COMPREHENSIVE HATCHERY MANAGEMENT PLAN

Spring Creek National Fish Hatchery

Planning Report: Number 4
February 2004 – Final Draft

U.S. Fish & Wildlife Service

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Prepared by:

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U.S. Fish & Wildlife Service, Region One
February 2004

Explanation of Purpose

Spring Creek National Fish Hatchery - Comprehensive Hatchery Management Plan

This Comprehensive Hatchery Management Plan (CHMP) for the Spring Creek National Fish Hatchery (NFH) is an operational management plan which outlines policy, legal mandates, goals and objectives relevant to the overall management of the station. This document is a planning and reference tool and is not a decision-making or policy-making document.

Additional documents being developed in separate processes are referenced in this CHMP and provide biological, policy, legal, and management analysis of the Spring Creek NFH. These documents are the Biological Assessment and Biological Opinion on Artificial Production in the Columbia River Basin (NMFS 1999a and NMFS 1999b), the Federal Columbia River Power System Biological Opinion (NMFS 2000), the Spring Creek NFH Hatchery and Genetic Management Plan (2003b) and the *United States v. Oregon* Columbia River Fisheries Management Plan.

The correct citation for this plan is: U.S. Fish and Wildlife Service (USFWS). 2004. Comprehensive Hatchery Management Plan for the Spring Creek National Fish Hatchery. Planning Report: Number 4, U.S. Fish and Wildlife Service, Spring Creek National Fish Hatchery, Underwood, Washington.

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This Comprehensive Hatchery Management Plan for the Spring Creek National Fish Hatchery (Planning Report: Number 4) addresses the Pacific Region's requirement to integrate U.S. Fish and Wildlife Service objectives and priorities with those of co-managers, other agencies, and resource programs; fulfill obligations under the Endangered Species Act and relevant fisheries conservation, mitigation, and management programs; identify and define hatchery reforms that are implemented to achieve objectives; and, provide a foundation for future program and budget development and review.

Submitted by:

Project Leader, Spring Creek NFH	Date
Project Leader, Columbia River FPO	Date
Project Leader, Lower Columbia River FHC	Date

Approved:

Assistant Regional Director, Fisheries	Date

Approved:

Regional Director, Pacific Region	Date

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Acknowledgments

Dan Diggs and Doug DeHart coordinated the initial development of this plan, along with Chuck Dunn, Lee Hillwig, Ed Forner, Kate Benkert, Bob Semple, Larry Marchant, Ed LaMotte, Bob Wunderlich, Ron Wong, Ray Jones, Thomas Trock, Brian Cates, and Rich Johnson. NOAA-Fisheries and the U.S. Army Corps of Engineers provide funding to operate Spring Creek National Fish Hatchery. The U.S. Army Corps of Engineers also provided funding to develop this plan and the 2003 Hatchery and Genetic Management Plan for Spring Creek NFH.

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Executive Summary

Plan Overview

The U.S. Fish and Wildlife Service (Service) has recognized the need for a comprehensive hatchery planning process to assist in meeting the challenge of changes to hatchery management as required by the conservation status of most Pacific salmon and other anadromous and freshwater fish species. The development of plans, such as this one, will help to:

1) integrate Service objectives and priorities with those of co-managers, other agencies, and resource programs;
2) fulfill our obligations under the Endangered Species Act and relevant fisheries conservation, mitigation, and management programs;
3) identify and define hatchery reforms we are implementing to achieve our objectives; and,
4) provide a foundation for future program and budget development and review.

This plan recognizes and complies with all management plans and Biological Opinions affecting the Columbia River Basin.

Hatchery Purpose

Spring Creek NFH was authorized by Special Act 24 Stat.523, March 03, 1887 and Special Act 30 Stat. 612, July 01, 1898 and placed into operation in September 1901 to support the commercial fishing industry. The hatchery was reauthorized by the Mitchell Act (16 USC 755-757; 52 Stat. 345) May 11, 1938 and amended on August 8, 1946, (60 Stat. 932) for conservation of fishery resources in the Columbia River Basin. The hatchery was remodeled in 1948 to prevent inundation by Bonneville Dam. The hatchery was again remodeled in 1970 to expand operations to meet commitments under the John Day Mitigation Act. The hatchery is currently producing tule fall Chinook salmon and is used for adult collection, egg incubation and rearing. The tule fall Chinook stock is indigenous to the White Salmon River and the hatchery has reared this stock since 1901.

The following Hatchery Management Goals were adapted from the Mitchell Act, John Day Mitigation Act, Endangered Species Act (ESA) Biological Opinions, *United States v. Oregon* agreements, and the Integrated Hatchery Operations Team - Operation Plans for Anadromous Fish Production Facilities in the Columbia River Basin Volume III - Washington, Annual Report for 1995 (IHOT 1996).

Hatchery Goals [1]

Goal 1: Conserve Columbia River tule fall Chinook salmon in the area upstream of Bonneville Dam (as defined in the Mitchell Act of 1937).

Goal 2: Assure that hatchery operations support Columbia River Fish Management Plan (*United States v. Oregon*) production and harvest objectives.

Goal 3: Minimize impacts to ESA listed and other native fish and wildlife species, their habitat, and the environment.

Goal 4: Develop outreach to enhance public understanding, participation and support of Service and Spring Creek NFH programs.

Planning Issues

Several federal, state and tribal entities share responsibilities for development of sub-basin plans, hatchery production, harvest management, and ESA considerations. Recent actions have centered around the possibility of the removal of Condit Dam on the White Salmon River and the role Spring Creek will play in subsequent salmon restoration. The agencies involved include the U.S. Forest Service, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Geological Survey, Bonneville Power Administration, the Washington Department of Fish and Wildlife, Underwood Conservation District, and the Yakama Nation.

The CHMP recognizes and complies with all management plans and Biological Opinions affecting the Columbia River Basin in general. The primary issues (of the Biological Opinion, CHMP or Planning) center around future mass marking, juvenile distribution and production numbers, tribal harvest, surplus adult distribution, negative impacts to listed and other aquatic resources and funding for operations, maintenance and evaluation.

[1]Tasks and current practices to achieve objectives are described in Chapter 3.

Marking

- To help protect wild and naturally produced fish, the states of Washington, Oregon and Idaho are implementing selective sport and commercial fisheries (non-tribal) on marked hatchery fish. These selective fisheries require that a large portion of the hatchery produced fish be marked. Mass marking of hatchery fish is being implemented for steelhead trout and coho salmon, and most recently for Spring Chinook salmon. Mass marking of fall Chinook salmon has not yet been implemented except for special cases. Mass marking at Spring Creek NFH will be logistically difficult due to the large number of fish produced.

- Columbia River Treaty Tribes generally disagree with the need for mass marking and selective fisheries.

- The Service has not made any unilateral decisions on marking. The Service will continue to coordinate our actions with the states and tribes through *United States v. Oregon* and National Oceanic and Atmospheric Administration (NOAA)-Fisheries to comply with ESA actions and coordinate with the Pacific States Marine Fisheries Commission (PSMFC) mark committee. In addition, State, Federal, and Tribal managers are discussing a comprehensive marking strategy for the Columbia River Basin as identified by Action 174-1 in the Federal Columbia River Power System Biological Opinion. NOAA-Fisheries will continue to meet with the states and tribes on this effort.

A comprehensive marking plan should:

- improve our ability to assess and monitor the status of naturally-producing (especially ESA listed) populations
- monitor and evaluate hatchery programs, including hatchery reforms and stray rates
- maintain critical harvest management and stock assessment information
- monitor mark-selective fishery regimes established by the states
- improve regional and watershed based marking decisions
- be consistent with recovery plan goals
- be coordinated through *United States v. Oregon*, Pacific States Marine Fisheries Commission and U.S. - Canada forums

Juvenile salmon distribution and production numbers

- Juvenile salmon are released from the Spring Creek National Fish Hatchery in three release groups (March, April and May) as sub-yearling smolts to promote quick downstream migration from the hatchery, through the Columbia River to the estuary and ocean. This release strategy is agreed to by the Service, Tribes, NOAA-Fisheries,

Army Corps of Engineers (COE), and Washington Department of Fish and Wildlife (WDFW).

- In addition to this release strategy, the Service is evaluating unfed fry releases for brood years 1999, 2001, and 2002.

Water Shortage (Drought)

- A contingency plan needs to be developed to address potential water shortages at the hatchery. The hatchery is designed as a 90% recirculating system based on 3000 gallons per minute spring water supply. During drought years, the spring water supply can drop below 2000 gallons per minute. The system can still be operated at these low flows but water quality will likely deteriorate, stressing the fish and leading to serious health problems.

- Early releases or lowered production during drought years may be necessary after consultation with all co-managers.

Surplus Adult Salmon Distribution.

- In many years, more fish return to the hatchery than are needed for brood stock. Surplus fish are distributed to the Yakama Nation or other tribes as requested. For the past several years, surplus fish have also been given to the Federal Prisons for food.

- Fish not suitable for human consumption are typically rendered or supplied for stream enrichment programs.

Fish Passage and Ladder Management

- The Service, NOAA-Fisheries, COE, WDFW and Yakama Nation agreed on a strategy for ladder management. The ladder remains open until all fish have entered the hatchery. During 2003, an assessment in ladder operation was performed with the permission of the co-managers and NOAA-Fisheries. Future ladder operation plans will be negotiated and ecological risks and benefits to native ESA listed salmon will be evaluated as well as the impact on US-Canada Pacific Salmon Treaty stock assessment.

Negative Impacts to Listed and Other Aquatic Resources and What Actions are Being Taken to Help Recover Listed and Depressed Populations

All hatcheries must consider their potential for adversely affecting the aquatic community. Of particular concern at Spring Creek NFH is the potential impact to Upper Columbia River Ecologically Significant Unit (ESU) of federally threatened salmon that might stray up the hatchery ladder in the fall.

- To meet ESA obligations, the Service is proceeding with actions to comply with the 1999 Biological Opinion on hatcheries.

- The Service has also developed a Hatchery and Genetic Management Plan (HGMP) to help assess impacts from hatchery operations. In 2002, the Service completed the Spring Creek HGMP.

- The Service needs to take Hatchery Reform actions to help recover listed and depressed populations.

- Developing an updated HGMP and implementing measures identified by the HGMP, this CHMP, and in Biological Opinions will require additional resources.

Insufficient Operations and Maintenance Funding Through the Mitchell Act

- Mitchell Act Funding has been inadequate for over ten years. Increased demands on hatchery programs, as required by ESA Biological Opinions, have strained hatchery budgets. Without increases in Mitchell Act funding, reductions in production programs could occur. The Service is currently working with NOAA Fisheries and other co-managers to address current budget shortfalls.

Harvest Contribution

- The tule fall Chinook salmon from Spring Creek NFH have been a very successful stock in supporting the commercial, sport and tribal fisheries along the coast of Washington as far north as the west coast on Vancouver Island, BC (Pastor 2000). The stock has also has been a large component of the sport and tribal fisheries in the Columbia River. For example, in 2002, one half of the commercial and sport Chinook catch off the coast of Washington was Spring Creek tules and over 140,000 Spring Creek adults entered the Columbia River.

Economic Benefit

- The role of a federal mitigation hatchery is to compensate for natural habitat lost to federal hydro-projects and other impacts caused by Basin development. It follows then, that the economic benefit of the mitigation hatchery is interwoven into the economic benefit of the development projects being mitigated for and that the hatchery can be characterized as an operating expense of these development projects. The Service recognizes that mitigation hatcheries serve a significant role in supporting economically important fisheries.

Unmet Management Needs

The following unmet management needs, which are linked to hatchery goals and objectives, were identified in fiscal year (FY) 2001:

- The 1999 NOAA Fisheries Biological Opinion on Artificial Propagation in the Columbia River Basin lists a host of measures which either must, in the case of Reasonable and Prudent Alternatives, be complied with or, in the case of Conservation Recommendations, should be implemented. Reasonable and Prudent Alternatives for Spring Creek NFH are listed in Chapter 4, under ESA compliance.

- Funding for Spring Creek NFH operations and support services are provided to the U.S. Fish and Wildlife Service through the Corps of Engineers, John Day mitigation, and the Mitchell Act as administered by the NOAA-Fisheries. Increased demands on hatchery programs, as required by ESA Biological Opinions, are inadequately funded through the Mitchell Act. Either Mitchell Act support needs to be increased or alternative funding sources need to be identified.

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CHAPTER 1. INTRODUCTION/BACKGROUND

The Spring Creek National Fish Hatchery (NFH) was placed in operation in September 1901 with the intent to supplement the commercial fishing industry. The hatchery's role expanded in the late 1930's under the Mitchell Act to one of mitigation for the loss of habitat from the developing hydro system. Over the years, the Spring Creek NFH production program has included a variety of fish species: rainbow trout, Yellowstone cutthroat trout, brook trout, and fall Chinook. Since 1901, Spring Creek NFH's main focus was almost exclusively on tule fall Chinook indigenous to the White Salmon River. The resulting program has emerged as one of the most successful hatchery programs in the Pacific Northwest. In the past, hatchery programs were allowed to evolve based on perceived needs and the capabilities of the facility. Today, hatchery programs are still dynamic and the origin of change is driven by public appeal, legislative mandates, judicial decrees, international agreements, treaty trust responsibilities and ESA. The need to develop thoughtful planning processes based on sound policy and scientific information has never been greater. Today, the trend for hatcheries is to rear stocks that are native to the area. Spring Creek NFH has been successful in this practice.

1.1 Purpose and Need for Plan

The Service has recognized the need for a comprehensive hatchery planning process to assist in meeting the challenge of changes to hatchery management required by the conservation status of most Pacific salmon and other anadromous and freshwater fish species. The development of plans, such as this one, will help with the following:

1. Integration of Service objectives and priorities with those of co-managers, other agencies, and resource programs.
2. Fulfill our obligations under the Endangered Species Act and relevant fisheries conservation, mitigation, and management programs.
3. Identify and define in specifics what hatchery reforms we are implementing to achieve our objectives.
4. Provide a foundation for future program and budget development and review.

The Service is committed to developing and maintaining sound scientific and management support for its programs. The Service has participated with State, Tribal and Federal partners in reviewing and assessing hatchery operations as they evolve to become part of the solution to fisheries restoration and recovery goals. The Service has involved our cooperators in defining and evaluating our respective roles, and continues to reach out to the general public, individual constituent groups, and local governments to explain our programs and goals. A system of program evaluation that utilizes principles of adaptive management to integrate new information and expectations has been implemented by the Service. The journey of developing these plans, the research, analysis, thought, and outreach, is as important as the

product itself. The Service looks into this process to stabilize and strengthen fish production programs in fisheries restoration and recovery efforts of the Nation.

1.2 Description of Planning Process

The planning process began in July 2002 with establishment of the Spring Creek CHMP Team, the core group responsible for drafting and revising the CHMP as it progressed towards its anticipated completion in October 2003. The Team is composed of Service staff directly involved with the hatchery program. Additional coordination was provided by members from the Regional CHMP Steering Committee. The Steering Committee, composed of Service representatives from the Pacific Region (USFWS Region 1), provided oversight to the CHMP development process. In addition, the Steering Committee developed the general format, time line for completing the CHMP process, reviewed drafts of the Spring Creek CHMP to ensure consistency with both the approved format and other CHMPs under development in the Region, and ensured consistency with Regional and National goals of the Service's Fisheries Program.

1.3 Composition of Planning Team

The planning team was made up of Service representatives from the following offices:

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- Ed LaMotte, Plan Co-Lead (retired - Spring Creek NFH)
- Larry Marchant (Spring Creek NFH)
- Bill Thorson (Carson NFH)
- Mark Ahrens (Spring Creek NFH)
- Bill Gale (Spring Creek NFH)
- Travis Anderson (Spring Creek NFH)
- Debbie Hogberg (Spring Creek NFH)

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- Doug Olson, Plan Co-Lead (CRFPO)
- Rod Engle (CRFPO)
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1.4 Review and Update of Plan

Because the biological, sociological, economic, and political environment is constantly changing, the role and responsibilities of Spring Creek NFH can also be expected to change. The intent from the beginning was that the CHMP would be dynamic in nature. Therefore, it was necessary to include a process for reviewing and updating the plan on a periodic basis. Review and update of this plan will take place at least once every five years and will be the responsibility of the Hatchery Evaluation Team (HET).

1.5 Fisheries Program Mission, Goals, and Priorities

Our National Fish Hatcheries have authority for construction, operation, and maintenance that is contained in a variety of specific and general statutes. The remainder of the Fisheries Program is guided by a variety of general statutory mandates and authorities. Without the specific direction that would come from organic legislation, the Service has continually adjusted the priorities of the entire Fisheries Program, at the national level, to guide the Program and ensure that each Region within the Service is focusing their limited resources on the highest priorities of the Nation.

The following paragraphs are excerpted from Conserving America's Fisheries - U.S. Fish and Wildlife Service Fisheries Program Vision for the Future (USFWS 2002) and outline the Fisheries Program's mission, goals and priorities. The entire document is available at http://pacific.fws.gov/Fisheries.

In order to better conserve and manage fish and other aquatic resources in the face of increasing threats, the Service worked with partners to refocus its Fisheries Program and develop a vision. **The vision of the Service and its Fisheries Program is working with partners to restore and maintain fish and other aquatic resources at self-sustaining levels and to support Federal mitigation programs for the benefit of the American public.** To achieve this vision, the Fisheries Program will work with its partners to:

- **Protect the health of aquatic habitats.**
- **Restore fish and other aquatic resources**
- **Provide opportunities to enjoy the benefits of healthy aquatic resources**

In July, 2001, the Sport Fishing and Boating Partnership Council (SFBPC) was charged by the Service to convene a steering committee representing perspectives from a broad array of stakeholders in fish and aquatic resource conservation to work with the Fisheries Program during the development of a new blueprint for the future. This provided partners with a unique opportunity to be engaged before the strategic vision was drafted. It was also unique because the Fisheries Steering Committee included representatives from the Service, along with partners and stakeholders.

In January, 2002, the SFBPC Fisheries Steering Committee provided the Service with a set of consensus recommendations on the Fisheries Program's role in the partnership effort to conserve the Nation's fish and other aquatic resources. This report, entitled "A Partnership Agenda for Fisheries Conservation," along with the earlier SFBPC hatchery report, "Saving a System in Peril," were keystone elements in developing the Fisheries Program's strategic vision. Using these two reports and working collaboratively with partners, the Service has better defined its role in conserving and managing aquatic resources across the county. This strategic vision discusses where the Fisheries Program is today, where it needs to go in the future, and why it is important to get there. To move forward and be successful in this role, the Fisheries Program must be solidly supported, backed by sound science, and grounded in dynamic partnerships.

The Service will also ensure that actions taken by the Fisheries Program will be consistent with strategic plans being developed by the Department of the Interior and the Service as a whole, and that Fisheries Program actions will help achieve performance targets laid out in those plans. The Fisheries Program's strategic planning effort is proceeding parallel to the strategic planning efforts being conducted by the Department and the Service. These

planning efforts have been closely coordinated to ensure agreement and consistency among the three levels of management.

The Service is re-committing to its role as a partner in conserving America's fish and other aquatic resources. In some cases, the Fisheries Program will lead; in others it will facilitate or follow. In all cases, the Fisheries Program will focus its efforts and activities on what it is best positioned to contribute based on its unique resources and capabilities, recognizing that sound science and solid partnerships will continue to be the key to aquatic resource stewardship. Working with its partners, the Fisheries Program has identified seven areas of emphasis with associated goals, objectives, and actions to focus on in the future. In some cases, these actions reflect a reaffirmation of current activities; in other cases, they reflect some change in those activities. In a few cases, the actions reflect a new activity for the Fisheries Program. Many of its current activities support these goals and objectives, and there will be some opportunities to refocus and change within existing resources. However, the scope and speed with which this blueprint for the future becomes reality will depend on the level of support and resources that are available to the Fisheries Program.

Listed below are the seven national level focus areas identified in Conserving America's Fisheries - U.S. Fish and Wildlife Service Fisheries Program Vision for the Future (USFWS 2002). Under each national focus area are sub-focus areas identified in the Pacific Region Fisheries Program Strategic Plan (USFWS 2003a). This Regional Strategic Plan and the sub-focus areas listed were developed with the help of Tribal, State, internal and external partners, in addition to other stakeholders.

