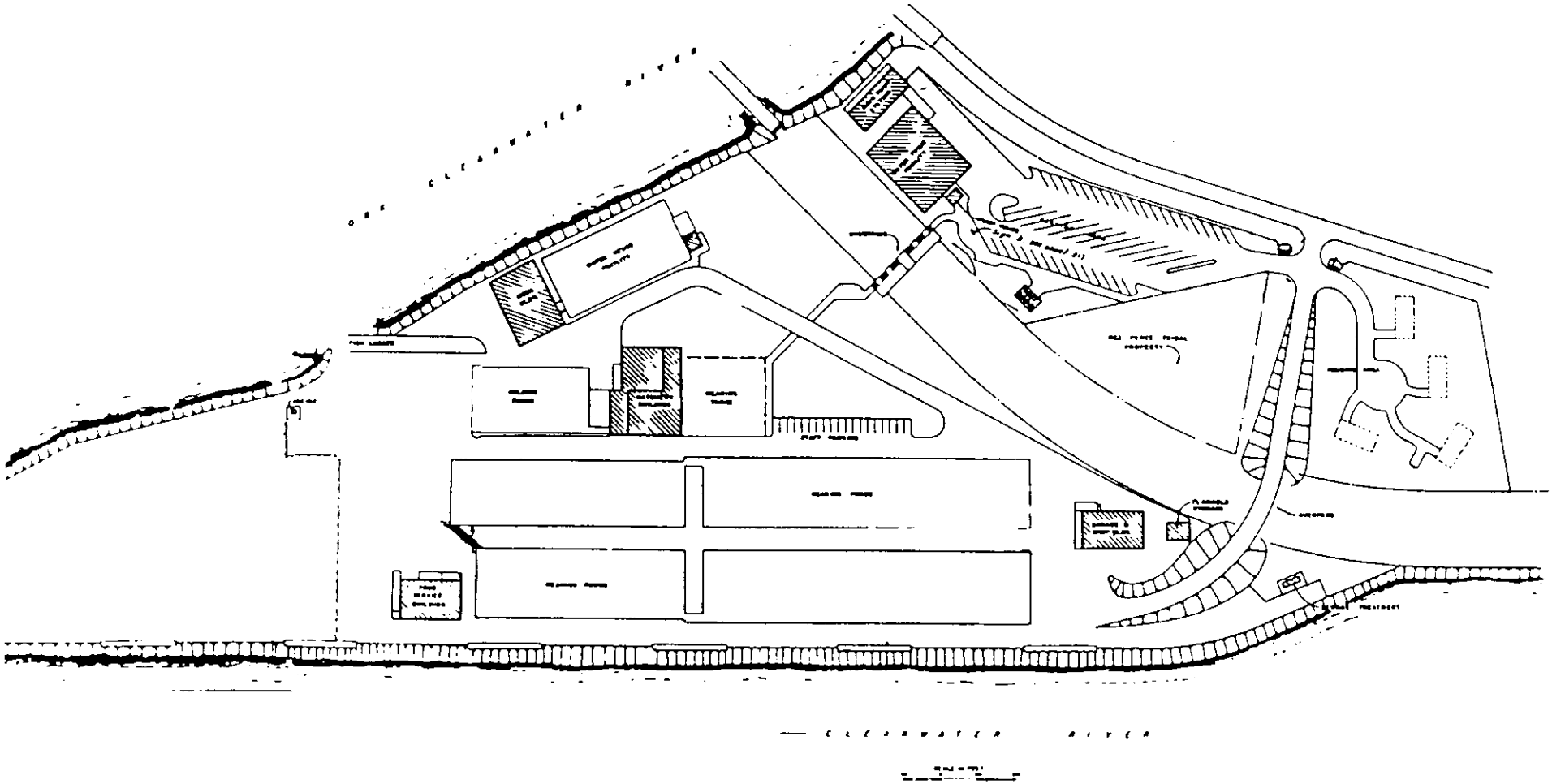
Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Check Hatchery Records for Accuracy and Completeness	All	Yes	Yes	--	
Develop and Review Equil. Brood Doc.	All	Yes	No	--	
Develop and Review Future Brood Doc.	All	Yes	Yes	--	
Develop and Review Current Brood Doc.	All	Yes	Yes	--	

Constraints/Comments—Dworshak National Fish Hatchery

1. Temperature of water released from Dworshak Reservoir sometimes restricts smolt size.

2. Brood collection in some years has resulted in spawning populations that are comprised of 75 percent females.

3. The Equilibrium Brood Document has not been completed at this time.



DWORSHAK NATIONAL FISH HATCHERY

AHSAHKA, IDAHO

Hagerman National Fish Hatchery

INTRODUCTION

The Hagerman NFH is located next to the Snake River in southern Idaho, approximately 5 miles southeast of the town of Hagerman. The facility is authorized a staff of 9.5 FTE's.

The facility consists of 102 raceways, 66 starter tanks and a display pond. Water temperature is a constant 59°F. Raceways are organized into two systems, each system with three tiers for serial re-use of water. Water rights are currently going through the Snake River Basin Water Rights Adjudication process. The amount claimed is 92.5 cfs from six major collecting structures.

Rearing Facilities at Hagerman National Fish Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
Brood Pond					0					
Heath Incubator					8		Fiberglass		Good	16 trays/stack
Jar Incubator					70		Plastic	12	Good	
Raceways	100	10	3	3,000	66	198,000	Concrete	28	Good	
Raceways	70	8	2.3	1,288	36	46,368	Concrete	28	Good	
Starter Tanks	15	2.6	2.6	140	20	2,800	Concrete	12	Good	
Starter Tanks	16	2.5	2.5	100	46	4,600	Concrete	45	Good	

PURPOSE

The hatchery was authorized in 1930 and began operating in 1933. Historically, production consisted of rearing rainbow trout for stocking waters in Idaho, Oregon and Nevada. In the late 1970s, trout production was reduced and the steelhead program started. The hatchery was remodeled and expanded from 1982 to 1984 as part of the Lower Snake River Compensation Program (LSRCP)—a program to mitigate for fishery losses caused by the four federal dams constructed on the lower Snake River.

Hagerman NFH is currently used for egg incubation and rearing of summer steelhead for LSRCP mitigation. It is also still used for rearing rainbow trout. No adults are collected or spawned at this facility. Eggs are transferred in from various Idaho Fish and Game facilities.

GOALS

Produce summer steelhead that will partially mitigate for summer steelhead losses incurred because of the construction of dams on the lower Snake River. The annual goal is 1,380,000 smolts averaging 5 fish per pound. The adult return goal is 13,600 fish to the Snake River Basin.

OBJECTIVES

Objective 1: Hatchery Production

Summer Steelhead
Produce 1.38 million smolts for off-station release into the Salmon and Snake rivers.

Other Species
Produce salmonids as needed to meet Fish and Wildlife Service goals.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other salmon producers and managers in the Columbia River Basin.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

The sections that follow describe the current hatchery practices used at this facility. Only practices associated with anadromous fish production are summarized in this portion of the report.

