

## TABLE OF CONTENTS

<b>Executive Summary</b>	<b>3</b>
Year 1 Challenges .....	4
HCP Projects and Activities .....	4
Summary .....	7
<b>HCP Program Element Summaries</b> .....	<b>8</b>
<b>HCP Background</b> .....	<b>8</b>
<b>Watershed Management Background</b> .....	<b>9</b>
Biodiversity Initiative .....	10
Volunteer Involvement .....	11
Watershed Road Decommissioning .....	12
Watershed Road Improvements .....	13
Road Maintenance .....	14
Large Woody Debris Placement .....	15
Streambank Stabilization .....	16
Streambank Revegetation .....	17
Riparian Conifer Underplanting .....	18
Riparian Restoration Thinning .....	19
Stream Crossings for Peak Flows .....	20
Stream Crossings for Fish Passage .....	21
Upland Restoration Thinning .....	22
Upland Ecological Thinning .....	23
Upland Restoration Planting .....	24
Common Loon Monitoring .....	25
Bull Trout Surveys .....	27
Watershed Characterization .....	30
Species/Habitat Relationship Modeling .....	33
Information Management .....	34
<b>Landsburg Mitigation Background</b> .....	<b>36</b>
Interim Mitigation for Coho, Chinook and Steelhead .....	37
Landsburg Fish Passage .....	39
Interim Sockeye Mitigation (Salmon Hatchery Program) .....	40
Cedar River Sockeye Hatchery Design and Construction .....	41
Cedar River Sockeye Hatchery Supplementation Guidelines .....	43
Cedar River Sockeye Hatchery Broodstock Collection Solutions and Monitoring .....	44
Drinking Water Quality Monitoring .....	45
Sockeye Fry Marking and Evaluation .....	46
Sockeye Fry Trapping and Counting .....	47
Short-Term Sockeye Fry Rearing .....	48
Lake Washington Plankton Studies .....	50
Adult Survival Distribution and Homing Studies .....	51
Phenotypic and Genetic Studies .....	52
<b>Instream Flow Background</b> .....	<b>53</b>
Implementation of the Cedar River Instream Flow Agreement and Workings of the Instream Flow Commission .....	54
Supplemental Biological Studies and Steelhead Redd Monitoring .....	60
Cedar Falls Powerhouse and Masonry Dam Improvements .....	62

<b>Smolt Passage Improvements and Freshwater Conservation at Locks ..</b>	<b>64</b>
<b>Conservation Messages for Fish .....</b>	<b>65</b>
<b>Downstream Habitat Protection and Restoration .....</b>	<b>67</b>
<b>Walsh Lake Restoration .....</b>	<b>68</b>
<b>Streamflow Gaging and Technical/Engineering Studies .....</b>	<b>69</b>
<b>Cedar Permanent Dead Storage Project Evaluation .....</b>	<b>70</b>
<b>Financial Overview .....</b>	<b>72</b>
<b>Anadromous Fish Committee Annual Report .....</b>	<b>73</b>
<b>Annual Compliance Report -- Instream Flow Agreement .....</b>	<b>83</b>

## EXECUTIVE SUMMARY

This first Annual Cedar River Habitat Conservation Plan (HCP) Accomplishments Report celebrates the completion of the first full year of implementing the most ambitious habitat restoration effort undertaken in the Puget Sound region to date. The signing of the HCP in April 2000 by the City of Seattle and State and Federal agencies marked the beginning of a 50-year effort to improve conditions for fish and wildlife in the Cedar River Municipal Watershed and areas downstream affected by river flows. It is with this report that we take stock of what has been accomplished, celebrate our successes, and examine where we can improve in future years. The breadth and complexity of the capital projects, research and monitoring efforts, and new operating protocols described in the pages that follow illustrate, collectively, the extensiveness of this ecosystem-based approach to habitat restoration, and land and river flow management. The City of Seattle is proud to present this first annual HCP Accomplishments Report.

When the signing of the HCP became imminent the City began to assemble the HCP implementation team. This interdisciplinary group of staff and managers from Seattle Public Utilities, Seattle City Light, and the Seattle City Attorney's Office includes scientists, engineers, planners, attorneys, project managers of other backgrounds, and resource managers. Many of these people were heavily involved during the development stage of the HCP; but in addition, 20 new people with the necessary backgrounds were recruited and hired in 2000/2001 to complete the Implementation Team. Since early in 2000, the HCP implementation team has continued and expanded upon an ethic of mutual respect and collaboration, and team members share a sense of ownership and commitment to the program's success.

While staff members were preparing to begin implementing projects, research and monitoring efforts, and operational activities during the program's first year, we needed to simultaneously create a number of management and support systems, and a considerable amount of planning has been needed in the startup phase of the HCP. The first order of business was to develop a budget within the City's internal biennial budgeting process for all of the new HCP projects and activities that would need to begin in the first "year" of implementation, defined in the HCP to include April-December of 2000 and all of 2001. Because the HCP includes specific commitments with respect to expenditures for a variety of activities and projects, we needed to develop a financial monitoring and reporting system that would accurately track expenditures of these HCP "cost commitment" dollars for this complex program. Efforts continue to refine the HCP financial monitoring system so that it is integrated with SPU's financial systems and provides an efficient tool for project managers to project and monitor costs.

Another area of focus was the establishment of the HCP oversight groups. The HCP sets forth a two-tiered structure for oversight of implementation. The federal and state agencies that are Parties to the HCP legal agreements, along with the City, represent the decision-making body for many HCP-related decisions, with the role of each agency specified in the applicable agreements. The City of Seattle, National Marine Fisheries Service, U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife, and Washington Department of Ecology each designated an individual within those agencies to serve as a Party representative. During HCP Year 1 this group of Party representatives has made a number of decisions, pursuant to their role as outlined in the HCP's legal agreements. The second tier of the HCP oversight structure is comprised of three committees that are responsible for advising the Parties on HCP matters or, in the case of the Instream Flow Commission, making certain decisions in accordance with the Instream Flow Agreement. The HCP Oversight Committee, the Instream Flow Commission and the Anadromous Fish Committee were all established during HCP Year 1. Government agencies and stakeholder groups were invited to recommend individuals to represent their agencies and organizations on these committees, as prescribed in the specific governing agreements. With input from the Parties, committee members were designated. Chartering sessions were conducted during which the groups clarified goals and established bylaws and procedures for conducting business. The Anadromous Fish Committee and the Instream Flow Commission have been conducting regular monthly meetings since chartering in 2000. More detailed descriptions of AFC and IFC Year 1 accomplishments are provided in

later sections of this report. The Oversight Committee conducted its chartering session in October 2001 and will conduct its first annual HCP review meeting in April 2002.

### **Year 1 Challenges**

In addition to the expected challenges of creating support systems, hiring staff and building an HCP team, other challenges were encountered in Year 1. One challenge was the permitting process for several projects that are part of the HCP. Questions were raised regarding how the permitting process for these projects needs to be conducted, given that these projects are part of an approved HCP and the basis for Incidental Take Permits granted to the City. During this first year of implementation, we have learned much regarding permitting requirements; these lessons will be useful as we proceed with implementation of additional HCP projects in the years ahead.

In addition to capital projects, HCP commitments include extensive research and monitoring activities. Some of these activities are clearly defined in the HCP, while the definition of other activities needs to occur through discussion by the technical committees and the Parties to the agreements. The process of defining research projects involves developing a collective understanding of the questions that need to be addressed, prioritizing these questions and developing an effective study methodology. This process can be quite time consuming and has slowed the initiation of research in some cases. Nevertheless, a methodical process helps to insure that the research results will be useful and applicable to the goals of the HCP.

The drought of 2001 put to the test the decision-making structure set forth in the Instream Flow Agreement. The Instream Flow Commission rose to the task and worked collaboratively to protect fish habitat while ensuring adequate water supply for consumers. (See the Program Element Summary for Implementation of the Cedar River Instream Flow Agreement and Workings of the Instream Flow Commission.)

The events of September 11 posed new security challenges for the managers of the City's water supply facilities and the Cedar River Watershed. Following the terrorist attacks, SPU immediately implemented steps to heighten security at all water facilities, from the watershed through the water distribution system. For a number of days following the attacks, SPU closed access to its watershed for all non-city personnel. In the weeks following the events of September 11, additional restrictions and procedures for gaining access to the city's municipal watershed and facilities were implemented. These procedures resulted in additional efforts and expenses to numerous contractors working within the watershed on HCP projects.

In general, the financial challenges facing public agencies throughout the state as a result of the recession and unplanned financial impacts related to the September 11 attacks, the Nisqually earthquake, and the drought also affected City programs, including the HCP. Position vacancies and hiring freezes, as well as intensive budget re-evaluations, made moving ahead on some HCP elements difficult.

### **HCP Projects and Activities**

While efforts were underway to set up the management systems to support HCP work, staff throughout SPU began implementing the specific projects, activities and operations that together constitute the HCP. The following sections provide an overview of Year 1 accomplishments in the three HCP Program Categories: Watershed Management, Landsburg Mitigation and Instream Flows. Later sections of the report provide more detailed information regarding these program accomplishments.

#### **Watershed Management**

HCP activity in the City's 90,500-acre municipal watershed is occurring in three primary areas: road improvements and decommissioning, stream and riparian restoration, and upland forest restoration. There is also a significant research and monitoring component that accompanies the stream/riparian and upland forest restoration work. Efforts were focused during HCP Year 1 on beginning development of plans that integrate the work of these three areas so that on-the-ground implementation is coordinated and prioritized according to the conservation objectives of the HCP. Early planning has included several

general components: (1) development of information about current habitat conditions in the watershed, as well as specification of desired future conditions, to support long term planning of restoration projects across the watershed landscape and to be able to monitor trends in habitat conditions over time; (2) development of an information framework for the data being collected; (3) development of short-term plans for restoration projects parallel to long-term planning efforts; and (4) development of a framework for monitoring to best use resources in evaluating how well we are meeting HCP conservation objectives.

For example, road decommissioning work needs to be planned both to provide benefits for streams (by reducing sediment loading from roads) and to ensure that planned restoration projects in a particular sub-basin are completed before access roads are removed. Because HCP funding was not designed to support intensive monitoring of every project and activity, it is also important to target monitoring dollars in the most appropriate manner and at the appropriate scale for evaluating the effectiveness of HCP restoration efforts, focusing, for example, where uncertainties are greatest and consequences are most important ecologically.

Most noteworthy about HCP Year 1 activity is the shift to managing watershed forests as an ecological reserve. In the past, commercial logging was conducted in the watershed – largely by private landowners and the U. S. Forest Service. With completion of several land exchanges and acquisitions in the 1990s, the City now owns 99.7% of the watershed. In the HCP, the City committed not to harvest timber for commercial purposes, focusing instead on restoring aquatic, riparian, and upland habitats damaged by past land management activities. Other Year 1 efforts in the watershed include progress on specific kinds of restoration work, such as removal of roads and thinning forests to accelerate development of old-growth conditions, and more general, overarching HCP commitments, such as the commitment to protect and restore biodiversity. Some examples are given below.

We made excellent progress on some restoration work, and focused more on planning for other activities. The HCP includes both road decommissioning and road improvements (for core roads that will be retained), both targeted largely at reducing sediment loading to streams from surface erosion and road failures (landslides). The HCP commits to decommissioning (removing) about 10 miles of forest roads per year for the first 20 years, but we decommissioned a total 14.5 miles of forest roads in 2000 and 2001. We also made major improvements on seven core road segments that will increase stability and reduce erosion. We began preparing a plan for road projects over the next several years, and we are developing a road inventory and an approach for prioritizing road projects over the longer term.

Stream and Riparian Restoration projects include projects to restore aquatic and riparian habitats in stream and wetlands systems. A major accomplishment was to replace two stream crossing structures that blocked passage of fish to upstream habitat with open-bottomed box culverts. At one of these locations, kokanee (a resident form of sockeye salmon, believed to be native to the Walsh Lake system) had moved beyond the new culvert and were utilizing newly accessible habitat less than half an hour after the barrier had been removed. We also upgraded one culvert that was undersized and had failed during storms in the past. Two experimental riparian restoration projects were completed, one in which we are trying several methods to get conifer seedlings to grow under hardwood trees near a stream and another in which we are testing methods to get conifer seedlings to grow on wood substrates in a previously logged wetland. Both projects are now being monitored. Year 1 activities for large woody debris placement, streambank revegetation, streambank stabilization, and riparian thinning focused on planning projects for 2002 and the development of a classification system for stream/riparian systems that will allow us to plan and prioritize projects in a manner related to the dynamics and functional characteristics of different kinds of systems.

Upland Forest Restoration includes restoration thinning (in forest generally under 30 years old), ecological thinning (in forest generally over 30 years old), and restoration planting. All three are focused largely on accelerating development of old-growth conditions and improving habitat for wildlife and biodiversity, with thinning focusing also on controlling the risk of catastrophic damage, as by a severe forest fire. The HCP commits to restoration thinning of 800 acres per year for the first 8 years, but we

thinned a total 1781 acres of young forest in 2000 and 2001. We also designed the first ecological thinning project for implementation in 2002, and began planning the first restoration planting project for 2002, which will use volunteers (see below). Long-term, landscape-level planning of upland restoration will require an updated database and evaluation of forest conditions; we began planning for that update and revising our habitat classification.

As mentioned above, the HCP includes a number of commitments that do not have associated “cost commitments,” such as commitments to prioritize projects, integrate and coordinate planning, use the best scientific information, establish interdisciplinary teams, develop and implement sound data management, engage in collaborative research to support the goals of the HCP, pursue forest certification, and protect, restore, and monitor natural biodiversity. We made progress on all of these fronts. For example, we launched a Biodiversity Initiative that is designed to provide a framework for acquiring, documenting, organizing and housing biodiversity data for the watershed in support of HCP goals. We also reviewed available forest certification processes, and intend to initiate an application for certification in 2002. Finally, we hosted an open house with regional researchers to explore opportunities for collaboration and implemented a volunteer program to involve the public in control of exotic plants and planting for habitat restoration. Much remains to be done in 2002 and beyond.

### ***Landsburg Mitigation***

Landsburg Mitigation efforts in HCP Year 1 were focused in the following four areas:

The Anadromous Fish Committee (AFC) was established in June, 2000 and has been conducting monthly meetings since that time. The Committee, which is charged with the responsibility of advising the Parties to the Landsburg Mitigation Agreement, has been integrally involved with the development of both the Landsburg Fish Passage and the Cedar Sockeye Hatchery projects, as well as with decision-making related to the Interim Mitigation Program for Chinook, Coho and Steelhead.

The Landsburg Fish Passage project was the first significant effort to be initiated following the signing of the HCP. Design began in May, 2000 and was almost at 100% completion at the end of 2001. The project design is a culmination of collaboration among City, federal and state agency engineers and biologists and incorporates an innovative “stepped weir” approach to achieving fish passage above the aqueduct crossing. Construction of the fish passage facilities is planned to begin in spring 2002.

Work on the Cedar River Sockeye Hatchery began with the hiring of the design consultant in May 2001. The remainder of the year was dedicated to the development of the “program” documents and conceptual design, which were near completion at the end of 2001. An environmental review process commenced in 2001, which included public scoping hearings in the fall. A draft EIS will be available for review in late summer, 2002. Construction on the hatchery is scheduled to begin in 2004 and be complete in 2005. Additional efforts related to the new hatchery include development of supplementation guidelines to direct the design and development of the hatchery and investigation of broodstock collection alternatives.

Research efforts in HCP Year 1 under the Landsburg Mitigation category included: collection of data on chinook to help better understand the biology and escapement of chinook in the Cedar River; fry marking and evaluation to monitor the performance of supplemental fry; fry trapping and counting to obtain estimates of sockeye fry originating from the hatchery and from the river; short term fry rearing study to determine if rearing of hatchery fry improves adult survival; Lake Washington plankton studies to better understand the carrying capacity of Lake Washington for juvenile sockeye; otolith marking to evaluate and modify fry release strategies; and phenotypic and genetic studies to characterize and monitor changes in phenotypic and molecular genetic traits in Lake Washington sockeye.

### ***Instream Flows***

Work under the Instream Flows category is described below:

Real-time Instream Flow Management proceeded under the new rules and guidelines established in the HCP Instream Flow Agreement (IFA). Careful tracking of real-time flows and rates of change of flow was conducted and reported in the first annual IFA Compliance Report. The City met all its commitments in this reporting period.

The Instream Flow Commission was established in July, 2000 and, since then, has participated in real-time stream flow management decisions according to the new flow regime set forth in the HCP. The Commission's ability to collaborate successfully was demonstrated during the fall 2000 – winter 2001 drought, when it was confronted with difficult decision-making associated with allocating supplemental instream flows in the fall, winter and spring. The decisions made resulted in successful refill of the reservoir while production of wild juvenile sockeye salmon was the largest since 1992.