National Focus Area: Partnerships and Accountability

Regional Sub-Focus Areas

- Maintain communication with stakeholders and establish meaningful partnerships for the purpose of accomplishing all of our goals.
- Improve accountability by establishing a implementing a better system for measuring and reporting progress.

National Focus Area: Aquatic Species Conservation and Management

Regional Sub-Focus Areas

- Native species will be protected and enhanced while maximizing species diversity and recreational opportunities, and meeting tribal needs.
- Minimize introductions of aquatic nuisance species while attempting to contain, reduce, and eliminate them.
- Support, facilitate or lead collaborative approaches managing interjurisdictional fisheries while conserving and restoring fish populations.

National Focus Area: Public Use

Regional Sub-Focus Areas

- Promote quality recreational fishing.
- Identify, meet, and obtain full funding for mitigation fisheries.

National Focus Area: Cooperation with Native Americans

Regional Sub-Focus Area

- Assist Native American tribes in their endeavors to manage, protect, and conserve their trust resources.

National Focus Area: Leadership in Science and Technology

Regional Sub-Focus Area

- Provide leadership in science and technology by using state-of-the-art and scientifically sound research studies and management techniques.

National Focus Area: Aquatic Habitat Conservation and Management

Regional Sub-Focus Area

- Protect, conserve and restore aquatic habitat by collaborating with internal and external partners with land management or regulatory authority.

National Focus Area: Workforce Management

Regional Sub-Focus Area

- Develop a diverse, effective, and motivated workforce.

1.6 National Fish Hatchery System - National/Regional Overview and Statutory Mandates/Authorities

The Service's stewardship of the Nation's varied and valuable fishery resources dates from the appointment of Spencer Baird as Commissioner of Fish and Fisheries by President Ulysses S. Grant in 1871. That initial Federal involvement was in response to concern over the widespread decline in domestic food fish supplies. In 1872, Congress provided the first appropriation for the Fisheries Program when it funded the introduction of shad, salmon, whitefish, and other food fishes into waters to which they were best adapted. A little later that year, the propriety was strongly urged, at the Boston meeting, of sending an experienced fish-culturist to the west coast for the purpose of securing a large amount of spawners of the California salmon. Mr. Livingston Stone traveled to California and established a hatching-works on the McCloud River. This was the first salmon breeding unit in the United States, the first hatchery to be established with federal funds, and the beginning of the National Fish Hatchery System.

During the early years of the hatchery program, most National Fish Hatcheries were established under general authorizations for fisheries development as specified in appropriation acts. Then in the 1930's a series of acts provided authorizations for hatchery development. This permitted the National Fish Hatchery System to expand on a planned basis.

The Service has a 130-year history of leading Federal fishery conservation efforts in the Pacific Northwest. During this time, our Federal fishery resource involvement and responsibilities have grown, diversified, and undergone several modifications in response to continually changing needs. The program shifts and expansions evolved to address the circumstances of each era. Today, the Service is taking a holistic approach to fishery conservation. Present activities focus on a broad array of scientific fishery management and conservation efforts.

Attachment 1 provides a historical background into the establishment and operation of National Fish Hatcheries in Region 1 (Note: Region 1 is the Pacific Region and includes Washington, Oregon, Idaho, California, Nevada, Hawaii and the Pacific Territories). Since the establishment of the first salmon hatchery on the McCloud River, 67 hatcheries or fish facilities have been established in California, Idaho, Oregon, and Washington. Only 19 of those hatcheries, 2 fish facilities, and 1 technology center are in operation today. The remainder have either been closed or transferred to State or other Federal agencies.

Attachment 2 documents the development of a broad range of statutory mandates and authorities under which the Service conducts its hatchery program and numerous other fishery related activities in cooperation with other Federal, State, Tribal, and private entities. Vested with significant legal responsibilities under State and international agreements, treaties and laws, the Service conducts an extensive conservation effort in order to help protect and restore native aquatic species and their habitats with the goal of preempting severe declines and potential listings under the Endangered Species Act (ESA).

The Region 1 Fisheries Program consists of four major program activities: National Fish Hatcheries, Fish Health Centers, the Abernathy Fish Technology Center, and Fishery Resource Offices/Fish and Wildlife Offices. Successful implementation of the Service's hatchery activities requires close coordination and cooperation with the other three Fisheries Program activities. Abernathy Fish Technology Center provides state-of-the-art applied research in several fields including development of new fish diets for salmonid and sturgeon culture, use of genetic identification in the recovery and restoration of native stocks, and development of new and improved techniques to increase the efficiency of fish culture and captive brood stock operations. Fish Health Centers participate in Investigational New Animal Drug (INAD) registration that provide diagnostic and veterinarian services on wild fish stocks and hatchery-reared fish, and supply health certifications for the export of fish and fish eggs. Fishery Resource Offices/Fish and Wildlife Offices participate in a wide

variety of activities including coast-wide stock assessment and evaluation, coded-wire tagging of hatchery indicator stocks for the U.S./Canada Treaty, evaluation of hatchery production, and assessment of new approaches to produce "wild type" fish at culture facilities. These offices also participate in a broad range of other activities including habitat assessment and restoration, non-indigenous species coordination, natural production studies, harvest assessment, fish passage coordination, and endangered species listing and recovery activities.

1.7 Regional Fishery Goals and Priorities

The Pacific Region Fisheries Program is committed to focusing its priorities and resources toward the conservation, recovery, and restoration of native resident and interjurisdictional species. The Fisheries Program works with State, Federal, Tribal and other partners, as well as on Service, Tribal, and other Federal lands, to ensure that its actions purposefully contribute to these objectives. Regional priorities are as follows:

1.7.1 Implementing Hatchery Reform. National Fish Hatcheries are reforming hatchery practices to conform to their associated scientific foundations and management evaluations of those efforts. National Fish Hatcheries in the Pacific Region produce and release stocks of fish, as identified in approved Hatchery Genetic Managements Plans.

1.7.2 Implementing Comprehensive Hatchery Management Plans. Implementation of the Comprehensive Hatchery Management Plan is a Regional priority. Comprehensive plans incorporate the rationale, authorities and supportive documentation for operation and management of National Fish Hatchery programs.

1.7.3 Hatchery Evaluations. Monitoring and evaluation of hatchery production programs are a critical component of effective hatchery operations. Completion of hatchery management plans, including this one, will help identify research needs.

1.7.4 Hatchery Evaluation Teams. To foster and enhance communication in the hatchery production and evaluation process, active participation in Hatchery Evaluation Teams by Service programs, resource agencies, and public partners is a Fisheries Program priority.

1.7.5 Habitat Restoration and Technical Assistance to Other Regional Programs. Providing technical assistance to other Regional programs on Service lands with Partners for Fish and Wildlife and other Service habitat restoration efforts is a high priority of the Fisheries Program.

1.7.6 Tribal and Federal Lands. Providing support to Tribal Governments and Federal land management agencies for fish and wildlife resources on their lands has always been, and continues to be, a high priority.

1.7.7 Fish Passage Improvement. An important part of the Fisheries Program is habitat restoration which re-establishes access to important historic habitats for fish. As such, emphasis is placed on fish passage improvement. A high priority is given to identifying and correcting fish passage problems at National Fish Hatcheries, other Service and non-Service lands.

1.7.8 Endangered Species Act. The Fisheries Program promotes and initiates actions that ensure all Fisheries Stations in the Pacific Region are in compliance with the Endangered Species Act.

1.7.9 Compliance with Court Agreements and Other Legal Obligations. The Fisheries Program complies with court agreements and other legal obligations, and enhancement efforts that contribute to the mitigation, conservation, restoration, and recovery of listed, candidate and imperiled fish species, both anadromous native fish and resident native fish, such as, bull trout, cutthroat trout, desert fishes, and others.

1.7.10 Mitigation. The Fisheries Program implements artificial production to comply with mitigation responsibilities consistent with Congressional mandates and funding.

1.7.11 Restoration and Recovery of Native Fishes. Restoration and recovery of native fishes is a priority. Healthy stocks of native fish are indicators of clean water and healthy aquatic ecosystems. Healthy stocks of native fish also provide harvest opportunities for recreational, commercial, and tribal fishers.

1.7.12 Ecosystem and Cross-program Approach. The Fisheries Program continues to work within an ecosystem and cross-program approach using the collective expertise of our employees and Programs in a coordinated fashion.

1.7.13 Make Full Use of Computer and Database Technology. An ongoing effort is to strengthen our staff capabilities and make full use of computer and database technology in order to increase program effectiveness and efficiency, and meet the needs of resource management agencies, tribes, and other Federal agencies.

1.7.14 Outreach. Educational and outreach opportunities are pursued to enhance public understanding of program responsibilities, capabilities, and accomplishments, and will continue to be an important component of the Fisheries Program.

1.8 Legal and Policy Guidance

National Fish Hatchery programs in the Columbia River Basin are shaped by various policies, regulations, laws, agreements and legislative mandates. National Fish Hatchery managers and policy makers are constantly challenged with the complex task of implementing a comprehensive state-of-the-art hatchery program while complying with legal, regulatory, and legislative mandates which have different and sometimes conflicting purposes. For example, the U.S.-Canada Pacific Salmon Treaty, Mitchell Act and subsequent amendments, Endangered Species Act and subsequent Biological Opinions, Treaty of 1855 with Columbia River Tribes, *United States v. Oregon* court order of 1969 and subsequent Columbia River Fish Management Plan all guide production in the Columbia River. Chapters 3 and 4 further discuss legal justification and operational guidance for Spring Creek National Fish Hatchery.

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CHAPTER 2. HATCHERY AND RESOURCE DESCRIPTIONS

2.1 Hatchery Overview

Spring Creek NFH is located 20 miles upstream from Bonneville Dam on the Columbia River, at river mile 167, on 60.21 acres. The hatchery is on the north side of the Columbia River near Hwy 14 in Skamania County, Washington (Figure 1). The hatchery is bounded by the Columbia River on the south and by 500ft high basalt cliffs to the north.

Spring Creek NFH also operates a sub-station on the White Salmon River. Known as the Big White Salmon Ponds, this facility is located on 42 acres about one and a quarter miles from the mouth of the White Salmon River. Constructed in the early 1950's, the Big White Salmon ponds were used as an adult trapping and egg collection facility. The ponds have been used to rear spring Chinook but the facility has not been used recently and will not be used until ESA screening concerns are met and the removal of Condit Dam is decided.

Currently Spring Creek NFH operates with a staff of eleven personnel. This includes the Hatchery Manager, Assistant Hatchery Manager, a Fishery Biologist, a Lead Fish Culturist, three additional Fish Culturists, two Maintenance Mechanics, a Program Assistant and an Information and Education Assistant. Additionally, volunteers are utilized to assist with outreach activities and station operations when available.

2.2 Facility and Site Descriptions

The hatchery has eight buildings involved in fish production and four residences (Table 1). Currently, there are no plans for new buildings; however, the hatchery would like to construct a multi use Salmon Forum/outreach/visitor center on the grassy area near the parking lot. Except for the residences, all structures are the property of the Corps of Engineers.

The hatchery facilities and rearing units are described in Table 2. The physical layout of the hatchery is diagramed in Attachment 3.

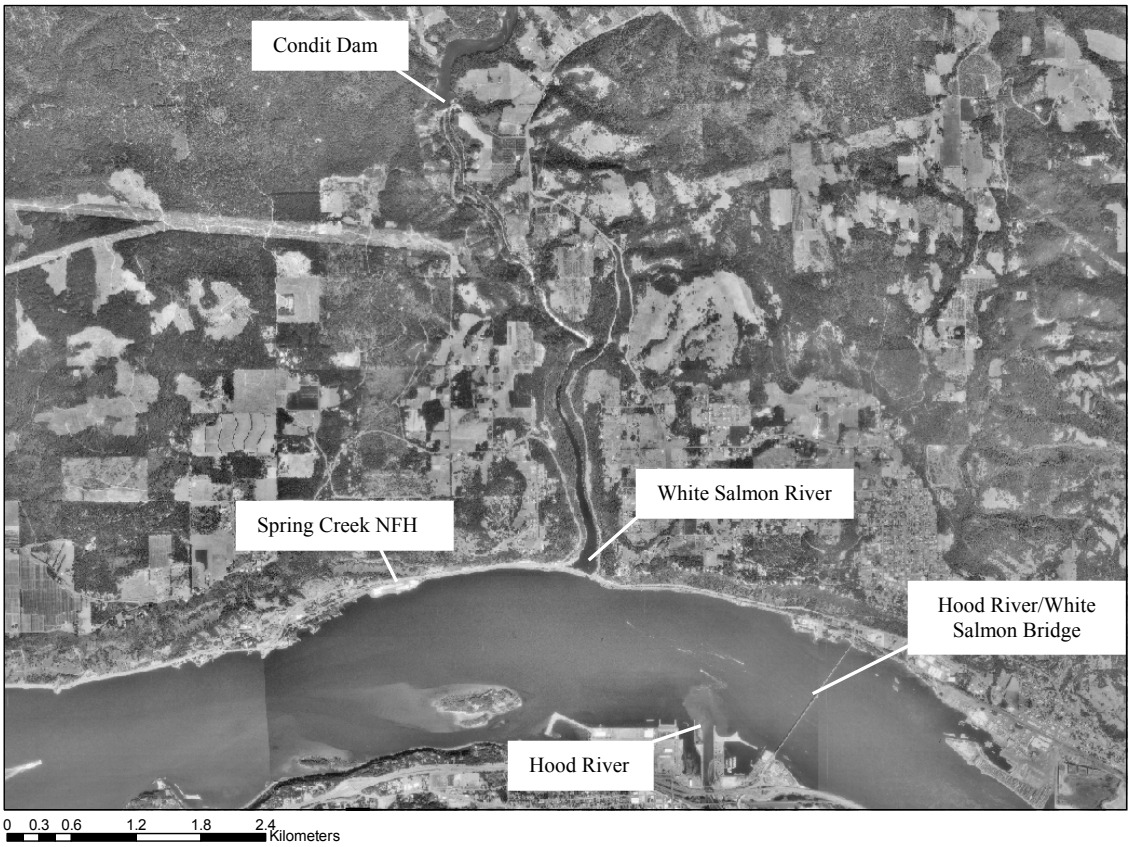

Figure 1. Aerial photograph of the Columbia River showing the location of Spring Creek National Fish Hatchery. Spring Creek National Fish Hatchery, the mouth of the White Salmon River, Condit Dam, the mouth of Hood River and the Hood River/White Salmon Bridge are identified.

Table 1. Hatchery buildings, primary use of buildings, size (sq. feet) and construction type. Further information can be found within the Spring Creek NFH station guide.

Building	Square Footage (ft^2)	Construction type
Incubation Bldg	9,994	Concrete & Brick , constructed 1953, remodeled 1972. Used to incubate eggs and fry.
Shop/Garage	4,196	Brick wall, constructed 1950. Expanded 1972.
Spawning/ Office/Visitor Center	5,329	Cement/Brick, constructed 1972.
Mechanical building	10,000	Cement/Brick, constructed 1972. Water recirculating plant and biological filtration are housed within this building
Fish Food Storage/Crew Break Room	3,577	Cement/Brick and Aluminum constructed in 1972
Storage Building	1,500	Brick, constructed 1990. Covers variable speed pump.
Well House	120	Cement/Brick, constructed in1972.
Chlorination Bldg.	168	Cement/Brick, constructed in1972.
Quarters #1	1,087	Wood frame, constructed 1947.
Quarters #2	1,176	Brick, constructed 1952.
Quarters #3	1,228	Wood frame, constructed 1950.
Quarters #4	3,000	Wood frame, constructed 1950. Converted to Lower Columbia River Fish Health Laboratory
Quarters #5	1,176	Brick, constructed 1952.

Table 2. Spring Creek NFH physical description of incubation, biological filters and rearing units.

Unit type	Length (ft)	Width (ft)	Depth (ft)	Volume (ft^3)	No.	Material	Age	Condition
Burrows pond	75	17	4	5,100	44	concrete	30	Good
Circular	30 (diam.)		3	283	1	concrete	56	Good
White Raceways	232	12	4	11,136	2	concrete	50	poor
Biological Filters	75	23	8	12,600	18	concrete	30	Good
Incubator troughs	20	1.5	1.5	45	30	fiberglass	20	good
Vertical stack incubators				7	288	fiberglass	32	Fair
Settling lagoons				470,000	2	earthen	30	good

2.3 Hatchery Purpose

Spring Creek NFH was placed into operation in 1901 to provide fish to supplement the commercial fishing industry. Spring Creek NFH was authorized by Appropriation Act , 24 Stat. 523, March 3, 1887, and Appropriation Act, 30 Stat. 612, July 7, 1898. The hatchery was reauthorized by the Mitchell Act (16 USC 755-757; 52 Stat. 345) May 11, 1938 and amended on August 8, 1946, (60 Stat. 932) for conservation of fishery resources in the Columbia River Basin. The hatchery was remodeled in 1948 to mitigate for Bonneville Dam (Mitchell Act). Another remodeling was completed in 1972 as part of the COE's mitigation for John Day Dam, Flood Control Act of 1950. The hatchery is used for tule fall Chinook salmon adult collection, egg incubation and rearing.

FINAL DRAFT

The following Hatchery Management Goals were adapted from the Mitchell Act, Endangered Species Act (ESA) Biological Opinions, *United States v. Oregon* agreements, COE's John Day Mitigation, and the Integrated Hatchery Operations Team - Operation Plans for Anadromous Fish Production Facilities in the Columbia River Basin Volume III - Washington, Annual Report for 1995 (IHOT 1996).

Goal 1: Conserve Columbia River tule fall Chinook salmon in the area upstream of Bonneville Dam (as defined in the Mitchell Act of 1937).

Goal 2: Assure that hatchery operations support Columbia River Fish Management Plan (*United States v. Oregon* and U.S.-Canada Pacific Salmon Treaty) production and harvest objectives.

Goal 3: Minimize impacts to listed (ESA) and other native species, their habitat, and the environment.

Goal 4: Develop outreach to enhance public understanding, participation, and support of Service and Spring Creek NFH programs.

To achieve these goals, 7,000 tule fall Chinook adult brood stock are collected, spawned, eggs incubated and reared at the hatchery to produce 15.1 million sub-yearling smolts for release into the Columbia River. Objectives, tasks, and current practices to achieve these goals are described in Chapter 3 and in Spring Creek NFH's Operational Plan, Goals and Standards (Attachment 4).

2.4 Archeology/Cultural Resources

The Spring Creek National Fish Hatchery was established in 1901 as mitigation for the decreasing salmon population in the Columbia River due to over-fishing and destruction of fish habitat. The original hatchery was flooded in 1938 after completion of the Bonneville Dam. After several years of modifications, the hatchery was then rebuilt in 1972 at its current location. Hatchery employee housing, located on the north side of the highway, was built in the 1940s and 50s. Some of these structures may be considered eligible for the national Register of historic places, yet have never been formally evaluated for eligibility.

Tule fall Chinook salmon are native to this part of the Columbia River and historically were an important resource for people living along the Columbia River. The hatchery is located in the traditional territory of the Upper Chinookan Cascade Indians (French 1998). Due to the area's popularity for salmon procurement it was also frequently visited by other Native American groups including the Columbia River Sahaptins (Hunn and French 1998). The mouth of the White Salmon River, less than a mile east of Spring Creek Hatchery, was a heavily utilized fishing area. Lewis and Clark mention this area in their journal dated April 14, 1806 (Moulton 1991), describing the semi-subterranean houses found near the modern day town of White Salmon as typical of Columbia Plateau peoples' winter houses. They also mention a spot called *ilk'i'lak* which is translated to mean "dried pulverized salmon." This village site was used by both the Upper Chinook and the Klickitat. On the western banks of the White Salmon River was a Chinookan village called *nánšuit* or *námni* (French 1998), and the Klickitat referred to the area as *láwli pamí* (Schuster 1998).