Objective 1: Hatchery Production

Adult Collection

No adults are collected or spawned at this facility because there is no fish passage at dams in the Hells Canyon reach of the Snake River. Summer steelhead eggs are transferred in from various Idaho Fish and Game facilities.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Interactions between hatchery fish and other fish populations can have a negative effect on both total production from a watershed (through competition with naturally produced fish) and genetic integrity of wild fish (through crossbreeding). Specific hatchery practices such as fish size at release, time of release, acclimation, and the use of volitional release can all play a role in minimizing these interactions. For example, one important strategy for minimizing interactions is to rear fish to sufficient size so that smoltification occurs within nearly the entire population. This will help reduce the retention time in the downstream migration. Rearing smolts on parent river water can help reduce straying when they return as adults as well as increase their survival to adulthood. The use of volitional release can help ensure that only actively migrating fish are released from the hatchery pond. The specific rearing and release strategies used at this hatchery are detailed below.

Summer Steelhead: Rear 1.38 million fish to a size of 5 fish / pound and release into the Salmon and Snake rivers in March and April.

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection and Spawning

No adults are collected or spawned at this facility. All hatchery production is the result of eggs transferred in from other facilities.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs—All Stocks

The primary objective of fish health management programs at USFWS hatcheries is to produce healthy smolts that will contribute to the program goals of that particular stock. Equally important is to prevent the introduction, amplification or spread of certain fish pathogens which might negatively affect the health of both hatchery and naturally reproducing stocks.

The USFWS has Fish Health Policy and Implementation Guidelines as well as disease prevention programs at all of its facilities to try and achieve these objectives. These programs include the following standard elements:

Disease Control

- Perform necropsies to diagnose the cause of fish loss.
- Prescribe appropriate treatments and remedies to disease.
- Follow USFWS Fish Health Policy and Implementation Guidelines for restrictions on movements of diseased stocks.
- Conduct applied research on new and existing techniques to control disease epizootics.

Disease Prevention (Proactive)

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.
- Implement disease preventative strategies in all aspects of fish culture to produce a quality fish. This includes prescribing the optimal nutritional needs and environmental conditions in the hatchery rearing container based on historical disease events. It also involves the prophylactic use of vaccines in order to prevent a disease problem.
- Follow USFWS Fish Health Policy and Implementation Guidelines on the introduction of stocks into a facility which may result in the introduction of a new disease condition or mortality.
- Use sanitation procedures which prevent introduction of pathogens into and/or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

- Utilize pond management strategies (e.g., Density Index and Flow Index) to help optimize the quality of the aquatic environment and minimize fish stress which can induce infectious and noninfectious diseases. For example, the Density Index is used to estimate the maximum number of fish (of a given length) that can occupy a rearing unit based on the rearing unit's size. The Flow Index is used to estimate the rearing unit's carrying capacity based on water flows.

Fish Health Activities at Hagerman NFH

Health Monitoring

- On at least a monthly basis, both healthy and clinically diseased fish from each fish lot are given a health exam. The sample includes a minimum of 60 fish per lot.

- Prior to transfer or release, fish are given a health exam. This exam may be in conjunction with the routine monthly visit. This sample consists of a minimum of 60 fish per lot.

- Whenever abnormal behavior or mortality is observed, the fish health specialist will examine the affected fish, make a diagnosis and recommend the appropriate remedial or preventative measures.

- Reporting and control of specific fish pathogens are conducted in accordance with the Co-Managers Fish Disease Control Policy and the USFWS Fish Health Policy and Implementation Guidelines.

Fish and Egg Movements

- Movements of fish and eggs are conducted in accordance with the Co-Managers Fish Disease Control Policy and the USFWS Fish Health Policy and Implementation Guidelines.

Therapeutic and Prophylactic Treatments

- At spawning, eggs are water-hardened in iodophor as a disinfectant.

- Juvenile fish are administered antibiotics orally when needed for the control of bacterial infections.

- Formalin (37% formaldehyde) is dispensed into water on an as needed basis for the control of fungus on eggs and the control of parasites on juveniles and adult salmon. Treatment dosage and time of exposure varies with species, life-stage and condition being treated.

- Only therapeutants approved by the U.S. Food and Drug Administration or those under Investigative New Animal Drug permits are used for treatments.

Sanitation

- All eggs brought to the facility are surface-disinfected with iodophor as per the USFWS Fish Health Policy.

- All equipment (nets, tanks, rain gear) is disinfected with iodophor between different fish / egg lots.

- Different fish / egg lots are physically isolated from each other by separate incubation units.

- Tank trucks or tagging trailers are disinfected when brought onto the station.

- Foot baths containing iodophor are strategically located on the hatchery grounds (i.e., entrance to hatchery building) to prevent spread of pathogens.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

Primarily, environmental monitoring is conducted at USFWS facilities to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit. It is also used in managing fish health. On a short-term basis, monitoring helps identify when changes to hatchery practices are required. Long-term monitoring provides the ability to quantify water quality impacts resulting from changes in the watershed (e.g., logging, road building and urbanization). The following parameters are currently monitored at this hatchery:

- *Total Suspended Solids (TSS)*—once per month on raceway effluent, settling pond influent, and settling pond effluent.

- *Settleable Solids (SS)*—twice per month on raceway effluent and once per week on settling pond influent and effluent.

- *Water Flows*—once per month on raceway and settling pond effluent flows.

- *In-hatchery Water Temperatures*—occasionally as spring water temperatures change very little.

- *In-hatchery Dissolved Oxygen*—as required based on numbers and size of fish in the raceways.

Objective 6: Communicate effectively with other salmon producers and managers.

Coordination/Communication within USFWS

The hatchery holds quarterly hatchery evaluation team (HET) meetings. These meetings include hatchery, management, and fish health representatives. Topics of concern include reports on current activities and accomplishments, present management programs, and future plans or studies that might affect, or be affected by hatchery operations. The hatchery evaluation team prepares an annual broodyear report for monitoring our progress at meeting hatchery objectives. Production is coordinated with the co-managers through the Production Advisory Committee, and with concurrence of the Regional office.

The hatchery also holds two coordination meetings each year. Cooperators and other interested parties are invited to hear reports on the accomplishments, review plans for the following six months, and present management programs that might affect, or be affected by hatchery operations. These meetings also serve as a forum to share technical information.

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Record Keeping

This station reports through the Columbia River Information System (CRIS) of the U.S. Fish and Wildlife Service. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. The CIS development is being funded by Bonneville Power Administration. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development and Review of Brood Documents

The three brood documents are reviewed and agreed to annually.

The Equilibrium Brood Document for the Columbia River and/or major tributaries has not yet been developed. It would document existing baseline production and current management.

The Future Brood Document is a detailed listing of annual production goals. This is reviewed and updated each spring, and is finalized by July.

The Current Brood Document reflects actual production relative to the annual production goals. It is developed in the spring after eggs are taken. It is usually finalized by March.