In order to continue to gain a better understanding of the relationships between stream flow and habitat conditions, staff worked closely with the Instream Flow Commission to develop and prioritize a set of Supplemental Studies questions for research that will be conducted through HCP Year 8. The Supplemental Studies will provide the Commission and the City with new information that can be used to adapt instream flow management practices to better protect resources.

Seattle City Light is overseeing Improvements to the Cedar Falls Powerhouse and Masonry Dam to improve fish habitat once fish can access this reach after the construction of the Landsburg Fish Passage facilities. The tailrace barrier will prevent injury to adult salmon and steelhead by blocking access to the tailrace. Final design for this project has been completed and construction will occur in 2002. The Emergency Bypass project will allow the powerhouse to maintain and regulate flow in the event of a load rejection or load reduction, thus providing protection from stranding of fish and dewatering of redds. New equipment for this system was installed in 1999 and was operating in HCP Year 1. The design of the control system was completed in 2001 and is currently under construction. Finally, to provide a continuous minimum flow of 30 cfs in this reach, a new low-level valve in Masonry Dam was designed and construction will occur in 2002.

Smolt Passage Improvements at the Hiram Chittenden (Ballard) Locks are being planned to facilitate migration of juvenile salmonids past the locks. Four smolt passage flumes were installed during 2000 at the spillway dam to increase survival of outmigrating smolts to the Puget Sound. Recent monitoring indicates a majority of smolts are using the new flumes in favor of other more hazardous passageways through the locks. The City also participated (and continues to participate) in Freshwater Conservation Studies to investigate the feasibility of water efficiency improvements at the locks. Work in Year 1 included investigations of water use efficiency alternatives, analyses of approaches for water quantity and quality modeling, preliminary environmental and economic analyses of alternatives, and field research looking at salmon habitat use and upstream and downstream migration through the locks.

A New Stream Gage upstream of the Cedar Falls Powerhouse was installed to monitor flow once fish passage above Landsburg is achieved. Stream gage monitoring and maintenance in cooperation with USGS was conducted at a number of gages along the river in conformance with requirements set forth in the Instream Flow Agreement.

### ***Summary***

HCP Year 1 was a very busy one for the City, its agency partners, and the many stakeholders that are working to implement high quality projects, research, monitoring, and operational activities for the HCP Program. In many ways, Year 1 was a ramp-up year – a year to get projects and programs underway, to get our new operating protocols and prescriptions in place, and to get staff teams and oversight groups formed. However, Year 1 was also a high production year and there was significant progress on the HCP's program elements. The remainder of this report provides additional details on the program elements, including background, objectives and goals, financial and performance commitments, programmatic and financial progress and future anticipated actions.

## HCP PROGRAM ELEMENT SUMMARIES

### HCP Background

December 2001 marked the end of the first year of implementing the Cedar River Watershed HCP. The HCP, approved in April 2000, is a comprehensive, ecosystem based plan for the Cedar River Municipal Watershed and areas downstream affected by river flows. The HCP incorporates more than 10 years of scientific research and monitoring, and commits more than \$90 million over the next 50 years to improve conditions for fish and wildlife. The plan will substantially contribute to ensuring that our region has an ample supply of high-quality drinking water well into the 21st century by meeting the requirements of the Endangered Species Act with regard to 83 species of fish and wildlife addressed in the HCP. It addresses many long-standing issues between the City of Seattle and the State of Washington regarding the blockage to anadromous fish posed by the Landsburg Diversion Dam. It also represents the completion of a long-running effort with state and federal agencies to develop technically sound instream flows in the Cedar River to protect salmon.

Because the Cedar River Municipal Watershed contains the headwaters of the major river that discharges into Lake Washington, management of the watershed and the Cedar River's instream flows represent a very important regional opportunity to protect and restore both salmon and other species that are dependent upon late-successional and old-growth forests. The watershed is important not only as the region's primary water supply but also as the major source of downstream river flows necessary to maintain habitat for anadromous salmonids. In addition, the municipal watershed offers one of the few significant opportunities to reestablish a block of mature, late-successional, and old-growth forest below 3,000 ft in a manner that could effectively link this forest block to existing old-growth in other areas of the Cascade Mountains.

As part of the HCP, the City of Seattle has made a 50-year commitment to a wide variety of programs providing significant benefits to fish and wildlife found throughout the entire Cedar River system. These commitments are in three primary categories: **Watershed Management**, **Landsburg Mitigation**, and **Instream Flows**. The HCP includes conservation measures and research and monitoring efforts in all three categories. In developing the Cedar River Watershed HCP, the City understood that undertaking a comprehensive, 50-year habitat protection and restoration program could be successful only with significant commitments to fund and implement monitoring and research activities. This includes: (1) compliance monitoring to determine whether HCP programs and elements are implemented; (2) effectiveness monitoring to determine whether HCP programs and selected elements result in the anticipated changes in habitat or other conditions for the species of concern; and (3) cooperative research to obtain more information on species of concern, test critical assumptions in the plan, and gain understanding needed to refine management decisions to meet plan objectives.

The sections that follow provide a finer level of detail for each program element's first year accomplishments (Program Element Summaries). The Program Element Summaries are organized into the three HCP Categories (Watershed Management, Landsburg Mitigation and Instream Flows) and each section is preceded by an explanation of the HCP Program Category.

## **Watershed Management Background**

The Cedar River Municipal Watershed supports a variety of species that are at risk in the region, largely as a result of habitat degradation and loss. Within the watershed the northern spotted owl, marbled murrelet, bald eagle, and bull trout are found, as well as other terrestrial and aquatic species that are at risk regionally. When the fish ladders are constructed at the Landsburg Diversion Dam, native anadromous salmonids, such as chinook salmon and steelhead trout, will also have access to the watershed. The HCP's watershed management mitigation and conservation strategies are designed to protect and contribute to the restoration of the habitats of at-risk species, and to contribute to the restoration of ecological and physical processes and functions that create and maintain key habitats.

The proposed mitigation represents a landscape approach to watershed management that includes both a commitment not to harvest timber for commercial purposes within the municipal watershed, effectively creating an ecological reserve that includes all forest outside limited developed areas, and a significant commitment to habitat restoration. These measures were developed collectively to mitigate for impacts of past land management activities, and they were developed in an integrated fashion to foster natural biological diversity and to help restore much of the watershed to more natural conditions.

Following is a listing of the specific components of the City's commitments under Watershed Management:

- Eliminate timber harvest for commercial purposes, effectively creating a watershed ecological reserve that includes all forest outside the few developed areas and that will provide long-term, comprehensive protection of the watershed ecosystem
- Develop and implement a comprehensive program to restore fish and wildlife habitats in the watershed that have been degraded by past activities, such as logging and road construction
- Commit to removing approximately 38% of the forest roads within the watershed by the end of HCP year 20; use restoration thinning, planting, and similar approaches to restore the natural ecological functions and processes in watershed forests that create and maintain habitats for at-risk species
- Design and conduct projects to restore habitat in streams and streamside areas and to improve water quality over the long term
- Design and conduct comprehensive research and monitoring studies that will provide the information needed to improve our ability to achieve the conservation objectives of the HCP over the long term

The following pages provide summaries of the individual HCP PROGRAM ELEMENTS under the Watershed Management program category.

## Watershed Management Program Element Summaries

### **HCP Program Element: Cedar River Watershed Biodiversity Initiative (to support restoration and monitoring in aquatic, riparian, and upland habitats)**

#### **HCP Program Category: Watershed Management**

**Contact:** David Chapin, Biologist and Clay Antieau, Senior Watershed Planner, Watershed Management Division, Cedar River Watershed, Cedar Falls

#### **Objectives & Goals**

Protecting, restoring, and monitoring natural biodiversity are stated goals of the HCP. Thus, it is important to have a framework for acquiring, documenting, organizing, and housing biodiversity data during the course of the HCP and beyond. The Cedar River Watershed Biodiversity Initiative (CRWBI) is intended to provide this framework by: (1) defining biodiversity in the context of the HCP; (2) developing a biodiversity database for the Watershed; (3) conducting targeted field surveys and collecting biodiversity data; (4) interpreting biodiversity data within the Watershed's biogeographical context; and (5) facilitating biodiversity research in the region. This project is part of the Watershed Characterization project (see separate summary).

#### **Status of Work (2001)**

- ***Document information from past ecological and taxonomic studies in the watershed***

A considerable amount of research has been conducted in the Watershed over many decades, but this has not been compiled into an organized bibliography. As a first step to build upon this history of research in the watershed, Phillip Buffington, a graduate student in the UW Information School, worked as an intern during summer 2001 to compile such a bibliography. Mr. Buffington built a bibliography of over 300 references, from which we are extracting pertinent biodiversity data.

- ***Collaborate with UW Botany Department on collecting and cataloging vascular plants***

Five day-long collecting forays were conducted in the Watershed in coordination with the UW Botany Department. Volunteers collected more than 500 plant specimens from a wide variety of habitats throughout the Watershed. Data for these and future specimens will be incorporated into the Watershed's biodiversity database. Two new State-listed rare plants were found [many-flowered sedge (*Carex pluriflora*); russet sedge (*Carex saxatilis*)]. Two new State-listed noxious weeds were discovered [diffuse knapweed (*Centaurea diffusa*); yellow hawkweed (*Hieracium caespitosum*)].

- ***Begin studies on presence and distribution of cryptogamic plants and fungi***

Tammy Stout, a graduate student in the UW College of Forest Resources, surveyed mosses, liverworts, and lichens. She established 32 permanent plots, within which she identified 116 bryophyte and 49 lichen species and resolved distribution patterns. Voucher specimens were submitted to the UW Herbarium. Additional studies will expand upon these initial surveys.

- ***Begin studies on presence and distribution of invertebrates***

Dr. Rick Sugg began a survey of terrestrial invertebrates in the watershed. This work is initially focused on ground-dwelling invertebrates across the Watershed. Based on this broad survey, Dr. Sugg plans to seek external funding to continue invertebrate biodiversity studies.

#### **Looking Ahead (Planned 2002 Accomplishments)**

The HCP Biological Diversity Initiative will continue in 2002 with major tasks focused on biological inventory and defining Cedar River Watershed restoration efforts in the context of biodiversity.

#### **Financial Summary**

This is not an explicit HCP Cost Commitment, thus there is no financial summary for this activity.

**HCP Program Element: HCP Volunteer Involvement Program**  
**HCP Program Category: Watershed Management**

**Contact:** Clay Antieau, Senior Watershed Planner, Watershed Management Division, Cedar River Watershed, Cedar Falls

**Objectives & Goals**

Watershed staff support two volunteer programs: a docent program associated with the Watershed Education Center, its collections/displays, and its visitors; and a "Habitat Conservation Plan (HCP) Implementation" program focusing on projects in the Watershed. The Cedar River Watershed's HCP Volunteer Program uses volunteers and "conservation corps" to assist Watershed Management Division staff in implementing HCP elements in the Watershed. As with most citizen-involvement initiatives, Cedar River Watershed managers use this Volunteer Program to renew citizens' commitment to their own communities and resources while benefiting from that volunteer assistance. Thus, essentially all events in which volunteers participate are designed and managed to provide distinct educational, training, or development opportunities to those volunteers.

**Status of Work (2001)**

- ◆ The HCP Volunteer Program involved more than 300 different volunteers in the mission, management, and ecology of the Cedar River Watershed, and generated approximately 1955 hours (244 person-days) of volunteer effort.
- ◆ The HCP Volunteer Program partnered with 12 partners: Friends of the Cedar River Watershed, Pacific Crest Biodiversity Project, University of Washington, Southwestern College (Winfield, Kansas), Girl Scouts Totem Council; Bank of America, Puget Sound Energy, EarthCorps, Mountains-to-Sound, YMCA Earth Service Corps, King County Department of Natural Resources, and the King County Native Plant Salvage Program.
- ◆ Scot's broom (*Cytisus scoparius*), a noxious weed, was removed from most of the Rattlesnake Lake Recreation Area (RLRA) (within an area of approximately 8 acres), and two new State-listed noxious weed species were discovered in the Watershed [diffuse knapweed (*Centaurea diffusa*) and yellow hawkweed (*Hieracium caespitosum*)].
- ◆ Approximately 550 conifers and big-leaf maples (*Acer macrophyllum*) were planted in the RLRA where previous volunteer work parties had removed Scot's broom; approximately 500 conifers and shrubs were planted inside the Watershed (Halmar Gates and Roads 10/18 Junction).
- ◆ More than 500 herbarium collections were made of the plant diversity found in the Watershed; these collections were deposited into the permanent collections at the University of Washington Herbarium.
- ◆ Two new State-listed rare plants were found in the Watershed [many-flowered sedge (*Carex pluriflora*) and russet sedge (*Carex saxatilis*)].

**Looking Ahead (Planned 2002 Accomplishments)**

The HCP Volunteer Program will continue in 2002 with major tasks focused on biological inventory, noxious weed management, and revegetation.

**Financial Summary**

This is not an HCP Cost Commitment, thus there is no financial summary for this activity.

**HCP Program Element: Watershed Road Decommissioning**  
**HCP Program Category: Watershed Management**

**Contact:** Marti Spencer, Watershed Engineering Supervisor, Watershed Management Division

**Objectives and goals**

To reduce the road network to a long-term core road system of approximately 384 miles, the City will remove approximately 236 miles of roads (about 38 percent of the current total), and expects to average about 10 miles of roads per year for the first 20 years of the HCP. The primary purpose of road decommissioning is to minimize sediment delivery to streams and to improve drainage patterns. Decommissioning also will reestablish fish passage between significant amounts of habitat. The basic principles of road deconstruction are to restore the site to approximate pre-road functioning and stability, and involve restoring drainage, placing material in stable locations, and controlling surface erosion. Mineral soils and organic debris are removed from "perched" or otherwise unstable locations and placed either in the roadbed against the cutbank, or hauled to a suitable waste site where it will not be likely to fail and deliver sediment to streams. Culverts are removed. Stream crossings are restored, and stabilized with grade control to avoid eroding into the hillslope. Constructing frequent waterbars across the road surface restores cross-slope drainage. All disturbed soils are treated with an approved seed mix and protected with an application of straw or brush to reduce surface erosion. We have had a lot of success with self-seeding of trees, and have occasionally planted seedling trees on deconstructed roads. Some of the roads slated for deconstruction may pass inspection for long-term stability of material and drainage, and may not require any work before declaring them "decommissioned."

**Status of work**

This project is funded for years 1 through 20 of the HCP. In 2000, we decommissioned 1.6 miles of roads, and 12.9 miles in 2001, totaling 14.5 miles of deconstructed roads for HCP Year 1. These roads were mostly higher elevation, between 2,000 and 4,000 feet. We worked on roads in the 110, 390, 800, 70, 540 road systems.

**Looking Ahead (Planned 2002 Accomplishments)**

Because we decommissioned more than the 10-mile annual target for the HCP and exceeded the cost commitment for Year 1, we expect to decommission only about 7 miles of road in 2002. We plan to work in the 70, 120, 150, 540 and 560 road systems, decommissioning some nonessential and temporary roads. We will also be working on a collaborative research project with the University of Washington to develop a decision support system to help us to plan our future selection of roads for abandonment (and improvement) projects. This effort may also include design of a monitoring program to determine if we are achieving the HCP objectives related to sediment delivery to streams.

**Financial Summary**

The HCP Cost Commitment for Year 1 is \$275,000; \$450,279 was expended for labor, equipment, materials, and related expenses. We expect to decommission fewer miles of road in 2002.

**HCP Program Element: Watershed Road Improvements**  
**HCP Program Category: Watershed Management**

**Contact:** Marti Spencer, Watershed Engineering Supervisor, Watershed Management Division

**Objectives and goals**

The purpose of road improvements is to reduce sediment loading to streams and other water bodies over time. To minimize sediment delivery to streams and to improve drainage patterns, priority stream crossings will be upgraded, and ditches will be sized to control hillslope surface and groundwater flows and to protect the road from surface erosion. Cross-drains will be installed at frequent intervals to move hillslope surface and groundwater across the road in a pattern that approximates the drainage pattern upslope of the road, and unstable sidecast and fill material will be moved. A road may be stabilized by constructing a supported keyed fill or by reconstructing the cutslope. Road improvements include activities such as applying rock for stability, increasing frequency of cross-drains, stabilizing fills, removing unstable sidecast material and dismantling perched landings.

**Status of work**

This is an on-going project, funded for 50 years of the HCP. In 2001 we applied rock to the 100, 500, 540, 700, and 21 roads, which increases road structure and stability and reduces surface run-off. We installed cross-drain culverts on the 21 and 562 roads to improve cross-road drainage and reduce sediment delivery to streams.

**Looking Ahead (Planned 2002 Accomplishments)**

In 2002, we plan to make improvements to the 9 Road, the 60-211 system and the 70-815 system, depending on the limits of funding. We also plan to develop a design for improvements of the 200 Road adjacent to Chester Morse Lake. This is a complex project and will also require extra permitting, so construction is planned for 2004.

