

Ford Hatchery

Washington Department of Fish and Wildlife Fish Program
Hatcheries Division

Annual Report
2003



DOE/BP-00005850-2

January 2004

This Document should be cited as follows:

*Lovrak, Jon, Glen Ward, "Ford Hatchery", Project No. 2001-02900, 19 electronic pages,
(BPA Report DOE/BP-00005850-2)*

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This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA.

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of
Fish and Wildlife
Fish Program
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FORD HATCHERY

Annual Report

January 1, 2003 – December 31, 2003

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Project No. 2001-029-00
Intergovernmental Agreement
DE-B179-91BP21191 and 00B124636

December 2003

Acknowledgments

With great appreciation we would like to acknowledge the members and participants of the Lake Roosevelt and Banks Lake Hatcheries Coordination Team consisting of Dr. Allan Scholz of Eastern Washington University, John Whalen, Regional 1 Fish Program Manager of the Washington Department of Fish and Wildlife, Matt Polocek and Kamia Knuttgen, Biologists, and Aulin Smith and Rochelle Shipley, Scientific Technicians, of the Banks Lake Fish Monitoring Program for the Department of Fish and Wildlife, Jeff Korth, Region 2 Biologist for the Department of Fish and Wildlife, Tim Peone of the Spokane Tribal Hatchery, Deanne Pavlik and Chuck Lee of the STH Banks Lake and Lake Roosevelt Fisheries Monitoring Program, and the staff of the Washington Department of Fish and Wildlife Spokane Complex.

Funding for the hatchery water improvement project and the operation and maintenance of this program is provided by Bonneville Power Administration (BPA), project number 21021. We thank Greg Baesler, Joe DeHerrera, and Ron Morinaka of the Bonneville Power Administration, Division of Fish and Wildlife, for their support and cooperation with this multi agency project.

Executive Summary

Bonneville Power Administration's participation with the Washington Department of Fish and Wildlife, Ford Hatchery, provides the opportunity for enhancing the recreational and subsistence kokanee fisheries in Banks Lake. The artificial production and fisheries evaluation is done cooperatively through the Spokane Hatchery, Sherman Creek Hatchery (WDFW), Banks Lake Volunteer Net Pen Project, and the Lake Roosevelt Fisheries Evaluation Program.

Ford Hatchery's production, together with the Sherman Creek and the Spokane Tribal Hatchery, will contribute to an annual goal of one million kokanee yearlings for Lake Roosevelt and 1.4 million kokanee fingerlings and fry for Banks Lake. The purpose of this multi-agency program is to restore and enhance kokanee salmon and rainbow trout populations in Lake Roosevelt and Banks Lake due to Grand Coulee Dam impoundments.

The Ford Hatchery will produce 9,533 lbs. (572,000) kokanee annually for release as fingerlings into Banks Lake in October. An additional 2,133 lbs. (128,000) kokanee will be transferred to net pens on Banks Lake at Electric City in October. The net pen raised kokanee will be reared through the fall, winter, and early spring to a total of 8,533 lbs and released in May.

While the origin of kokanee comes from Lake Whatcom, current objectives will be to increase the use of native (or, indigenous) stocks for propagation in Banks Lake and the Upper Columbia River. Additional stocks planned for future use in Banks Lake include Lake Roosevelt kokanee and Meadow Creek kokanee.

The Ford Hatchery continues to produce resident trout (80,584 lb. per year) to promote the sport fisheries in trout fishing lakes in eastern Washington (WDFW Management, Region 1). Operation and maintenance funding for the increased kokanee program was implemented in FY 2001 and scheduled to continue through FY 2010.

Funds from BPA allow for an additional employee at the Ford Hatchery to assist in the operations and maintenance associated with kokanee production. Fish food, materials, and other supplies associated with this program are also funded by BPA. Other funds from BPA will also improve water quality and supply at the Ford Hatchery, enabling the increased fall kokanee fingerling program.

Monitoring and evaluation of the Ford stocking programs will include existing WDFW creel and lake survey programs to assess resident trout releases in trout managed waters. BPA is also funding a creel survey to assess the harvest of hatchery kokanee in Banks Lake.

Ford Hatchery photos



Ford Hatchery (1941) incubation building and circular rearing ponds.



Ford Hatchery (1941) trough and tank room.