PERFORMANCE STANDARDS—HAGERMAN N/ATION/AL FISH HATCHERY

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	STS	N/A	N/A	N/A	
Adult Prespawning Survival	STS	N/A	N/A	N/A	
Egg-take	STS	N/A	N/A	N/A	
Green Egg-to-Fry Survival	STS	N/A	N/A	N/A	
Fry-to-Smolt Survival	STS	90%	93.6%	90.2-96.9%	1
Smolt Releases	STS	1.38M	849K	477K-1.44M	1
Egg Transfers	STS	0	0	0	
Fish Transfers	STS	As Needed	815K	0-1.27M	2
Adults Passed Upstream	STS	0	0	0	
Percent Survival	STS	N/A	Unknown	Unknown	

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolt Size at Release (fish/lb)	STS	5	4.6	4.3-4.8	
Acclimation	STS	Partial	No	--	4
Volitional Release	STS	No	No	--	

N/A=Not applicable.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults Throughout Run	STS	N/A	N/A	N/A	
Spawning Pop. >500	STS	N/A	N/A	N/A	
Spawning Ratio Male:Female	STS	N/A	N/A	N/A	

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to Disease Policy	STS	Yes	Yes	--	

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Hagerman Hatchery	G	G				
STS/Clearwater 'B"			IHN	+	ERM	
STS/Sawtooth			IHN	+	ERM	
STS/Pahsimeroi					ERM	

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the U.S. Fish and Wildlife Service.)

Objective 5

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Meet Requirements of NPDES Permit	All	Yes	Yes	--	

Objective 6

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Check Hatchery Records for Accuracy and Completeness	All	Yes	Yes	--	
Develop and Review Equil. Brood Doc.	All	Yes	No	--	5
Develop and Review Future Brood Doc.	All	Yes	Yes	--	
Develop and Review Current Brood Doc.	All	Yes	Yes	--	

Constraints/Comments—Hagerman National Fish Hatchery

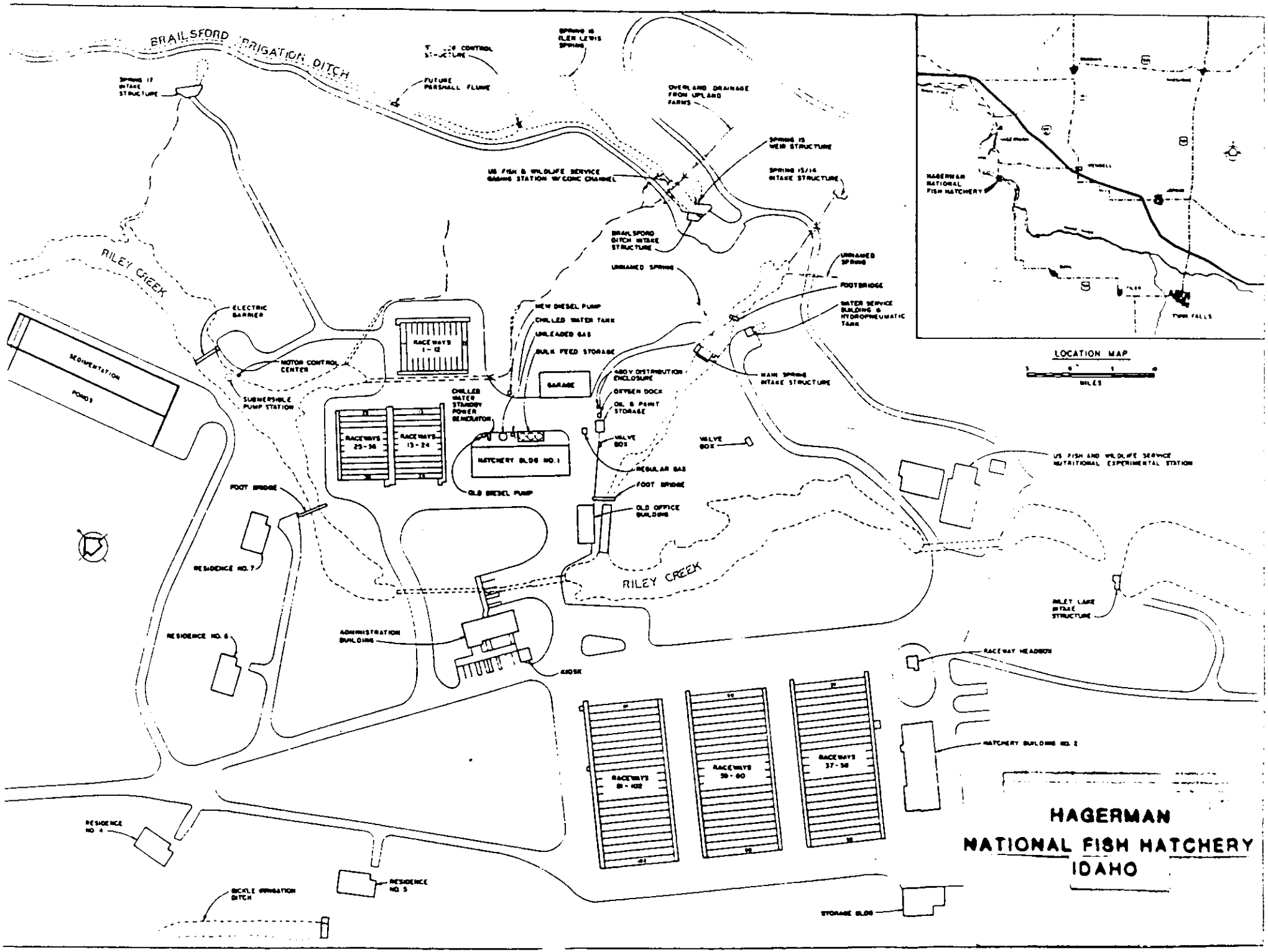
1. Bird predation reduced fry-to-smolt survival during the years analyzed for this report. A bird exclosure was completed in June 1993.

2. Steelhead fingerlings are produced and transferred to State or Federal hatcheries on an "as needed" basis.

3. Smolt size goal is set by Idaho Department of Fish and Game. The actual smolt size attained is dependent upon stocking dates, which often changes at the last minute.

4. Acclimation is being tested at this time. Approximately 524,200 smolts (1991 brood year) were released into Sawtooth Fish Hatchery raceways and 223,400 smolts were released into the Pahsimeroi Hatchery ponds in March 1992.