**Financial summary**

The HCP commits funding of \$1,925,000 for HCP years 1-5 (in 2001 dollars), with an average of \$385,00 per year. A total of \$287,195 was expended in years 2000 and 2001 (HCP year 1).

**HCP Program Element: Road Maintenance**  
**HCP Program Category: Watershed Management**

**Contact:** Marti Spencer, Watershed Engineering Supervisor, Watershed Management Division

**Objectives and Goals**

The primary objectives of road maintenance under the HCP are to minimize sediment delivery to streams, to improve drainage patterns that have been altered by roads, and to provide fish passage, following standards included in the HCP. These standards are designed to maintain a stable, functional road system that minimizes adverse impacts on stream and riparian habitat. The focus is on road segments that are near streams or have the potential to deliver sediment to streams. Other areas are now maintained with more precautions and added cost to protect draws and water crossings. Some roads may have tighter seasonal restrictions on regular maintenance activities, to avoid degradation that would occur if maintenance occurred during adverse weather conditions.

The funding level is based on estimates that approximately 20-30 percent of total road maintenance costs will be related to correcting and avoiding direct impacts on streams, and that road maintenance costs will decline as total road miles are reduced and road conditions are improved. The funding commitments are for increases in levels of maintenance over current levels, and cover maintenance activities specifically targeted at reducing sediment loading to streams. The road maintenance standards included in the HCP will be updated as new equipment, materials, and methods become available.

**Status of Work (2001)**

This is an on-going project funded through all 50 years of the HCP. In 2001 we accomplished maintenance on particular roads that have potential to impact aquatic habitat.

**Looking Ahead (Planned 2002 Accomplishments)**

We will continue road maintenance activities to protect and benefit habitat.

**Financial Summary**

The HCP commits funding of \$514,800 for HCP years 1-5 (in 2001 dollars), with an average of \$102,960 per year. A total of \$75,789 was expended in 2001.

**HCP Program Element: Large Woody Debris Placement**  
**HCP Program Category: Watershed Management**

**Contact:** Dave Beedle, Senior Watershed Hydrologist, Watershed Management Division, Cedar River Watershed, Cedar Falls

**Objectives and Goals**

The objective of this element is to temporarily enhance stream habitat by placing large woody debris in selected streams that lack wood as a result of past land management activities. The goal is to help restore ecological functions by enhancing in-channel structural characteristics. This will temporarily improve fish habitat until the adjacent riparian area begins to supply woody debris of appropriate size and quantity. A specific plan was developed for the Cedar River between Cedar Falls and Landsburg. This plan was developed to incorporate specific water supply infrastructure, water quality, and personnel safety concerns.

**Status of Work (2001)**

Year 2002 was largely devoted to planning projects. All the aquatic and riparian ecosystem elements (streambank stabilization, streambank revegetation, conifer under-planting, and riparian thinning) are closely related and must be integrated during design of any one specific aquatic or riparian element. The first step is to determine where aquatic restoration needs to occur and to prioritize locations.

A Stream-Riparian Classification and Inventory system was developed to identify project locations and prioritize locations, and field inventory work was begun to classify individual stream reaches in a manner that will allow prioritization over the landscape. The inventory work is still in progress. Until the inventory described in the Large Woody Debris Placement status report is complete, an Interdisciplinary Team will select project locations by areas with a high probability of success and low negative ecological consequences.

A single project was completed in 2001. Logs were added to the Halmar Gates wetland to provide substrate for conifer regeneration in a project that used EarthCorps volunteers to plant seedlings of several species of conifer into the added logs and existing stumps.

**Looking Ahead (Planned 2002 Accomplishments)**

The three (3) aquatic restoration projects (Streambank Stabilization, Streambank Revegetation and Large Woody Debris Replacement) will be combined at two locations to maximize the ecological benefit and minimize costs. The two planned areas for 2002 are Boulder Creek downstream of the 200 road and Rock Creek adjacent to the 16 road. The Boulder Creek project will reroute the creek back into a channel from which the creek was diverted as a result of several debris flows caused by road failures during the 1990 storm. The Rock Creek project is a road abandonment project through a wetland. Restoration activities will occur just upstream and downstream of the road prism. In addition, work on the Stream-Riparian Inventory will continue.

**Financial Summary**

The HCP commits funding of approximately \$110,000 for HCP years 1-8 (in 2001 dollars), with an average of \$13,750 per year. None of this amount was expended. Projects will be implemented in 2002.

**HCP Program Element: Streambank Stabilization**  
**HCP Program Category: Watershed Management**

**Contact:** Dave Beedle, Senior Watershed Hydrologist, Watershed Management Division, Cedar River Watershed, Cedar Falls

**Objectives and Goals**

The objective of this element is to minimize excessive rate of streambank erosion caused by forest roads and land management activities. The goal is to improve storm water quality and reduced magnitude and frequency of disturbance to fish habitat from sediment inputs and bedload movement.

**Status of Work (2001)**

Year 2002 was largely devoted to planning projects (see status report on Large Woody Debris Placement). Until the inventory described in the Large Woody Debris Placement status report is complete, an Interdisciplinary Team will select project locations by areas with a high probability of success and low negative ecological consequences.

**Looking Ahead (Planned 2002 Accomplishments)**

The three (3) aquatic restoration projects (Streambank Stabilization, Streambank Revegetation and Large Woody Debris Replacement) will be combined at two locations to maximize the ecological benefit and minimize costs. The two planned areas for 2002 are Boulder Creek downstream of the 200 road and Rock Creek adjacent to the 16 road. The Boulder Creek project will reroute the creek back into a channel from which the creek was diverted as a result of several debris flows caused by road failures during the 1990 storm. The Rock Creek project is a road abandonment project through a wetland. Restoration activities will occur just upstream and downstream of the road prism. In addition, work on the Stream-Riparian Inventory will continue.

**Financial Summary**

The HCP commits funding of approximately \$173,800 for HCP years 1-8 (in 2001 dollars), with an average of \$21,730 per year. None of this amount was expended. Projects will be implemented in 2002.

**HCP Program Element: Streambank Revegetation**  
**HCP Program Category: Watershed Management**

**Contact:** Dave Beedle, Senior Watershed Hydrologist, Watershed Management Division, Cedar River Watershed, Cedar Falls

**Objectives and Goals**

The objective of this element is to revegetate streambanks where past upstream or upslope activities have altered the riparian vegetation to the point where excessive streambank erosion is occurring and channel stability has been reduced. The goal is to help restore ecological functions by recovery of vegetation characteristics. This will improve storm water quality and reduced magnitude and frequency of disturbance to fish habitat from sediment inputs and bedload movement.

**Status of Work (2001)**

Year 2002 was largely devoted to planning projects (see status report on Large Woody Debris Placement). Until the inventory described in the Large Woody Debris Placement status report is complete, an Interdisciplinary Team will select project locations by areas with a high probability of success and low negative ecological consequences.

**Looking Ahead (Planned 2002 Accomplishments)**

The three (3) aquatic restoration projects (Streambank Stabilization, Streambank Revegetation and Large Woody Debris Replacement) will be combined at two locations to maximize the ecological benefit and minimize costs. The two planned areas for 2002 are Boulder Creek downstream of the 200 road and Rock Creek adjacent to the 16 road. The Boulder Creek project will reroute the creek back into a channel from which the creek was diverted as a result of several debris flows caused by road failures during the 1990 storm. The Rock Creek project is a road abandonment project through a wetland. Restoration activities will occur just upstream and downstream of the road prism. In addition, work on the Stream-Riparian Inventory will continue.

**Financial Summary**

The HCP commits funding of \$58,300 for HCP years 1-8 (in 2001 dollars), with an average of \$7,290 per year. None of this amount was expended. Projects will be implemented in 2002.

**HCP Program Element: Riparian Conifer Underplanting, Riparian Forest Development**  
**HCP Program Category: Watershed Management, Watershed Terrestrial Monitoring and Research**

**Contact:** Wendy Sammarco, Forest Ecologist, Watershed Management Division

**Objectives & Goals**

The objective of this element is to plant and reestablish conifers near streams and in forested areas around wetlands, ponds, and other nonforested aquatic habitats to help accelerate the restoration of diverse and structurally complex riparian stands within the watershed and to promote biodiversity and the restoration of the native conifers in areas that were disturbed by early timber harvest activities with resultant loss of conifers.

**Status of Work (2001)**

The Webster Creek conifer under-planting project was designed to investigate seedling survival in a variety of conditions, and ideally to increase the presence of conifer in this riparian forest. The replicated experimental design included two site preparation techniques: rototilling and brushing, brushing only, and a control (no site preparation). Ungulates, particularly elk, are well known to browse on young cedars and impede regeneration of conifers. The seedlings received three protective treatments to reduce browsing by ungulates: corrugated plastic tubes, plastic netting, and a control (no protection). The seedlings selected for the under-planting were Sitka spruce and western red cedar. The installation occurred in the first quarter of 2001. A total of 360 seedlings were planted. The project is being monitored for seedling survival and browse by ungulates (surveys of pellets, tracks and browse on shrubs as well as the planted seedlings). To date, only seven seedlings, all spruce, have been browsed, but no mortality has occurred as a result of the browsing. The upcoming winter months, when other types of forage are less abundant, will be key in determining the amount of browse damage that ungulates are likely to cause to the seedlings.

The Halmar Gates project was designed with reference to the observation that much conifer regeneration in western Washington occurs on wood. EarthCorps and other volunteers planted Sitka spruce and western red cedar in the Halmar Gates wetland in a pilot project to test the efficacy of planting conifers in wood. Logs from past blowdown events were placed in the previously logged wetland, then chain saws were used to create planting holes in the logs and in pre-existing stumps. Volunteers added soil to the holes and planted conifer seedlings. Potted, older, seedlings were planted on the railroad grades at the site. Seedling survival has been excellent to date.

**Looking Ahead (Planned 2002 Accomplishments)**

Data will be collected and analyzed that will allow us to assess the efficacy of the planting methods, seedling survival, and the long-term potential for any of the tested techniques in both projects. Staff will continue monitoring deer and elk foraging in the Webster Creek area to see what damage they might be doing to planted seedlings and to what extent the protective tubes can reduce impacts, if they occur. (See summary on ungulate monitoring for this project.)

**Financial Summary**

The HCP commits funding of \$55,000 for HCP years 1-8 (in 2001 dollars), with an average of \$6,880 per year. A total of \$6,880 was expended in years 2000 and 2001. There is no cost commitment for riparian project monitoring in HCP year 1.

**HCP Program Element: Riparian Restoration Thinning**  
**HCP Program Category: Watershed Management**

**Contacts:** Wendy Sammarco, Forest Ecologist, and Stan Pasin, Watershed Resource Specialist  
Watershed Management Division

**Objectives & Goals**

The objective of this element is to conduct restoration thinning (forest under 30 years old) and ecological thinning (forest over 30 years old) within the previously disturbed riparian zones of streams, open water bodies, and wetlands to accelerate the growth and structural development of trees, providing greater protection for streams and eventually developing forest structure, composition, and diversity characteristics of the natural, mature riparian conifer forest originally on the site. Thinning is focused on stands with high tree density. Thinning involves cutting trees to a desired spacing to promote more rapid tree growth (by reducing competition), improve current habitat (by allowing more light penetration and facilitating animal movement), and accelerate the development of conditions characteristic of older forests. Thinning is designed to move an area of forest more rapidly through the period of intense competition among trees – during which the primary mortality factor is competition for light, nutrients, and water – and into the stage of forest development in which disturbances, such as wind and disease, are the primary sources of mortality and dominate forest development.

**Status of Work (2001)**

Year 1 was largely devoted to planning and developing an approach to thinning in riparian areas that is consistent with the new state Forest Practices rules designed to protect fish habitat. Staff consulted with Washington Department of Natural Resources and outside experts to develop the approach, and developed provisions for contracts needed to do the work. Initial focus will be on young stand in which restoration thinning would be appropriate and beneficial. Candidate stands were located for thinning in the near term.

**Looking Ahead (Planned 2002 Accomplishments)**

The riparian thinning program will be designed with the upland restoration program in 2002, and only young stands (less than 30 years old) will be thinned. Washington Department of Natural Resources has agreed to standards for thinning in riparian areas under the Forest and Fish rules.

**Financial Summary**

The HCP commits funding of \$49,500 for HCP years 1-8 (in 2001 dollars), with an average of \$6,190 per year. None of this amount was expended.

**HCP Program Element: Stream Crossings for Peak Flows**  
**HCP Program Category: Watershed Management**

**Contact:** Marti Spencer, Watershed Engineering Supervisor, Watershed Management Division

**Objectives and Goals**

Stream crossing projects are designed to improve drainage patterns that have been altered by roads, minimizing sediment delivery to streams and achieving channel stability at that particular site. There are approximately 1,300 stream crossing structures on non-fish-bearing streams in the Cedar River Watershed. Many need to be upgraded with regard to size or alignment, except where the road including the culverts is deconstructed. A few will need more expensive repairs. The first repairs will be directed at crossings that are known to have problems, as prioritized by an interdisciplinary team.

**Status of Work (2001)**

This is an on-going project funded through all 50 years of the HCP. The first year HCP activities include replacing the 60 Road - Middle Fork Taylor Creek crossing. This was a culvert crossing that failed because it was undersized. It was replaced by a pipe-arch, or "squashed culvert" (that is larger horizontally than vertically). The replacement pipe was sized by the Watershed Hydrologist and installed to work with the stream dynamics in the forest environment. Note that the two crossings described under "Stream Crossings for Fish Passage" will also solve problems with peak flow events, and will thus contribute to reducing sediment loading to the affected streams over time

**Looking Ahead (Planned 2002 Accomplishments)**

Projects planned for 2002 are replacements of failed wood puncheon culverts on the 500-600 Road and the 530-3 culvert, which is also a failing wood puncheon culvert. The Watershed Hydrologist is sizing the replacement culverts.

**Financial Summary**

The HCP commits funding of \$137,500 for HCP years 1-8 (in 2001 dollars), with an average of \$17,190 per year. A total of \$17,190 was expended in 2001. As described above, the two crossings constructed for fish passage also provide benefits regarding handling peak flows.

**HCP Program Element: Stream Crossings for Fish Passage**  
**HCP Program Category: Watershed Management**

**Contact:** Marti Spencer, Watershed Engineering Supervisor, Watershed Management Division

**Objectives and Goals**

Stream Crossing improvements are designed to reestablish fish passage in locations where road crossings interrupt connectivity between significant habitat areas for resident or anadromous fish. Restoration of access to habitat by upgrading, replacing and removing inadequate culverts on fish-bearing streams can be one of the most cost-effective strategies for fish habitat restoration. Removing artificial migration barriers can also restore biological connections between upstream and downstream reaches that are an important part of natural stream functions. Restored fish access can also result in increased fish production as a result of increased availability of habitat for rearing and spawning. A total of approximately 20 culverts in the municipal watershed have been identified as potentially non-fish-passable. The actual number of fish barrier culverts is likely different, because of limits to sampling methodology or because the culverts are potentially located above natural fish barriers.

**Status of Work (2001)**

This is an ongoing program that is funded for 50 years of the HCP. In 2001, we replaced two fish-blocking culvert installations with new crossings that restored fish passage. Both crossings are open-bottom pre-cast concrete box culverts, with restored stream bed downstream and upstream and through the crossings. The locations are Shotgun Creek - 200 Road and Webster Creek - 10 Road. During construction, the streams are diverted around the construction zone through a bypass culvert, to protect the water from construction-generated sediment. Within 30 minutes of removing the bypass culvert for Webster Creek, kokanee were using the restored stream habitat. Within 5 days, a few kokanee moved 1,500 feet into the newly accessible habitat. We will be waiting until spring 2002 to evaluate fish presence upstream of the construction location in Shotgun Creek. Note that these two crossings also will solve problems with peak flow events, and will contribute to reducing sediment loading to the affected streams over time (see summary on Stream Crossings for Peak Flows).

**Looking Ahead (Planned 2002 Accomplishments)**

In 2002, we plan to pave the approaches to the two 2001 projects, which will finish them. We also plan to have a consultant complete design for four new crossings. This will provide project designs for construction in 2003 or later. Two of the locations are on Carey Creek - 19 Road, one is on Webster Creek - 20 Road, and one is on Bear Creek tributary - 600 Road.

**Financial Summary**

The HCP commits funding of \$1,056,000 for HCP years 1-8 (in 2001 dollars), with an average of \$132,000 per year. A total of \$400,007 was expended in 2001. Note that the crossings constructed in 2001 were at the extreme high end of cost and sophistication for such structures, requiring a construction contract. Most crossings will cost much less and can be installed by watershed staff. As noted above, these two crossings will provide benefits regarding the passage of peak flows, so serve a dual purpose.