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Introduction

The Ford Hatchery is located at the eastern edge of the Spokane Indian Reservation, on the upper unit of the Chamokane Valley Aquifer system. The effluent flows into Chamokane Creek, a tributary of the Spokane River. The site is on land that is leased to WDFW from the Bureau of Reclamation as a mitigation agreement. The Bonneville Power Administration (BPA) constructed the hatchery in 1941. The Washington Department of Fish and Wildlife (WDFW) manages the operations and maintenance with funding provided by state fishing and regulatory revenues. Beginning in 2001, funds were provided by BPA for enhancing the kokanee production in Banks Lake.

The Ford Hatchery fish program was designed and created to provide harvest of Eastern Brook, German Brown and Rainbow trout for local public streams and lakes. The kokanee (*Oncorhynchus nerka*) production was created as mitigation in supplying harvest for the loss of anadromous fish habitat on the Upper Columbia River, due to the construction of the Grand Coulee Dam in 1939. The BPA, Spokane Indian Tribe (ST), Eastern Washington University (EWU), National Park Service (NPS) and the WDFW work together toward fishery enhancement on Lake Roosevelt and Banks Lake.

The annual production goal of the Ford Hatchery kokanee program for the Banks Lake watershed is 1,100,000. 400,000 fry (667 lbs.) are to be reared and planted into Banks Lake in early May. 700,000 fingerlings (11,666 lbs.) are to be reared and planted into Banks Lake in early October.

The role of the Ford Hatchery in this program is to: (a) create and enhance the kokanee fishery within Banks Lake; (b) establish a kokanee broodstock for future egg requirements; and (c) minimize the rate of precocity in hatchery reared kokanee using its colder water source beneficial in curtailing development in juvenile fish.

2002-2003 Annual Operating Plan

2002-2003 Banks Lake Annual Production Goal (APG)

The APG was established in FY 2001. The kokanee production increase to 700,000 fingerlings, along with 400,000 fry, for the Banks Lake watershed is reviewed by The Lake Roosevelt Hatchery Coordination Team (LRHCT). The rearing, marking and planting strategies are reviewed annually for providing program direction.

Table 1. 2002-2003 APG summary and time line for operations																	
Unit	Fish	Operation	Number	In	Out	N	D	J	F	M	A	M	J	J	A	S	O
Trough	KO	Hatching	1.35 mil.	5000/lb	1800/lb		I	X	X	X	O						
Tank	KO	Rearing	580,000*	1800/lb	520 / lb						I	P					
Tank	KO	Rearing	700,000	1800/lb	300 / lb						I	X	X	O			
Tank	KO	Rearing	128,000	300 / lb	60 / lb									I	X	X	T
Ponds	KO	Rearing	572,000	300 / lb	60 / lb									I	X	X	P
Key: Trough= eggs and fry reared in shallow units measuring 7.5 cubic feet (44 units)						KO = Kokanee						I = Received In					
Tanks = fry reared in intermediate raceways measuring 210 cu. ft. (12 units)						K = (x 1,000)						O = Moved					
Ponds = rearing units measuring 2400 cu. ft. (12 units)						Size = per / lb.						P = Planted Out					
						U = Unknown						T = Transferred (to net pens)					
*Note: 100,000 kokanee planted into Chapman Lake (Region 1) in May @ 600 fpp																	
*Note: 40,000 kokanee planted into Deep Lake (Region 1) in May @ 600 fpp																	

All production numbers, including fish sizes at release, are target goals. Actual size and release numbers may be different from these goals. The APG and strategies for operation are based on the anticipated egg take event at Lake Whatcom. In the event of significant circumstances or operations change, these changes will be reported to the LRHCT and BPA.

2002-2003 Annual Operation Plan (AOP) Goals

The operation and program goals from the 2002-2003 AOP were as follows:

1. Coordinate Ford Hatchery production with those at WDFW Sherman Creek and Spokane Tribal Hatchery to meet regional program goals for Lake Roosevelt and Banks Lake.
Status: Completed
2. Fish health monitoring and effective feed program to meet planting size goals.
Status: Completed
3. Water improvements project: Mary's Ditch pipeline to raceway headbox.
Status: Completed
4. Improvements to the Lower Intake
Status: Completed
5. Construction of a new production well for incubation needs.
Status: Ongoing / Partially completed
6. Repair existing intake supply system to the hatchery building.
Status: Ongoing
7. Construction of a an Aeration Tower.
Status: Ongoing
8. Construct a Pump House for the New Well.
Status: Ongoing
9. Construct new pond screens for rearing kokanee fry and fingerlings.
Status: Ongoing
10. Hire full-time temporary employee to accommodate program increase (Oct.)
Status: Completed
11. Rear and plant 700,000-kokanee fingerlings into Banks Lake (BY 02) (Oct. 2003).
Status: Completed