5. The Equilibrium Brood Document has not been completed at this time.


BRAILSFORD IRRIGATION DITCH
SPRING 17 INTAKE STRUCTURE
FUTURE PARSHALL FLUME
SPRING 16 ALER LEWIS SPRING
OVERLAND DRAINAGE FROM UPLAND FARMS
SPRING 15 WEIR STRUCTURE
US FISH & WILDLIFE SERVICE GAGING STATION W/CONC CHANNEL
SPRING 13/14 INTAKE STRUCTURE
BRAILSFORD DITCH INTAKE STRUCTURE
UNNAMED SPRING
UNNAMED SPRING
FOOTBRIDGE
WATER SERVICE BUILDING & HYDROPNEUMATIC TANK
RILEY CREEK
ELECTRIC BARRIER
NEW DIESEL PUMP
CHILLED WATER TANK
UNLEADED GAS
BULK FEED STORAGE
RACEWAYS 1 - 12
SEDIMENTATION PONDS
MOTOR CONTROL CENTER
SUBMERSIBLE PUMP STATION
GARAGE
480V DISTRIBUTION ENCLOSURE
OXYGEN DOCK
OIL & PAINT STORAGE
MAIN SPRING INTAKE STRUCTURE
CHILLED WATER STANDBY POWER GENERATOR
RACEWAYS 25 - 36
RACEWAYS 13 - 24
HATCHERY BLDG NO. 1
VALVE BOX
VALVE BOX
REGULAR GAS
FOOT BRIDGE
OLD DIESEL PUMP
OLD OFFICE BUILDING
US FISH AND WILDLIFE SERVICE NUTRITIONAL EXPERIMENTAL STATION
FOOT BRIDGE
RESIDENCE NO. 7
RILEY CREEK
INLET LAKE INTAKE STRUCTURE
RESIDENCE NO. 6
ADMINISTRATION BUILDING
KIOSK
RACEWAY HEADBOX
RACEWAYS 61 - 102
RACEWAYS 39 - 60
RACEWAYS 37 - 38
HATCHERY BUILDING NO. 2
RESIDENCE NO. 4
RESIDENCE NO. 5
BICKLE IRRIGATION DITCH
STORAGE BLDG
HAGERMAN NATIONAL FISH HATCHERY
IDAHO
HAGERMAN NATIONAL FISH HATCHERY
TWIN FALLS
LOCATION MAP
MILES

Kooskia National Fish Hatchery

INTRODUCTION

Kooskia NFH is located in north-central Idaho, approximately 75 miles southeast of Lewiston in northwest Idaho County. The hatchery is situated in a narrow valley of Clear Creek, just upstream of the confluence with the Middle Fork Clearwater River. Site elevation is 1,295 feet above sea level. The facility is operated as a satellite facility of Dworshak NFH and is staffed with 4.0 FTE's.

The facility consists of 12 raceways, 6 Burrows ponds, 42 circular starter tanks, 32 rectangular starter tanks and 1 adult holding pond. Water rights total 13,456 gpm from six wells and Clear Creek. Just over half the water is from Clear Creek. Water available for hatchery use ranges from 4,389 gpm to 8,527 gpm, with the majority supplied from Clear Creek. The hatchery is operated with a water re-use system that incorporates bio-filters between uses.

Rearing Facilities at Kooskia National Fish Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material	Age	Condition	Comment
Brood Pond	72	16	4	4,608	1	4,608	Concrete	21	Good	
Heath Incubator					32		Fiberglass	10	Good	
Burrows Raceways	80	17	2	2,720	6	16,320	Concrete	28	Fair	
Raceways	80	60	1.6	1,024	12	12,288	Concrete	28	Fair	
Circular Starter Tanks				75	42	3,150	Fiberglass	26	Good	
Rectangular Starter Tanks					32					

PURPOSE

The hatchery was authorized in 1961 to facilitate restoration of depleted, nationally significant fishery resources. It is currently used for adult collection and rearing of spring chinook (spawning and incubation occurs at Dworshak NFH).

GOALS

Produce spring chinook to help restore depleted upriver salmon stocks.

OBJECTIVES

Objective 1: Hatchery Production

Produce 800,000 yearling spring chinook for on-station release.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other salmon producers and managers in the Columbia River Basin.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

The intent of adult collection procedures at Kooskia NFH is to collect as many adults as possible to maintain the hatchery production program and to establish tribal and sport harvest opportunities.

Entry of adult spring chinook into the subbasin occurs from May through September with a peak in early June. Adults are trapped at Kooskia NFH. However, because of warm Clear Creek water temperatures, fish must be transferred to Dworshak NFH for maturation and spawning. Eyed eggs are returned to Kooskia NFH in October.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Interactions between hatchery fish and other fish populations can have a negative effect on both total production from a watershed (through competition with naturally produced fish) and genetic integrity of wild fish (through crossbreeding). Specific hatchery practices such as fish size at release, time of release, acclimation, and the use of volitional release can all play a role in minimizing these interactions. For example, one important strategy for minimizing interactions is to rear fish to sufficient size so that smoltification occurs within nearly the entire population. This will help reduce the retention time in the downstream migration. Rearing smolts on parent river water can help reduce straying when they return as adults as well as increase their survival to adulthood. The use of volitional release can help ensure that only actively migrating fish are released from the hatchery pond. The specific rearing and release strategies used at this hatchery are detailed below.

Spring Chinook: Transfer eyed eggs from Dworshak NFH to Kooskia NFH in October; rear 800,000 fish to a yearling smolt size of 20 fish / pound and release on-station in April.

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection

Adults are collected throughout the entire run to ensure that the run timing for these stocks is maintained.

Spawning Protocol

No spawning occurs at this facility. The Kooskia adults transferred to Dworshak NFH are held in separate holding ponds and eggs remain segregated after spawning.

Acceptable Stocks

Only spring chinook returning to Clear Creek are used for broodstock.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs—All Stocks

The primary objective of fish health management programs at USFWS hatcheries is to produce healthy smolts that will contribute to the program goals of that particular stock. Equally important is to prevent the introduction, amplification or spread of certain fish pathogens which might negatively affect the health of both hatchery and naturally reproducing stocks.

The USFWS has Fish Health Policy and Implementation Guidelines as well as disease prevention programs at all of its facilities to try and achieve these objectives. These programs include the following standard elements:

Disease Control

- Perform necropsies to diagnose the cause of fish loss.
- Prescribe appropriate treatments and remedies to disease.
- Follow USFWS Fish Health Policy and Implementation Guidelines for restrictions on movements of diseased stocks.
- Conduct applied research on new and existing techniques to control disease epizootics.

Disease Prevention (Proactive)

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.
- Implement disease preventative strategies in all aspects of fish culture to produce a quality fish. This includes prescribing the optimal nutritional needs and environmental conditions in the hatchery rearing container based on historical disease events. It also involves the prophylactic use of vaccines in order to prevent a disease problem.
- Follow USFWS Fish Health Policy and Implementation Guidelines on the introduction of stocks into a facility which may result in the introduction of a new disease condition or mortality.
- Use sanitation procedures which prevent introduction of pathogens into and/or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

- Utilize pond management strategies (e.g., Density Index and Flow Index) to help optimize the quality of the aquatic environment and minimize fish stress which can induce infectious and noninfectious diseases. For example, the Density Index is used to estimate the maximum number of fish (of a given length) that can occupy a rearing unit based on the rearing unit's size. The Flow Index is used to estimate the rearing unit's carrying capacity based on water flows.

Fish Health Activities at Kooskia NFH

Health Monitoring

- On at least a monthly basis, both healthy and clinically diseased fish from each fish lot are given a health exam. The sample includes a minimum of 60 fish per lot.

- Prior to transfer or release, fish are given a health exam. This exam may be in conjunction with the routine monthly visit. This sample consists of a minimum of 60 fish per lot.

- Whenever abnormal behavior or mortality is observed, the fish health specialist will examine the affected fish, make a diagnosis and recommend the appropriate remedial or preventative measures.