During hatchery construction in the 1970's, fill dirt was brought in to build the holding tanks upon, reducing the possibility of encountering remains of Native American settlement in this area. However, Native American artifacts have been reported in the vicinity of the hatchery. One archaeological site is recorded within hatchery boundaries and two other sites occur within a mile of the hatchery. Site number 45SA384 is located below a scree slope just west of a water collection structure associated with the hatchery. This site is described as a single panel pictograph on a basalt boulder. Site number 45SA408 is located north of the hatchery, off Underwood road. Described as a historic period site containing architectural artifacts and associated domestic materials, there was also a single piece of obsidian found here which may indicate prehistoric use as well. Site number 45SA22 is located on the west bank of the White Salmon River. The site is described as several petroglyphs, badly eroded and hard to decipher. The site record states that these boulders are located just upstream from the Indian Fishing area set aside for Native American use. There are no other archaeological sites recorded in the area; however, occupants of the hatchery employee housing on the north side of the highway have reported finding Native American artifacts in their yards (Edward LaMotte personal communication October 2002).

This region of the Columbia River is rich in cultural history as indicated by historical accounts and recent archaeological investigations. The location of the Spring Creek National Fish Hatchery undoubtedly saw much historic and prehistoric fishing activity.

2.5 Watershed/Ecosystem Setting

The Columbia River is the fourth largest river in North America and drains parts of Washington, Oregon, Idaho, western Montana, northern Nevada and southern British Columbia (Bonneville Power Administration 1994). Spring Creek NFH is located on the banks of the Columbia River within the Columbia River Gorge National Scenic Area upstream from Bonneville Dam hydropower facility and downstream of The Dalles hydropower facility. Located in the lower Columbia basin, the Columbia River Gorge National Scenic Area is managed by the U.S. Department of Agriculture – Forest Service and was established by Congress in 1986 (Perry and Perry 1997). Being designated as a National Scenic Area allows for existing rural and scenic characteristics to be retained within the Columbia Gorge, while encouraging compatible growth and development within urban areas. The Columbia River Gorge itself is a deep canyon between Washington and Oregon and is the only near sea-level passage through the Cascade Mountains. The western Columbia River gorge consists of forested hillsides of Douglas fir, Western cedar, and many fern and moss species. The eastern gorge consists of grassland interspersed with Ponderosa Pine and oaks. Within the Columbia Gorge there are massive canyon walls, large rock formations, waterfalls and numerous small tributary streams and springs (Perry and Perry 1997).

2.5.1 Geology. Springs supplying water to the hatchery issue from beneath a talus slope above and north of the hatchery. Cliffs rise 400-500 feet above the springs and merge with gentle slopes of Underwood Mountain. The geology of the area is characterized by basalt flows of Pleistocene and Miocene age (Hinkle 1996). These basalt flows lie approximately in a horizontal plane, but have been subjected to considerable faulting. There are three main geologic units affecting the land base: Grand Ronde Basalt, Frenchman Springs Member of the Wanapum Basalt, and Basalt of Underwood Mountain. The hatchery springs discharge from the Frenchman Springs Member (Hinkle 1996).

2.5.2 Climate and Hydrology. The annual average precipitation at the hatchery is about 40 inches a year. Approximately 80% of the precipitation occurs between October and April. The average ambient air temperature is 76°F during the summer and 40°F in the winter.

Spring flow has varied over the years coinciding with regional drought cycles. Flows have been as low as 1,800 gallons per minute to over 4,000 gallons per minute, with an average of about 3,000 gallons per minute. The U.S. Geological Survey Water-Resources Investigations Report 95-4272 (Hinkle 1996), suggest that water discharging at the hatchery springs appears to contain a mixture of modern and old water, where old water is defined as water

recharge prior to 1944. Water from the hatchery well, drilled in 1991, appears to contain little or no modern water and to have an overall age of thousands of years (Hinkle 1996).

2.5.3 Vegetation. Presently, vegetation around the hatchery is Douglas fir, western cedar, blackberries and grassland. Listed and candidate species which may occur in the area of the hatchery are included in Attachment 5.

2.5.4 Fish and Wildlife. There are no anadromous salmonids that historically ascended the hatchery springs. The Spring Creek hatchery run can arguably be the first man-made anadromous salmon run established in the Pacific Northwest. Pacific lamprey may have ascended the springs, but there is no documented evidence to verify this claim. The Spring Creek tule stock is part of the lower Columbia River fall Chinook Ecologically Significant Unit (ESU).

Spring Creek tule fall Chinook are indigenous to local watersheds. In most years, spawning ground surveys have shown that the number of natural spawning fall Chinook in local tributaries is relatively small (Eric Olsen ODFW, personal communication). Today, there are on average less than 100 spawning tule fall Chinook salmon in the Wind River below Shepard Falls, and about 200 in the White Salmon River (WDFW and ODFW 2002). Listed and candidate species which may occur in the area of the hatchery are included in Attachment 5.

2.5.5 Habitat Condition. Tule fall Chinook spawned in the lower reaches of the Wind, Little White Salmon, White Salmon, and Klickitat rivers. After the construction of Bonneville Dam in 1938, spawning grounds were inundated and little of the historical spawning grounds of tule fall Chinook remained. Restoring the tule fall Chinook run into the White Salmon River, where the Spring Creek NFH stock originated, may be a reality if Condit Dam is removed. With the removal of Condit Dam, 18 miles of river will be available for all anadromous fish, including tule fall Chinook salmon.

2.5.6 Current and Future Development. Removal of Condit Dam would restore the ecosystem in the White Salmon watershed. Spring Creek NFH would have a role in returning tule fall Chinook salmon to the White Salmon River. Production at Spring Creek NFH will continue to mitigate for lost habitat as a result of John Day and Bonneville dams.

2.6 History of Hatchery Stocks

2.6.1 Legal Authority. Congress passed the Mitchell Act, which was intended to help remedy the decline of salmon and steelhead, particularly from the negative effects of constructing Bonneville Dam. On August 8, 1946, the Act was amended (60 Stat. 932) by Congress to authorize the Secretary of Interior the transfer of funds to the states for specific projects to develop salmon resources (i.e. hatcheries). In 1947, the Columbia River Fisheries

Development Program was formed to plan and coordinate the use of Mitchell Act funds. At this time, major reconstruction took place at the Underwood Station under the Mitchell Act. The station was renamed the Spring Creek Hatchery. In 1956, Congress expanded the Mitchell Act to include the preservation of fisheries resources above McNary Dam. Administration of the Mitchell Act was shifted from the Department of the Interior to the Department of Commerce by the Reorganization Plan No. 4 of 1970 (84 Stat. 2090). The Act is currently administered by NOAA-Fisheries which provides part of the funding to the Service for operation and maintenance of the hatchery.

In 1970, a major expansion of the hatchery occurred under the Flood Control Act of 1950 for mitigation of the John Day Dam. The Corps of Engineers configured the hatchery into its present state during this time. The Corps of Engineers funds approximately 50% of facility operational costs.

In addition to the initial authorizations listed above, hatchery operations are authorized, sanctioned and influenced by the following treaties, judicial decisions and specific legislation:

Treaty with the Makah, 01/31/1855;
Treaty with the Walla Walla, Cayuse, Umatilla Tribes, 06/09/1855;
Treaty with the Yakama, 06/09/1855;
Treaty with the Nez Perce, 06/11/1855;
Treaty with the Tribes of Middle Oregon, 06/25/1855;
Treaty with the Quinault and Quileute, 07/01/1855;
Mitchell Act, 52 STAT. 345, 05/11/1938;
Mitchell Act (Amended), 60 STAT. 932, 08/08/1946;
Shoalwater Bay Tribe, Executive Order, 09/22/1886;
Chehalis Tribe, Executive Order, 10/01/1886;
Hoh Tribe, Executive Order, 09/11/1983;
United States v. Oregon (*Sohappy v. Smith*, Belloni decision: Case 899), 07/08/1969;
Flood Control Act of 1950;
Tule fall Chinook - Listed as a Significant Stock-Endangered Species Act of 1973, 87 STAT. 884, 12/28/1973;
Salmon and Steelhead Conservation and Enhancement Act, 94 STAT. 3299, 12/22/1980; and
Pacific Salmon Treaty Act of 1985 (U.S./Canada Pacific Salmon Treaty), Public law 99-5, 16 U.S.C. 363, 03/15/1985.

2.6.2 Production and Management History. The Columbia River was the largest producer of salmon in the world. Cannery records reveal that catches in the late 1800's and early 1900's were in the millions. This extraordinary harvest could not last, and it was recognized in the late 1800's that something must be done to preserve the salmon. The commercial

fishing industry in 1880's attempted to supplement the commercial harvest with a hatchery on the Clackamas River, Oregon.

After a few years of failed results, the industry asked the U.S. Fish and Fisheries Commission to take over the operation of the facility. In 1896, a team was sent to the Columbia River Basin to search for a hatchery site to supplement the Clackamas River hatchery. A number of streams were evaluated during August and September. Salmon in significant numbers were found in the White Salmon and Little White Salmon rivers (USFWS 2003b). Hatchery sites on the Little White Salmon and Wind rivers were selected and in operation by 1899. These sites were authorized under the Appropriation Act, 24 Stat. 523, 03/03/1887 and Appropriation Act, 30 Stat. 612, 07/01/1898.

Fall Chinook eggs were collected from both the Little White Salmon and White Salmon Rivers, these were incubated at the Little White Salmon site and most were transferred to the Clackamas Station but some were hatched and released back into the rivers. While transporting eggs from the White Salmon collection site back to the Little White Salmon Station, an employee suggested that spring water cascading over basalt cliffs into the Columbia River might be a water source to incubate eggs. This suggestion was accepted and incubation boxes were placed at the springs in 1901. Some of the eggs and, possibly, fry escaped and entered the Columbia River. After a couple of years, adults were trying to swim up into the springs. These fish were captured and eggs taken. The facility was named White Substation.

As years passed, more adults returned to the springs and more eggs were collected. The site was eventually developed with an adult holding pond and an incubation building. Eggs were incubated and sent to the Clackamas Station; fry were released on site and back into the White Salmon River. Sometime in the 1920's the facility name was changed to the Underwood Station.

From 1901 to 1938, tule fall Chinook adults were trapped by seining the mouth of the White Salmon River. Collected eggs were transferred to the Spring Creek site. As the eggs hatched, those not shipped to other locations were released both at the Spring Creek site and the White Salmon River.

The average number of eggs taken during the 1901 to 1938 time period was 9.1 million, of which nearly 1.4 million (15%) were transferred to other locations (Attachment 6). Two feeding channels were constructed in the two main springs at the Spring Creek site. Fish food diets were developed and fish feeding began. During this time period, fish were fed for a short time, reaching the size of 1 to 2 inches, and then released. The larger fish were held until May. As food formulas and feeding techniques improved, more fish were held longer and size at release increased to 3 inches for the largest fish. Still, the majority of fish released were as unfed fry and small fingerlings fed only for two or three weeks.

After the construction of Bonneville Dam in 1938, egg collections on the White Salmon River were impossible. Egg collection was moved up river about 0.5 miles. Despite this move, egg collections on the White Salmon River started to decrease. A permanent facility (White sub-station) was then constructed an additional 0.75 mi. upstream in the early 1950's to trap adult tule fall Chinook for egg collection. This facility also was used sporadically during 1950's to rear and release additional species into the White Salmon River, including 130,000 Brook Trout from Washington Department of Fisheries, 400,000 chum salmon during 1956 provided by Quilcene NFH, and an average release of 175,000 coho salmon from 1957-59 and 1961 from multiple egg sources, but including coho salmon collected at the White sub-station (Spring Creek NFH historical records).

Due to an increase in adults returning to Spring Creek NFH, a decision was made to discontinue adult trapping at the White sub-station in 1964. The facility was then used to raise additional tule fall Chinook fry and fingerling for release into the White Salmon River. Attempts to raise additional species besides tule fall Chinook occurred in 1969, 1972 and 1973. An average of 900,000 coho salmon were reared and released from the White sub-station during those years (Spring Creek NFH records).

From 1938 to 1970, the average egg take was 31.1 million with 43% of these tule fall Chinook eggs transferred to other locations (Attachment 7). A record tule fall Chinook egg take took place in 1958 when the hatchery took 90.3 million, shipping 64.8 million to other hatcheries.

From 1939 to 1970, large releases of tule fall Chinook unfed fry and small fingerlings occurred. As the hatchery expanded and food nutrition improved, feeding and holding fish longer became the management practice. These changes in management practices coincided with the first mention of disease problems at Spring Creek NFH including coagulated yolk problems, bacterial infections and mysterious fish losses. Despite disease issues, in the mid 1950's through the 1960's adult returns increased dramatically. Size of fish released increased and some studies showed that larger fish contributed to harvest at a higher rate. Large numbers of eggs were supplied to any hatchery who requested them. During this time, the Spring Creek NFH tule stock was the source for eggs to almost all lower Columbia River hatcheries.

2.6.3 Reuse System Era 1971 to Present. In 1970, major reconstruction by the Corps of Engineers took place by making the hatchery into a new modern reuse system with heated water capabilities. This reconstruction was done to mitigate for the loss of habitat resulting from the construction of the John Day Dam (USFWS 1982).

Hatchery expansion, improvements in fish culture, and feed resulted in fish being released at a larger size. Fish releases occurred in March, April, and May with some fish released in

early February. Unfed fry and pre-smolt releases were discontinued after 1980, until the mid 1990's when an unfed fry evaluation study was initiated (see Chapter 3-Hatchery Evaluation Studies). Smolt size increased from 3 inches to over 4 inches for the mid May release during this time. The hatchery reared the same number of fish as before but was able to hold them longer thus the larger size. During the early 1970's the hatchery released some fish in early February to make room for growth on the remaining fish. This practice was curtailed when coded wire tag programs were implemented and evaluating the fishery for harvest was important.

Throughout the 70's fishing pressure increased, especially with Treaty fishing above Bonneville Dam. The hatchery managed to get enough escapement for full production and supply other hatchery shortfalls but during 1986-88, 1990, 1993 and 1994, additional adult collections were made from traps located at Bonneville Dam and below Bonneville Dam at Bonneville Fish Hatchery and Abernathy Fish Technology Center where Spring Creek stock had been a large component of their stock history (CRiS database, Stephen M. Pastor 3/19/2003, see also Attachment 8 for detailed numbers). The release goal at Spring Creek NFH continues to be 7.6 million in March, 4.2 million in April, and 3.3 million in May (15.1 million annually) at 120, 90, and 60 fish/lb, respectively. The average annual hatchery release has been 14.47 million between 1989 to 2001 (USFWS 2003b).

2.7 Biological Risks and Ecological Interactions between Hatchery fall Chinook salmon and Wild (Listed) Salmon

All hatcheries must consider their potential to adversely affect the aquatic community. To help assess potential impacts, the Service has developed Hatchery and Genetic Management Plans for National Fish Hatcheries in the lower Columbia River, including Spring Creek NFH. These HGMPs are being drafted to assess our program and meet Endangered Species Act requirements identified by NOAA-Fisheries. It is anticipated that these plans will be updated regularly and re-submitted to NOAA-Fisheries and the Service.

In the 2003 HGMP (USFWS 2003b), the Service assessed the potential impacts from hatchery operations including: water withdrawal and effluent discharge, brood stock collection, genetic introgression, juvenile fish releases, disease, competition, predation, residualism, and migration corridor and ocean impacts. Our assessment to date, with NOAA-Fisheries concurrence, concludes that operation of Spring Creek NFH will not jeopardize listed fish populations (NMFS 1999b). However, we also recognize that more research is needed to more fully understand the impacts of hatchery operations, releases, and impact of straying into local tributaries (see Chapter 4: Monitoring and Evaluation). In addition to completing documentation to comply with our ESA responsibilities, we must also meet our mitigation responsibilities under the Mitchell Act, John Day Dam mitigation as well as meet our Tribal Trust and *United States v. Oregon* obligations. In order to balance these

sometimes conflicting mandates, we regularly meet with our co-managers to discuss operation and management of the hatchery.

The following information was primarily extracted from our Spring Creek NFH Hatchery and Genetic Management Plan (USFWS 2003b) and the Total Dissolved Gas Waiver Request for Bonneville Dam Spill memo of November 30, 2001 (included in the HGMP). Both of these documents discuss biological risks and ecological interactions between hatchery fall Chinook salmon and wild (listed) salmon.

The Spring Creek NFH's fall Chinook program may adversely affect listed populations, but impacts are substantially below the jeopardy threshold (NMFS 1999a). The 1999 Biological Assessment for the Operation of Hatcheries Funded by the NOAA Fisheries under the Columbia River Fisheries Development Program (NMFS 1999a) and the 1999 Biological Opinion on Artificial Propagation in the Columbia River Basin (NMFS 1999b) present a discussion of the potential effects of hatchery programs on listed salmon and steelhead populations. A discussion of ecological interactions and biological risks relative to the Spring Creek's fall Chinook program follows:

2.7.1 Hatchery Water Intake and Use. Hatchery rearing water is primarily derived from several springs emerging from a basalt cliff located on hatchery property. Anadromous fish do not have access to the springs. Flows between 2000-3000 gpm are collected from springs when fish are on station and pumped to a de-aeration tower and packed coke ring column to remove excess nitrogen. Within the de-aeration pit, warm water from a hatchery well is mixed with the spring water. This mixing of cold spring water and warm well water allows hatchery staff to control growth and developmental rates of fish on station. Production water (water exiting from rearing ponds) is recirculated through the biological filters to the aeration chamber and back to the rearing ponds. The hatchery recirculating system contains 3 million gallons of water and at full capacity circulates 30,000 gpm. The system is designed as a 90 percent reuse system and discharges only 10% of the total available water to the wastewater treatment lagoon located 0.5 miles from the biological filters. The wastewater treatment lagoon consists of a series of two settling ponds that eventually drain into the Columbia River. Hatchery effluents from the settling ponds meet established water quality standards and are diluted by the flow in the Columbia River. Attachment 9 provides a diagram of the hatchery reuse system.

2.7.2 Brood Stock Collection. Returning fall Chinook are collected for brood stock at the hatchery rack. Hatchery fish volitionally return to the hatchery using the hatchery's fish ladder, homing into the spring water. Over 99% of the fish entering the hatchery are tule fall Chinook. There may be a small number of naturally spawning tules that enter the hatchery but there is no way of distinguishing these fish from the hatchery stock.

The hatchery also gets a small number of Bright fall Chinook, these potentially could be strays from the Mid-Columbia Bright program or Up-River Brights that may include listed stocks, but most likely are from the Little White Salmon NFH. These fish are returned to the river to resume their journey. Additionally, any other salmonid or non-salmonid species is returned to the Columbia River.

2.7.3 Genetic Introgression. The Spring Creek NFH stock originated from native brood stock collected from the White Salmon River and has developed over many generations without major transfers of other stocks of fish into its program. It is thought that the hatchery stock is virtually the same as the naturally spawning stock. Over the past 100 years, the hatchery has stocked many smolts into the local waters and the concern of straying in either direction is not a major concern. Genetic testing would provide better information on the hatchery and natural spawning tule fall Chinook in the local watersheds.

Straying of Spring Creek tule fall Chinook is not considered a major problem for local watersheds. This stock is part of the listed lower Columbia River Chinook ESU, although the hatchery stock is not currently listed. Therefore, genetic introgression of tule fall Chinook released from Spring Creek NFH with naturally spawning tule fall Chinook stocks is not considered a significant problem. The Service analyzed data to quantify the degree of straying of fish from our National Fish Hatcheries. For Spring Creek National Fish Hatchery, data indicates that 98% of the estimated adult recoveries are either on route to or at the hatchery (Stephen Pastor, USFWS Vancouver, WA, unpublished data on hatchery strays, 2003).

2.7.4 Hatchery Production. Spring Creek NFH tule fall Chinook releases are some of the largest in magnitude relative to other production programs. Spring Creek releases, in most years, are made during three separate time periods. About 7.6 million smolts are released in mid-March, 4.2 million in mid-April and final release 3.3 million in May.