2002-2003 Annual Operating Plan Objectives

The main objective for this contractual period was to design and secure the permits for the hatchery water improvements. Other objectives include rearing and planting 1.1 million kokanee into Banks Lake and the monitoring and evaluation of the kokanee fishery through extensive creel survey.

Table 2. 2002-2003 AOP Objectives	
(1.1) Regional production goals	(1.7) Fry planting
(1.2) Receive 1.4 million	(1.7) Marking / Tagging net pen fish
(1.3) Thermal mark eggs	(1.8) Build pond screens
(1.4) Fish health monitoring	(1.9) Rear 700,000 fall fingerlings
(1.5) Water improvements	(1.10) Use of high energy fish feed
(1.6) Hire additional employee	

Status: Ongoing

Note: These objectives follow *chronological* order of the program

Kokanee Production

The kokanee production for Banks Lake derives from the stock from Lake Whatcom, a WDFW hatchery near Bellingham, Washington. Kokanee are native to Lake Whatcom and it has been the state's primary egg source since 1915. The stock is pure, having no known introductions from other kokanee sources (Crawford 1979).

Depending on availability, additional stocks of kokanee are planned for future use, including Lake Roosevelt and Meadow Creek.

Year	Direct Plants			Net Pen Transfers		
	Number	Avg. size	Pounds	Number	Avg. size	Pounds
2001	471,758	72.0	6,552	0	0.0	0
2002*	639,063	67.5	9,467	0	0.0	0
2003*	419,898	51.4	8,172	128,759	52.9	2,430

***Note:** In 2002 an additional 50,050 fall fry were planted in Banks Lake by the Spokane Tribal Hatchery. In 2003 an additional 50,000 fall fry will be planted in Banks Lake by the Spokane Tribal Hatchery. **The additional STH plants are part of an exchange for the precocity study on Lake Roosevelt**

Ford Hatchery Production/Plants

The annual kokanee egg-take transfer goal from Lake Whatcom to the Ford Hatchery is 1.4 million. This goal was achieved in 2002-2003. The eggs were received in two lots; **LOT 3** was received on December 31, 2002. **LOT 4** was received on January 27, 2003.

Lot 03 and Lot 04 Lake Whatcom BY 02

Lot 03 kokanee were otolith marked to distinguish as "fall fry". 351,400 eggs were shipped from Lake Whatcom to the Spokane Hatchery for thermal marking of the otolith prior to transfer to the Ford Hatchery on December 31, 2002. These eggs were set out to hatch in twelve shallow troughs on January 10, 2003.

Lot 04 kokanee were otolith marked to distinguish as "fall fry" and "spring fry". 1,052,100 eggs were shipped from Lake Whatcom to the Spokane Hatchery for thermal marking. 550,000 eggs were otolith marked in the chillers as "spring fry". The remaining 502,100 eggs were otolith marked in the chillers as "fall fry". Lot 04 kokanee were received at the Ford Hatchery on January 26, 2003. All eggs were set out to hatch in 34 troughs on February 2, 2003.

On March 12, 2003 fry mortality began to increase in Lot 03 and Lot 04. The Fish Health Specialist was contacted and a fish health analysis performed. Kidney failure was the preliminary indication as the cause for mortality. Subsequent pathological and histological reports found no bacterial or viral infection present. Without a clear cause for the kidney failure and high mortality, the Fish Health Specialist recommended changing feed diets. High mortality continued for the next three weeks.

On June 5th, 2003, **367,033** kokanee "spring fry" at 619 fish-per-pound were transported from the Ford Hatchery and successfully planted at Northrup Creek on Banks Lake.

Lot 03 and **Lot 04** fall fry were *combined* (**Lot 4**) and moved into hatchery tanks and round ponds on June 25, 2003. At the end of this quarter fish were healthy and the average size was 70.3 fpp.