- Reporting and control of specific fish pathogens are conducted in accordance with the Co-Managers Fish Disease Control Policy and the USFWS Fish Health Policy and Implementation Guidelines.

Fish and Egg Movements

- Movements of fish and eggs are conducted in accordance with the Co-Managers Fish Disease Control Policy and the USFWS Fish Health Policy and Implementation Guidelines.

Therapeutic and Prophylactic Treatments

- At spawning, eggs are water-hardened in iodophor as a disinfectant.

- Juvenile fish are administered antibiotics orally when needed for the control of bacterial infections.

- Formalin (37% formaldehyde) is dispensed into water for the control of fungus on eggs and the control of parasites on juveniles and adult salmon. Treatment dosage and time of exposure varies with species, life-stage and condition being treated.

- Only therapeutants approved by the U.S. Food and Drug Administration or those under Investigative New Animal Drug permits are used for treatments.

Sanitation

- All eggs brought to the facility are surface-disinfected with iodophor as per the USFWS Fish Health Policy.

- All equipment (nets, tanks, rain gear) is disinfected with iodophor between different fish / egg lots.

- Different fish / egg lots are physically distinct and kept in separate ponds or incubation units.

- Tank trucks or tagging trailers are disinfected when brought onto the station.

- Foot baths containing iodophor are strategically located on the hatchery grounds (i.e., entrance to hatchery building) to prevent spread of pathogens.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

Primarily, environmental monitoring is conducted at USFWS facilities to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System Permit. It is also used in managing fish health. On a short-term basis, monitoring helps identify when changes to hatchery practices are required. Long-term monitoring provides the ability to quantify water quality impacts resulting from changes in the watershed (e.g., logging, road building and urbanization). The following parameters are currently monitored at this hatchery:

- *Total Suspended Solids (TSS)*—1 to 2 times per month on composite effluent, maximum effluent and influent samples. Once per month on pollution abatement pond influent and effluent samples.

- *Settleable Solids (SS)*—1 to 2 times per month on effluent and influent samples. Once per week on pollution abatement pond influent and effluent samples.

- *In-hatchery Water Temperatures*—maximum and minimum daily.

- *In-hatchery Dissolved Oxygen*—as required by steam flow or weather conditions.

Objective 6: Communicate effectively with other salmon producers and managers.

Coordination/Communication within USFWS

The hatchery holds quarterly hatchery evaluation team (HET) meetings. These meetings include hatchery, management, and fish health representatives. Topics of concern include reports on current activities and accomplishments, present management programs, and future plans or studies that might affect, or be affected by hatchery operations. The hatchery evaluation team prepares an annual broodyear report for monitoring our progress at meeting hatchery objectives. Production is coordinated with the co-managers through the Production Advisory Committee, and with concurrence of the Regional office.

The hatchery also holds two coordination meetings each year. Cooperators and other interested parties are invited to hear reports on the accomplishments, review plans for the following six months, and present management programs that might affect, or be affected by hatchery operations. These meetings also serve as a forum to share technical information.

Interagency Coordination/Communication

The USFWS hatchery managers communicate through the regional "Fishery Resource Offices," and a basin-wide "Columbia River Fisheries Program Office" that participates in the following forums:

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes. IHOT meets monthly and is currently developing a series of regional hatchery policies.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

Record Keeping

This station reports through the Columbia River Information System (CRIS) of the U.S. Fish and Wildlife Service. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. The CIS development is being funded by Bonneville Power Administration. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Development and Review of Brood Documents

The three brood documents are reviewed and agreed to annually. The Equilibrium Brood Document for the Columbia River and/or major tributaries has not yet been developed. It would document existing baseline production and current management. The Future Brood Document is a detailed listing of annual production goals. This is reviewed and updated each spring, and is finalized by July. The Current Brood Document reflects actual production relative to the annual production goals. It is developed in the spring after eggs are taken. It is usually finalized by March.

PERFORMANCE STANDARDS—KOOSKIA N/ATION/AL FISH HATCHERY

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	CHS	700	446	40-1,180	1
Adult Prespawning Survival	CHS	90%	90%	90%	
Egg-take	CHS	1.05M	811K[1]	34K-2.0M[1]	
Green Egg-to-Fry Survival	CHS	N/A[2]	N/A	N/A	
Fry-to-Smolt Survival	CHS	85%	87.5%	84-91%[2]	
Fish Releases	CHS	800K	513K	305K-815K	1
Egg Transfers	CHS	0	0	0	
Fish Transfers	CHS	0	0	0	
Adults Passed Upstream	CHS	10%	--[3]	0-10%	
Percent Survival	CHS	0.3%	--[3]	--[3]	

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Smolt Size at Release (fish/lb)	CHS	20	Yes	--	
Acclimation	CHS	Yes	Yes	--	
Volitional Release	CHS	No	No	--	

N/A=Not applicable.
[1] 1993-95 data. Prior to 1993, stock mixed with Dworshak NFH. Eggs are taken and started at Dworshak from Kooskia returns.
[2] Eyed eggs are shipped to Kooskia NFH.
[3] Not estimated for this report.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults Throughout Run	CHS	Yes	Yes	--	
Spawning Pop. >500	CHS	Yes	365[1]	12-916[1]	
Spawning Ratio Male:Female	CHS	1:1	1:1.25[1]	1:1.07-1:1.4[1]	

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to Disease Policy	CHS	Yes	Yes	--	

History of Reportable Pathogens—1990-1995

Species/Stock	Water Supply Inc.	Water Supply Rear.	Virus	BKD	Furunc./ ERM	Other/Comments
Kooskia Hatchery	G	S, SA				
CHS/Clear Creek (adults)			IHN	+	ERM	*C. shasta*/EIBS
CHS/Clear Creek (juveniles)				+	ERM	EIBS
STS/Clearwater 'B' (adults)			IHN		ERM	
STS/Clearwater 'B' (juveniles)			IHN			

(Note: This is only a summary of reportable pathogens at this facility. More detailed information is available from the U.S. Fish and Wildlife Service.)

Objective 5

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Meet Requirements of NPDES Permit	All	Yes	Yes	--	

[1] 1993-1995 data. Prior to 1993, stock mixed with Dworshak NFH.