**HCP Program Element: Upland Restoration Thinning**  
**HCP Program Category: Watershed Management**

**Contacts:** Wendy Sammarco, Forest Ecologist and Stan Pasin, Watershed Resource Specialist, Watershed Management Division

**Objectives & Goals**

The restoration thinning program focuses on watershed forests that are typically less than about 30 years old. These stands are the direct result of commercial harvest that occurred within the watershed during the past three decades. They often have a very high density of trees that results in intense competition for light, water, and nutrients, and some are referred to as “dog-hair stands” because of this density. The objective of this element is to use thinning to move the stands more quickly out of this competitive stage, to accelerate development of late-successional and old-growth forest conditions, to develop habitat structure that supports a diversity of native wildlife, and to reduce the chance of catastrophic damage to the forest. Restoration thinning involves cutting trees to a desired spacing to promote more rapid tree growth (by reducing competition and mortality from competition), improve current habitat (by allowing more light penetration and facilitating animal movement), and accelerate the development of conditions characteristic of older forests. The forest is moved more rapidly into the stage of forest development in which disturbances, such as wind and disease, are the primary mortality sources.

**Status of Work (2001)**

Because the relative value of restoration thinning diminishes as a stand ages, efforts in HCP year 1 were on thinning a number of areas of very high tree density. Some of these stands included relatively large trees in spots, and the thinners selectively left these trees. In addition, an Interdisciplinary Team that included wildlife ecologists developed specific provisions for the thinning contracts to protect elements of diversity in stands, such as western red cedars and hardwoods. Many stands needing thinning had already been identified and mapped prior to implementation of the HCP. Mapping continued in HCP year 1, as staff collected more data to characterize young stands and identify unique and potentially sensitive habitats that may occur within or near potential restoration thinning units. Staff designed restoration thinning unit locations and boundaries through a landscape analysis approach, so that units included young forest of different ages. In all, 499 acres were thinned in 2000 and 1,282 acres in 2001 (total 1,781 acres), well in excess of the 807-acre target for HCP year 1. Planning was also initiated for areas to be thinned in 2002.

**Looking Ahead (Planned 2002 Accomplishments)**

Approximately 1,100 acres will be thinned in 2002. Some surveying at watershed boundaries will be done to ensure the activities will be on City land. The Interdisciplinary Team will continue consultation, initiated in 2001, with experts on forest restoration to develop the most effective approaches to accomplish the HCP objectives. Computer growth models will also be used to investigate different approaches.

**Financial Summary**

The HCP commits funding of \$1,775,400 for HCP years 1-8 (in 2001 dollars), with an average of \$221,930 per year. A total of \$266,449 was expended in years 2000 and 2001. Expenditures (and acres thinned) will be decreased in 2002.

**HCP Program Element: Upland Ecological Thinning**  
**HCP Program Category: Watershed Management**

**Contact:** Wendy Sammarco, Forest Ecologist, Watershed Management Division

**Objectives & Goals**

Ecological thinning uses a variety of silvicultural techniques, including variable density thinning, to manipulate forest that is greater than 30 years old to improve current habitat conditions, accelerate forest development of old-growth conditions, and reduce the risk of catastrophic event, such as a severe forest fire. Major objectives of ecological thinning are to restore natural forest processes and biological diversity. Thinning is focused on stands with relatively high tree density little structural diversity. Thinning involves cutting trees to create variable spacing, promote the development of large trees and trees of variable height and diameter, structural characteristics of older forest. The HCP provides that trees can be removed from the site and sold in cases where the biological objectives of an ecological thinning project can be met.

**Status of Work (2001)**

The Demo Thin site was selected in 2001 as an ecological thinning site because it possesses minimal biological and structural diversity and has potential for using silviculture to achieve HCP objectives. The planned thinning manipulation on this site is designed to encourage development of the habitat structure and heterogeneity typical of late-successional and old-growth stands by: (1) creating variable spacing among trees, a diversity of tree diameters, and several canopy layers, (2) creating small forest openings to recruit desired plant species and to stimulate growth of large trees and understory shrubs and trees, (3) increasing light levels to “release” intermediate-sized trees, and (4) favoring desired species and damaged trees. The biological objectives can be met with removal of logs from the site, and these logs will be sold.

A team of forest ecologists, wildlife biologists, and a hydrologist surveyed the 249-acre site and selected areas in which to avoid thinning (“skips”), which included wetlands and surrounding areas, root rot centers (a source of snags and logs), areas with large “residual” trees or hardwoods, and other areas exhibiting biological diversity that will be maintained. Biologists identified wildlife species that might use the site, as well as elements that might be manipulated to affect future use. Variable density thinning will be used within the 143-acre area on the site to be treated. A thinning prescription was prepared; site boundaries were marked; and individual trees were marked for cutting. A cruise was performed for the financial appraisal. A city ordinance and a contract will be needed to sell logs from the site, and staff initiated preparation of ordinance and contract documents.

**Looking Ahead (Planned 2002 Accomplishments)**

Staff expect to get ordinance approval, make contractual arrangements, and begin implementation of the Demo Thin project in 2002. Staff will also complete a long-term plan for the Demo Thin site, which will include other potential interventions (such as planting) and the need for follow-up monitoring and adaptive management. A monitoring program for the project will be designed and implemented in 2002. An interdisciplinary team will also begin identifying other potential ecological thinning areas within the Cedar River Watershed, and will begin field investigation and design of the next ecological thinning project.

**Financial Summary**

The HCP commits funding of \$275,000 for HCP years 1-8 (in 2001 dollars), with an average of \$34,380 per year. A total of \$34,380 was expended in 2001 for the design, layout, and preparation of the Demo Thin project and preliminary work on the next potential ecological thinning project.

**HCP Program Element: Upland Restoration Planting**  
**HCP Program Category: Watershed Management**

**Contact:** Wendy Sammarco, Forest Ecologist, Watershed Management Division

**Objectives & Goals**

Restoration planting is intended to benefit the Cedar River Watershed in the following ways: (1) diversify the plant community by developing a diversity of trees and shrubs characteristic of naturally regenerated stands on similar sites and that will support a diversity of native wildlife species, and (2) enhance hardwood development by recruiting species such as big leaf maple and black cottonwood to diversify stand structure at lower elevations. Planting may include trees, shrubs, and forbs, or such cryptoflora as lichens and mosses. Projects will be monitored, and techniques will be changed in response to better understanding of how desired effects can be achieved.

**Status of Work (2001)**

Planning stages of upland planting, which included the following: identifying areas that potentially could benefit from plantings, utilizing volunteers for smaller projects.

**Looking Ahead (Planned 2002 Accomplishments)**

In 2002, we will conduct a thorough analysis of young stands in the upper watershed that appear to have poor seedling survival and low seedling numbers, and will look for other areas in which restoration planting may be appropriate. We plan to use volunteer groups for targeted restoration planting projects and data collection. Restoration planting projects will likely be integrated with other HCP projects, such as thinning and stream and riparian restoration projects.

**Financial Summary**

The HCP commits funding of \$82,500 for HCP years 1-8 (in 2001 dollars), with an average of \$10,310 per year. None of this amount was expended.

**HCP Program Element: Common Loon Monitoring**  
**HCP Program Category: Watershed Management**

**Contact:** Dwayne Paige, Senior Watershed Ecologist, Watershed Management Division

**Objectives and Goals**

Document the reproductive success of common loons nesting within the Cedar River Watershed, especially those utilizing habitat in the Chester Morse Lake/Masonry Pool complex, and provide alternative nest sites through the deployment of artificial nest platforms at appropriate selected location(s) and under appropriate environmental circumstances.

**Status of Work (2001)**

Although common loons use many lakes in Washington as foraging and resting habitat, often tolerating high levels of human activity, only 10-12 of these lakes are currently known to have supported active nesting in any given year or on a regular basis at any time during the last decade. Nesting habitat and structures are potentially available in willow-dominated zones of the Cedar and Rex River deltas and in specific small areas of Masonry Pool. This nesting habitat, however, is currently subject to springtime water level fluctuations over the course of the nesting season (April through mid-June) of up to 10 ft or more under the present reservoir operating regime.

Relatively little is known about the historic presence or reproductive success of common loons within the Cedar River Watershed prior to the last 20-25 years. Despite the lack of information before that period, a general knowledge does exist of (1) the historic uses of the watershed, (2) the major habitat changes through time, and (3) the degree of protection that has been afforded Chester Morse Lake over the last 100 years. We can reasonably assume that loons have nested on the shores of the Chester Morse Lake reservoir for many decades, and probably on the original natural lake (Cedar Lake) for hundreds of years. In the period of the mid-1970s to late-1980s, loons were frequently sighted on Chester Morse Lake, and young chicks were observed by City staff on the Masonry Pool at least once in each of the years 1979, 1982, and 1988.

In order to reduce adverse effects of reservoir fluctuations on nesting loons, since 1990 the City has been conducting an experimental nest platform program in which artificial floating platforms with native vegetation are deployed at the beginning of the loon nesting season, or when reservoir water levels allow, to provide more stable nest sites. Although the platforms are not sufficient to counteract the effects of reservoir fluctuations of more than about 5-8 ft, such as occur during a prolonged, early season drought, this program has demonstrated some success. Platforms have been used by nesting loons in at least one, and typically two, of the three nesting territories on the reservoir complex in each of the 12 project years during the period 1990-2001; a platform has been used in 11 consecutive years in one territory; and a platform has been used in 9 of 12 years in a second territory. Of 29 nests on the reservoir during the period 1990-2001, 21 (72 percent) have been on platforms. Of the 31 chicks produced during this period, 7 chicks hatched on natural nests and 25 chicks (81 percent) hatched on the platform nests.

Monitoring during two common loon nesting seasons (2000 and 2001) since implementation of the HCP has extended the long-term data record of loon reproduction on the Chester Morse Lake/Masonry Pool complex with somewhat atypical results. In 2000, two of the three pairs in the system nested on experimental platforms, the third pair did not nest. One platform nest produced two chicks. The other platform nest was lost early to a predator or scavenger, but the re-nesting effort of this pair on a natural nest site produced a single chick. Although disappointing, observations during 2001 documented the first year within the last decade in which no loon chicks were produced in the watershed. This result was significant in that, although nesting conditions in the watershed (e.g., lake levels) were apparently normal, none of the three pairs nested successfully. The only nesting attempt was on a platform nest that was lost to a predator or scavenger early in the nesting period as in the previous year; however, no re-nest was

established in this case. The lack of common loon reproductive success documented in the Cedar River Watershed was not inconsistent with overall results throughout western Washington, which may suggest a regional, rather than local environmental influence on nesting success during 2001.

The importance of the Cedar River Watershed as habitat for common loons takes on added significance when considered in a regional or statewide context, as the three pairs of common loons that typically nest in the municipal watershed have constituted more than one-quarter of the loons nesting in Washington State in many recent years. The production of fledglings from the watershed has, in many years, constituted an even larger fraction of the fledged loons produced in the state, likely as a result of the degree of security within the watershed compared to the high levels of human disturbance to nesting loons on lakes open to the public. As population growth and development pressure from the Seattle/Tacoma metropolitan area continue to diminish the quantity of loon habitat (through housing development around lake and reservoir shorelines) and the quality of habitat (through increasing recreational boat use of lakes and reservoirs, and through sediment input), the availability of undisturbed habitat in the municipal watershed will play an increasingly critical role in maintaining the viability of populations of common loons that nest in the Puget Trough and the western Washington Cascades.

#### **Looking Ahead (Planned 2002 Accomplishments)**

Staff will continue to monitor common loon reproductive activity and will deploy experimental nest platforms (as long as monitoring continues to document the efficacy of the program) during 2002 on the Chester Morse Lake/Masonry Pool complex.

#### **Financial Summary**

The HCP commits funding of \$25,000 for HCP years 1-10 (in 2001 dollars), with an average of \$2,750 per year. A total of \$2,750 was expended in years 2000 and 2001.

**HCP Program Elements:** Bull Trout Spawning Surveys  
Bull Trout Fry/Juvenile Surveys  
Bull Trout Stream Distribution Surveys  
Bull Trout Surveys (adult/weir)

**HCP Program Category:** Watershed Management

**Contact:** Dwayne Paige, Senior Watershed Ecologist, Watershed Management Division

### **Objectives and Goals**

Document the overall distribution of bull trout spawning habitat within the CRW (CRW) and monitor long-term trends in the annual level of spawning activity in “core” spawning habitat as an index of the status of the adfluvial bull trout population in the Chester Morse Lake drainage basin.

Document the basic behavior patterns of bull trout fry (e.g., emergence/outmigration timing), evaluate spring “fry counts” as a potential index of the adfluvial bull trout population and habitat use, and determine the distribution of juvenile rearing habitat within the CRW.

Document the overall extent and distribution of major stream and tributary habitat used by bull trout (all life history stages/forms) within the CRW in order to facilitate development of the most effective management prescriptions for protection and/or enhancement of bull trout habitat under conservation and mitigation strategies of the HCP.

### **Status of Work (2001)**

Numbers of bull trout redds located during recent years have varied widely as a result of natural bull trout behavior, stream flow conditions (i.e., high flows), and staff time available to conduct surveys. During the 2000 season, however, relatively low river flow conditions were ideal for conducting spawning surveys, and additional HCP staff was available to conduct more intensive surveys. A conservative total of 236 redds were observed within the Chester Morse Lake drainage basin, which was more than double the previous high count of 111 redds. In the 2001 season, staff again observed a conservative total of 236 redds within the Chester Morse Lake drainage basin. Based on information from other studies, the number of bull trout redds observed in two consecutive seasons appear to fall well within the range of numbers of redds that would be predicted for a viable, adfluvial bull trout population of this size. Spawning activity was also observed in some side-channel reaches where spawning activity had not previously been documented. Also, the spawning season in 2001 extended into mid-January, approximately four weeks longer than previously documented.

Two experimental techniques have been used to investigate the seasonal timing of bull trout fry behavior and production in the Chester Morse Lake drainage basin. In the early 1990s, fyke nets were deployed at selected locations on the mainstem Cedar and Rex rivers to determine seasonal timing of fry movement and outmigration in mainstem reaches, indicating peak movement levels from mid- to late April. During 2000 and 2001, periodic surveys (direct observation) of bull trout fry have also been conducted in selected mainstem and side-channel reaches of the Cedar and Rex rivers, as well as in selected tributary streams (e.g., Boulder, Cabin, Eagle Ridge, and Morse creeks) to document habitat use and general fry behavior, and to identify general trends in the relative number of bull trout fry present in the tributaries of Chester Morse Lake from year to year. This technique is experimental at present and will be evaluated for possible use as an index to monitor annual bull trout fry production under the HCP. The presence of fry was also observed in some side-channel reaches where rearing activity had not previously been documented. Observations of fry in some reaches also indicated earlier dates of emergence and movement in streams than previously documented in this system.

The Chester Morse Lake bull trout population was conservatively estimated to be approximately 3,100 fish, and general distribution within the lake was documented in 1995 (R2 Resource Consultants, 2001).

The full extent of the distribution of bull trout in tributary streams is currently incomplete. The presence of bull trout has, however, been documented in the mainstem of the Cedar River upstream from Chester Morse Lake, 0.7 mile into the North Fork to a natural barrier (falls) and also 0.7 mile into the South Fork to a partial seasonal barrier. In contrast to the rainbow trout distribution within the lake basin, bull trout (or redds) have only been observed in three of the smaller tributaries to the reservoir complex (i.e., Rack Creek, Shotgun Creek, and Damburat Creek (single observation)). Bull trout have not yet been found in certain major tributaries of the Cedar River including Bear Creek, which is accessible and rainbow trout are present. Within the Rex River system, bull trout have been observed upstream in the mainstem as far as the confluence of Lindsay Creek, in Boulder Creek and Cabin Creek (spawning/rearing), and in Morse Creek and Lindsay Creek (rearing only). New observations during 2000-01 (see above) increased the known distribution of spawning and rearing habitat, but limited surveys in a few selected reaches did not extend the overall known range of bull trout within the watershed.

A fish weir project was initially proposed as one potential method to obtain physical and behavioral data on the adfluvial bull trout spawning population accessing habitat in the major tributaries of Chester Morse Lake (Cedar and Rex rivers), as well as to efficiently support (e.g., fish capture) other HCP monitoring and research projects, such as lake and stream telemetry and redd inundation studies. At least two factors have recently come to light, that in combination, make it advisable to at least temporarily delay and reevaluate the ecological risks (and logistics) associated with this project. First, observations in some bull trout populations (and other salmonids) have indicated that weirs and/or the capture process may adversely affect aspects of natural bull trout spawning behavior (e.g., upstream and/or downstream position of spawning). The potential of interference from a weir may be of particular concern in a system, such as this one, where the actual effect of spring inundation (a result of reservoir fill regimes) of bull trout redds remains a question, and relative location of redds within the accessible reaches may be of potential significance to annual reproductive success. Secondly, bull trout redd counts in these systems over the last decade have been highly variable, as influenced by diverse environmental survey conditions (e.g., peak stream flow events) and differing levels of survey effort, as well as the natural variability of bull trout spawning behavior in these dynamic systems. Without longer term spawning survey data, it is difficult to identify natural variability between spawning years and the patterns of spawning within particular streams that would allow staff to effectively evaluate potential risk to spawning populations resulting from a weir. In short, the City believes that construction of one or more weirs should be put on hold until risks and options have been evaluated. The City will continue to evaluate risk factors associated with the implementation of this project (weir) in consultation with the USFWS and work to identify possible alternative means and methods by which to address the monitoring and research commitments in the HCP initially associated with this project.