The total loss due to kidney failure in Lot 03 was 83,542. The total loss due to kidney failure in Lot 04 was 158,967. The *combined* total loss was 242,509. The cause was never clearly determined.

Lot 04 Lake Whatcom BY 02

Lot 04 inventory on June 25, 2003 was 611,050 otolith marked fall-fry kokanee. Higher than normal mortality developed following the transfer of fish from the tanks inside the building to outdoor round ponds. The mortality was due to sunburn. The cause of the sunburn was due to a higher than normal fat content in the fish. The Fish Health Specialist concluded that this was another feed related issue, as well as exposure to high ultraviolet light.

On July 3, 2003, tarpaulins were purchased and placed on the pond frames for shading. The tarps helped to reduce further sunburn. A total loss of 13,109 fish was due to sunburn (*steatitis*).

On August 21, 2003, 128,000 kokanee were inventoried in the tanks to be left-vent fin-clipped for the Electric City net pens. There were also 50,000 kokanee inventoried in the tanks and adipose fin-clipped. The adipose marked fish were to be transferred to two net pens in the Colville River on Lake Roosevelt for the precocity study in early November 2003.

On October 10, 2003, **128,759** left-vent fin-clipped kokanee at 56 fpp (2,286 lbs.) were transferred from two round ponds to the Electric City net pens.

After closely monitoring lake temperatures (60 degree limit) per the biologists recommendations, **419,898** fall-fry kokanee at 52 fpp (8,073 lbs.) were successfully planted on October 14th and 15th, 2003, at Northrup Creek on Banks Lake.

On October 23, 2003, **53,328** adipose fin-clipped kokanee at 48 fpp (1,111 lbs) were transferred to the Lake Roosevelt net pens, in care of the Sherman Creek Hatchery. **600** non-clipped fish were retained at the Ford Hatchery to conclude the precocity study (spring 2004).

Following all plants and transfers a positive inventory adjustment of 3,885 kokanee was made.

Kokanee Marking

In December 2002, water chillers were installed at the Spokane Hatchery. Two lots of kokanee eggs were received and chilled at Spokane for thermo marking of the otolith.

Lot 3 – 701,400 eggs were marked for fall plants; 350,000 eggs for the Spokane Tribal Hatchery and 351,400 eggs for the Ford Hatchery. The reason Lot 3 was marked as fall fry was due to priority of the program. There was no guaranteed number of subsequent eggs received from Lake Whatcom.

Lot 4 – 550,000 eggs were marked for spring plants and 502,100 eggs were marked for fall plants. As funds and rearing strategies develop external marking of all kokanee may be implemented. This year, 128,000 fingerlings were left-vent clipped, for transfer to the Banks Lake Net Pens in October. Also, 50,000 fingerlings were adipose fin-clipped for transfer to the Lake Roosevelt Net Pen site on the Colville River. These fish will be monitored to study precocity (early maturation).

The Ford Hatchery provides the coldest water temperature for the rearing cycle of the kokanee in this region and it is believed to aid in the deterrence of precocity in the juveniles. The analysis and conclusion of this two-year study will be provided in next year's report.

Adult Kokanee Collected

No adults were collected or trapped in Banks Lake from the 2001-2002 brood years. It is a continuing goal to establish the use of native stocks for propagation in Banks Lake and the Upper Columbia. The use of a locally adaptive stock will enhance the harvest productivity as well as supplementing future egg goals.

While all eggs currently are received from Lake Whatcom, a proposed diversion of the Nooksack River in and through the lake will all but eliminate this source. Strict WDFW disease policies do not allow transfer of eggs out of watersheds impacted by anadromous fish. The use of the Meadow Creek stock, from the Meadow Creek Spawning Channel at the north end of Kootenay Lake, British Columbia, may be a viable option. It is currently implemented in the Lake Roosevelt kokanee program, but may not meet the demands of all kokanee programs for Banks Lake and Lake Roosevelt.

The continuing development of the Lake Whatcom, Nooksack diversion proposal will be addressed in future quarterly and annual reports.

Hatchery Operations and Maintenance

Maintenance and Construction Projects

Operations and maintenance were performed according to state of Washington and WDFW policies and guidelines.