Objective 6

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Check Hatchery Records for Accuracy and Completeness	All	Yes	Yes	--	
Develop and Review Equil. Brood Doc.	All	Yes	No	--	2
Develop and Review Future Brood Doc.	All	Yes	Yes	--	
Develop and Review Current Brood Doc.	All	Yes	Yes	--	

Constraints/Comments—Kooskia National Fish Hatchery

1. Adult return is dependent upon migration conditions.

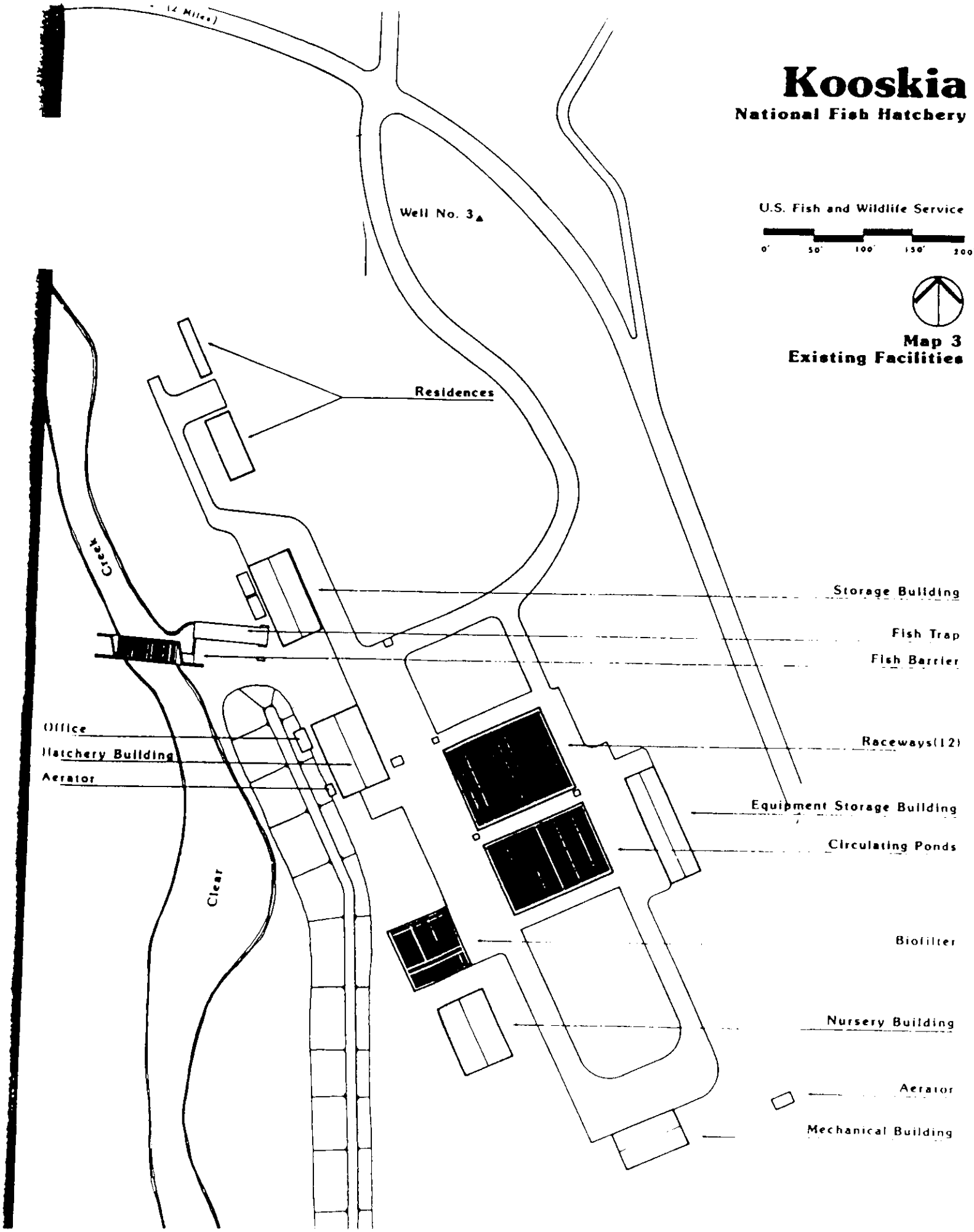
2. The Equilibrium Brood Document has not been completed at this time.

Kooskia
National Fish Hatchery

U.S. Fish and Wildlife Service

0' 50' 100' 150' 200'

Map 3
Existing Facilities



INTEGRATED
HATCHERY
OPERATIONS
TEAM

Nez Perce Tribe
Hatchery Operation Plan

Sweetwater Springs Hatchery

INTRODUCTION

Sweetwater Springs Hatchery is located on Sweetwater Creek, approximately 10 miles southeast of Lewiston, Idaho Sweetwater Creek is a tributary of Lapwai Creek (a Clearwater River tributary). Facility elevation is 2,900 feet above sea level. The facility is staffed with 3 FTE's when fish are on station. The facility is presently owned by Idaho Department of Fish and Game (IDFG). Ownership transfer to the Nez Perce Tribe (NPT) is being negotiated.

The facility was renovated by the Nez Perce Tribe in 1993 and has capacity for up to 1 million eggs. Outside facilities include 15 circular tanks and 4 portable pools.

The water source is Sweetwater Springs, which provides up to 5 cfs at a relatively constant temperature ranging from 48 to 50F. Discharge fluctuation is directly related to the water elevation in Lake Waha located 1 mile south of Sweetwater Springs. Water rights are being negotiated for the Nez Perce Tribe through the Snake River Basin Adjudication.

PURPOSE

Sweetwater Springs Hatchery was constructed by Idaho Department of Fish and Game in the early 1960s as an incubation and fry rearing station for chinook salmon and steelhead trout. IDFG has not used the facility since 1978. During the Nez Perce Tribal Hatchery (NPTH) planning process, the NPT identified this hatchery as a facility that could help build future broodstock returns for the NPTH Complex, which is not scheduled to be constructed until 1996. In August 1993, the IDFG Commission reviewed and approved a request from the NPT Department of Fisheries Resource Management to renovate and temporarily operate Sweetwater Springs Hatchery.

In the 1960s and 70s, IDFG used this facility to incubate spring chinook and steelhead eggs. The NPT has used Sweetwater Springs to rear spring chinook and coho salmon. Available rearing space limits large-scale fish production to parr size.

GOALS

The production goal at Sweetwater Springs Hatchery is to use artificial propagation to replace adult production lost due to smolt mortality at the four lower Snake River dams.

OBJECTIVES

Objective 1: Hatchery Production

Fluctuates annually with egg availability. Under current configuration, the hatchery is capable of rearing 400,000 fingerlings to a size of 100 fish / pound at a Density Index (lb / ft3 / in) of 0.2. Based on the existing water supply, installation of additional rearing containers could expand production to 1 million fingerlings. Future production under the NPTH Complex plan is programmed to be versatile allowing incubation, juvenile rearing and adult holding for one to four stocks..

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Objective 3: Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Objective 5: Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Objective 6: Communicate effectively with other salmon producers and managers in the Columbia River Basin, and with the spill coordination committee.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

Objective 1: Hatchery Production

Adult Collection

No adults are collected at this facility. In 1993, spring chinook eggs were shipped from Lookingglass and Wallowa hatcheries in Oregon. In 1994, coho eggs from Cascade Hatchery, Oregon were incubated at Sweetwater Springs following quarantine and culling at FISHPRO in Port Orchard, Washington. Future egg sources will be NPTH and / or other tribal projects.

Objective 2: Minimize interactions with other fish populations through proper rearing and release strategies.

Rearing and Release Strategies

Juvenile fish production at this hatchery is programmed to mimic nature. Specifically, incubation temperatures and growth rates are controlled so fish size approximates those produced by streams into which they are released. Release timing is selected to provide a friendly environment and natural food production supportive of fish. Scattered releases providing low densities are used to minimize ecological interactions with other species. The numbers of fish released are less than the estimated carrying capacity of streams.