### **Looking Ahead (Planned 2002 Accomplishments)**

Staff will continue to conduct surveys under each of these three bull trout monitoring projects during 2002-03 with the intent of extending documentation of the overall range of bull trout in the watershed, increasing knowledge relative to timing of bull trout life history stages and behavior, and adding to current information on bull trout habitat use. As mentioned above, the City will also work with the USFWS to determine the best approach to monitoring bull trout population change over time, as was the intent of the weir proposal described above.

## **Financial Summary**

	<b>Year 1 Cost Commitment</b>	<b>Year 1 Expenditures</b>	<b>Work accomplished</b>
Bull Trout Spawning Surveys	\$38,500	\$38,500	Surveys done in 2000 and 2001
Bull Trout Fry/Juvenile Surveys	\$38,500	\$6,816	Partial surveys done in 2000 and 2001 only to test methods
Bull Trout Stream Distribution Surveys <sup>1</sup>	\$13,200	\$1,562	Only incidental observations in year 1, but surveys will be done in 2002.
Bull Trout Surveys (adult, weir)	\$55,000	\$151	Discussion with USFWS regarding appropriate methods and timing

1 The HCP commitments is for five surveys within HCP years 1-20.

## **HCP Program Elements: Watershed Characterization:**

**Assessment of Expanded Forest Stand Attributes**

**Assessment of Expanded Forest Attributes**

**Augmentation of Forest Habitat Inventory**

**Long-term Forest Habitat Inventory**

**Old-growth Classification**

**Field Verification**

**Forest Habitat Modeling**

**Species-Habitat Modeling**

## **HCP Program Category: Watershed Management**

**Contact:** Duncan Munro, Remote Sensing Specialist; Wendy Sammarco, Forest Ecologist; and Dwayne Paige, Senior Watershed Ecologist; Watershed Management Division

## **Objectives & Goals**

The purpose of the watershed characterization project is to provide information to support the following three major uses of that information under the HCP regarding management of the Cedar River Municipal Watershed (CRW): (1) plan and prioritize habitat restoration projects to meet HCP goals and objectives, (2) track changes in habitats over time, and (3) evaluate alternative approaches for different kinds of restoration projects. This project encompasses the specific HCP commitments listed above, as well as the more general commitments to plan and prioritize restoration activities on a landscape scale. Because the inventory data and remote sensing data are out of date, the funding for the above-listed activities is being combined for a comprehensive approach to providing up-to-date, useful information for planning and monitoring. The project will be closely integrated with a project to develop an Information Framework and a project to develop an overall approach to monitoring and research.

## **Status of Work (2001)**

In HCP Year 1, an interdisciplinary team identified the following major components of the Watershed Characterization project and made the progress described for each:

- Updated, appropriate classification of watershed habitats: Developed a classification for stream and riparian habitats to support planning and prioritizing restoration projects, initiating a field inventory, and began a review and revision of the existing upland forest habitat classification
- Evaluation of the condition of watershed habitats relative to original, potential, or desired conditions: Began defining data needed for characterizing current conditions, and an assessment of available information
- Integration of a field inventory with remote sensing data (from aerial photos, satellites, and other sensors on fixed-wing aircraft) to provide the most useful, cost-effective characterization of watershed habitats: Assigned to an interdisciplinary team. Also see last component below
- Design and development of a statistically valid field inventory, including permanent sampling plots, and collection and analysis of inventory data: Initiated planning for a forest inventory, identifying three levels of sampling (widely spaced permanent plots to detect forest habitat change, other more closely spaced plots, and project monitoring plots); developed lists of attributes to be sampled (including not only characteristics of trees and forest structure but also attributes related to such poorly understood groups of organisms as mosses, lichens, and insects); and established a GIS grid for permanent sample plots in forest
- Selection, acquisition, and analysis of remote sensing data sets: Identified and performed a preliminary evaluation of several remote sensing data sets, including LIDAR (using light), MASTER

(multispectral), and RADAR , and acquired the MASTER data for analysis. LIDAR is expensive, but has the potential to provide good information on forest structure, pertinent to planning forest restoration and tracking forest change, and may be pursued in a collaborative arrangement.

- Characterization of biodiversity in the watershed: See summary of biodiversity.

In addition, staff initiated development of an “interim landscape plan,” which includes the planning of restoration activities on a landscape scale and selecting appropriate restoration projects in the 2-5 year time frame, while a long-term plan is developed with data being collected and analyzed in the Watershed Characterization project.

**Looking Ahead (Planned 2002 Accomplishments)**

In 2002, we will continue to work on developing the most cost-effective and useful approach to the inventory; integrating inventories of aquatic, riparian, and upland habitats; and integrating field sampling information with remote sensing data for greatest usefulness and most cost-effective use of the funding available. We will continue to pursue collaborative efforts and external grant funding to “leverage” the funding in the HCP.

Primary activities in 2002 will include:

- Complete the “interim landscape plan” for restoration projects in the 2-5 year time frame, and continue working on the long-term, landscape-level plan
- Establish a formal Interdisciplinary (ID) Team to plan and oversee the project
- Establish permanent field sample plots and begin collecting data
- Design and partially complete a road inventory to support prioritization of road decommissioning and improvement work
- Continues to evaluate LIDAR (forest structure) and other remote sensing data sets, and analyze MASTER data acquired in 2001
- Continue to evaluate appropriate forest growth models and species/habitat relationship models (see summary on Species/Habitat Modeling)
- Continue developing habitat classifications for aquatic, riparian, and upland habitats, and continue related field inventories.

**Financial Summary**

	<b>Year 1 Cost Commitment</b>	<b>Year 1 Expenditures</b>	<b>Work accomplished</b>
<b>Assessment of expanded forest stand attributes <sup>1</sup></b>	\$11,000	\$0	Preliminary planning
<b>Assessment of expanded forest attributes <sup>1</sup></b>	\$11,000	\$0	Preliminary planning
<b>Augmentation of Forest Habitat Inventory <sup>1</sup></b>	\$16,500	\$2,000	Identified additional attributes
<b>Long-term Forest Habitat Inventory <sup>2</sup></b>	\$4,125	\$4,000	Development of a framework for a forest inventory (consultant), aerial photos

	<b>Year 1 Cost Commitment</b>	<b>Year 1 Expenditures</b>	<b>Work accomplished</b>
<b>Old-growth Classification</b>	\$0	\$0	Starts in Year 3
<b>Field verification of habitat classification</b> <sup>1</sup>	\$12,375	\$12,375	Evaluation of existing classification, development of a draft riparian/aquatic classification, initiation of field verification
<b>Forest Habitat Modeling</b> <sup>3</sup>	\$10,310	\$1,966	Preliminary planning, updating of forest modeling software (consultant)
<b>Species/Habitat Modeling</b> <sup>1</sup>	\$22,000	\$7,491	See separate summary

1 The HCP commitments are funded to be accomplished within HCP years 1-5

2 Design within HCP years 1-5

3 The HCP commitments are funded to be accomplished within HCP years 1-8

**HCP Component/Project Title: Species/Habitat Relationship Modeling (contributes to Upland Forest Ecological Thinning, Restoration Thinning, and Restoration Planting,)**

**Contact:** Bill Richards, Terrestrial Ecologist; Dwayne Paige, Senior Watershed Ecologist; Watershed Management Division

**Primary Objective (initial phase)**

Utilize Habitat/Dispersal Simulation Modeling as a tool to identify and aid prioritization of specific areas within the landscape of the Cedar River Municipal Watershed (CRW) where forest restoration projects will be most effective in promoting mid- to late-seral forest connectivity as guided by the conservation strategies of the HCP.

**Status of Work (2001)**

This project is part of the Watershed Characterization project (see separate summary). In order to provide potential habitat benefits for populations of 28 wildlife species dependent on late-seral forest conditions, one of the goals of the HCP is to facilitate the restoration of late-seral forest characteristics by thinning relatively young and dense second-growth forest. The HCP commits to planning forest restoration on a landscape scale, prioritizing projects for the most potential benefit. This modeling application attempts to identify where ecological and restoration thinning projects will most benefit the connectivity of mid- to late-seral forest habitat.

This project is being conducted in two phases: 1) habitat modeling, and 2) dispersal simulations. The habitat-modeling phase combines the best available landscape data to define current forest habitat conditions with forest growth models (e.g., SPS, FVS) to predict forest conditions at the end of the 50-year HCP. Ecological and restoration thinnings in potential stands will be simulated under current habitat conditions and “grown” 50 years to produce an array of alternative landscape conditions. The dispersal simulation phase utilizes a spatially explicit model (PATCH) designed to simulate populations of territorial, terrestrial vertebrate species. Comparing dispersal success and dispersal patterns of late-seral dependent wildlife species between alternative landscape conditions will identify forest areas, that when thinned, will most benefit forested habitat connectivity. During 2001, we conducted preliminary evaluations of some available models, and preliminary evaluations of data needed for these models.

**Looking Ahead (Planned 2002 Accomplishments)**

Staff will continue to investigate the availability and effectiveness of current technology pertinent to development and/or utilization of species/habitat modeling capability to support landscape level decisions for habitat protection and management under the Conservation and Mitigation Strategies in the HCP during 2002.

**Financial Summary**

The HCP commits funding of \$110,000 for HCP years 1-5 (in 2001 dollars), with an average of \$22,000 per year. A total of \$7,491 was expended in years 2000 and 2001. (Also described in the summary on Watershed Characterization.)

**HCP Program Element: HCP Information Resource Management (includes GIS Data Compatibility)**

**HCP Program Category: Watershed Management**

**Contact:** Tom Van Buren, IT Professional, Watershed Management Division

**Objectives & Goals**

Developing and maintaining a well-organized and efficient system of accurate databases, integrated and compatible with the GIS, is essential to support many HCP commitments within the Cedar River Municipal Watershed (CRW). In addition, as indicated in this section, most of the program elements are interdependent and rely on data and analyses from several tasks in order to be fully functional and effective as management tools. Therefore, it is critical that all databases are designed, maintained, and updated by a procedure that will ensure accuracy and integration of information, including the acquisition and incorporation of pertinent information from outside sources.

The objective of this program is to provide a systematic and efficient means by which data collection formats, incorporation of data in databases, database management, and integration with modeling efforts can be designed and maintained to maximize the system's ability to support HCP-related management activities. In addition, databases should be updated with the most current and best available information whenever possible from both departmental and appropriate external sources. Data management systems are being developed for various kinds of users, from technical specialists to the public.

**Status of Work (2001)**

- Internet map service installed for staff.
- Geodatabase prototype built, hardware and software installed.
- Research and development of extensible markup language (XML) vocabularies for data acquisition documents and metadata.
- Research and development of web services and universal description, discovery and integration standards.
- Development of a GIS grid of locations for permanent and additional inventory sample plots for upper and lower CRW.
- Acquisition of hyperspectral remotely sensed imagery (i.e., with many frequency bands) in collaboration with NASA and UW.
- Review of information requirements for HCP that can be met by remotely sensed data.

**Looking Ahead (Planned 2002 Accomplishments)**

- Finalize information framework standards and protocols
  - + Develop data dictionaries
  - + Develop metadata standards
  - + Develop logical data models
- Develop Web services
  - + Share information resources
  - + Adopt web services standards
  - + Complete Watershed Characterization Project (see summary)
  - + Define and implement a methodology to create a baseline of the current extent and condition of SPU watersheds

## **Financial Summary**

The HCP commits specific funding of \$55,000 for HCP years 1-8 (in 2001 dollars), with an average of \$6,880 per year. The full \$6,880 was expended in Year 1. In addition, the HCP includes a variety of commitments that have no explicit HCP Cost Commitments but that create a need for linking information management to planning and documenting restoration, monitoring, and research activities.

## Landsburg Mitigation Background

The anadromous fish conservation strategies are designed to mitigate for the blockage to fish passage created by the Landsburg Diversion Dam. These strategies are designed to complement other regional efforts to protect and restore declining stocks in the Lake Washington Basin. The intent is to implement biologically sound solutions that (1) contribute to the recovery and persistence of healthy, harvestable runs of anadromous fish in the Cedar River and Lake Washington Basin; (2) have a high likelihood of success; and (3) maintain a safe, high quality drinking water supply.

Anadromous salmonids have not entered the protected watershed in nearly a century. The HCP will provide passage for all native anadromous salmonids into the protected watershed, significant regionally as refuge habitat in that it is highly protected and in relatively good condition. Included among these native salmonids are chinook and coho salmon, and steelhead trout. The sockeye salmon stock in the Cedar River was introduced from the North Cascades. Because of risks to public health, the City cannot allow passage above the raw water intake of the mass-spawning sockeye salmon. In lieu of passage, the City commits to artificial propagation for sockeye, with extensive monitoring and appropriate adaptive management provisions to reduce or eliminate risks to wild fish. In addition, the City commits to funding habitat protection and/or restoration for anadromous fish in the Cedar River Basin downstream of Landsburg.

Specifically, the City has committed to the following activities:

- Provide funding to protect and restore habitats and populations of anadromous fish currently blocked from entry into the municipal watershed by the Landsburg Diversion Dam
- Construct fish ladders, protective screens on the water intake, and other improvements for the safe passage of chinook, coho, steelhead, and other native fish species over the Landsburg Diversion Dam, providing access to some of the most protected “refuge” habitat in the region
- Prior to construction of fish passage facilities, commit to interim mitigation for chinook, coho and steelhead, which could involve conducting key studies or emergency supplementation, if justified.
- Construct a new sockeye hatchery capable of producing up to 34 million fry, replacing the existing interim hatchery facility at Landsburg
- Continue to operate the interim sockeye hatchery at Landsburg as mitigation until the replacement hatchery is built
- Provide funding for habitat protection and restoration downstream of the Landsburg Diversion Dam for all anadromous fish species
- Develop and implement a comprehensive program of research, monitoring, and adaptive management for salmon and steelhead
- Create the Cedar River Anadromous Fish Committee, comprised of agencies signatory to the Landsburg Mitigation Agreement and other stakeholders, which will advise the City regarding implementation of anadromous fish mitigation

The following pages provide summaries of the individual HCP PROGRAM ELEMENTS under the Landsburg Mitigation program category.

## Landsburg Mitigation Program Element Summaries

### **HCP Program Element: Interim Mitigation for Coho, Chinook and Steelhead** **HCP Program Category: Landsburg Mitigation**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section

#### **Objectives and Goals**

Guidance for the Interim Mitigation Program for Coho, Chinook and Steelhead is found in the Cedar River HCP and the Landsburg Mitigation Agreement. The HCP states:

*Prior to the construction of fish passage, the City will implement interim restoration measures for steelhead, coho, and chinook based on the following primary objectives: (1) gather biological information that is critical in designing and managing effective, biologically sound short- and long-term conservation measures; and (2) if appropriate, design and implement broodstock augmentation programs to help preserve one or more of the populations. Appropriateness of augmentation measures will be determined jointly by agreement of the Parties to the Landsburg Mitigation Agreement (Appendix 28), which includes the USFWS and NMFS, with advice from the Cedar River Anadromous Fish Committee. The City will commit up to \$90,000 per year until all fish passage facilities have been constructed to implement either one or a combination of the following two interim mitigation measures, as agreed upon by the Parties:*

- *Conduct studies of life history, genetics, or demographics of the populations to support the development of the most appropriate measures to protect and rehabilitate the runs over the long-term; and*
- *Develop and implement an emergency artificial propagation program to help preserve one or more of the runs and prevent extinction, loss of genetic diversity, or loss of adaptive capacity associated with extremely small population size.*

The Landsburg Mitigation Agreement states:

*The interim mitigation funds shall be used, with agreement of all Parties, to accomplish the following: i) fund the implementation of life history, genetic, demographic and/or ecological studies to fill critical information gaps; ii) implement emergency supplemental production programs designed to help sustain and rebuild the populations in a manner that helps ensure their long-term reproductive fitness, and capacity to adapt to changing environmental conditions; and/or iii) other measures deemed appropriate by the Parties to achieve the objectives of the LMA. If the Parties fail to agree on the form of interim mitigation within two years of initiating discussion of the issue, then the City shall spend the funds for fish habitat acquisition, restoration, or enhancement within the Lake Washington Basin.*

#### **Status of Work (2001)**

- ***Establish procedures and initiate discussion period***

While general direction for the program is provided in the HCP and the LMA, the Parties must approve specific actions. The AFC provides advice to the Parties. The AFC invited the co-managers to submit proposals under this program and have developed written guidance for the content and submittal times of proposals. The role of the AFC and the Parties is not to determine if certain actions associated with chinook, coho and steelhead should occur, only if HCP funding should be used to support proposed actions.