2.7.5 Disease. The Spring Creek tule fall Chinook salmon are a remarkably healthy stock with a very low incidence of the listed pathogens that plague other hatcheries (Fish Health Inspection Reports, 1982 to present, Lower Columbia River Fish Health Center). Adults return with no virus and low levels of two bacterial pathogens and there is no vertical transmission of disease to their offspring. Relative to this, the Spring Creek NFH fish have never suffered the decimating and uncontrollable losses caused by virus and have therefore never posed a viral threat to wild/native fish. Over the years, improvements to the handling of fish and to the recirculation system have significantly reduced disease. The juveniles still face challenges from pathogens external to the hatchery and common to the Columbia River; however, timely release of the juveniles reduces health risks. Spring Creek tule fall Chinook salmon are released directly into the Columbia River at the hatchery site and pass only Bonneville Dam on route to the ocean, so there is reduced potential for transmission of

pathogens to other populations. In comparison, upriver programs are subjected to the high density impacts and stresses of collection for transport and/or diversion through multiple bypass systems where stress can trigger disease transmission. As a consequence, direct infection of other fish by Spring Creek fish is considered minimal.

Many of the disease concerns related to hatchery fish are based on old management styles that emphasized the release of large numbers of fish regardless of their health status. Since that time. The desire to improve fish health and prevent disease outbreaks has resulted in better husbandry. This includes decreases in rearing densities to reduce the crowding and stress that affects the resistance of salmonids to disease (Salonius and Iwama 1993; Schreck et al. 1993). Along with decreased densities and improved animal husbandry, advances in fish health care and adherence to federal and interagency fish health policies have significantly decreased the possibility of disease transmission from hatchery fish to wild/native fish. The policy requirements are especially appropriate to this facility where the recirculation system does not allow isolation of fish to prevent transmission of water-borne infections. In addition, the Lower Columbia River Fish Health Center is located nearby so fish health sampling, diagnosis, and treatment are readily available as fish health issues arise. Spring Creek NFH, as do all federal hatcheries in the Columbia River Basin, takes extensive measures to control disease and release healthy fish. Chapter 4 provides more detail on Fish Health practices.

While fish managers largely understand the epidemiology of pathogens at each hatchery, the same cannot be said of local wild fish populations. Recent studies suggest that the incidence of some pathogens in naturally spawning populations may be higher than in hatchery populations (Elliot and Pascho 1994). *Renibacterium salmoninarum*, the causative agent of bacterial kidney disease (BKD), appears, in general, to be significantly more prevalent among wild smolts of spring/summer Chinook salmon than hatchery smolts (Congleton et al. 1995; Elliot et al. 1997). Many biologists believe disease-related losses in naturally spawning populations often go undetected, and that the impact of disease is underestimated (Goede 1986; Steward and Bjornn 1990). In addition, although pathogens may cause significant post-release mortality in fish from some hatcheries, there is little evidence that hatchery origin fish routinely infect naturally produced salmon and steelhead in the Pacific Northwest (Enhancement Planning Team 1986; Foott et al. 2000; Steward and Bjornn 1990). Additional information on wild fish health has been collected since 1997 by the USFWS Fish Health Centers through the National Wild Fish Health Survey which is being conducted to better understand the health status of wild fish and to address the issues of disease interactions (http://wildfishsurvey.fws.gov).

2.7.6 Competition. The potential impacts from competition are assumed to be greatest in the spawning and nursery areas at points of highest density (release areas) and diminish as hatchery smolts disperse (USFWS 1994). Salmon and steelhead smolts actively feed during their downstream migration (Becker 1973; Muir and Emmett 1988; Sager and Glova 1988).

Competition in reservoirs could occur where food supplies are inadequate for migrating salmon and steelhead. However, the degree to which smolt performance and survival are affected by insufficient food supplies is unknown (Muir et al.1994). On the other hand, the available data are more consistent with the alternative hypothesis that hatchery-produced smolts are at a competitive disadvantage relative to naturally produced fish in tributaries and free-flowing mainstem sections (Steward and Bjornn 1990). Although limited information exists, available data reveal no significant relationship between level of crowding and condition of fish at mainstem dams. Consequently, survival of natural smolts during passage at mainstem dams does not appear to be affected directly by the number (or density) of hatchery smolts passing through the system at present population levels. While smolts may be delayed at mainstem dams, the general consensus is that smolts do not normally compete for space when swimming through the bypass facilities (Enhancement Planning Team 1986). The main factor causing mortality during bypass appears to be confinement and handling in the bypass facilities, not the number of fish being bypassed.

Juvenile salmon and steelhead, of both natural and hatchery origin, rear for varying lengths of time in the Columbia River estuary and pre-estuary before moving out to sea. The intensity and magnitude of competition in the area depends on location and duration of estuarine residence for the various species of fish. Research suggests, for some species, a negative correlation between size of fish and residence time in the estuary (Simenstad et al. 1982).

While competition may occur between natural and hatchery juvenile salmonids in or immediately upstream of the Columbia River estuary, few studies have been conducted to evaluate this potential problem (Dawley et al. 1986). The general conclusion is that competition may occur between natural and hatchery salmonid juveniles in the Columbia River estuary, particularly in years when ocean productivity is low. Competition may affect survival and growth of juveniles and thus affect subsequent abundance of returning adults. However, these are postulated effects that have not been quantified or well documented.

The release of hatchery smolts that are physiologically ready to migrate is expected to minimize competitive interactions as they should quickly migrate from the release site. Spring Creek tule fall Chinook are released into the Columbia River at the hatchery site and migrate quickly past Bonneville Dam en route to the ocean based on juvenile out-migrant trapping, reducing potential competitive interactions within the lower Columbia River basin. Because Spring Creek tule fall Chinook releases occur in the lower Columbia Basin system and earlier than the migration period for most wild listed stocks, there is reduced opportunity for competitive interactions.

2.7.7 Predation. The Service presented information that salmonid predators are generally thought to prey on fish approximately one-third or less than their size (USFWS 1994). Depending on species and population, hatchery smolts are often released at a size that is

greater than their naturally-produced counterparts. For species that typically smolt as sub-yearlings (e.g. fall Chinook salmon), hatchery-origin smolts may displace younger year classes of naturally-produced fish from their territorial feeding areas. Both factors could lead to predation by hatchery fish on naturally produced fish, but these effects have not been extensively documented, nor are the effects consistent (Steward and Bjornn 1990).

In general, the extent to which salmon and steelhead smolts of hatchery origin prey on fry from naturally reproducing populations is not known, particularly in the Columbia River basin. The available information, while limited, is consistent with the hypothesis that predation by hatchery-origin fish is, most likely, not a major source of mortality to naturally reproducing populations, at least in freshwater environments of the Columbia River basin (Enhancement Planning Team 1986). However, virtually no information exists regarding the potential for such interactions in the marine environment.

Based on time of their release and the travel time taken by Spring Creek fish to exit the river, there is little potential for Spring Creek tule fall Chinook to prey on natural fry in the Columbia River. In addition, much of the spawning and early rearing areas for natural production are in the tributaries and upper basin areas.

Spring Creek tule fall Chinook releases may contribute to indirect predation effects on listed stocks by attracting predators (birds, fish, pinnipeds) and/or by providing a large forage base to sustain predator populations. Releasing large numbers of hatchery fish may lead to a shift in the density or behavior of non-salmonid predators, thus increasing predation on naturally reproducing populations. Conversely, large numbers of hatchery fish may mask or buffer the presence of naturally produced fish, thus providing sufficient distraction to allow natural juveniles to escape (Park 1993). Prey densities at which consumption rates are highest, such as northern pikeminnow in the tailraces of mainstem dams (Beamesderfer et al. 1996; Isaak and Bjornn 1996), have the greatest potential for adversely affecting the viability of naturally reproducing populations, similar to the effects of mixed fisheries on hatchery and wild fish. However, hatchery fish may be substantially more susceptible to predation than naturally produced fish, particularly at the juvenile and smolt stages (Piggins and Mills 1985; Olla et al. 1993).

Predation by birds and marine mammals (e.g., seals and sea lions) may also be significant source of mortality to juvenile salmonid fishes, but functional relationships between the abundance of smolts and rates of predation have not been demonstrated. Nevertheless, shorebirds, marine fish, and marine mammals (NMFS 1997) can be significant predators of hatchery fish immediately below dams and in estuaries (Bayer 1986; Ruggerone 1986; Beamish et al. 1992; Park 1993; Collis et al. 2001). Unfortunately, the degree to which adding large numbers of hatchery smolts affects predation on naturally produced fish in the Columbia River estuary and marine environments is unknown, although many of the caveats

associated with predation by northern pikeminnow in freshwater are true also for marine predators in saltwater.

2.7.8 Residualism. Spring Creek tule fall Chinook releases are not known to residualize in the Columbia River. Available out-migrant sampling information indicates a rapid exit of Spring Creek tule fall Chinook from the hatchery (see Chapter 4 - Monitoring and Evaluation discussion).

2.7.9 Migration Corridor/Ocean. The Columbia River hatchery production ceiling, called for in the Proposed Recovery Plan for Snake River Salmon of approximately 197.4 million fish (1994 release levels), has been incorporated by NOAA-Fisheries into their recent hatchery biological opinions to address potential mainstem corridor and ocean effects, as well as other potential ecological effects from hatchery fish. Although hatchery releases occur throughout the year, approximately 80 percent occur from April to June (NMFS 1999a) and Columbia River out-migration occurs primarily from April through August. Spring Creek releases one half of its production in March before the beginning of the normal hatchery and natural stock out-migration season. The total number of hatchery fish released in the Columbia River basin has declined by about 26 percent since 1994 (NMFS 1999c), reducing potential ecological interactions throughout the basin.

Ocean rearing conditions are dynamic. Consequently, fish culture programs might cause density-dependent effects during years of low ocean productivity, especially in near shore areas affected by upwelling (Chapman and Witty 1993). To date, research has not demonstrated that hatchery and naturally produced salmonids compete directly in the ocean, or that the survival and return rates of naturally produced and hatchery origin fish are inversely related to the number of hatchery origin smolts entering the ocean (Enhancement Planning Team 1986). If competition occurs, it most likely occurs in near shore areas when (a) upwelling is suppressed due to warm ocean temperatures and/or (b) when the abundance or concentration of smolts entering the ocean is relatively high. However, we are only beginning to understand the food-chain effects of cyclic, warm ocean conditions in the northern Pacific Ocean and associated impacts on salmon survival and productivity (Beamish 1995; Mantua et al. 1997). Consequently, the potential for competition effects in the ocean cannot be discounted (Emlen et al. 1990).

Alternatively, the hatchery program may be filling an ecological niche in the freshwater and marine ecosystem. A large number of species are known to utilize juvenile and adult salmon as a nutrient and food base (Groot and Margolis 1991, McNeil and Himsworth 1980). Pacific salmon carcasses are also important for nutrient input back to freshwater streams (Cederholm et al. 1999). Reductions and extinctions of wild populations of salmon could reduce overall ecosystem productivity. Because of this, hatchery production has the potential for playing an important role in population dynamics of predator-prey relationships and community

ecology. The Service speculates that these relationships may be particularly important (as either ecological risks or benefits) in years of low productivity and shifting climatic cycles.

2.7.10 Harvest. A large portion of Spring Creek fish are caught under the United States/Canada treaty allocations. Spring Creek fish are also very important to near shore fisheries off the Washington and northern Oregon coast and local fisheries in the Columbia River (see section 3.8.5 for more information). Fisheries management of the Spring Creek NFH stock provides protection to the listed Snake River populations and other stocks of Chinook salmon, because the Canadian ocean fisheries are managed under harvest rate quota, time, and area regulations. Both the Spring Creek NFH stock and many other listed Columbia River stocks of salmon occur off the west coast of Vancouver Island. Fishery management constraints are in lace for all west coast and Columbia River fisheries to provide appropriate protection of listed stocks at all levels of hatchery fish abundance. Biological Assessments and Biological Opinions are completed by the fishery management agencies to ensure listed species are not jeopardized.

2.8 Beneficial Uses (historic and present cultural and public uses, fishery benefits, harvest contribution, economic value)

2.8.1 Public Uses. The Columbia River Gorge proximity to the Portland/Vancouver area makes it a popular recreation destination for fishing, windsurfing, swimming, camping, hiking, picnicking, waterfall viewing, hunting, and berry picking. Historically, visitation to Spring Creek NFH has been limited. Although visitors were welcomed, no record of any real effort to encourage visitation or to enhance the visitor's experience can be found until 1994 when a full time Information and Education Specialist was hired. Upgrades in the visitor center have been made and additional interpretive projects are planned. The hatchery celebrated its Centennial year in 2001 and has become associated with a friends group, Friends of Northwest Hatcheries, in 1999. In addition, the Spring Creek hatchery site has become a world famous wind surfing access location. Washington State Parks and Recreation has entered into a long term lease with the Corps of Engineers making the front section of the hatchery's entrance road into the Spring Creek Hatchery State Park an access point for windsurfers. Several thousand wind surf enthusiasts and spectators visit the site each year. The hatchery is also located on the official Lewis and Clark Trail for Washington State (State Route 14) which provides additional visitors to the hatchery each year.

2.8.2 Harvest Contribution. Tule fall Chinook salmon from Spring Creek NFH have, over the years, been the largest contributor to the commercial, sport and tribal fishery both in the ocean and Columbia River of any Columbia River Hatchery (Stephen Pastor – USFWS, CRiS database January 2003). Fisheries occur along the coast of Washington as far north as the west coast of Vancouver Island and in the Columbia River from Buoy 10 to above Bonneville Dam in the tribal zone 6 fishery. Historically, Spring Creek fish have contributed up to 9% of the catch in the fishery off the west coast of Vancouver Island, B.C., and 27% of

the catch off the Washington and northern Oregon coasts. See section 3.8.5 of this document for more information on Spring Creek NFH contributions to ocean and freshwater harvest.

2.8.3 Economic Benefit. Spring Creek NFH is an economically efficient producer of smolts in addition to being one of the major contributors to the commercial, sports and tribal fishery both in the ocean and in river. Studying the economic benefits of hatcheries until recently has not been undertaken in a comprehensive way. Recently, the Northwest Power Planning Council has initiated an economic analysis of hatcheries. In some preliminary research they stated that Spring Creek was one of the more efficient producers of smolts, about $0.06 six cents per fish.

Spring Creek NFH tule fall Chinook production benefits the economy of international, commercial, tribal, and sport fisheries. As stated previously, Spring Creek NFH tule fall Chinook have historically contributed up to 9% of the Chinook catch in the West Coast Vancouver Island fisheries and 27% of the Chinook catch off the Washington and northern Oregon Coasts. From 1980 – 1995, Spring Creek NFH production fish produced an average Columbia River harvest of 14,784 fish annually between sport fisherman and commercial and tribal gill net fisheries on the Columbia River (Table 4, USFWS 2003b). For that same time period, an average of 15,621 fish were captured for commercial, tribal and sport fisherman in ocean fisheries.

2.8.4 Cultural Values. The Columbia River Treaty Tribes (Yakama, Warm Springs, Nez Perce, and Umatilla) share the in-river harvest of tule fall Chinook salmon returning to Spring Creek NFH and are one of the primary beneficiaries of tule fall Chinook salmon, which enter the hatchery holding ponds. The cultural significance of these fish to the tribes is best characterized by the following quotations:

"For the Yakama people salmon is seen as one of the gifts from the Creator. Since the beginning of time the Yakama people have relied upon salmon as well as the roots, berries, deer, elk and herbal medicines still important today. When the Yakama people were placed on this part of Mother Earth they were told by the Creator that He was going to give us some gifts. Those gifts came in the form of salmon and other natural resources.

He also instructed the Yakama people on how to care for the resources and warned that if any of the resources disappear, then we too as people, would disappear. That is why the Yakama people continually care for the salmon, the deer, the elk, the roots, the berries and the herbal medicines. We are also taught at a very young age that we are not here on Mother Earth to live and go away. Our Yakama elders tell us that we are only borrowing the water, the salmon, the Yakama language and everything else and we are preparing for the up and coming generations. Its like remembering the future."- Carol Craig, Yakama Nation Fisheries Resource Management, Public Information Officer, personal communication.

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"Salmon was presented to me and my family through our religion as our brother. The same with the deer. And our sisters are the roots and berries. And you would treat them as such. Their life to you is just as important as another person would be."- Margeret Saluskin,Yakama Nation, Columbia River Inter-Tribal Fish Commission Web-Page.

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CHAPTER 3. HATCHERY AND RESOURCE MANAGEMENT

3.1 Hatchery Goals, Objectives, and Tasks [2]

The following Hatchery Management Goals were adapted from the Mitchell Act, Endangered Species Act (ESA) Biological Opinions, *United States v. Oregon* agreements, and the Integrated Hatchery Operations Team – Operation Plans for Anadromous Fish Production Facilities in the Columbia River Basin Volume III – Washington, Annual Report for 1995 (IHOT 1996). Additionally, a Hatchery and Genetic Management Plan for Spring Creek NFH (USFWS 2003b) was submitted to NOAA-Fisheries in December 2002. After co-manager and public review, a final HGMP will be completed in 2004. Within the HGMP, specific Performance Standards and Indicators (PSI's) that have been established will be adhered to by the Service during operation of Spring Creek NFH.

Goal 1: Conserve Columbia River fall Chinook salmon in the area upstream of Bonneville Dam as defined in the Mitchell Act of 1937.

Objective 1: Successfully maintain a brood stock of tule fall Chinook salmon at Spring Creek National Fish Hatchery without the need for out-of-basin egg or fish transfers to the hatchery (achieve a minimum 0.05% smolt to adult return back to the hatchery).

Task 1:Implement measures to efficiently manage and conserve water use at the hatchery.

Task 2:Implement measures for brood stock management to maintain integrity and genetic diversity of the Spring Creek tule hatchery stock, as identified in the Hatchery and Genetic Management Plan (HGMP).

Task 3:Implement management practices for incubation strategies and procedures at the hatchery.

Task 4:Implement management practices for hatchery rearing strategies making sure the biological filter system is operating as efficiently as possible.

Task 5:Implement management practices for release strategies at the hatchery.

Task 6:Maximize survival at all life stages using disease control and prevention techniques. Prevent introduction, spread or amplification of fish pathogens.

[2]Tasks and current practices to achieve objectives are described in this chapter.

Task 7:Maintain genetic integrity for possible reintroduction of stock back into its native White Salmon River pending Condit Dam removal.

Objective 2: Conduct monitoring and evaluation to ensure Goal 1 is achieved.

Task 1:Conduct hatchery evaluation studies to investigate alternative strategies to improve water management, brood stock management, incubation, rearing, and release strategies. Support research on physiology, diet, fish health, and genetics (unfunded), and other Columbia River projects.

Task 2:Collect information to monitor life history characteristics such as length, age sex composition, and run timing.

Task 3: Hold Hatchery Evaluation Team (HET) meetings each winter and summer to review progress.

Task 4:Complete a Station Development Plan (Engineering) to identify facility needs in addressing the needs of hatchery conservation goals (unfunded).

Task 5:Monitor health and disease status of fish, following the Service Fish Health Policy and Pacific Northwest Fish Health Committee and Integrated Hatchery Operation Team (IHOT) guidelines.

Related Spring Creek HGMP Performance Standards and Indicators to Goal 1, Objectives and Tasks:
Benefit PSI 1. - Program contributes to mitigation requirements.
Benefit PSI 4. - Communicate effectively with other salmon producers and co-managers.
Benefit PSI 7. - Fish collected for brood stock are taken throughout the return and in proportions approximating the timing and age distribution of the population from which brood stock is taken.
Risk PSI 2. - Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread, or amplification of fish pathogens.
Risk PSI 3. - Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Goal 2: Assure that hatchery operations support Columbia River Fish Management Plan (*United States v. Oregon*) and US/Canada Pacific Salmon Treaty production and harvest objectives.

Objective 1: Collect sufficient brood stock to produce 15.1 million smolts for on-station release into the Columbia River.

Task 1: Collect 7000 brood stock, of which 4000 are females.

Task 2: Work with co-managers to manage for fisheries, food, stream enrichment, outplanting, or rendering purposes.

Objective 2: Contribute to a meaningful harvest for sport, tribal and commercial fisheries both in the ocean and in-river (achieve a 10-year average of ≥ 0.5% smolt to adult survival, harvest plus escapement).

Task 1: Work with states, tribes, and Foreign governments to establish meaningful fisheries (through *United States v. Oregon*, U.S./Canada, Pacific Fishery Management Council forums).

Task 2: Index mark juvenile hatchery fish prior to release to facilitate harvest and related conservation and assessment efforts for hatchery, wild, and Endangered Species Act (ESA) listed stocks.