Present production strategies seek to rear and release fingerlings either at, or prior to, attaining a size of 100 fish / pound. Size at release is modified to species and environment.

Objective 3: Maintain stock integrity and genetic diversity.

Broodstock Selection and Spawning

No adults are collected or spawned at this facility. Current use is to rear “surplus” fish from other hatcheries in the region. Future broodstock will be NPTH. Broodstock selection and spawning under NPTH protocols will include 1) collecting fish throughout the range of spawning timing, 2) using a 1:1 male-to-female spawning ratio when possible, 3) randomly pairing males and females by size and age, and 4) pairing hatchery and natural fish to select for successful natural traits.

Acceptable Stocks

Spring Chinook -	Rapid River stock, Kooskia Hatchery stock
Summer Chinook -	Mid-Columbia River summer chinook stock: September / October spawner, subyearling migrant
Fall Chinook -	Lyons Ferry stock, Clearwater River naturally spawning fall chinook
Coho -	Early-run Cascade Hatchery stock, other stocks being considered

Objective 4: Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

Fish Health Management Programs—All Stocks

The primary objective of fish health management programs at NPT hatcheries is to produce healthy fry, fingerlings and smolts that will contribute to fisheries and natural production. Equally important is to prevent the introduction, amplification or spread of certain fish pathogens which might negatively affect the health of both hatchery and naturally reproducing species / stocks.

The NPT implemented both disease control and disease prevention programs at Sweetwater Springs Hatchery to try and achieve these objectives. These programs include the following standard elements:

<u>Disease Control (Reactive)</u>

- Perform necropsies of diseased and dead fish to diagnose the cause of fish loss.

- Prescribe appropriate treatments and remedies to disease.

- Use a disease control policy which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.

- Conduct applied research on new and existing techniques to control disease epizootics.

Disease Prevention (Proactive)

- Routinely perform necropsies of clinically healthy fish to assess health status and detect problems before they progress to clinical disease or mortality.

- Implement disease preventative strategies in all aspects of fish culture to produce a quality fish. This includes prescribing the optimal nutritional needs and environmental conditions in the hatchery rearing container based on historical disease events. It also involves the prophylactic use of vaccines in order to avoid a disease problem.

- Use a disease prevention policy which controls the introduction of stocks into a facility which may result in the introduction of a new disease condition or mortality.

- Use sanitation procedures which prevent introduction of pathogens into, out of, or within a facility.

- Conduct applied research on new and existing disease prevention techniques.

- Utilize pond management strategies (e.g., Density Index and Flow Index) to help optimize the quality of the aquatic environment and minimize fish stress which can induce infectious and noninfectious diseases. For example, the Density Index is used to estimate the maximum number of fish (of a given length) that can occupy a rearing unit based on the rearing unit's size. The Flow Index is used to estimate the rearing unit's carrying capacity based on water flows. Proper feeding practices are used to discourage overfeeding of the fish and over-accumulation of uneaten food or feces. Ponds or raceways are vacuumed to maintain cleanliness and reduce stress caused by other cleaning methods.

Fish Health Activities at Sweetwater Springs Hatchery

Health Monitoring

- In 1993, all spring chinook broodstock (males and females) were sampled at spawning for bacterial and viral pathogens from each fish lot. All 1994 coho broodstock were pathologically sampled at spawning; females for viral and bacterial pathogens, and males for viral pathogens.

- At spawning, an Enzyme Link Immunosorbent Assay (ELISA) is conducted on kidney tissue samples from spawned females. ELISA is used to detect the bacterium which causes kidney disease (*Renibacterium salmoninarum*). Progeny from females with Optical Density greater than 0.5 are culled.

- Whenever abnormal behavior or mortality is observed, a fish health specialist is notified and requested to examine the affected fish, make a diagnosis and recommend the appropriate remedial or preventative measures.

- Report and control selected fish pathogens in accordance with the Pacific Northwest Fish Health Protection Committee (PNFHPC).

- As often as necessary, fish are given a health exam; especially prior to transfers or releases. In some cases, subsequent fish health exams will be conducted to obtain further information for management.

Fish and Egg Movements

- Fish and egg movements are conducted in accordance with the Nez Perce Tribal Fish Health Policy based on the PNFHPC and the AFS Fish Health Blue Book.

Therapeutic and Prophylactic Treatments

- At spawning, eggs are water-hardened in iodophor as a disinfectant.

- Juvenile fish are administered antibiotics orally when needed for the control of bacterial infections.

- Formalin (37% formaldehyde) is dispensed into water for the control of parasites and fungus on eggs and juveniles. Treatment dosage and time of exposure varies with species, life-stage and condition being treated.

- Only therapeutants approved by the U.S. Food and Drug Administration or those under an Investigative New Animal Drug (IN / AD) permits are used for treatments.

Sanitation

- All eggs brought to the facility are surface-disinfected with iodophor (as per the NPT Fish Health Policy).

- All equipment (nets, tanks, rain gear) is disinfected with iodophor between different fish / egg lots.

- Different fish / egg lots are physically isolated from each other by separate incubation units or tanks.

- Sanitation stations and iodophor baths are strategically located on the hatchery grounds to control the spread of pathogens.

Objective 5: Conduct environmental monitoring.

Environmental Monitoring

This facility is currently under the minimum size requiring a National Pollution Discharge Elimination System Permit administered by the Idaho Department of Environmental Quality. Primarily, environmental monitoring at this facility has been conducted to identify when changes to hatchery practices are required and to manage fish health. The following parameters are currently monitored at this hatchery:

- In-hatchery water temperatures
- In-hatchery dissolved oxygen
- Flow rates

The following additional parameters may be monitored in the future to assure protection of the instream environment of Sweetwater Creek:

- Total suspended solids
- Settleable solids
- Upstream and downstream temperatures
- Upstream and downstream dissolved oxygen
- Influent pH / conductivity
- In-stream flow / current

Objective 6: Communicate effectively with other salmon producers and managers.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest professionals. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Integrated Hatchery Operations Team (IHOT): This group is comprised of representatives from fish management agencies and tribes, and funding entities.

IHOT has developed a series of regional hatchery policies and is currently involved in evaluating independent hatchery audits.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

In-River Agreements: State, federal and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

Record Keeping

Records are kept in a consistent manner employing standard formats to allow for documentation and monitoring. Future record keeping will be coordinated with the basin-wide Coordinated Information System (CIS) currently under development. The CIS development is being funded by Bonneville Power Administration. It will be a system to access all necessary databases in the region. It is hoped that coordinated information collection and reporting will result in consistency between the various agencies.

Evaluation Program

A monitoring and evaluation program established under NPTH was implemented with release of spring chinook from Sweetwater Springs Hatchery in 1994. Annual production reports will include disease history, genetic monitoring results, interactions with natural production at the time of fish release, survival estimates, and adult returns.