The LMA allows the Parties to have two years to discuss the form of interim mitigation. If this requirement is not met, the LMA contains the default action of funding habitat acquisition, restoration or enhancement within the Lake Washington Basin.

The Parties agreed to certain additional guidelines for this program in early 2001, including how the two-year decision-making period would be initiated. The Parties agreed to begin the

discussion period on March 29, 2001. The AFC has 18 months to make recommendations. The Parties have the option of changing procedures or deadlines for this program.

- ***Initiate recovery actions***

During HCP year 1, the Parties approved one proposal submitted by the co-managers, WDFW and the Muckleshoot Tribe. Interim mitigation funding was used to collect additional chinook data from the Cedar River chinook to help to better understand the biology and escapement of chinook in the Cedar River. Funding this work allowed more frequent surveys and better information to be collected than in previous years.

There is concern about the decline of steelhead in the Cedar River and discussions of steelhead recovery options were initiated in 2001.

### **Looking Ahead (Planned 2002 Accomplishments)**

Discussion between the co-managers and the AFC continues in 2002 to define appropriate actions under this program. Under procedures approved by the Parties, the AFC will present the Parties with a report in the fall containing a status report and recommendations. The AFC will also be considering new proposals for work to begin in 2002.

### **Financial Summary**

Expenditures for Year 1 amounted to 19% of the commitment funding level. This was due to several factors. The formal discussion period for the form of interim mitigation began at the end of March 2001, about one year after the HCP was signed. The process for selection of appropriate interim measures relies on the development of proposals. The AFC opted to encourage proposal development from the co-managers and the AFC has been responsive to the proposals that have been submitted to date. However, guidelines for supplementation existing in the HCP need to be addressed and this has been a factor in the discussion of some of the proposed actions.

The AFC re-evaluated the process for the development of proposals at the March 2002 meeting. The committee acknowledged creating proposals that met supplementation guidelines was difficult but reaffirmed their commitment to the interim mitigation process. The AFC also recognized that recent proposals were perhaps narrowly focused on supplementation while other avenues for interim mitigation measures needed exploration. To help facilitate the proposal process, members held a planning session that identified a number of potential projects under four categories: planning, colonization, research and supplementation. Projects under these categories will be prioritized at subsequent AFC meetings. Please see the financial section of this report for further details.

**HCP Program Element: Landsburg Fish Passage**  
**HCP Program Category: Landsburg Mitigation**

**Contact:** Bill Wells, Project Manager, Operations Branch; Bruce Bachen, Senior Fish Biologist, Water Management Section; Paul Faulds, Planning and Development Specialist, Water Management Section

**Goals and Objectives**

The goal of the fish passage project is to provide safe passage for coho, chinook and steelhead moving both upstream and downstream at Landsburg Dam and the aqueduct crossing. This project will allow these species to have access to 17 miles of mainstem and tributary habitat that has been inaccessible since the dam was built at Landsburg in about 1900.

**Status of Work (2001)**

• ***Development of facility designs***

The fish passage project includes the development of two upstream passage facilities, a new intake screen for the municipal supply intake at the diversion dam and a new control gate in the dam for safer downstream passage. Sorting facilities are built into the fish ladder at Landsburg Dam to allow sockeye to be separated from other species.

A great deal of work has been involved in the development and review of alternative concepts. Participation in the development, evaluation and selection of the preferred alternative has been broad based. The AFC was consulted monthly and several consultations with fish passage experts from NMFS, WDFW and USFWS were also held. Primary considerations in the design included minimizing delay of passage, minimizing risk of harm to fish, maximizing the proportion of fish that ascend the passage facilities and minimizing impacts to riparian areas. In addition to hiring a very experienced design firm, the project has also benefited from the involvement of the general contractor during the design process, in part to insure that designs and schedules could be implemented with minimal delay during the construction period. Design was nearly 100% complete at the end of Year 1.

• ***Permitting***

Applications were made for permits from the appropriate regulatory agencies. This included the Army Corps of Engineers, the Washington Department of Fish and Wildlife, King County DDES and the Washington State Department of Ecology. Mitigation plans have been developed to offset the impacts of construction activity.

**Looking Ahead (Planned 2002 Accomplishments)**

All permits are expected by May 1 and construction is expected to begin in June. Construction is scheduled through the remainder of 2002 and is expected to be completed in 2003. Beginning in 2002, salmon are expected to be able to move above the aqueduct crossing, but will not be able to pass the dam until 2003.

**Financial Summary**

Year 1 cost commitment for this project is \$551,100. Actual cost commitment expenditure during HCP Year 1 was \$1,095,900; this funded design and permitting activities during 2000 and 2001. The overall costs for this project will exceed the commitment amount. The project is on track to meet the performance commitment of having construction completed by the end of HCP Year 3.

**HCP Program Element: Interim Sockeye Mitigation (Salmon Hatchery Program)**  
**HCP Program Category: Landsburg Mitigation**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section

**Objectives and Goals**

The Washington Department of Fish and Wildlife (WDFW) operates a sockeye broodstock collection facility and hatchery on the Cedar River through an agreement with Seattle Public Utilities. The interim hatchery program first began operations in 1991 and the broodstock collection facility has been in operation since 1993. The interim hatchery will be in operation until 2005, at which time a new facility is expected to start operation. The hatchery program involves the incubation and release of unfed sockeye fry into the Cedar River so they can outmigrate and rear naturally in Lake Washington. To maintain this program broodstock are collected at a weir and fish trap located at river mile 6.5. The broodstock are transported to an adult holding facility at Landsburg and spawned when ripe. Fertilized eggs are then incubated at the hatchery and the resulting emergent fry are released into the river.

**Status of Work (2001)**

This year's relatively strong return of sockeye and chinook to the Cedar River provided weir operators an opportunity to thoroughly test the operation's goals; to achieve the 2001 broodstock collection target of 17.2 million eggs and minimize the potential impacts of facility operations to returning adult chinook salmon. To avoid delaying chinook from migrating up river WDFW routinely opened the weir for twelve hour periods. This practice allowed many chinook (and sockeye) to move up river without significant delay and spawn as far up as the aqueduct crossing at Landsburg. The weir was removed in the middle of November due to high flows and the presence of a chinook redd within 25 meters of the weir. Hatchery fry releases began in February 2001 and the last release occurred at the end of March 2002. The final egg take was close to 13 million with approximately 12.5 million fry released into the river.

**Looking Ahead (Planned 2002 Accomplishments)**

This work will continue annually.

**Financial Summary**

The Year 1 cost commitment was \$140,000. Expenditures totaled \$149,000, which is 106% of the commitment.

**HCP Program Element: Cedar River Sockeye Hatchery, Design and Construction**  
**HCP Program Category: Landsburg Mitigation**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section; Cyndy Holtz, Acting HCP Program Manager, Resource Planning Division; Bill Wells, Engineer, Operations Branch

**Objectives and Goals**

Mitigate for the effects of the blockage created by Landsburg Dam on sockeye in the Cedar River by:

- Planning, designing, permitting and constructing a replacement sockeye facility capable of producing 34 million sockeye fry per year.
- Development of the operating protocols, the adaptive management plan, the capacity analysis and design for consideration by the Parties to the Landsburg Mitigation Agreement in HCP Year 3.
- Implementation of a comprehensive public involvement and environmental review process for this project prior to HCP Year 3.

**Status of Work (2001)**

*Other HCP activities are closely associated with the development of program documents and plans for the replacement hatchery, including Broodstock Collection Solutions, Supplementation Guidelines and the results of the sockeye monitoring and evaluation activities. Please see separate reports for further detail about these related activities.*

- ***Selection of a Design Consultant***

Seattle Public Utilities initiated the selection process for a design consultant for the project in 2000 and interviews were held with responsive firms in January 2001. The prospective consultants were asked to develop teams that would be qualified to successfully complete a broad range of tasks associated with the implementation of the project, including development of program documents (operating protocols, capacity analysis and adaptive management plan), engineering and design of the facilities, environmental review and permitting.

The firm of TetraTech/KCM was selected as the consultant for the project, in part because of the depth of biological and hatchery expertise that they could provide. In particular, the team includes considerable academic and practical experience with hatcheries and the issues that surround them. Some on the team have been publicly critical of historic hatchery practices while others have been involved in highly successful sockeye projects in Alaska.

- ***Design and Program Development***

Beginning in June 2001, the design team has worked to develop the programming documents and conceptual design. The team has taken the report developed by the Science Panel and applied the concepts where possible to recommended procedures and designs. Using the experience of others, where possible, the adaptive management plan attempts to define the critical areas of uncertainty associated with the project, discuss how monitoring and evaluation could address these questions and provide a mechanism for the incorporation of scientific results into management decisions that would guide the project. The documents were nearing completion by the end of 2001.

Design for the hatchery was developed after establishment of biocriteria. The biocriteria establish specific operating parameters that the design must accommodate. One example is the need to better match incubation temperatures in the hatchery with the thermal regime that eggs would experience in the river. For most of the incubation cycle, the temperature of the spring water source exceeds the river and this causes accelerated development of the eggs in incubators. This leads to early outmigration, which is thought to adversely affect survival. Using the river temperature regime, the biocriteria establishes temperature parameters that the design must meet to make this improvement.

The most challenging areas of the design lie with water supply development and with broodstock collection. Work in these areas was ongoing at the end of 2001. The hatchery building, water conditioning facilities, broodstock holding and spawning facilities and housing have reached the early design level by the end of 2001.

- ***Environmental Review***

The City of Seattle began an environmental review process in 2001. Public scoping opportunity was provided in the fall of 2001 through two public meetings and the option to provide written comment. Notices of the initiation of the process were sent to those indicating interest in the project during the HCP EA/EIS and through newspaper advertisements.

- ***Oversight and outreach***

The Anadromous Fish Committee (AFC) receives monthly reports on the progress of the project; this enables the AFC to provide direction or comment on the project. In addition, several meetings were held with representatives of the co-managers, WDFW and the Muckleshoot Indian Tribe, to discuss aspects of the project. Status reports were given to the WRIA 8 Technical Committee and the Cedar River Council in 2001. Development of text for an informational web site was done in 2001.

### **Looking Ahead (Planned 2002 Accomplishments)**

The draft EIS for the project is expected to be available to the public by fall 2002. A public workshop and public hearing will be held to discuss benefits and concerns about the impacts of the project. Design will continue with emphasis on further work on the water supply and broodstock collection facilities. Refinement of the program documents will be accomplished through solicitation of feedback from the AFC, Science Panel, co-managers and others. The HCP does not specify who will operate the hatchery and resolution of this question is a goal for 2002.

### **Financial Summary**

For HCP Year 1, 76% of the commitment amount allocated to Year 1 was expended. This amount does not reflect significant expenditures by SPU for staff involved in this project. The overall costs of the project are expected to exceed the overall commitment amount. See financial section of this report for details.

**HCP Program Element: Cedar River Sockeye Hatchery Supplementation Guidelines**  
**HCP Program Category: Landsburg Mitigation**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section

**Objectives and Goals**

Develop guidelines to direct the design, construction, operation and monitoring phases of the sockeye fry production program.

**Status of Work (2001)**

- *Completion of guidelines*

A panel of respected scientists was assembled to develop guidelines for the Cedar River sockeye hatchery. The Science Panel included Dr. Ernie Brannon (chair), Dr. Dave Beauchamp, Dr. Don Campton, Dr. Conrad Mahnken and Dr. Jim Winton. All are active specialists in areas relevant to hatchery operations and issues and work for federal agencies or universities. The panel worked for over a year, holding regular meetings to discuss issues and approaches for the sockeye hatchery. The final report was completed in May 2001. Their work offers support for the hatchery by providing detailed scientific guidance for the further development of the project.

- *Incorporation into the hatchery program development and design*

A meeting was held with stakeholders, agency representatives, Science Panelists and the TetraTech/KCM design team to allow the presentation of interests of those who have interests in the project and to allow the Science Panel to present their findings. This was a highly successful event that provided a transition from the work of the Science Panel to the design phase of the hatchery project.

**Looking Ahead (Planned 2002 Accomplishments)**

While the guidelines have been completed and memorialized in a report, the Science Panel has been asked to provide periodic feedback to the design and program development work by the TetraTech/KCM design team that has been underway since June 2001. At least one meeting is scheduled to allow discussion between the Science Panel and the TetraTech/ KCM design team.

**Financial Summary**

For HCP Year 1, 32% of the first year commitment was spent for supplementation guidelines. See financial section of this report for details. All panel members generously volunteered their time spent participating in the development of the guidelines. The costs of printing the final report were never charged to the City of Seattle. Some panelists contributed travel expenses. Consequently expenditures for this project were substantially less than anticipated.

## **HCP Program Element: Cedar River Sockeye Hatchery Broodstock Collection Solutions and Monitoring**

### **HCP Program Category: Landsburg Mitigation**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section

### **Objectives and Goals**

Evaluate alternative broodstock collection methods and sites as options that would allow the hatchery to meet its egg take goals while minimizing adverse impacts on chinook and other salmonids.

### **Status of Work (2001)**

- ***Evaluation of current broodstock collection facility and recommend improvements***

Northwest Hydraulic Consultants was hired to evaluate the temporary fence and trap structure operated at River Mile 6.5 each year between September and November. A set of objectives was developed and an assessment was done to determine how well the present design met the objectives. Recommendations were developed that would allow the present facility to better reach the goals. A final report was issued.

- ***Evaluation of alternative broodstock capture methods and facilities and recommendations***

Chinook Engineering, Inc. was hired to gather information from agencies from Alaska to Oregon about fish capture methods and facilities. The range of options is described in their final report along with a preferred alternative. Potential sites for a broodstock collection facility were described. The report assesses how the various methods meet design goals. A final report has been completed.

- ***Evaluation of beach and purse seining as methods for broodstock capture***

Two forms of active netting were tested this year as alternative capture methods. Beach seining was attempted in the lower Cedar River, but densities were too low to allow this technique to work effectively. Purse seining in Lake Washington was attempted during the third week of October with poor results. The sockeye run abruptly diminished this year and may have affected the evaluation of this gear. Plans have been made to try again next year beginning at an earlier time.

- ***Evaluation of sonar to count sockeye migrating up the Cedar River***

A pilot project was initiated to test the efficacy of using sonar to count fish moving up the Cedar River. The test proved that sonar could be used to enumerate salmon. This would be important information so broodstock can be collected in proportion to the run as it develops.

### **Looking Ahead (Planned 2002 Accomplishments)**

We plan to continue to develop information that would be useful in identifying the best options for broodstock collection facilities and sites. Site surveys and additional testing is anticipated.

### **Financial Summary**

For HCP Year 1, 92% of the first year commitment was spent for broodstock collection solutions. See financial section of this report for details.

**HCP Program Element: Drinking Water Quality Monitoring, Fish Passage Evaluation**  
**HCP Program Category: Landsburg Mitigation**

**Contact:** Rich Donner, Senior Water Quality Engineer, Resource Planning Division

**Objectives and Goals**

The study will provide a basis for evaluating the effects of fish passage on the ecosystem above Landsburg Dam as fish passage is restored. There are two main components: (1) collect baseline nutrient data from water samples, fish and riparian biota for two years and, (2) conduct simulation experiments with small artificial channels to evaluate impact of fish carcasses on stream water quality.

This project does not involve the monitoring of drinking water quality, despite what the title implies. However, it will provide data useful in evaluating the possible role of fish passage in any subsequent drinking water quality problems related to the Cedar source. For example, correlation between the problem and nutrient level changes above Landsburg could be evaluated.

The project is a joint effort of SPU and the National Marine Fisheries Service under a memorandum of agreement.

**Status of Work (2000-2001)**

The majority of the baseline samples were collected and analyzed. Staff from NMFS performed the sampling and related field work, and SPU's Water Quality Laboratory analyzed the water samples. Habitat surveys and population estimates of resident fish were done in the Cedar River and tributaries above Landsburg.

Artificial channel experiments were delayed by a year due to difficulty in locating an appropriate site. These channels will allow the controlled introduction and tracking of nutrients.

**Looking Ahead (Planned 2002 Accomplishments)**

Baseline sampling will be completed in early 2002, and the artificial channel experiments will begin. This field work will also be performed by NMFS.

**Financial Summary**

The Year 1 (2000 and 2001) commitment for this work was \$77,000. Expenditures during Year 1 totaled \$54,260, of which \$23,250 counted toward the commitment. Remaining unspent commitment is \$53,750.

**HCP Program Element: Sockeye Fry Marking and Evaluation**  
**HCP Program Category: Sockeye Research and Monitoring**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section

**Objectives and Goals**

All sockeye fry produced at the hatchery are marked to enable identification in later evaluations. This work is being done to monitor the performance of supplemental fry and their behavior after release and to support the collection of general life history information on Lake Washington sockeye salmon.