The Ford Hatchery crew was involved with a variety of projects both with fish handling and facility improvements. Some projects accomplished were: modifying and adapting rearing strategies for improving fish health and production; building 32 new round pond and 10 intermediate tank screens for raising kokanee fry.

The WDFW Engineering Division concluded the project plans for the water improvements. The hatchery staff took an active role in providing important planning information and feedback to the engineering personnel. WDFW Maintenance and Construction Division performed the "Mary's Ditch" pipeline project in May 2003. The new 500-foot pipeline captures an additional 300 gallons-per-minute of fresh water, providing increased water quality and flows to the raceways.

The lower intake geo-tile hydro-jet procedure was performed in May 2003. This process, performed by a contract vendor, helped to clear the existing pipeline of debris. Once cleared, this enabled all existing spring water to flow freely through the pipe and into the incubation building.

Fogel Pump drilled a new well for incubation improvements on September 8-10th. They concluded drilling at a depth of 380 ft, installing 60ft of fine-screen before developing the well on September 17th. A 4-hour step and 24-hour test were concluded on September 19th. During the 24 hour test 513 gpm was pumped from the well at a level of 124ft. With the development of the well, we look forward to the improvements in incubation water quality.

The final phase of the water improvements projects will be the well pump, aeration tower and pipeline installation, scheduled for 2004.

Equipment Purchases

Screens and materials

The new round-pond and intermediate tank screens and frames were made from aluminum. As well as being extremely durable, the aluminum frames and screens provide easy maintenance for routine cleaning and storage. The tube framing and screen was purchased and the hatchery crew welds the frames together. The screens are then riveted to the frames.

Future Modifications Identified

- Complete the water increase and improvement projects.
- With the kokanee program established and the improvement project completed, hire a permanent full-time employee for accommodating the increased workload.

Cooperative Projects

The Ford Hatchery kokanee program for Banks Lake in 2003 included the Banks Lake Net Pens. 128,000 fish were transferred from the hatchery to the net pen site in October for further enhancing development and acclimation prior to release in April 2004. The fish were left-vent marked for distinguishing as net-pen origin, as well as hatchery rearing cycle of Ford. We look forward to the productivity and harvest data this part of the program can supply in the coming year.

Personnel

The Ford Hatchery was operated during 2003 using three FTE's; Jon Lovrak, Fish Hatchery Specialist 4, Glenn Ward, Fish Hatchery Specialist 3 and Rex Gearhart, Fish Hatchery Specialist 2.

Forrest Imus occupied the 9-month seasonal temporary position from April through November. Prior to Forrest, Adam Harris was the 9-month seasonal temporary. Adam resigned in February 2003 to accept a permanent position with an Oregon based stream survey and analysis company.

Administrative and complex support was provided from Mike Lewis, Complex Manager.

Steve Roberts, Fish Health Specialist, provided fish health services for both Ford and the Spokane Tribal Hatchery.

During the annual period the hatchery staff continued its training in kokanee production. Some of the following areas were enhanced: fish health, fish culture techniques, and fisheries management strategies.

Appendix A

Ford Hatchery Planting Report Summary 2003

Lot #	SPECIES (Spc:STK:BY:BO)	DATE	WATER NAME	SITE	NUMBER	SIZE	POUNDS	MARK	?
04	KO:WHAL:02:M	05-Jun-03	Banks Lake	Northrup Creek	367,033	619.9	592	OT-S	1
03 & 04	KO:WHAL:02:M	15-Oct-03	Banks Lake	Northrup Creek	419,898	51.38	8,172	OT-F	
03 & 04	KO:WHAL:02:M	13-Oct-03	Banks Lake	Electric City Net Pens	128,759	52.9	2,430	OT-F/LV	
03 & 04	KO:WHAL:02:M	23-Oct-03	Lake Roosevelt	Colville River Net Pens	53,328	48.4	1,102	OT-F/AD	2
	Spring TOTALS		BANKS LAKE		367,033	619.8	592		1
	Fall TOTALS		BANKS LAKE		548,657	51.8	10,602		
	GRAND TOTALS		BANKS LAKE		969,018	<78.8>	12,296		

1. These fish are part of the Ford Trout Hatchery annual operating plan.
 ? 2. These fish are part of the precocity study on Lake Roosevelt.

Mark: OT-S = Spring otolith
 OT-F = Fall otolith
 LV = Left vent clipped
 AD = Adipose fin clipped