Objective 3: Meet tribal trust responsibilities.

Task 1: Follow pertinent Laws, Agreements, Policies and Executive Orders on Consultation and Coordination with Native American Tribal Governments.

Task 2: As requested, present Spring Creek NFH production information and issues at Columbia River Inter-Tribal Fish Commission meetings.

Task 3: Meet with individual treaty tribes (Umatilla, Nez Perce, Yakama, and Warm Springs) as requested.

Objective 4: Communicate and coordinate effectively with co-managers in the Columbia River Basin.

Task 1: Participate in *United States v. Oregon* Production Advisory Committee (PAC) and Technical Advisory Committee (TAC) meetings.

Task 2: Develop technical reports for PAC and TAC.

Task 3: Discuss management issues for Spring Creek NFH at annual coordination meeting each February between the Service, WDFW, NOAA, Fisheries, COE and the Columbia River treaty tribes.

Objective 5: Conduct monitoring and evaluation to ensure goal #2 is achieved.

Task 1:Coded-Wire-Tag representative release groups annually.

Task 2:Produce an annual report on stock assessment and contribution to fisheries.

Task 3:Compare and evaluate survival, life history, fisheries contribution, and fish health parameters between brood years in order to improve fish culture techniques.

Related Spring Creek HGMP Performance Standard and Indicator to Goal 2, Objectives and Tasks:
Benefit PSI 2. - Implement spawning and rearing practices to achieve production goal.
Benefit PSI 3. - Maintain stock integrity and genetic diversity of each unique stock through proper management of genetic resources.
Benefit PSI 4. - Communicate effectively with other salmon producers and co-managers.
Benefit PSI 5. - Program contributes to fulfilling tribal trust responsibility, mandates and treaty rights, as described in *United States v. Oregon*.
Risk PSI 5. - Release groups are sufficiently marked in a manner consistent with information needs and protocols to enable determination of impacts to natural and hatchery-origin fish in fisheries.

Goal 3: Minimize impacts to listed (ESA) and other native species, their habitat, and the environment.

Objective 1: Minimize harmful interactions with other fish and wildlife populations.

Task 1:Implement the Spring Creek NFH Hatchery and Genetic Management Plan (USFWS 2003b).

Task 2:Release juvenile fish (smolts) ready to migrate downstream.

Task 3:Return any ESA listed or wild fish into the river that enter hatchery ladder during brood stock collection.

Objective 2: Conduct monitoring and evaluation to ensure Goal 3 is achieved.

Task 1:Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.

Task 2:Investigate ways to improve the efficiency of biological filters to improve water quality, fish health and smolt quality.

Task 3:Develop a study plan to assess physiological status of juveniles prior to release (unfunded) and determine downstream migration rates.

Task 4:Assess straying rates and recovery location of fish from Spring Creek NFH.

Task 5:Monitor health and disease status of fish, following the Service Fish Health Policy, continue Geodes index reading for each release group.

Related Spring Creek HGMP Performance Standard and Indicator to Goal 3, Objectives and Tasks:
Risk PSI 1. – Minimize interactions with other fish populations through proper rearing and release strategies.
Risk PSI 3. – Conduct environmental monitoring to ensure that hatchery operations comply with water quality standards and to assist in managing fish health.
Risk PSI 4. – Hatchery program addresses ESA responsibility.

Goal 4: Develop outreach to enhance public understanding, participation and support of Service and Spring Creek NFH programs.

Objective 1: Increase public awareness of Spring Creek NFH.

Task 1:Coordinate with other federal, state, and local information/public affairs offices to incorporate information about Spring Creek NFH.

Task 2:Facilitate interagency cooperation with existing and new programs in the Columbia River Gorge.

Task 3:Coordinate with Service, NOAA-Fisheries and COE-Fisheries to host special events, such as National Fishing and Boating Week and National Wildlife Refuge Week activities, and open houses at the hatchery.

Task 4:Interact with Service, NOAA and COE Fisheries outreach coordinators and actively seek to integrate Lower Columbia River fisheries outreach activities with the Regional and National Outreach Strategies.

Task 5:Increase public use of the hatchery facilities by inviting special interest groups to tour the hatchery.

Objective 2: Provide information and education about Service programs and Spring Creek NFH to internal and external audiences.

Task 1:Develop new cooperative agreements and partnerships with public, private and home school groups. Expand relationships with Friends Group, Friends of Northwest Hatcheries.

Task 2:Maintain website for the Spring Creek NFH to inform cyber-visitors of the Spring Creek NFH programs, history and general information.

Task 3:Staff the hatchery on weekends with Information and Education assistance during peak adult fish returns (September) to give tours, answer questions, and disseminate general information.

Task 4:Develop a strong working relationship with the local media (newspaper, radio, and other Columbia River Gorge publications) and provide regular news releases and articles regarding agency issues and station activities.

Objective 3: Develop forums for public participation (or input) into Spring Creek NFH issues.

Task 1:Regularly participate in White Salmon River Watershed Technical Advisory and Council meetings.

Task 2:Hold an annual meeting with local conservation groups each spring to discuss Spring Creek NFH's program and other issues of concern.

Objective 4: Conduct monitoring and evaluation to ensure Goal 4 is achieved.

Task 1: Evaluate use and/or exposure of program materials and exhibits as they help support goals of the Information and Education program.

Task 2: Distribute teacher evaluations of our education programs to assure education goals are met.

3.2 Current Practices to Achieve Goals, Objectives, and Tasks

3.2.1 Water Use and Management.

Table 3. Certificates of water right held by Spring Creek NFH.

Source	Certificate No.	Date	Flow (cfs)	Use
Unnamed Creek	8398	Feb. 9, 1955	0.01	Domestic Supply
Hatchery Springs	6716	Nov. 4 1953	12.0	Fish Propagation Domestic Supply
Unnamed Creek	10424	Feb. 4, 1957	1.5	Fish Propagation
White Salmon River	9029	May 11, 1956	30.0	Fish Propagation
Well	Pending	Sept. 1991	2.22	Fish Propagation
Columbia River	12045	Nov. 20, 1959	11.2	Fish Propagation

The main water source for the hatchery is spring water upwelling from basalt cliffs and which is collected at several locations. Spring water is piped into the Mechanical Building where it is pumped into the recirculating system. Domestic water for onsite hatchery housing is also provided by these springs. Water flow has fluctuated from a low of 1,800 gpm to over 4,000 gpm, but supply 3,000 gpm on average. The recirculating system is designed as a 90% reuse system, circulating 30,000 gpm at maximum loading. During power outages and possible failure of the standby generator to operate, water can be supplied by gravity flow to the incubation building keeping eggs and fish alive.

In 1990, the hatchery drilled an additional well that supplies warm water (66^0F) which is mixed with the spring water to increase incubation temperature from 47^0F to 52^0F. The well can supply up to 800 gpm and is used to increase the production water temperature if the hatchery is experiencing extremely cold weather. This well allowed the hatchery to remove and surplus three large chillers and heat exchangers used to heat the spring water, saving a considerable amount of hatchery operational costs.
The hatchery also has rights to 11.2 cfs Columbia River water. This water was used on an emergency basis for fish culture before the hatchery was remodeled in 1970 and then used as heat source water for the heat exchangers before the well was established in 1990.

When operated, the Big White Salmon Ponds is supplied with a 30 cfs water right from the White Salmon River.

All domestic water is collected and tested monthly at the point where it enters the hatchery's closed circulation system. Test results conform to Washington Department of Health (WDOH) fecal coliform standards. Water quality of the spring water is taken yearly with major analysis done every five years. The only suspected pathogen in this water source is the causative agent for Enteric Redmouth, *Yersinia ruckeri*.

3.2.2 Screening. Fish do not exist at or within hatchery water supply collection area therefore, screening is unnecessary**.** Water is immediately collected and piped into the recirculating system. The White Salmon Sub-station water intake screening system is not in compliance with NOAA Fisheries screening criteria. This facility is not currently in use and will not be used until the proper screens are installed. At this time, there are no plans to replace the intake structure to comply with ESA screening criteria.

3.2.3 Conveyance System to Hatchery and Ponds. Spring water is collected via a series of small dams and connecting pipes. The water is piped under State Highway 14 into a distribution box where it can be diverted into the incubation building, down the fish ladder or sent to the mechanical buildings to be pumped into the system.

The recirculating system consists of 18 biological filter beds and 44 Burrows ponds. A total of 3 million gallons of water is needed to fill the system.

3.2.4 Effluent Treatment and Monitoring. Raceway cleaning and biological filter bed effluent from back washing is sent to two pollution abatement ponds where solids are removed prior to discharge to the Columbia River. Effluent during cleaning and normal operations is monitored weekly for suspended and settleable solids. Spring Creek NFH complies with Environmental Protection Agency standards.

Ponds may be cleaned or flushed weekly and the filter bed back-washed every other week. Organic loads are kept low by controlling feeding level and use of organic consuming bacteria.

3.3 Brood Stock Management

Spring Creek NFH is a single species facility rearing only tule fall Chinook salmon. Brood stock collection at the hatchery is managed to maintain the genetic integrity of the stock. The Service ensures that adult brood stock is randomly collected across the spawning run in proportion to the rate at which they return. The hatchery escapement goal is 7,000 adults of which 4,000 need to be females, but all fish returning are allowed to enter the hatchery. Fish exceeding the escapement goal are distributed meeting tribal requests as a first priority.

When return numbers are in excess of escapement goals, surplus fish are randomly selected throughout the spectrum of the run. Fish enter the hatchery daily, are visually counted and sexed, and guided to one of 17 Burrows ponds. One Burrows pond is filled at a time before another pond is opened, with each pond receiving between 400 and 1,000 fish, depending on the size of the run.

Adult tule fall Chinook return to the hatchery from late August through September with 70% of the return entering the hatchery between September 4th and September 20th. Traditionally, the hatchery starts the spawning process around the 15th of September and is generally finished by the 5th of October. Spawning takes place daily with an average daily egg take of 1.75 million although it's possible to have daily takes of over 5 million eggs.

At the start of the spawning process, adults are crowded out of the ponds and into a central channel leading to the spawning building. Fish are then crowded down the channel to the building where a portion is lifted with elevators into a bath of anesthesia. Once the fish are anesthetized they are sorted for ripeness. "Green" or unripe fish are returned to the holding pond and held for two days before being crowded and checked again for ripeness. Ripe fish are euthenized and bled prior to spawning to maximize the fertilization process.

3.3.1 Upstream Passage. There is no upstream passage at Spring Creek NFH that concerns the hatchery's water supply. Non-hatchery fish species incidentally caught within the ladder, including wild and ESA listed fish, are released back into the Columbia River. For hatchery fish that enter the ladder, Spring Creek NFH is a terminal fish culture facility.

3.3.2 Surplus Adult Returns. In most years, more fish enter the hatchery than are needed for brood stock. Fish beyond hatchery needs are distributed to the Yakama Nation for Ceremonial and Subsistence (C&S) and other tribes as requested. Additional fish are transferred to the Bureau of Federal Prisons for inmate rations. Any fish anesthetized using Tricaine Methanesulfonate (MS-222) is considered unfit for human consumption by the Food and Drug Administration. Surplus or spawned carcasses are available for stream enrichment directly or can be processed into bio-cubes for future enrichment programs. All other surplus fish will be rendered through a Service-approved rendering company.

3.3.3 Spawning Protocol. Genetic integrity of the Spring Creek NFH population is maintained by random collection of brood stock (Attachment 10 – Don Campton, Abernathy Fish Technology Center Protocol). When possible, a strict 1:1 spawning ratio is used, however the sex ratio of returning adults is typically skewed toward females. The actual ratio attained is usually 1.0 males : 1.4 females (i.e. some males are used more than once). Jacks are randomly included in the spawning population and comprise 2% of the male spawning population. The hatchery goal is to maintain an effective population size of greater than 5,000.

To achieve production goals, 7,000 tule fall Chinook brood stock are needed based on the following assumptions:

1. 15.1 million smolt release goal
2. 4,000 of the 7,000 are females
3. Fecundity of 5,000 eggs per female
4. Less than 5% pre-spawning mortality
5. ≥ 95% survival egg to eye-up
6. ≥ 90% survival egg to fry
7. ≥ 97% survival fry to smolt

3.3.4 Other Acceptable Stocks. If brood stock numbers are insufficient to meet hatchery production objectives, the hatchery will rear fewer fish. At present there is no other hatchery rearing the Spring Creek stock and therefore there is no other acceptable tule fall Chinook hatchery stock to rear at Spring Creek NFH. Historically, tule fall Chinook returning to the White Salmon River were used for brood stock in years of insufficient return.

3.3.5 Special Concerns of Brood Stock Management. Co-managers are involved in brood stock management decisions through participation in Hatchery Evaluation Team meetings, direct contact with the Columbia River Fisheries Program Office, or other regional forums. For example, during the late 1980's and early 1990's when Spring Creek runs were depressed, both ocean commercial and river tribal fisheries were impacted with closures and restricted catches to increase hatchery returns. The hatchery has a 0.5 mi. upstream and a 1.5 mi. downstream fishing sanctuary from the location of the ladder. The sanctuary can be opened or closed to tribal fishing depending on run size.

3.4 Incubation Strategies and Procedures

Each female is individually spawned with one male. After fertilization has occurred, the eggs from three females are combined into one bucket, washed, and split into two Heath incubation trays. At the eyed stage, eggs are shocked and salted to remove the dead eggs, then inventoried back into the incubators, placing approximately 4,000 eggs per tray. There

are 288 stacks of Heath incubation trays that have the capacity to incubate 21.6 million eggs. Each incubator stack is picked for nonviable embryos at least two times during incubation with a cumulative record maintained for each stack. All eggs are treated with iodophor three times a week at a rate of 10 to 15 ppm. These treatments are used to reduce any bacteria related soft shell problems. Incubation takes place in a mix of spring and well water to control temperature between 48°F and 53°F. Swim-up fry are placed directly into the raceways.

3.5 Rearing Strategies

Fry are moved outside to 44 Burrows ponds the first week of December. At full production, 350,000 swim up fry are placed in each of the ponds. Since the early 1980's, starter feeds from the manufacturer Bio-Oregon™ (Astoria, OR), have been used. After a month, feed is switched to dry Abernathy Diet. The manufacturer of Abernathy Diet may vary depending on contract bids. Fish are fed once an hour, eight times a day, for the first four weeks. As the fish grow and the feed size is increased and feeding frequency is reduced. At final release, fish may only be fed 4 or 5 times a day by hatchery staff. Daily feeding rations are controlled to prevent overload of the biological filter system. Past experience has proven that under-feeding by about 10% of recommended feed ration allows the filter system to function efficiently, maintaining water quality and fish growth.

Pond flow rates at the time of ponding are 400 gpm. After three weeks, flow is increased to 550 gpm, and again at seven weeks to a maximum 700 gpm. Fish mortalities are removed and recorded daily. Daily logs are kept that record weather, water temperature and any unusual fish behavior or incidents.

Fish are sampled every two weeks to determine growth rates and target goals. Growth rates are controlled by monitoring growth as it relates to the average water temperature. Feeding rates can be adjusted as need arises. Condition factors (K) are taken at the end of each month to track growth. Water chemistries are conducted weekly, or more frequently, to evaluate the status of the biological filters and water quality. Ammonia output by fish can be controlled by adjusting the feeding level and/or adding commercial bacteria (*Nitrosomonas* and *Nitrobacter* species) to the biofilter system.

Pond cleaning is generally not needed until the last week of February when hatchery density and loading levels are reaching their maximum level. During the past several years, the hatchery has been using a commercial, organic-reducing bacteria with some success. This action has resulted in reduced pond cleaning and back-washing of the biological filter beds. From about the first of March, pond cleaning and back-washing must be done every other week.

Fish are marked with coded-wire tags and adipose fin clips starting the second week of February. Currently, 450,000 are marked, (150,000 for each release group - March, April and May). Soon after the March release, the remaining fish are split into the empty ponds to provide more room for growth of the April and May release groups reducing densities. No other splitting is required.

In the early 1990's a study was conducted and concluded that present rearing densities produced the highest adult recoveries (Banks and LaMotte 2002). Banks and LaMotte (2002) provided data that adult contributions might increase by increasing rearing densities, but the potential for catastrophic losses in a recirculation system was a concern. The Density Index standard established at Spring Creek NFH is not to exceed 0.30.

3.6 Release Strategies.

After Spring Creek was remodeled in 1970, release strategies changed. Before the reuse system, fish were released whenever loads dictated, i.e., weekly releases could have started in February. With the reuse system and the additional space for fish, the hatchery was able to hold fish longer and release fish at a larger size. Releases are dictated by loading factors and half of the production fish are released in March to reduce densities and organic loads on the biological filtration system. Therefore, at full production of 15.1 million smolts, 7.6 million is the release goal for mid-March at a target size ≤125 fish per pound. Fish are released directly into the Columbia River from the hatchery.

Fish remaining after the first release are split into the empty ponds to lessen crowding and allow for more growth. In mid-April, the release goal is 4.2 million smolts at a target size of ≤ 90 fish per pound. The April release group generally migrates quickly past Bonneville Dam to the Columbia River estuary. The final hatchery release occurs during the first week in May, with a release goal of 3.3 million at a target size of ≤ 60 fish per pound. Behavior, coloration, and saltwater challenges indicate that the May release group exhibit smolt characteristics. These fish presumably migrate quickly to the estuary based on weekly and monthly juvenile fish passage information provided by the Fish Passage Center (www.fpc.org).

3.7 Fish Health Management Program

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.

3.7.1 Fish Health Policy. The Lower Columbia River Fish Health Center (FHC) in

Underwood, WA provides fish health care for Spring Creek NFH under the auspices of the published policy 713 FW in the Fish and Wildlife Service Manual. In addition to this policy, the 1994 annual report "Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries" by the Integrated Hatchery Operations Team (IHOT 1995) provides further fish health guidelines as approved by northwestern state, federal, and tribal entities. The directives of these two documents more than meet the requirements of the Washington State and Tribal fish health entities who follow the Co-Managers' Salmonid Disease Control Policy of 1998. All of these documents provide guidance for preventing or minimizing diseases within and outside of the hatchery. In general, movements of live fish into or out of the hatchery must be approved in the *United States v. Oregon* Production Advisory Committee forum and be noted on the State of Washington Brood Document for the hatchery. If a fish transfer or release is not on the State of Washington Brood Document, permits from the Washington Department of Fish & Wildlife, the USFWS, and any other states through which the fish travel must be obtained and approved by co-managers. Fish health exam and certification must be done prior to any releases or transfers from the hatchery to minimize risks from possible disease transmittance.

3.7.2 Fish Health Examinations at Spring Creek NFH. Monthly examination: A pathologist from the FHC visits at least monthly after fry are placed in ponds. Based on pathological signs, age of fish, concerns of hatchery personnel, and the history of the facility, the examining pathologist determines the appropriate tests. This usually includes a necropsy with an external and internal exam of skin, gills, and internal organs and can include other tests for bacteria, virus and parasites. Kidneys, gills and other tissues are checked for common bacterial pathogens by culture. Blood is checked for signs of anemia or other infections, including viral anemia. Additional tests for virus or parasites are done if warranted. The pathologist will also examine fish which are moribund or freshly dead to ascertain potential disease problems in the stock.

Diagnostic Examination: This is done on an as-needed basis as determined by the pathologist or requested by hatchery personnel. Moribund, freshly dead fish or fish with unusual signs or behavior are examined for disease using necropsy and appropriate diagnostic tests. A pathologist will normally check symptomatic fish during a monthly examination.

Ponding Examination: The first health exam of newly hatched fish occurs when approximately 50% of the animals are beyond the yolk sac stage and begin feeding. Sixty fish will be sampled and tested for virus.

Pre-release Examination: At two to four weeks prior to a release or transfer from the hatchery, 60 fish from the stock are necropsied and tissues are taken for testing of listed pathogens. The listed pathogens, defined in USFWS policy 713 FW (Fish and Wildlife Service Manual) include infectious hematopoietic necrosis virus (IHNV), infectious pancreatic necrosis virus (IPNV), viral hemorrhagic septicemia virus (VHSV),

Renibacterium salmoninarum, Aeromonas salmonicida, and *Yersinia ruckeri*. The FHC tests for *Myxobolus cerebralis,* another listed pathogen upon request, regarding the Spring Creek stock as being at minimal risk of infection.