**Status of Work (2001)**

- *Marks applied to the 2001 brood year sockeye*

WDFW was contracted to develop, apply and verify marking protocols for the 2001 brood year sockeye. The marking plan incorporated the need to identify 8 separate groups of fish that were part of an evaluation of short-term rearing as well as at least one production mark. This work has been completed for the 2001 brood year. Samples are collected and will be processed for confirmation of the marks.

**Looking Ahead (Planned 2002 Accomplishments)**

This work will continue annually with specific marking plans developed to meet research priorities.

**Financial Summary**

Expenditures for this activity in HCP Year 1 amounted to 91% of the commitment level. Please see financial section of this report for details.

**HCP Program Element: Sockeye Fry Trapping and Counting**  
**HCP Program Category: Sockeye Monitoring and Research**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section

**Objectives and Goals**

Support the operation of fry trapping operations near the mouth of the Cedar River to allow the development of estimates of sockeye fry originating from the hatchery and from the river. Upriver hatchery releases are evaluated to estimate the number that reaches the trapping site.

**Status of Work (2001)**

• ***Support for trapping project in 2001-2002***

Funding was provided to WDFW through a two-year agreement to support fry trapping operations on the Cedar River. This agreement provides the full HCP funding commitment for the period. HCP funding is combined with support from other sources to fully fund the activities and analyses associated with the project. A trap is maintained and operated from January to July each year resulting in estimates of the outmigrant salmonids from the river. This is the only estimate of natural fry production available.

**Looking Ahead (Planned 2002 Accomplishments)**

This work will continue in 2002. A report for 2001 is expected this year that provides estimates of hatchery and natural origin sockeye.

**Financial Summary**

Expenditures in Year 1 for this project amounted to 33% of the Year 1 commitment. As explained above, a two year agreement was signed in the fall of 2001 to fully utilize both Year 1 and 2 by the end of 2002. This approach was taken after encountering significant delays in the development of the draft agreement. Please see financial section of the report for details.

**HCP Program Element: Short-Term Sockeye Fry Rearing**  
**HCP Program Category: Sockeye Research and Monitoring**

**Contact:** Bruce Bachen, Senior Environmental Analyst and Paul Faulds, Planning and Development Specialist II, Water Management Section

**Objectives & Goals**

The prototype sockeye hatchery at Landsburg on the Cedar River has been operating since 1991. The hatchery is limited to serving as an incubation facility and fry are normally released the day that they are removed from incubators. One of the fundamental goals of the hatchery program is to produce sockeye fry that are comparable in quality to those produced in the Cedar River. Results from the prototype hatchery suggest that the hatchery-produced fry tend to emerge and outmigrate to Lake Washington somewhat earlier than naturally produced fry. Outmigration timing could be adjusted by modifying incubation temperature, improving the alignment of egg take timing with spawning timing, and by short term rearing. It has been hypothesized that by rearing artificially produced sockeye fry for a short period of time (approximately two weeks) the hatchery will more closely simulate the timing and behavior of naturally produced emerging fry from the Cedar River. The objective of this study is to release identifiable groups of fry, some reared and some not, under similar conditions at the same release sites to generate information on impacts of rearing on survival and distribution of adults. A four-year commitment to assess the effects of short term rearing is included in the HCP.

**Status of Work (2001)**

- ***Develop the study design for the Short Term Fry Rearing Project***  
Julie Hall, a graduate student at the University of Washington and former Seattle Public Utilities temporary employee, developed the study design to release paired groups of reared and un-reared fry throughout the emergence period (February – March). The Anadromous Fish Committee approved the study design.
- ***Project Agreement with Washington Department of Fish and Wildlife (WDFW)***  
A project agreement was developed between SPU and WDFW to implement the study. WDFW was contracted to assist with the project site development, carry out the normal day-to-day tasks of the study (feeding, transporting, and releasing sockeye fry), as well as recording project data and producing a final report.
- ***Marking fry in the study***  
During the incubation period, each study group of eggs was otolith marked by varying the water temperature of the incubators at the hatchery. Each group received a unique mark so they could be assigned to one of 8 study groups. The otolith-marking schedule was developed in coordination with Eric Volk and Kurt Fresh of the WDFW.
- ***Project Implementation***  
Paul Faulds, the SPU Project Manager, coordinated the rearing site development, equipment purchases, contract development, and study implementation.

**Looking Ahead (Planned 2002 Accomplishments)**

The Short Term Rearing Study will continue in 2002 with focus on rearing and releasing fry, taking biological samples of fry, data analysis, and final reporting.

## **Financial Summary**

Attempts were made in 2000 to initiate the rearing study, but facilities could not be put into place in time to conduct the rearing experiments. Savings in the preparation for the study and the one year delay has contributed to underspending the Year 1 commitment by 70%. Unspent commitment funds from Year 1 could be used to extend the study for the 2004 brood year or to increase operations funding for the other years.

**HCP Program Element: Lake Washington Plankton Studies (year-round)**  
**HCP Program Category: Sockeye Research and Monitoring**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section

**Objectives and Goals**

To gain a better understanding of the capabilities of the lake to support large numbers of juvenile sockeye and to better understand the within-year and between-year dynamics of the zooplankton forage base. The study program will monitor zooplankton composition, abundance and distribution in Lake Washington. This will provide information on the trophic factors that control the growth and survival of juvenile sockeye salmon in the lake and will help improve our understanding of the lake's carrying capacity.

**Status of Work (2001)**

• ***Research initiated in 2001***

The HCP provided support to the University of Washington to: 1) evaluate the diet and food availability for sockeye when they first enter Lake Washington; 2) increase zooplankton sampling stations to evaluate how zooplankton abundance varies temporally and spatially throughout the lake; and 3) obtain fall population and size estimates of sockeye and smelt. The investigators for this work are Dr. David Beauchamp and Dr. Daniel Schindler.

This work was particularly important and timely this year since the highest number of sockeye fry entered the lake since counting began in 1992. A key concern about the sockeye hatchery is whether the additional sockeye fry from the hatchery will exceed the lake's carrying capacity. Variation in annual fry numbers, particularly when fry production is large, provides opportunity to gain insight into this issue. The results are expected to address concerns about early diet of sockeye and assess whether food supply at this stage could be a limiting factor.

**Looking Ahead (Planned 2002 Accomplishments)**

Additional field research will be undertaken in 2002 and the results of 2001 are expected by May. The investigators have identified Lake Washington research priorities for the future as 1) describe the seasonal distribution and dispersal of sockeye fry from February through May; 2) performance of hatchery and wild sockeye through the first growing season; and 3) abundance estimates for key predators.

**Financial Summary**

Expenditures for this project amounted to 95% of the funding commitment for HCP Year 1. Please see financial section of the report for details.

**HCP Program Element: Adult Survival Distribution and Homing Studies**  
**HCP Program Category: Sockeye Monitoring and Research**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section

**Objectives and Goals**

All sockeye released from the Cedar River Hatchery are exposed to temperature changes during incubation that result in marks on the otolith bone. The purpose of this activity is to collect otoliths from a representative sample of sockeye spawning in the Cedar River. When these samples are analyzed, they provide the data to permit evaluation of marked groups originating from the Cedar River Sockeye Hatchery. The specific evaluations are dependent on the marking strategy employed. Some examples of analyses that will be or have been done are to measure fry to adult survival of hatchery-produced fish, monitor the spawning distribution of hatchery-produced fish in the Cedar River, and to assess straying in Bear Creek.

Data from these studies will be used to evaluate and modify fry release strategies and other appropriate aspects of the supplementation program to improve performance and minimize the risks of deleterious effects on sockeye spawning in the wild.

**Status of Work (2001)**

- ***Collection of otolith samples from sockeye carcasses in the Cedar River***  
Otolith samples were collected from the first week of October through the first week of January. Samples were collected in three reaches of the river (lower, mid and upper). In addition, pectoral fins, scales and tissue samples were collected to be used for aging and genetics work. Otoliths were collected from approximately 2500 fish.
- ***Evaluation of straying into Bear Creek***  
While not funded through the HCP funds, Washington Department of Fish and Wildlife released a report summarizing the evaluation of straying into Bear Creek by Cedar River hatchery sockeye. No marked sockeye were found in three years of sampling suggesting that the straying rate is very low. These results have influenced the need for further sample collection in Bear Creek.

**Looking Ahead (Planned 2002 Accomplishments)**

Otolith collection will continue in 2002. Analysis of samples collected in 2001 is expected to be supported financially by Washington Department of Fish and Wildlife and is expected to result in a report in 2002.

**Financial Summary**

For HCP Year 1, 94% of the commitment was spent. Please see financial section of this report for details.

**HCP Program Element: Phenotypic and Genetic Studies**  
**HCP Program Category: Sockeye Research and Monitoring**

**Contact:** Bruce Bachen, Senior Fish Biologist, Water Management Section

**Objectives and Goals**

To characterize and monitor changes in phenotypic and molecular genetic traits in Lake Washington sockeye salmon populations in the Cedar River and north Lake Washington tributaries.

**Status of Work (2001)**

• ***Genetic analysis of sockeye and kokanee by spawning location***

Genetic analyses of major spawning populations in the Lake Washington basin, source populations of sockeye and kokanee that have been introduced into the lake and an outgroup were undertaken. Investigators from the University of Washington including Dr. Paul Bentzen, Dr. Kerry Naish and Ph.D. student Ingrid Spies have been involved in this research. A draft report of their findings was available in October and is being revised. The report examines similarities and differences between spawning locations and compares these results with those of stocks used to establish kokanee and sockeye populations in the basin. The results of earlier genetic studies of sockeye and kokanee in Lake Washington have conflicted on findings of relationships between groups and the results of this study corroborate the findings of some previous research in some cases and not in others.

**Looking Ahead (Planned 2002 Accomplishments)**

A final report is expected in 2002 for the analyses completed in Year 1. Further work is expected to be undertaken in 2002. There is interest in the analysis of spatial and temporal differences of sockeye spawning in the Cedar River as well as in further research into genetic relationships between populations within the Lake Washington Basin, given sometimes conflicting results of previous genetic work.

**Financial Summary**

Expenditures for sockeye phenotypic and genetic studies for HCP Year 1 were 110% of the commitment amount. See financial section of the report for details.

## **Instream Flows Background**

The City manages the Cedar River water supply: (1) to provide its customers in the region with a high quality, reliable, and adequate supply of drinking water; (2) to protect fisheries resources in the Cedar River and Lake Washington; and (3) to provide a measure of flood protection compatible with the City's primary water supply mission. The instream flow management strategy commits the City to binding instream flows designed to improve habitat conditions for chinook, coho, sockeye, and steelhead in the regulated portion of the Cedar River.

Based on an extensive, 5-year study and analysis of the needs of all life stages for each of the four anadromous species, the flows provide habitat for spawning, incubation, rearing of young fish, and holding for adult fish. The flow regime includes not only minimum instream flow requirements but also adaptive provisions for allocation of supplemental flows above minimums in years when available, through operation of a multi-agency commission.

It is important to note that, as used in the HCP, the term *minimum flow* does not connote an instream flow that provides only minimum habitat or benefit for fish. Rather, such flows represent commitments to minimum levels of instream flows that the City will allow to occur, and they were designed to provide substantial benefit and habitat for the fish species addressed. As used in the HCP, *supplemental flows* are increases above minimums that are believed to provide even greater benefits and habitat during certain times of the year. The combination of minimum and supplemental flows are termed *guaranteed flows*.

In addition to these guaranteed river flows, the HCP instream flow management commitments provide the following measures:

- Limit rates of decrease in river levels (down-ramping) to minimize the risk of stranding fish in shallow areas
- Guaranteed flows in the “bypass reach” between the Masonry Dam and the Cedar Falls Hydroelectric Plant
- Move the measurement (compliance) point for flows in the lower river from Renton, at the mouth of the Cedar River, to Landsburg to provide more protected and natural habitat conditions for fish in the lower river
- In addition to the habitat and species restoration commitments in the Watershed Management and Landsburg Mitigation Categories, provide funding specifically to protect and restore habitats and populations of anadromous fish affected by the City's water supply operations
- Provide funding for improvements at the Ballard Locks to increase survival of young fish moving out into salt water, to protect and restore habitat in the Cedar River Basin downstream of the Landsburg Diversion Dam, to develop water conservation messages for the public related to protecting fish and fish habitat, and to modify hydroelectric facilities for fish protection
- Evaluate the potential permanent use of “dead storage” in Chester More Lake reservoir (water below the elevation of gravity out-flow) for improved instream flows and water supply
- Create the Cedar River Instream Flow Commission, comprised of representatives from state, federal and tribal resource agencies, the U.S. Army Corps of Engineers, and King County, which will assist the City in carrying out its responsibilities for managing the Cedar River for fish and people
- Develop and implement research, monitoring, and adaptive management related to management of the water supply and river flows in the Cedar River.

**The following pages provide summaries of the individual HCP PROGRAM ELEMENTS under the Instream Flow program category.**

## Instream Flow Program Element Summaries

**HCP Program Element:**           **Implementation of the Cedar River Instream Flow Agreement and Workings of the Instream Flow Commission**

**HCP Program Category:**       **Instream Flow Management**

**Contact:** George Schneider, Water Resource Manager; Rand Little, Senior Fisheries Biologist, Water Management Section

### Objectives & Goals

The City of Seattle influences river flows in the Cedar River through its water supply and hydroelectric operations within the municipal watershed. Water from the Cedar River is used by about two-thirds of the City's 1.3 million customers in King and Snohomish Counties. The objective of the Instream Flow Agreement of the HCP is to provide highly beneficial conditions for instream resources, while preserving Seattle's water supply and power generation capabilities. We intend to meet this objective, using an extensive, collaboratively developed, scientific information base coupled with an adaptive approach to instream flow management that is supported by continuing research, management flexibility and effective oversight.

### Status of Work (2000-01)

The *Instream Flow Agreement (IFA)* established a body to assist the City in carrying out its river management responsibilities. *The Cedar River Instream Flow Commission (IFC)* was first convened in July 2000, and has met nearly every month since then. In HCP Year 1, the IFC participated in real-time stream flow management decisions, guided the development and implementation of supplemental studies and other technical analyses, established organizational bylaws, and monitored compliance with the IFA. Meetings are chaired by SPU (George Schneider, chair; Rand Little, vice-chair) and have been very well attended. Organizational membership is as follows:

- National Marine Fisheries Service – Voting Member
- U.S. Fish and Wildlife Service – Voting Member
- Washington Department of Fish and Wildlife – Voting Member
- Washington Department of Ecology – Voting Member
- Muckleshoot Indian Tribe – Voting Member
- City of Seattle – Voting Member
- Corps of Engineers – Non-voting Member
- King County – Non-voting Member

The *severe drought conditions* that prevailed between October 2000 and March 2001 (the driest in over 70 years of record keeping) put the IFC and the instream flow regime to the test right out of the starting gate. In the end, a success story emerged. Owing in part to a good reservoir storage situation coming into the drought period, *high-normal fall flows* were provided through December (Figure 1). The IFC recognized that providing the *supplemental outmigration flows* in the February to April period would pose a risk for successful refill of the reservoir and subsequent summer and fall instream flows, so that goal was not met (Figure 2). Nonetheless, the annual production of wild juvenile sockeye salmon from the river was the largest since enumeration was initiated in 1992 (Figure 3). Although the brood year 2001 chinook salmon return was the lowest on record, the production of juvenile chinook was much greater than expected and indicates that spawning, incubation, rearing and emigration conditions in the river were very favorable (Table 1). Normal weather returned in mid-spring, and full reservoir refill was achieved. Beginning in April, water customers of SPU and its purveyors responded to a request for voluntary reduction in water use. As a result, over the spring and summer, water use was about 15 percent below normal. Instream flows were kept at or above the guaranteed normal levels throughout the summer. The high-normal fall flow regime was provided throughout the fall and early winter 2001 (Figure 2).

The *first annual Flow Compliance Report* was prepared for the IFC and delivered in March 2002. It demonstrates that SPU was in full compliance with all applicable IFA flow and downramping provisions. The HCP also directed SPU to manage average annual Cedar River diversions in the 98 to 105 mgd range for the first five to ten years of the HCP. In calendar year 2000, diversions were 93 mgd; in 2001, because of the water use curtailments in effect, diversions were only 90 mgd.

The *first amendment to the IFA* was recommended to the Parties by the IFC. It relates to the re-scheduling of two IFA commitments. Significant elements of *the Cedar Permanent Dead Storage Project Evaluation* were deferred for up to five years (see Program Element Summary on Cedar Permanent Dead Storage below for more information on this). Implementation of certain *downramping prescriptions* was delayed by one year .