PERFORMANCE STANDARDS—SWEETWATER SPRINGS HATCHERY

Objective 1

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adult Capture	CHS	N/A	N/A	N/A	2,3,7
	COH	N/A	N/A	N/A	
Adult Prespawning Survival	CHS	90-95%	90%[1]	85-95+%	
	COH	90-95%	90%[2]	85-95+%	
Egg-take	CHS	N/A	N/A	N/A	
	COH	N/A	N/A	N/A	
Eyed Egg-to-Parr Survival	CHS	95%	94.4%[1]	N/A	
	COH	95%	87.5%[2]	N/A	
Fish Releases	CHS		430,000[1]	N/A	
	COH		635,000[2]	N/A	
Egg Transfers	CHS	N/A	N/A	N/A	
	COH	N/A	N/A	N/A	
Fish Transfers	CHS	N/A	N/A	N/A	
	COH	N/A	N/A	N/A	
Adults Back to River	CHS	N/A	N/A	N/A	
	COH	N/A	N/A	N/A	
Percent Survival	CHS	N/A	N/A	N/A	
	COH	N/A	N/A	N/A	

Objective 2

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Proper Release Size (fish/lb)	CHS	100	81[1]	76-87	
	COH	80-120	134[2]	92-159	

N/A=Not applicable.
[1] Based on 1993-94 production.
[2] Based on 1994-95 production.

Objective 3

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Collect Adults Throughout Run	ALL	N/A	N/A	N/A	
Spawning Pop. >200	ALL	N/A	N/A	N/A	
Spawning Ratio Male:Female	ALL	N/A	N/A	N/A	
Acceptable Stocks	CHS	Yes	N/A[1]	--	
	COH	Yes	N/A[2]	--	

Objective 4

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Adhere to Disease Policy	CHS	Yes	N/A[1]	--	
	COH	Yes	N/A[2]	--	

Recent Disease History - Pathogen Positive - Juveniles

Species	Inspection Dates	Classification
CHS	July 20, 1994	
COH	June 27, 1995	

Objective 5

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
In-Hatchery Water Temperatures	All	48-50ºF	48-50ºF	48-50ºF	
In-Hatchery Dissolved Oxygen	All	>5 mg/L	N/A[1,2]	6-8 mg/L	

Objective 6

Measures	Species	Hatchery Goal	5-Year Average	Range	Constraints
Check Hatchery Records for Accuracy and Completeness	All	Yes	Yes[1,2]	--	

[1] Based on 1993-94 production.
[2] Based on 1994-95 production.

Constraints/Comments—Sweetwater Springs Hatchery

1. Winter flows have been observed at less than 150 gpm, which could limit incubation and smolt rearing capabilities.

2. Adult holding capacity is presently limited by lack of space and containers. Winter flows (discharge) limit adult capacity.

3. Adults cannot naturally access the hatchery. They must be captured and transferred from elsewhere.

4. Constant temperature of spring water prevents freeze-up during winter months.

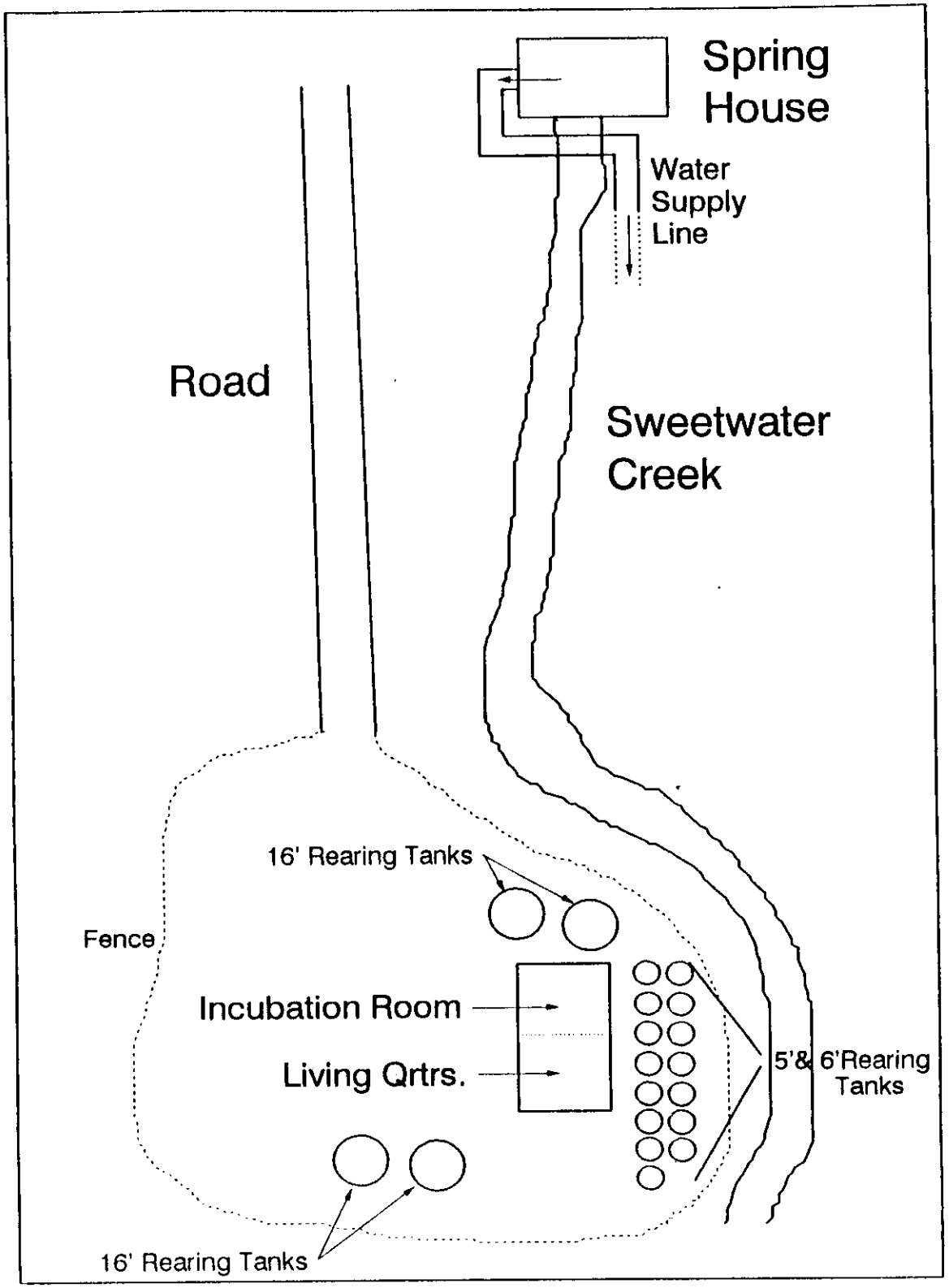
5. Temperature-controlled incubation allows mimicking of natural incubation temperatures.

6. Temperature-controlled incubation provides for mass marking of otoliths during rearing at the hatchery.

7. Constant temperature of spring water may not provide proper acclimation conditions prior to outplant.

8. As presently constructed, physical space controls production. With limited renovation and construction, the facility could produce 1 to 2 million fingerlings.

9. Facility ownership is currently being negotiated between IDFG, Nez Perce Tribe, and Bonneville Power Administration



Facility Diagram of Sweetwater Springs Hatchery, Idaho, 1995.