In addition to the normal pre-release exam, the FHC performs a Geode's exam, a quantitative necropsy of 10 randomly selected fish from each raceway a few days prior to release (Adams et al., 1993; Goede and Barton, 1990, see Attachment 11 for Spring Creek NFH Fish Health Quality Goals 1980-1992). This information is used by hatchery personnel to ascertain general health of the population in relation to their survival and return as adults.

Adult Certification Examination: At spawning, tissues from adult fish are collected to assay viral, bacterial, and parasite infections and to provide a health profile. The FHC tests for all of the listed pathogens, except *Myxobolus cerebralis* (unless requested), and including *Ceratomyxa shasta*.

Eggs received at the hatchery must be disinfected before they are allowed to come in contact with the station's water, rearing units or equipment. Details are provided in the 713 FW policy.

3.7.3 Chemotherapeutant Use. The biological filter component of the recirculation system presents challenges for disease control when outbreaks occur. Most chemotherapeutant treatments that kill pathogens also kill or reduce viability of the biological filter, create the potential for increased ammonia levels and the potential for rapid onset of bacterial gill disease. Bacterial gill disease can cause rapid annihilation of fish within days, and was responsible for a catastrophic loss in 1985 (Talo and LaMotte 1999). The hatchery has used formalin at low concentrations to control some external parasites on juveniles with limited success. The adult brood stock is in the hatchery for only two to three weeks so formalin treatments for fungus and parasites are not used.

Water-hardening of eggs with a polyvinyl-pyrrolidone iodine compound (approximately 1% iodine) is required by 713 FW policy to minimize/prevent transmittance of viral and bacterial pathogens; however, the configuration of the water system, the limited water supply, and large numbers of eggs taken at Spring Creek NFH complicate this process and it has been deemed unnecessary because of the low pathogen incidence in the adult fish.

Eggs are treated three times per week regularly with a low level of Iodophor (10 - 15 ppm), primarily to prevent losses from soft-shell disease. In the past, mortalities from this disease were severe enough to initiate various experimental treatments to control mortalities (Lower Columbia River FHC files) but a series of improvements over the years, including gentler handling of adults and the use of well water with a high sulfur content, have controlled this problem (personal communication, Ed LaMotte, 2002). Fungus has not been a problem so treatments for its control are not routinely used. Losses incurred during and after hatching

are typically less than 3%, and are removed manually by hatchery staff.

The inability to use basic treatments to control pathogens makes it important to prevent disease occurrence and to ensure that regular sanitation of the reuse system is maintained. It has been and will continue to be necessary to protect fish health through approved early releases to reduce fish numbers when environmental conditions dictate. All early releases are done in accordance with the fish health policies of the USFWS and the Washington and Oregon co-managers which prohibit the spread of exotic or listed pathogens. The limitations imposed by the biological filter minimize chemical and drug use which reduces impacts on the local environment, eases compliance with many safety regulations, and reduces risks to employees.

3.7.4 Other Fish Health Precautions. Because of the recirculation system and the risk of horizontal transmission and amplification of pathogens, healthy stocks are important to the successful operation of the Spring Creek NFH. It is critical that regular maintenance and annual sanitation of the hatchery is completed. After spawning of the adults, the oyster bed biological filter is temporarily decommissioned by disinfection with chlorine and allowed to dry for three months prior to the ponding of their offspring. This is not a complete disinfection as some water remains in the beds; however, it does constitute a sanitation protocol that reduces carry-over of pathogens to the offspring that will later be reared in the same system.

The Spring Creek tule fall Chinook adults have a very low incidence of vertically transmitted pathogens, which means their offspring begin life without the burden of inherited infections that could develop into disease. The young tule fall Chinook are thereby only at risk for environmentally-induced pathogens that are natural inhabitants in the water source or carried by aquatic animals/birds. The spring water source is relatively clean, notwithstanding its aquatic residents (frogs, salamanders, other animals) which may contribute pathogens like *Yersinia ruckeri* (enteric redmouth disease), *Aeromonas hydrophila* and *Saprolegnium*. The young hatchery juveniles are at risk when water temperatures enhance the life cycles of pathogens ubiquitous in the springs or the Columbia River. The recirculation of ninety percent of the water also means the recirculation of any pathogens that benefit from environmental conditions conducive to their growth. Unfortunately, abatement of pathogen transmission through the use of chemotherapeutants requires a fine balancing of fish numbers, density, water temperature (limited) and levels of the chemotherapeutant to obtain an effective treatment, while preventing dysfunction of the bio-filter. In reality, even simple formalin treatments for parasites are often ineffective, the levels necessary for killing also being the levels that kill the bio-filter. To prevent disease outbreaks or declines in health, releases of fish must be based on environmental conditions and prompt response to deteriorating changes in water quality and temperature.

Changing or shortcutting important features in the operation of the system results in

disastrous mortalities. In 1985, the addition of a second species (upriver bright fall Chinook salmon) to Spring Creek NFH initiated the onset of bacterial gill disease that killed millions of fish. A report by Talo and LaMotte (1999) summarizes operational errors that led to this event. In short, an increase in fish density, incompatible growth patterns for the two species, semi-functional filter beds and partial utilization of the reuse system facilities led to an estimated loss of up to 50% of the fish. Since that time, numerous improvements have been made and minimal disease-related losses have occurred.

The three releases of the juveniles allow maximum production at the hatchery while reducing potential health concerns since densities are decreased with each release. A second cleaning and drying of the biological filter system occurs after the last release of the juveniles in May. This allows opportunity to clean the system before the adults return.

Tank trucks or tagging trailers are disinfected before being brought onto the station.

Abernathy Fish Technology Center provides quarterly feed quality analyses to meet nutritional requirements and prevent nutritional diseases.

3.8 Monitoring, Evaluation, and Coordination

The Columbia River Fisheries Program Office (CRFPO) provides monitoring, evaluation, and coordination services concerning Spring Creek NFH production. The CRFPO staff monitors hatchery returns, biological characteristics of the hatchery stock, fish marking, tag recovery, and other aspects of the hatchery program. The CRFPO maintains the database that stores this information and serves as a link to databases maintained by other agencies (ODFW, WDFW, CRITFC, NOAA-Fisheries, Fish Passage Center, PSMFC-Regional Mark Information System, StreamNet and other Service offices). The CRFPO also cooperates with the hatchery, Lower Columbia River Fish Health Center, Abernathy Fish Technology Center, and co-managers to evaluate fish culture practices, assess impacts to native species, and coordinate hatchery programs both locally and regionally. These activities are described in the following section:

3.8.1 Database Management. The Fisheries Information System (FIS) is a national database system for the Service Fisheries Program. The FIS consists of five different databases, two of which, the Fish and Egg Distribution Databases, document production accomplishments from all National Fish Hatcheries. Each Service field office contributes to this database. The Fisheries Information System database is discussed further in Chapter 4.

Information from and about Spring Creek NFH is connected to the broader fisheries community of the West Coast of the North American Continent through the U.S. Fish & Wildlife Service Columbia River (information) System (CRiS). The following information is recorded in files that are components of the CRiS database: returns to the hatchery; age, sex,

length, mark and coded-wire tag information for returning fish that are sampled; egg development and disposition; the origin of fish raised at the hatchery; and fish transfers and releases. Spring Creek NFH maintains files containing information generated at the hatchery (brood stock management, incubation, rearing, and release). Staff from the CRFPO maintain files containing information on marked juvenile fish and on sampled adult fish (adult bio-samples).

Use of CRiS database files and programs achieves the following purposes:
1) Reduces the amount of effort expended to meet reporting requirements.
2) Increases the quality and consistency of data.
3) Facilitates development of software usable at all stations.
4) Provides a platform on which to build effective evaluation tools which can be used by hatcheries, fisheries management and regional offices.
5) Facilitates the exchange of information with other agencies.
For example, release and recovery information is reported to both the Regional Mark Information Center and the StreamNet databases.

Computer programs that are components of the CRiS database are used to transform data into formats required by other agencies. These formats can be either electronic or printed. Other CRiS programs combine data from the hatchery, CRFPO, and from databases maintained by other agencies into other formats to accomplish reporting, monitoring, and evaluation.

Spring Creek NFH also has developed a database which compares hatchery-developed quality standards, goals and other external parameters to total survival of any brood year back to 1986.

3.8.2 Marking/Tagging Program. Spring Creek is an index stock for the US/Canada Pacific Salmon Treaty. Juvenile fish are fin clipped and coded-wire tagged by CRFPO to monitor and evaluate fish cultural techniques, survival and fishery contribution. Presently, only 450,000 tule fall Chinook salmon are being marked at Spring Creek NFH to access survival and evaluate harvest potential. This is in compliance with recommendations of the Biological Opinions of NOAA-Fisheries 1999 Artificial Propagation in the Columbia River Basin (NMFS 1999b) and the 2000 Reinitiating of Consultation on Operation of the Federal Columbia River Power System, under the Endangered Species Act-Section 7 Consultation. Future mass-marking is being discussed and may be implemented.

3.8.3 Bio-sampling and Reporting. Sampling of hatchery returns, provides data that is combined with other information collected by agencies and tribes to evaluate the relative success of individual broods and compare performance between years and hatcheries. This information is used by salmon harvest managers to develop plans allowing harvest of hatchery fish while protecting threatened, endangered, or other stocks of concern.

All sampled fish are checked for clipped adipose fins. These marked fish are sampled for coded-wire tags. The heads of the adipose-clipped fish are removed, and recovered coded-wire tags are read for year of hatchery release. A percentage of unmarked fish are also sampled. Length and sex are recorded and scales are collected to determine average size, sex ratios, and age composition of returning fish. At least 500 fish are sampled in this way each year. Coded-wire tagging began at Spring Creek NFH with brood year 1972.

3.8.4 Hatchery Evaluation Studies. Hatchery evaluation is the use of replicable, statistically defensible studies to guide management decisions. The hatchery evaluation vision action plan developed in 1993 for Region 1 Fisheries describes hatchery evaluation in greater detail (USFWS 1993). The purpose of hatchery evaluation is to evaluate and improve fisheries management decisions through planning, implementing, documenting, monitoring, analyzing, and reporting.

To evaluate contribution to the various fisheries, coded wire tag programs were implemented in 1972. With the widespread use of the coded wire tags starting in 1972, information has been obtained about ocean distribution, survival and contribution of Spring Creek NFH tule fall Chinook. One of the many studies worthy of note is Robert Vreeland's (Vreeland 1987) evaluation that compared fisheries contribution rates of fall Chinook hatcheries from the Columbia River for brood years 1978-1981. This study found that Spring Creek production fish were a major contributor to a number of fisheries for brood years 1978 and 1979, but a drop in survival and contribution rates of Spring Creek NFH production occurred in 1980 and 1981. This lower survival and contribution continued until the late 1990's when major increases in survival started to again occur (Pastor 2001).

Past hatchery evaluation studies include NOAA-Fisheries coded-wire tagging of Spring Creek stock during the late 1970's and early 80's. This study evaluated the contribution of Chinook salmon reared at several Columbia River hatcheries to the pacific salmon fisheries (Vreeland 1987). Abernathy Fish Technology Center has also conducted Spring Creek hatchery evaluation studies during brood years 1989 to 1992 involving rearing densities (Banks and LaMotte 2002) and concluded that rearing densities be maintained at the hatchery's current index of ≤ 0.30 with a flow index greater than 1.5. In 2002, a study conducted by hatchery staff determined that AquaMats® impart little improvement in fish quality or behavior prior to release (Gale and LaMotte 2002).

Spring Creek NFH, with assistance from the CRFPO and Abernathy Fish Technology Center, is presently evaluating unfed fry releases using otolithography, an otolith branding process, on three million unfed fry each year (LaMotte et al. 1999). Brood year 1999 was the first year of otolithography and three year old returns are currently being evaluated. In brood year 2000, no unfed fry were marked due to low adult returns, but three million were marked in 2001 and another three million were marked in 2002. The results of this evaluation are forthcoming and the study is ongoing.

3.8.5 Stock Assessment and Contribution to Fisheries. Coded-wire tagging of production fish at Spring Creek NFH began in 1972. In 1985, the Pacific Salmon Commission (PSC) funded "Index Stock" program began. Currently, representative groups of 150,000 fish from each release group are adipose fin clipped and coded-wire tagged to assess survival and fisheries contribution. All Spring Creek NFH release and recovery information is reported to the PSMFC via the CRiS database, CRFPO, and the Western Washington Fisheries Office. Coded-wire tags recovered are reported to PSMFC via the appropriate state, provincial, and tribal organizations.

The most recent Annual Stock Assessment Report (Pastor 2001) includes brood years with "complete" coded-wire tag recovery information, brood years 1980 through 1994. Average survival for these brood years is estimated to be 0.3151%. The standard deviation for those survivals is 0.2425%. The minimal survival was 0.0462% for brood year 1984, and the maximum was 0.9838% for brood year 1982.

On average for brood years 1980 through 1994, the percentage of fish harvested in the Columbia River gill net fishery has been equal to the number of fish returning to the hatchery, approximately 34%. About 13% of Spring Creek fish are harvested in British Columbia sport and commercial fisheries. Washington and Oregon commercial fisheries each take about 6%. Brood years in the 1970's routinely provided over 100,000 fish for harvest in ocean fisheries. Table 4 provides information on escapement and harvest of Spring Creek NFH tule fall Chinook.

Table 4. Hatchery escapement, Columbia River harvest, ocean harvest and total adult production for Spring Creek NFH tule fall Chinook salmon 1980-1995. The total adult production number given includes all estimated sport, tribal, commercial, and international harvest of Spring Creek NFH fish. This table is partially reproduced from the Spring Creek NFH - Hatchery and Genetic Management Plan (USFWS 2003b). Data presented in this table is calculated from the Columbia River Information System or CRiS (Stephen M. Pastor, August 2002).

Brood Year	Hatchery Escapement (Goal: >7000)	Columbia River Harvest	Ocean Harvest	Total Adult Production Number[1]
1980	4634	7433	17021	29088
1981	7366	15838	23347	46551
1982	16268	65631	58928	140827
1983	986	8638	6436	16060
1984	481	2407	3530	6418
1985	785	5330	7593	13708
1986	5812	17824	22414	46050
1987	5244	7388	14694	27326
1988	14331	30548	34223	79102
1989	8368	11646	26779	46793
1990	6251	5420	9642	21313
1991	9693	9995	10253	29941
1992	7771	12139	3578	23488
1993	67	26524	5279	31870
1994	5837	6189	4407	16433
1995	2643	3586	1821	8050
Mean	6034	14784	15621	36439

[1]Includes adult fish captured in tribal, sport and commercial harvest in freshwater or saltwater and escapement to Spring Creek NFH.

3.8.6 Juvenile Monitoring. Juvenile fish at Spring Creek NFH are monitored on a routine basis by the hatchery staff to determine the condition factor of fry, fingerlings and smolts. Samples are taken by the Lower Columbia River Fish Health Center to determine the health condition of fry, fingerling and smolts prior to release. Sampling of fingerlings for tag retention and fin mark quality, prior to release, is conducted by CRFPO. Salt water challenges are conducted before each release to assess smolting. Results are entered into the hatchery's database.

Currently, the only monitoring of juvenile releases from Spring Creek NFH is done by the Fish Passage Center (FPC) located at Bonneville Dam. Shortly after Spring Creek NFH releases, the fish passage center usually notes when Spring Creek NFH juveniles are passing by Bonneville Dam in their weekly report available online (www.fpc.org).

3.8.7 ESA Assessments, Ecological Interactions, and Natural Production Studies. The Service completes Biological Assessments and Hatchery and Genetic Management Plans to comply with the Endangered Species Act. These assessments and plans help guide production, considering the potential impacts on the biological community.

Additional monitoring is needed to evaluate Spring Creek releases, possible interactions with wild stocks in the migration corridor, and to identify potential hatchery reform measures. Currently, staff from Spring Creek NFH, Columbia River FPO, Lower Columbia FHC, and Abernathy Fish Technology Center are working to identify critical study questions to evaluate these topics. Shared project proposals will be submitted to the Services' FONS database for funding.

3.8.8 Environmental Monitoring. Environmental monitoring is conducted at Service facilities to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System (NPDES) permit and is also used in managing fish health. On a short-term basis, environmental monitoring helps identify when changes to hatchery practices are required. The following parameters are currently monitored at Spring Creek:

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

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

3.8.9 Coordination/Communication. The hatchery holds Hatchery Evaluation Team (HET) meetings each summer and winter. These meetings include representatives from Spring Creek NFH, CRFPO, and LCRFHC. 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. Other aspects include survival, life history, fisheries contribution, and fish health parameters at Spring Creek NFH and how it compares to other National Fish Hatcheries producing fall Chinook salmon in the Columbia River. These meetings have evolved into combination HET/Coordination meetings. Cooperators (NOAA-Fisheries, WDFW, COE, and Yakama Nation) are invited to all HET meetings and are especially encouraged to attend when significant hatchery management decisions are scheduled. The winter HET meeting reviews adult returns, results of hatchery evaluation studies, with emphasis on production decisions for the next year. The summer meeting details last springs releases, fish health quality, production number, predicted adult returns, adult spawning operations and needs, and sampling plans for Bio-sampling. Hatchery production is coordinated with the co-managers through the Production Advisory Committee and with concurrence of the Regional Office, NOAA-Fisheries and Corps of Engineers.

3.8.10 Fish and Egg Transfers. All fish, and/or egg requests and transfers are coordinated through Spring Creek NFH, LCRFHC, and CRFPO. Any request for fish and/or eggs, either in or out of Spring Creek NFH, will be in writing and a National Fish Hatchery Planned Release or Transfer Schedule will be prepared by the requester. All transfers of fish and/or eggs require a fish health certification from LCRFHC prior to transfer. All fish and egg transfers are made in accordance with the fish disease policies of the co-managers and Service fish health policy. If the fish and/or eggs are determined to be healthy, the LCRFHC arranges for all appropriate state permits involving the transport. The transfer schedule is signed by the Spring Creek NFH manager and LCRFHC, in turn the document and permits are sent to the CRFPO for approval. These requests and permits are kept on file at the CRFPO for future reference.

3.8.11 Interagency Coordination/Communication. As part of the *United States v. Oregon* Columbia River Fish Management Plan, the Technical Advisory and Production Advisory Committees are comprised of harvest and production assessment biologists, including representatives from the Service, Tribes, NOAA-Fisheries, and states of Oregon, Washington and Idaho. These groups provide management direction used in establishing hatchery fish production goals and harvest rates.

The Integrated Hatchery Operations Team (IHOT) was comprised of representatives from fish management agencies, including CRFPO and tribes. IHOT developed a series of regional hatchery policies and operational plans. The IHOT group has since been replaced by the Artificial Production Review and Evaluation process funded by the Northwest Power Planning Council. The Service is represented by our Regional Office staff.

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

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

3.8.12 Ocean Fisheries Management. Spring Creek NFH tule fall Chinook salmon are a major component in ocean fisheries. This stock influences ocean fishery management decisions. See section 2.7.10, 2.8.2, and 3.8.5 for further information on commercial fishery contributions.

3.8.13 Freshwater Fisheries Management. Washington, Oregon, and the four treaty tribes (Yakama, Warm Springs, Umatilla and Nez Perce), that are parties to the Columbia River Fish Management Plan (*United States v. Oregon*), prepare harvest strategies based on run size predictions made by their respective fishery agencies. They then jointly present their findings to the Columbia River Compact through the Technical Advisory Committee (TAC). The Columbia River Compact, created by Congress, has the authority to approve or reject commercial fishery proposals for the main stem Columbia River. In their deliberations, the Compact will consider the findings of the TAC. If those findings are in compliance with the management plan, brood stock goals and ESA guidelines, and the run size prediction shows a harvestable surplus, the Compact will set commercial seasons for non-tribal and/or tribal fisheries in the main stem Columbia River. Sport regulations are set by each state individually. The court adopted 2003 Management Agreement for Upper Columbia River fall Chinook, Steelhead, and Coho (*United States v. Oregon* court proceedings Civil No. 68-513 KI) stated that the escapement objective for Spring Creek NFH would be the program production requirements of 7,000 adult tule fall Chinook, of which 4,000 are females. Ocean and in-river fisheries were managed to help achieve this escapement in accordance with the fishing regimes described within the document.

Spring Creek NFH is a major contributor to the sports fishery at the mouth of the Columbia River as well as the commercial gill net fishery below Bonneville Dam. The Spring Creek stock is also a major contributor in the tribal zone 6 fishery above Bonneville Dam.

3.9 Public Outreach Activities

The Columbia River Gorge Information and Education (I&E) Office services the Spring Creek and Carson National Fish Hatcheries and the Lower Columbia River Fish Health Center. The Office shares/distributes its time and staffing between these stations. The I&E program is mainly funded by the Spring Creek NFH with assistance from the Carson NFH and the Lower Columbia Fish Health Center.

The goal of the Columbia River Gorge I&E Office outreach program is to increase the visibility of the Fish and Wildlife Service (FWS) facilities in the Columbia River Gorge and to provide information about FWS programs to internal and external audiences. FWS staff and volunteers show how FWS programs benefit the public and the environment in keeping with the FWS mission: Working with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

Recognizing the importance of all FWS staff to be involved in gaining or retaining public support for our programs, the I&E program will strive to insure that staff are well-informed about policies, procedures, and issues; and that staff are willing and able to interact with the public. Program efforts will include providing information to staff, partners, and volunteers and, through them, to members of the community and other publics. Outreach will be used as a management tool, providing support to the Service, the public, and our hatchery programs.

Information on Spring Creek NFH can be found online at http://gorgefish.fws.gov/SpringCreek. Additional biological information on tule fall Chinook salmon at the hatchery can be viewed at http://columbiariver.fws.gov.

3.9.1 On Station. On station activities include tours of the facility to schools and special interest groups. On site educational efforts include touring some 800-1000 students through the hatchery during spawning, to gain a better understanding of hatchery operations and salmon life cycle. Information and education staff provide educational materials to schools and set up fish tanks for learning situations. Students from area schools raise tule fall Chinook salmon in their classrooms and annually release their fish into the nearby White Salmon River. Annual festivals include a Visitor's Weekend each September to highlight spawning and hatchery operations for the visiting and local public.

3.9.2 Off Station. Outreach efforts include an array of activities that occur throughout the Pacific Region. Examples include various festivals, classroom participation at local schools, stream adoption, participation in other National Fish Hatchery events, Jewett Creek restoration project and county fairs (Hood River and Skamania counties, and the Trout Lake Community Fair).

3.9.3 Partnerships/Cooperators with Spring Creek National Fish Hatchery.

Partnerships/Cooperators

- Bonneville Power Administration
- Columbia River Inter-Tribal Fish Commission
- Friends of Northwest Hatcheries
- NOAA-Fisheries
- Private land owners in White Salmon River watershed.
- U.S. Army – Corps of Engineers
- U.S. Environmental Protection Agency
- *United States v. Oregon* parties - co-managers of Columbia River fisheries, including Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe, Confederated Tribes of the Warm Springs Reservation of Oregon, Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, Idaho Fish and Game, NOAA-Fisheries and U.S. Fish and Wildlife Service.
- Washington Department of Ecology
- Washington Department of Fish and Wildlife
- Washington Trollers Association
- White Salmon River Watershed Council
- White Salmon River Technical Advisory Committee
- Yakama Nation

3.10 Special Concerns

3.10.1 Planning Issues. Federal, state and tribal entities share responsibilities for development of sub-basin plans, hatchery production, harvest management, and ESA considerations. Planning issues center around correcting factors contributing to the decline of

Columbia River aquatic resources. The agencies involved include the U.S. Forest Service, U.S. Fish and Wildlife Service, NOAA-Fisheries, U.S. Army Corps of Engineers, U.S. Geological Survey, Bonneville Power Administration, the Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, Underwood Conservation District, and the Yakama Nation.

This Comprehensive Hatchery Management Plan will recognize and comply with all management plans and Biological Opinions affecting the Columbia River Basin. Operations at Spring Creek NFH center around marking, juvenile releases and production numbers, surplus adult distribution, impacts to aquatic resources, actions being taken to help recover listed and depressed populations, and funding for operations, maintenance and evaluation.

3.10.2 Marking. To help protect wild and naturally produced fish, the states of Washington, Oregon and Idaho are implementing selective sport and commercial fisheries (non-tribal) on marked hatchery fish. To be effective, these selective fisheries require that a high proportion of hatchery produced fish be marked. Mass marking (100% adipose fin clipped) of most hatchery fish is being implemented for steelhead trout and coho salmon, and most recently for spring Chinook salmon. Currently, mass marking of fall Chinook salmon has not yet been implemented except for special cases, but will be looked at in the future. Presently, cost and logistics of marking 15 million smolts are the prohibitive factors for mass marking and could be a future concern if all Spring Creek NFH fish must be marked.

Tribal managers generally disagree with the management strategy for mass marking and selective fisheries. The Service has not made any unilateral decisions on marking and will continue to coordinate actions with the states and tribes through *United States v. Oregon* and NOAA-Fisheries to comply with ESA actions and coordinate with the Pacific States Marine Fisheries Commission mark committee. In addition, federal agencies are beginning discussions on a comprehensive marking strategy for the Columbia River Basin as identified by Action 174-1in the Federal Columbia River Power System Biological Opinion. Federal agencies (NOAA-Fisheries lead) are meeting with the states and tribes to begin this effort.

This comprehensive marking plan should:

- Improve our ability to assess and monitor the status of naturally-producing (especially ESA listed) populations.
- Monitor and evaluate hatchery programs, including hatchery reforms and stray rates.
- Maintain critical harvest management and stock assessment information.
- Monitor mark-selective fishery regimes established by the states.
- Improve regional and watershed based marking decisions.
- Be consistent with recovery plan goals.
- Be coordinated through *United States v. Oregon*, PSMFC, and U.S. - Canada forums.

3.10.3 Juvenile Salmon Distribution and Production Numbers. Juvenile salmon are released from Spring Creek NFH in March, April and May as sub-yearling smolts. In some years, unfed fry have also been released during December. These release strategies are in agreement with WDFW, COE, the Service and NOAA-Fisheries.

3.10.4 Water Use (Drought). During drought years spring water flow may drop low enough to negatively impact water quality within the hatchery. Earlier than planned releases may be necessary during those years to reduce fish densities. All proper approvals will be obtained prior to a drought related release.

3.10.5 Emergency Releases. There may be a situation that warrants early or emergency releases caused by factors such as mechanical problems creating disruption of water flow, natural disasters or fish health concerns. The decision to make an early or emergency release will be based on the emergency release plan guidelines that are located in the hatchery's operational plan (Attachment 4). Notification procedures need to be followed to ensure all management agencies affected by an early or emergency release are notified in a timely manner and are aware of the circumstances that initiated the decision for releases outside the normal release periods. Table 5 lists the contact points that will be notified prior to an emergency release. In cases of extreme mechanical failure contacts will be notified as soon as logistically possible of an early or emergency release.

3.10.6 Surplus Adult Salmon Distribution. In most years, more fish return to the hatchery than are needed for brood stock. Most of these surplus fish are in good condition upon entry into the hatchery and are distributed either to the Yakama Nation or other tribes as requested. The Federal Prison inmate food program can receive any fish beyond tribal requests. Fish not suitable for food are typically rendered. Plans are underway to determine the number, if any, suitable for stream enrichment via carcass distribution or production of nutrient enrichment pellets.

3.10.7 Hatchery Fish Ladder Management. The Service, NOAA-Fisheries, COE, WDFW and Yakama Nation agreed on a strategy for ladder management; the ladder remains open until all fish have entered the hatchery. Fish other than tule fall Chinook that enter the ladder during hatchery brood stock collection and surplus activities are returned to the river to continue their migration. These fish may include ESA listed species.

In 2003 with the permission of NOAA-Fisheries, COE, WDFW and Yakama Nation, an alternative to the current ladder operation was tested on two separate occasions, one during which ladder operation would be open and closed periodically, or pulsed, for brood stock collection. During a pulsed ladder operation, fish in surplus of brood stock collection will be left in the river for nutrient enhancement, natural spawning, and additional fishing opportunities. Future ladder operational plans will be negotiated and ecological risks and

benefits to native ESA listed salmon will be evaluated through HET meetings and communication with NOAA-Fisheries, COE, WDFW and Yakama Nation.

Table 5. Notification list for emergency or early release. If an emergency or early release occurs during non-workday hours, or the contact person cannot be reached, voicemail messages will be left of the release.

NAME	PHONE	FAX	E-MAIL
NOAA Fisheries			
Rich Turner	503-736-4737	503-872-2737	rich.turner@noaa.gov
Fish Passage Center			
Larry Basham	503-230-4287	503-230-7559	lbasham@fpc.org
Jerry McCann	503-230-4291	503-230-7559	jmccann@fpc.org
PSMFC			
Bonneville SMP Project Leader			
Rick Martinson	541-296-8989	541-296-8717	rickdm@gorge.net
U.S. Army COE			
Bonneville Dam Project Biologist			
Tammy Mackey	541-374-4552	541-374-8761	Tammy.M.Mackey@nwp01.usace.army.mil
Bonneville Dam Operations Manager			
Jim Mahar	541-374-4550	541-374-8073	James.R.Mahar@usace.army.mil
USFWS			
Rich Johnson (RO)	503-872-2763	503-231-2062	rich_r_johnson@r1.fws.gov
Tim Roth (CRFPO)	360-696-7605	360-696-7968	timothy_roth@r1.fws.gov
David Wills (CRFPO)	360-696-7605	360-696-7968	david_wills@r1.fws.gov

3.10.8 Negative Impacts to Listed and Other Aquatic Resources and What Actions are Taken to Help Recover Listed and Depressed Populations. All hatcheries must consider their potential for adversely affecting the aquatic community and Spring Creek NFH is no exception. Of particular concern, is potential impact to the Columbia River Ecologically Significant Unit (ESU) of threatened Snake River fall Chinook. To meet our ESA obligations, the Service is proceeding with actions to comply with the March 1999 Biological Opinion on hatcheries and the 2000 Biological Opinion on the Columbia River Federal Power System. An update of the Biological Opinion on hatcheries is expected in 2004. Actions in compliance with Biological Opinions are identified in Chapter 4 of this document. The Service has developed a Hatchery and Genetic Management Plan for Spring Creek NFH (USFWS 2003b) to help assess the impacts from hatchery operations. The Service will work toward going beyond the assessment stage and taking actions which help recover listed and depressed populations, including appropriate or innovative hatchery reforms. Chapter 4 identifies potential projects and funding needs.

3.10.9 Insufficient Operations and Maintenance Funding Through the Mitchell Act. Increased demands on hatchery programs, as required by ESA Biological Opinions, have strained hatchery budgets. Without increases in Mitchell Act funding, reductions in production programs may need to be made. While reducing hatchery production may allow the hatchery, and the Service, to meet some ESA requirements, it may not uphold mitigation and tribal trust responsibility. The Service is working with NOAA-Fisheries and other co-managers to address current budget shortfalls.

FINAL DRAFT

CHAPTER 4. IMPLEMENTATION

Implementation of the Spring Creek NFH program requires input to reimbursable and Service budget processes, as well as compliance with Service policies, legal mandates, and other environmental and human resource laws. This chapter intends to outline these processes and discuss the policy and planning documents which provide guidance to Spring Creek NFH in regards to policy, budget, safety, grounds and facilities maintenance.

4.1 Budget Overview

Spring Creek National Fish Hatchery receives 100% of its operations budget from reimbursable funds, Corps of Engineers(COE) under the John Day Mitigation Act and NOAA Fisheries under the Mitchell Act. The original agreement was for a 50/50 split between the COE and NOAA-Fisheries, but over the years funding has been skewed toward the COE. Presently, the COE provides approximately 70% of operating costs for Spring Creek NFH. Operational budget needs are identified each year and negotiated with the COE and NOAA-Fisheries to determine the final fiscal year allocation (see following section on Mitchell Act). Deferred maintenance and most construction are usually funded by the COE, but projects are also entered into the Service's Maintenance Management System (MMS) for possible funding. Some funding for special studies can also be derived from reimbursable sources. The current budget and the number of full-time personnel at Spring Creek NFH are provided in Table 6. Additional COE and Mitchell Act funding is provided to the CRFPO, LCRFHC, Little White Salmon NFH and Abernathy Fish Technology Center for support services to the hatchery. In past years, Spring Creek NFH received Service operational funds but this was discontinued in the early 1990's.

4.1.1 Fisheries Information System. The Service's Washington Fisheries Office implemented the Fisheries Information System (FIS) in 1989 in order to meet the increasing demands for information to answer inquiries from Congress, other Federal Government and State Government offices and the public. Automation of the data gathering process insured standardization of data and quicker response time. The FIS consists of database modules which address future budgeting needs above base funding - Fishery Operation Needs (FONS) Module, resource oriented accomplishments that occurred over a fiscal year - Accomplishments Module, and Congressionally mandated reporting requirements that describe yearly production at NFH's - Fish Request and Distribution Module and the Egg Request and Distribution Module. The Washington Fisheries Office may add or delete modules as need requires. The FIS originally included a module that compiled a list of a hatchery's deferred maintenance projects – Maintenance Management System (MMS). This database has been transferred temporarily to the Service's National Wildlife Refuge Management Information System until the startup of the Service Asset Maintenance Management System (SAMMS) is brought on line in the near future.

Table 6. Budget by funding source and full time equivalent personnel for the fiscal years 2000-2002. Budget numbers are in thousands of dollars.

	2000 Actual	2001 Actual	2002 Actual
COE	556.7	603.1	640.9
NOAA Fisheries	189.7	315.0	301.0
Operations	746.4	918.1	941.9
Cyclical	148.5	112.0	9.9
Quarters	8.8	15.0	24.9
Veh./Equipment	69.5	0.0	0.0
MMS project list	0.0	0.0	68.0
Maintenance	226.8	127.0	102.5
FTEs	9.38	11.0	10.25

4.1.2 ESA Compliance. The 1999 Biological Opinion on Artificial Propagation in the Columbia River Basin lists a host of measures which either must, in the case of Reasonable and Prudent Alternatives, be complied with or, in the case of Conservation Recommendations, should be implemented.

Reasonable and Prudent Alternatives for Spring Creek NFH are:

- Manage adult hatchery stray rates to the lowest level achievable

Conservation Recommendations are:
- Minimize inter-basin stock transfers
- Emphasize juveniles that are ready to migrate to the ocean and spend a minimum amount of time in the freshwater environment
- Improve homing and reduce straying
- Evaluate "NATURES" type rearing strategies
- Monitor and evaluate ecological interactions
- Assess carrying capacity and density-dependent effects
- Monitor and evaluate predation
- Conduct spawning ground surveys
- Assess use of hatchery carcasses for nutrient input
- Use appropriate brood stock for reintroduction into historic or vacant habitats
- Develop cost-effective externally distinguishable marks to identify hatchery origin fish
- Modify hatchery programs to conservation/enhancement role
- Adopt strategies to separate returning hatchery fish from listed naturally spawning fish
- Continue adaptive management to improve smolt quality
- Continue to coordinate hatchery programs to meet ESA concerns

In addition, the following measures are associated with an Incidental Take Statement:
Reasonable and Prudent Measures are:
- Provide projected hatchery releases to NOAA Fisheries annually
- Manage programs to minimize potential inbreeding of hatchery and listed fish
- Monitor and evaluate artificial propagation programs
- Reduce potential negative impacts to listed salmon and steelhead from hatchery operations

Terms and Conditions include:
- Provide projected hatchery releases and annual report of releases and returns to NOAA-Fisheries
- Mark a representative sample of hatchery salmon released to allow monitoring and evaluation.

- Develop protocols for fishery augmentation/mitigation programs to reduce potential for interbreeding and genetic introgression
- Ensure water intakes are properly screened and comply with NOAA-Fisheries intake structure criteria
- Implement PNFHPC and IHOT guidelines
- Monitor effluent for compliance with NPDES permits

4.1.3 Budgetary Needs and Strategies. Funding for construction, program changes, and quarters maintenance is identified through the Maintenance Management System (MMS), the Fisheries Operational Needs System (FONS), projects submitted to the COE, and Regional Quarters Overhead funds allocated through a competitive process. Access to FONS and is through the FIS database.

4.1.4 Fisheries Operational Needs System. Fisheries Operations Needs System, or FONS, was established in 1999 as a planning, budgeting, and communication tool to enhance identification of funding and staffing needs for the Fisheries Program. FONS projects are used in budget requests to the Department of Interior and the Office of Management and Budget. Table 7 outlines the Regional and National budget formulation, and provides a timeline through the process. Projects are submitted to evaluate hatchery goals and standards (Table 8). Additional projects will be submitted as needs arise. Several other Service field offices support Spring Creek NFH, including CRFPO (Vancouver, Washington), Lower Columbia River Fish Health Center, and Abernathy Fish Technology Center.

Table 7. Regional and National calendar for the budget formulation process.

Regional Formulation Process	
November	Project Leaders complete FONS submissions, emphasizing projects related to ecoregion priorities, and forward to the Regional FONS Coordinator. Submissions are reviewed for completeness and clarity. Projects are then submitted to the relevant supervisors for ranking. ARD, Fisheries incorporate supervisor rankings and input, plus regional and national priorities to develop regional ranking recommendations. Regional Director reviews and approves/modifies regional ranking recommendations.
National Formulation Process	
February	Regional FONS submission to Service's Washington Office.
March and April	Assistant Director, Fisheries and Habitat Conservation and ARD, Fisheries review regional submissions and identify themes. Themes communicated to ARD, Fisheries, Regional Directors, and Director.
May and June	Regions use themes in the development of regional budget requests. Using FONS, project lists will be developed for each theme to be forwarded in the Regional Request.
June	The Service Budget Committee considers the Regional Requests in setting priorities for the Service's Budget Request to the Department.
June to January	As the Service's Budget Request moves through the approval process (Department of Interior and OMB review), ARD, Fisheries will be consulted to ensure that FONS lists still represent the highest priorities of the regions.
February	President's budget submitted to Congress including FONS projects for Fisheries Program increases.

Table 8. Projects submitted for fiscal year 2004 and are linked to Spring Creek NFH Goals and Objectives. See Section 3.1 of this document for more information regarding hatchery goals and objectives.

Goal	Objective	Intended accomplishment	FONS Project #	Proposed by	Cost ($1,000)
3	1,2	Develop cooperative implementation plan and obtain baseline conditions for anadromous fish stocks to the (Big) White Salmon River. Gather data for reintroduction or supplementation of fish populations utilizing Spring Creek NFH program fish.	1999-008	CRFPO	825
3 2	1,2 4	Development of hatchery reform implementation plan for Service operated/administered facilities in the Columbia River Basin.	2004-009	CRFPO	1000
3	1,2	Evaluate ecological interactions between production fish from Little White NFH and Spring Creek NFH, listed wild fish, and other native fish using tagging and tracking methods, instream sampling, habitat, genetics and fish health.	2004-011	CRFPO	300
4	1	Plan, construct a sturgeon fishing platform and access ramp for mobility impaired persons.	2001-001	SCNFH	69
4	1,2,3	Construct Salmon forum Visitor Complex	2002-002	SCNFH	750
3	1,2	Fish passage studies prior to removal of Condit Dam.	2002-004	SCNFH	250
1	2	Evaluate success of unfed fry releases	2003-002	SCNFH	100
3	2	Determine ecological interactions between wild and hatchery fish in the Columbia River Gorge (ladder pulsing study).	2004-001	SCNFH	50
				Total:	3,344

4.1.5 Maintenance Management System (MMS). The Maintenance Management System (MMS) is an inventory of deferred maintenance projects, which are maintenance projects that can be put off or do not occur on an annual basis. The MMS is the primary vehicle used to address maintenance requirements above $5,000. The database is updated annually then forwarded to the Washington Office (WO) for consolidation and submission into the budgetary process. Projects submitted for consideration are too numerous to list here and can be found in Attachment 12. Recent MMS funding has been directed toward correcting Health and Safety discrepancies.

4.1.6 Five-year Construction Plan. Fisheries Construction projects are entered into the Refuge Management Information System (RMIS), the same web-based database, developed for Refuges, as is used for the Real Property Inventory (RPI). Scores and Regional priorities are assigned and the information is used in the WO to develop the Five-year Construction Plan. This plan, after it has been approved by the Department and Office of Management and Budget (OMB), is submitted as part of the Service Budget to Congress. The out-years of this plan are subject to revision each year.

Construction funds are similar to MMS funds but are reserved for new construction and maintenance to existing buildings above $500,000. A project to relocate the White Salmon River intake and bring it into compliance with NOAA Fisheries screen criteria is a major project listed.

4.1.7 Five-year Maintenance Plan. The Deferred Maintenance projects entered into the database are prioritized by the WO, at least partially, based on the priority established by the Field Office and Regional Office priorities. This plan is reviewed by the Department and the approved plan is part of the basis of our MMS budget request to Congress (see previous discussion on MMS). Many maintenance projects are funded with reimbursable funds from the COE Corps of Engineers, as the COE owns most of the facility's structures.

4.1.8 Mitchell Act and Other Reimbursable Funding Processes. As stated previously, 100% of Spring Creek NFH operations are derived through reimbursable funding, COE and NOAA-Fisheries. Resource management funding that comes from the Service's share of the annual U.S./Canada Pacific Salmon Treaty funding process is provided to mark 450,000 fish with a coded-wire tag for stock assessment, as outlined in Chapter 3. Funding is negotiated yearly with the Fish and Wildlife Service submitting budget proposals to COE, NOAA-Fisheries and PFMC for there consideration. Agreements are signed and are required to be in place by January 1st of the budget year.

The increased demands on hatchery programs, as required by ESA Biological Opinions, are inadequately funded through the Mitchell Act. Either Mitchell Act support needs to be increased or alternative funding sources need to be identified. If additional support is not

secured in the near future, hatchery programs may need to reduce production. Reducing production may meet ESA requirements but it does not uphold our federal mitigation or tribal trust responsibility.

4.2 Service and Station Guidance

Spring Creek NFH operates under a variety of Service guidance and policies. Some of the more significant policies are described in the following section:

4.2.1 Quarters Policy. The Service administers a variety of field offices and National Fish Hatcheries. At many of these hatcheries, including Spring Creek NFH, government owned residences are available to employees on a required occupancy basis. The determination of whether an employee must occupy government furnished quarters as a condition of employment is made on a station-by-station, position-by-position basis. In making a determination, supervisors will consider: the dependability of the water supply, adequacy of the alarm and call back systems, response time needed to take emergency corrective actions, and the adequacy of the security provided to protect fish, facilities, and equipment.

4.2.2 Required On-Station Housing. The current Quarters Plan for Spring Creek NFH is dated April 10, 1998 (Attachment 13). The intent of having personnel living in government quarters at Spring Creek NFH is to provide station security and operations during non-duty hours. Mechanical systems to regulate water flows must be maintained to prevent loss of fish. Additional protection of government owned property is provided by occupants, especially when anadromous brood stock is present. The Spring Creek NFH water recirculating system, water pumps, standby generator and computerized alarm system requires quick response to prevent fish losses. In addition, staff residency is required due to potential inaccessibility during severe weather storms or events.

4.2.3 Overtime, Compensatory Time, and Standby. Regulations governing overtime, compensatory time, and standby are described in the U. S. Fish and Wildlife Service Administrative Manual. Premium pay is discussed in Part 225 FW of the Manual with specific discussions on overtime regulations in Chapter 7.8, callback overtime in Chapter 7.13, Compensatory time in Chapter 7.18, and standby in Chapter 7.22.

4.2.4 Surplus Fish and Eggs as Government Property. This guidance was provided in a July 2001 memorandum from the Regional Director (Attachment 14). The guidance states: "Live fish entering a National Fish Hatchery, whole fish carcasses or their parts, are Government property and cannot be converted for personal use, even temporarily on loan". Misuse of Government property may result in disciplinary action ranging from a written reprimand to removal from the Service.

All possible uses of hatchery fish that are consistent with the Service Mission are only considered. See the section titled Surplus Fish Distribution in this chapter or in Chapter 3 of this document for more information.

4.2.5 Drugs and Anesthetics. Guidance on the use of anesthetics, drugs and other chemicals was provided in a November 9, 2000 memorandum from the Assistant Regional Director for Fisheries in Region 1 (Attachment 15). Hatcheries and other Fisheries offices within Region 1 may at times have legitimate and necessary reasons to use certain drugs and chemicals to achieve their goals and complete the mission and objectives of the Service. During the capture, rearing, or monitoring of fish species, several drugs and chemicals are used for anesthesia, disease treatments, or to increase the survival of the animals. Some of these compounds are already registered and labeled for fisheries use. Others may be legally used under the prescription and supervision of a veterinarian, or within the protocols of an existing Investigational New Animal Drug (INAD) exemption permit issued by the Food and Drug Administration (FDA). The Service has existing correspondence from the FDA concerning the use of compounds in the recovery of threatened and endangered species, but there are strict considerations and limits in those situations. Region 1, working closely with the National INAD Office and through appropriate consultation with FDA, will fully comply with all regulations and agreements for the use of aquatic drugs and chemicals. The inappropriate use of compounds on fish or aquatic animals intended for human or animal consumption is prohibited.

4.2.6 Employee Training. Regulations governing employee training are described in the U. S. Fish and Wildlife Service Administrative Manual. Career development is discussed starting in Part 230 FW of the Manual.

4.3 Service Required Planning Documents

Daily operations of Spring Creek NFH are guided by a number of plans and reports designed to promote health and safety, station development, emergency situations, employee training, and other actions. Some of the more significant ones are described in the following sections.

4.3.1 Safety and Health Plan. Safety regulations and safety program discussions are described in the U. S. Fish and Wildlife Service Administrative Manual.

4.3.2 Fire Management Plan. Department and Service policy require that "every area with burnable vegetation must have an approved Fire Management Plan" and field stations cannot conduct prescribed fire operations, including trash burning, without an approved Fire Management Plan that includes such activities. All Service facilities developed plans and had them approved in FY2001, but they must be amended before any controlled burning can be conducted.

4.3.3 Integrated Pesticide Management Plan. It is Service policy to eliminate unnecessary use of pesticides by implementing integrated pest management techniques and by selecting crops and other vegetation that are beneficial to fish and wildlife but do not require pesticides. The ultimate goal is to eliminate pesticide use on Service lands and facilities and to encourage pest management programs that benefit trust resources and provide long-term, environmentally sound solutions to pest management problems on sites which are off Service lands.

When pesticides are used, they must be part of a pest management program that includes strategies to reduce and eventually eliminate their use. The program must be set forth in an Integrated Pest Management Plan which must include consideration of target specificity of the pesticide (insecticide, fungicide, herbicide, etc.), risk to nontarget organisms, incidental reduction of food resources for trust species, persistence, control and prevention of the spread of fish and wildlife diseases, and other environmental hazards.

4.3.4 Station Development Plan. The Station Development Plan considers future growth and construction needs of the facility that are necessary to meet goals and objectives. The plan is an opportunity to work with the Service's Engineering Department to thoughtfully lay out a course of action to maintain the facility in proper operating condition. It is also a necessary precursor to get construction projects on the five-year construction list (see previous discussion).

Station Development Plans were completed for many stations in the early to mid-1980s. Unfortunately no plan was written for Spring Creek and needs to be completed.

4.3.5 Monitoring and Evaluation Plan. Monitoring and evaluation of production programs are outlined in the Spring Creek Hatchery and Genetic Management Plan (USFWS 2003b). A more detailed discussion of monitoring and evaluation can be found earlier in Chapter 3. Spring Creek has also developed its own database, collecting information as a historical reference for comparison of release groups since 1986.

4.3.6 Distribution of Surplus Fish. The Hatchery works cooperatively with the CRFPO, LCRFHC Lower Columbia River Fish Health Center, and co-managers to plan beneficial uses of fish surplus to hatchery needs in years of large adult returns. The plan should consider all possible uses of adult carcasses and live fish in excess of hatchery needs, and will be coordinated with co-managers when necessary to achieve mutually satisfying solutions. The plan will be developed in years where surplus fish are anticipated, and in advance of spawning operations.

4.3.7 Small Water Systems Management Plan (Drinking Water). The Safe Drinking Water Act (SDWA) delegates safe drinking water control to the States. Spring Creek NFH must meet state requirements to provide drinking water to the public as well as our

employees and their families. The Environmental Protection Agency (EPA) recently indicated that a significant number of the Service's systems do not fully comply with the SDWA. They have requested an audit of compliance with State regulation. This process has started using the services of a contractor. Facilities in the State of Washington have been surveyed. Deficiencies discovered in water systems will be corrected as they are detected.

4.3.8 Continuity of Operation Plan. The Continuity of Operations Plan provides guidance for Spring Creek NFH staff to ensure that essential operations and activities continue during, and after, an emergency situation. The plan is developed in accordance with the Department of the Interior MRPS Bulletin 98-01, Continuity of Operations Planning - Guidance and Schedules, dated March 27, 1998, and number 380 DM 6, Vital Records Program. This plan is current and located in the hatchery administrative files.

4.3.9 Spill Prevention, Control and Countermeasure Plan. A Spill Prevention, Control, and Countermeasure Plan (SPCC) is prepared in accordance with the provisions of Title 40 of the Code of Federal Regulations, Part 112. An SPCC plan establishes procedures, methods, and equipment used at the Spring Creek NFH to comply with the EPA oil spill prevention control and countermeasures standards, and inspection reporting, training and record keeping requirements. An SPCC is required at Spring Creek NFH due to petroleum fuel storage in above ground tanks greater than 660 gallons. The SPCC for Spring Creek is current (April 1999) and can be located in the hatchery administrative files, or the Fisheries Program Regional Office in Portland, OR.

4.3.10 Outreach Plan. An outreach plan describes the hatchery's strategy for telling the Service's, Spring Creek National Fish Hatchery's, and the Columbia River Basin's resource story to the public. Furthermore, this plan describes outreach tools and facilities needed to implement this strategy. The plan should be cited when describing unmet outreach needs in the FONS database (see Fish and Wildlife Service Budgeting Process).

4.3.11 Watershed/Sub-basin Plan. National attention has been focused on the Columbia River basin with listings of salmon and steelhead, bull trout and other aquatic species. Endangered Species Act consultations and recovery planning for listed species are having a major impact on management of fishery resources and the economy and cultural values in the Columbia basin. Consultations include the operation of the Federal Columbia River Power System, hatchery operations, harvest actions, and habitat planning and project specific activities.

The Pacific Northwest Electric Power Planning and Conservation Act resulted in the establishment of the Northwest Power Planning Council and ultimately the development of its Columbia Basin Fish and Wildlife Program, a comprehensive program to enhance and restore the salmon and steelhead runs and other fish and wildlife resources of the Columbia River basin. The Northwest Power Planning Council (now known as the Northwest Power

and Conservation Council) is leading a major sub-basin assessment and planning effort which will provide key building blocks for aquatic species restoration in the basin. At the same time, the Service has initiated recovery planning for bull trout and NOAA-Fisheries for salmon and steelhead. Each of these recovery plans will rely on sub-basin planning as major building blocks for recovery of listed species. In addition, Implementation Plans have been developed by the COE, BPA, and the Bureau of Reclamation that require implementation of significant habitat actions for listed salmon.

There are over 30 different agencies, Indian tribes, councils or commissions with fisheries responsibilities or interests operating in the Columbia River basin. The effective management and restoration of Columbia River basin salmon and steelhead and other aquatic resources depends to a large extent on the ability of these agencies to communicate effectively, resolve differences, develop unified sub-basin plans, and work together in a spirit of cooperation in various interagency forums to solve regional and river basin problems.

4.4 Compliance with Service and Other Requirements

4.4.1 Endangered Species Act (ESA). The 1999 NOAA-Fisheries Biological Opinion on Artificial Propagation in the Columbia River Basin lists a host of measures which either must, in the case of Reasonable and Prudent Alternatives, be complied with or, in the case of Conservation Recommendations, should be implemented. Several Conservation Recommendations (CR) are discussed below. The complete list of measures which may affect Spring Creek NFH can be found in NMFS (1999b).

- CR 6. Monitor and evaluate ecological interaction.
  Little data describing the ecological interaction of hatchery Chinook smolts with Endangered Species Act listed stocks are available. Funding to fill this data gap is being pursued via the FONS system initiated with the FY 2002 FONS submissions. This will be a shared project with the Columbia River Fisheries Program Office.

- CR 10. Assess use of hatchery carcasses for nutrient input.
  Outplanting spawned or excess adult Chinook salmon carcasses for nutrient enrichment has been discussed with co-managers.

4.4.2 National Pollution Discharge Elimination System. Spring Creek NFH is currently in compliance with required National Pollution Discharge Elimination System (NPDES) permit requirements for effluent discharge from the hatchery.

4.4.3 Hazardous Waste. Spring Creek NFH is currently in compliance with all hazardous waste treatment and control regulations. Efforts have been made to reduce dependence on products resulting in hazardous waste to the greatest extent possible.

4.4.4 Investigative New Animal Drugs (INAD). No drugs requiring an Investigative New Animal Drug use permit have been used in recent years. Spring Creek will be testing Aqui-S, an aquatic anesthetic, under a Service INAD, to evaluate its effectiveness and possible future use.

4.5 Monitoring and Reporting

4.5.1 Fisheries Information System (FIS). The FIS is a multifaceted database system consisting of five modules which address unmet management needs (out-year budgeting), accomplishments, deferred maintenance, and other national reporting requirements. This system was previously referenced in Budgetary Needs and Strategies section. The following paragraphs provide a more detailed description of the modules and their reporting requirements.

4.5.2 Fisheries Operational Needs System (FONS). FONS was described earlier in this Chapter under Fish and Wildlife Service Budgeting Process. This database is available through the hatchery or the Fisheries Program Regional Office in Portland.

4.5.3 Accomplishment Module. The Fisheries Accomplishment Module was established as a planning, budgeting, and communication tool to enhance identification of Fisheries Program accomplishments. These data are used in budget documents presented to the Department, OMB, and Congress. The data structure is an alternative program of the FONS Module data structure (see previous Fish and Wildlife Service Budgeting Process). This module is used to describe all accomplishments, regardless of funding source. This database is available through the hatchery or the Fisheries Program Regional Office in Portland.

4.5.4 Fish and Egg Distribution. This information is used in the Fish and Egg Distribution Report. The report describes the mission of the National Fish Hatchery System, a component of the Fisheries Program of the Fish and Wildlife Service, and its varied accomplishments. The report contains detailed information regarding species, numbers, and pounds of fish produced. It also describes the general purpose of the production program and if the species being cultured is listed. Copies of the report can be obtained by writing the Division of Fish Hatcheries, U. S. Fish and Wildlife Service, 4401 N. Fairfax Drive, Room 810, Arlington, Virginia 22203.

4.5.5 Imperiled Species Module. The Imperiled Species Module was designed to capture and report on imperiled species work performed by any Fisheries office. Reporting occurs annually, generally in November. For the purpose of this database, an imperiled species is any species or population that is:

1) Federally listed under the ESA as threatened or endangered.
2) Petitioned, proposed, or a candidate for Federal listing.

3) A State-listed species or a species of special concern.

4.5.6 Maintenance Management System (MMS). MMS was described earlier in this Chapter under Fish and Wildlife Service Budgeting Process. This database is available through the hatchery or the Fisheries Program Regional Office in Portland.

4.5.7 Station Guides. The Station Guide provides an overview of the hatchery program. It describes the station location, layout plan, easements or permits in place, water supply, quarters, office and other buildings. The Guide also provides a brief history of the hatchery. This summary document is useful for providing a quick overview to Service employees and parties interested the hatchery program and facility layout. The Guide is current and updated annually. Copies can be obtained from the hatchery or the Fisheries Program Regional Office in Portland.

4.5.8 Real Property Inventory. The RPI provides an annual update on Service real property (anything fixed to the ground or a building). The RPI was maintained by the Realty Branch until automated in the Spring of 1999. Pen-and ink changes to a paper file were changed to an automated system using FileMaker Pro software in FY1999. It was converted to a web data base in FY2001. This method of updating the database is expected to continue until it will be converted to Maximo/SAMMS, also a web-based database.

4.5.9 Columbia River Information System (CRiS) Reports. This database is used at Columbia River Basin hatcheries to record information related to hatchery operations, marking and tagging, juvenile releases, adult returns, etc. The CRiS also is useful in providing summary reports of this data. The utility and purpose of this database is described in greater detail in Chapter 4 under Monitoring, Evaluation and Coordination.

4.5.10 Energy Use Report. This is an annual report that summarizes electricity, heating and cooling energy, and gasoline used at the hatchery and kept in Hatchery files on station.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

BOR	Bureau of Reclamation
BPA	Bonneville Power Administration
BPH	Bonneville Pool Hatchery (Spring Creek "tules")
CHMP	Comprehensive Hatchery Management Plan
COE	Corps of Engineers
CRiS	Columbia River information System
CRITFC	Columbia River Inter-Tribal Fish Commission
CRFPO	Columbia River Fisheries Program Office
CWT	Coded-wire tag
DNR	Department of Natural Resources
ESA	Endangered Species Act
ESU	Ecologically Significant Unit
FIS	Fisheries Information System
FONS	Fisheries Operations Needs System
FPC	Fish Passage Center
FTE	Full Time Equivalent
HGMP	Hatchery and Genetic Management Plan
IHOT	Integrated Hatchery Operations Team
LCRFHC	Lower Columbia River Fish Health Center
MMS	Maintenance Management System
NFH	National Fish Hatchery
NMFS	National Marine Fisheries Service now known as NOAA-Fisheries
NOAA-Fisheries	Also known as NMFS or National Marine Fisheries Service National Oceanic and Atmospheric Administration, U.S. Department of Commerce
NPDES	National Pollution Discharge Elimination System
ODFW	Oregon Department of Fish and Wildlife
PAC	Production Advisory Committee
PFMC	Pacific Fishery Management Council
PIT	Passive Integrated Transponder
PNFHPC	Pacific Northwest Fish Health Protection Committee
PSMFC	Pacific States Marine Fisheries Commission
RMIS	Refuge Management Information System
SWDA	Safe Water Drinking Act
TAC	Technical Advisory Committee
TSS	Total Suspended Solids
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WDOH	Washington Department of Health

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APPENDIX

Attachment 1. Historical Background of National Fish Hatcheries in Region One.

Attachment 2. Statutory Mandates and Authorities.

Attachment 3. Layout Diagram of Spring Creek National Fish Hatchery.

Attachment 4. Spring Creek NFH – Operational Plan, Goals and Standards, dated May 15, 2000.

Attachment 5. List of Listed and Proposed Endangered and Threatened Species, Candidate Species, and Species of Concern Which May Occur within the Vicinity of the Proposed Master Plan Improvements – Spring Creek NFH dated 8/11/1998.

Attachment 6. Fall Chinook Salmon Spawning and Distribution from the Big White and Spring Creek Stations During Brood Years 1901 to 1937.

Attachment 7. Fall Chinook Salmon Spawning and Distribution from the Big White and Spring Creek Stations During Brood Years 1938-1970.

Attachment 8. Fall Chinook Salmon Spawning and Distribution from the Big White and Spring Creek Stations During Brood Years 1971-2002, Reuse System Era.

Attachment 9. Spring Creek Water Reuse System Diagram.

Attachment 10. Recommended Spawning Protocols for Pacific Salmon and Steelhead at U.S. Fish and Wildlife Service Hatcheries. Donald E. Compton author. Dated 12/1/02.

Attachment 11. Spring Creek NFH Fish Health Quality Goals 1980-1992.

Attachment 12. FIS Deferred Maintenance – Five Year Plan (Fiscal Years 2003-07), Spring Creek NFH Maintenance Projects.

Attachment 13. Memorandum to Employees of Spring Creek NFH – Subject: Occupancy of Government Quarters at Spring Creek NFH.

Attachment 14. Memorandum to Fishery Project Leaders – Subject: Surplus Fish as Government Property. Dated July 10, 2001.

Attachment 15. Memorandum from ARD Fisheries Region 1 – Subject: Guidance on the use of anesthetics, drugs, and other chemicals. Dated 11/9/00.