**Looking ahead: Planned 2002 accomplishments:**

The IFC will continue its work in all of the areas that it has been involved with so far. Considerable focus will be on advancing the research and technical study program (see following section). In 2002, the City will try to achieve the goals related to water rights, i.e.; dedication of 100 mgd of the Cedar claim to instream uses, and modification of the water right permit for the dead storage temporary pump plant to reflect the HCP and IFA.

**Financial Summary:**

This is not an HCP cost commitment. Thus there is no financial summary for this activity.

Last Update: 12/31/2000

### Calendar Year 2000 Cedar River Instream Flows Measured at USGS Stream Gage No. 12117600

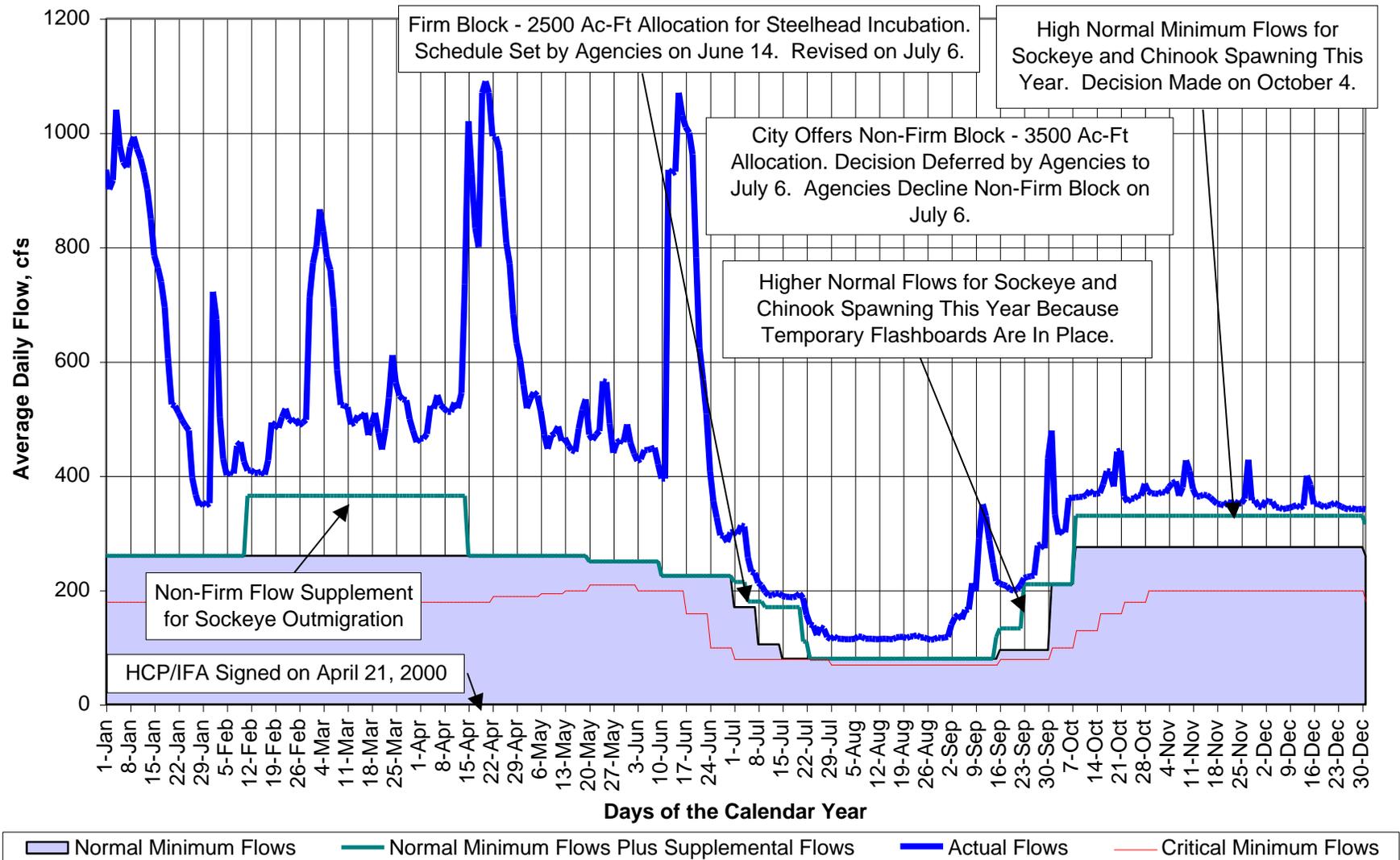


Figure 1 – Cedar River Mean Daily Stream Flow – 2000

Last Update: 1/1/2002

Calendar Year 2001

### Cedar River Instream Flows Measured at USGS Stream Gage No. 12117600

All Data is Provisional and Subject to Revision

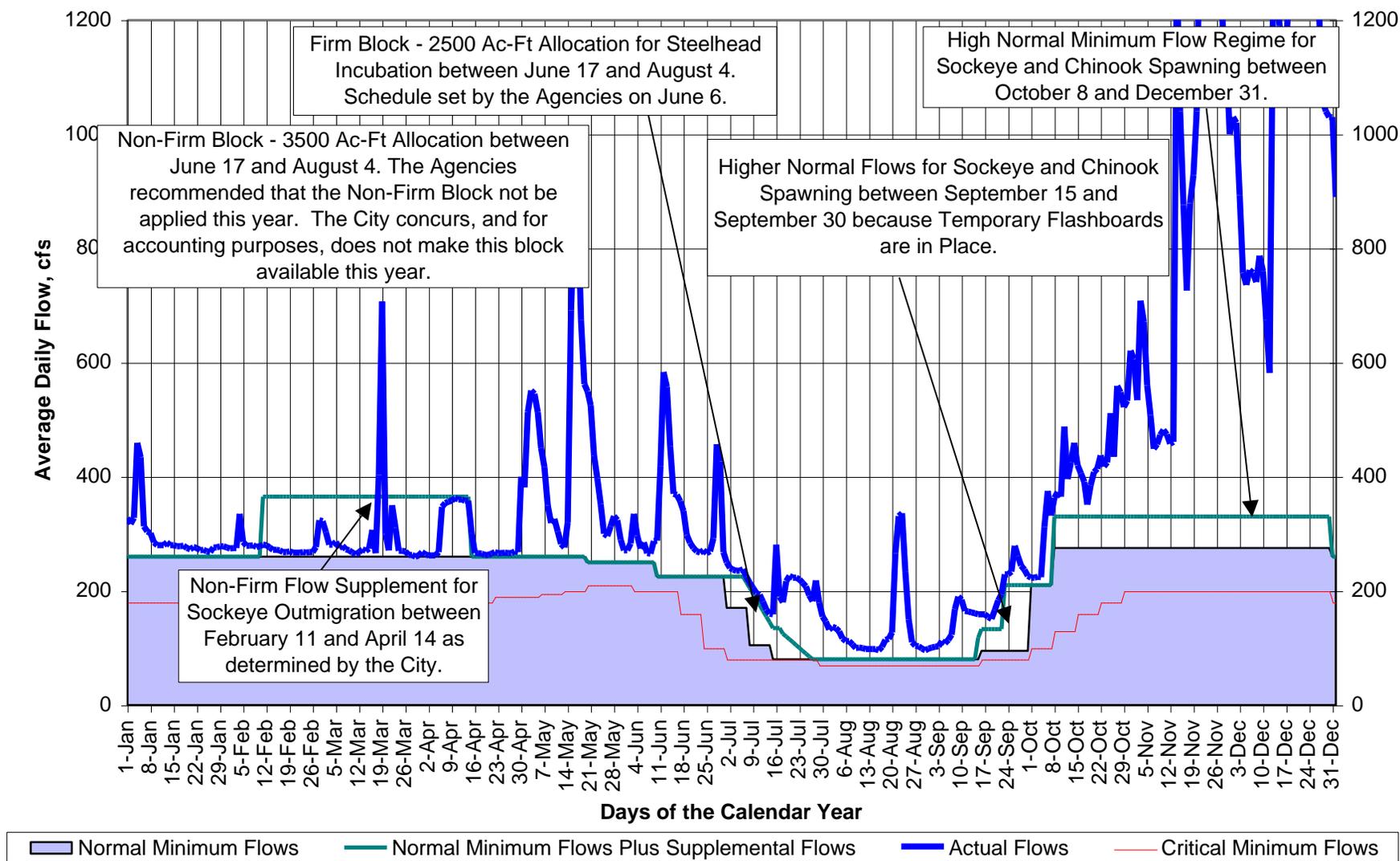


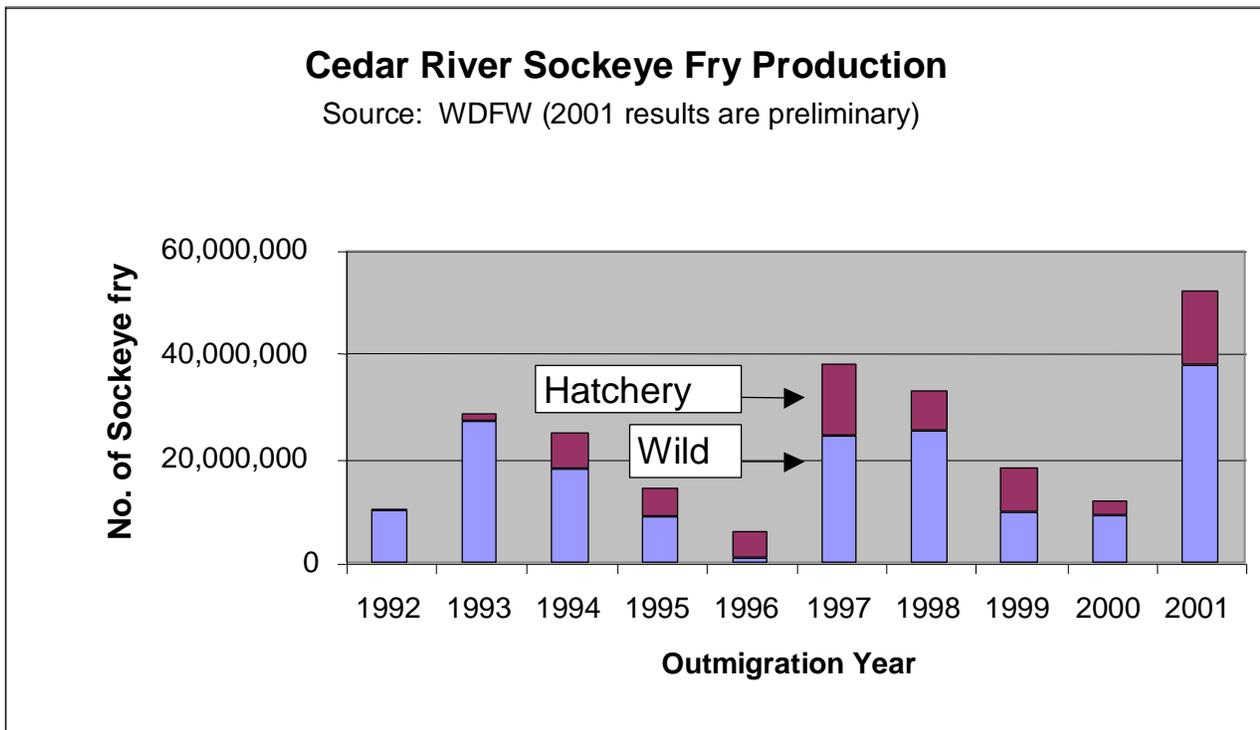
Figure 2– Cedar River Mean Daily Stream Flow – 2001

**Table 1: Lake Washington Juvenile Chinook Salmon Production**

<b>Cedar River Juvenile Chinook Production</b>			
Source: WDFW (2001, 2002 data preliminary)			
Outmigration Year	Estimated No. of Spawning Females	Estimated No. of Juvenile Emigrants	No. of Juveniles per Spawning Female
1999	232	79,800	344
2000	180	74,700	415
2001	53	29,600	558
2002	383	in progress	in progress

<b>Bear Creek Juvenile Chinook Production</b>			
Source: WDFW (2001,2002 data preliminary)			
Outmigration Year	Estimated No. of Spawning Females	Estimated No. of Juvenile Emigrants	No. of Juveniles per Spawning Female
1999	159	14,900	94
2000	293	31,900	109
2001	133	11,200	84
2002	276	in progress	in progress

**Figure 3: Cedar River Sockeye Salmon Fry Production**



**HCP Program Element: Supplemental Biological Studies and Steelhead Redd Monitoring Project**  
**HCP Program Category: Instream Flow Monitoring and Research**

**Contact:** Rand Little, Senior Fisheries Biologist; Karl Burton, Fisheries Biologist; Water Management Section

**Objectives and Goals**

The HCP instream flow management program on the Cedar River attempts to provide certainty for instream resource protection through the implementation of the guaranteed flow regime based on more than 10 years of collaborative study and analysis. The program also provides flexibility to improve and adapt management practices as new information becomes available. The HCP provides this flexibility by placing limits on municipal diversions, providing funding for continued study, and by committing to collaborate with the Cedar River Instream Flow Commission in using new information from a suite of supplemental studies to adapt and improve instream flow management practices in the future.

Soon after its inception in July of 2000, the Commission developed the following objectives for the supplemental studies in support of ongoing efforts to adaptively manage instream flows in the Cedar River:

- Continue to increase our understanding of the relationships between stream flow and habitat conditions in the Cedar River, with an emphasis on chinook salmon and other naturally reproducing salmonids
- Support effective allocation of the “firm” and “non-firm” blocks of water during the summer
- Help guide the allocation of available water above guaranteed levels
- Help address several remaining technical issues that emerged in the later stages of the HCP development

**Status of Work (2000-01)**

From the objectives above, the Commission developed 9 study topic areas and 19 specific study questions. Through an iterative process, the Commission spent approximately one year refining and prioritizing the study questions and developing preliminary study scopes for each question. The study topics and questions address four major areas of interest:

- Chinook and sockeye spawning and incubation
- Chinook early life history
- The relative effect of stream flow on water temperature
- The relationships between stream flow and natural ecological processes that shape and maintain riparian and in-channel habitat in altered systems.

This work is summarized in a draft document that was finalized in September of 2001 entitled: *Cedar River Instream Flow Management: Biological Research and Monitoring*. This product is considered a living document that will continue to be revised as it is used to guide the implementation of supplemental studies.

In addition to the study planning and development work, several high priority studies were implemented in HCP year 1. SPU, in collaboration with the Washington Department of Fish and Wildlife (WDFW) conducted steelhead spawning and incubation studies as provided in Section E. 5. of the Instream Flow Agreement. Final reports are available for the results of studies conducted in 2000 and 2001.

In addition, the Commission authorized SPU to implement work on a top priority supplemental study question: “What is the effect of stream flow on the temporal and spatial distribution of chinook spawning activity in the Cedar River?” SPU staff conducted field studies in the fall of 2000 and 2001 in

collaboration with staff from WDFW, the Muckleshoot Indian Tribe and the King County Department of Natural Resources. The annual report for 2000 is currently available and the 2001 annual report will be available later this spring.

Since 1999, WDFW has conducted a major sampling effort to estimate the number of juvenile chinook emigrating from the Cedar River each year. This program is continuing this year with funds from King County and the Landsburg Mitigation component of the Cedar River HCP. This information is considered critical to addressing several of the instream flow supplemental study questions. It is of most immediate interest in addressing another of the top priority questions identified by the Commission: "Are the numbers of recently emerged chinook fry that migrate out of the Cedar River [as opposed to remaining to rear in the river] correlated with stream flow?" The Commission has identified the continued collection of chinook emigration data by WDFW as a key element in addressing this question. Supplemental study funding may be allocated to investigate potential relationships between stream flow and chinook early life history in the Cedar using past WDFW data. WDFW has also conducted annual enumeration of sockeye fry emigrants from the Cedar River since 1992. The Commission has identified this effort as another high priority information source for instream flow management. If future funding from current sources becomes unavailable, the Commission will consider funding these fry enumeration programs with funding from the HCP instream flow supplemental studies program.

The IFA provides for "firm" and "non-firm" volumes of water to supplement minimum flows during the steelhead incubation period. In order to support decision making regarding this water, the City conducts a steelhead redd monitoring program that locates, characterizes and monitors steelhead redds from the time of their construction through fry emergence. In both 2000 and 2001, this monitoring program coupled with the City's flow management and the natural hydrology resulted in protection of 100 percent of the steelhead redds in the Cedar River.

### **Looking Ahead (Planned 2002 Accomplishments)**

Steelhead spawning and incubation and chinook spawning studies will continue in 2002. SPU has obtained a grant from the King County Conservation District to support its participation in chinook spawning surveys in 2002. As mentioned above, WDFW will continue to enumerate emigrating juvenile chinook and the Commission may ask WDFW to begin analyzing past data to investigate potential links between stream flow and early life history characteristics. The Commission is also working with a consultant to scope approaches to another challenging high priority question: "Is chinook survival to smolt and adult correlated with early life history strategy."

A final area of increasing interest involves the relationship between stream flow and natural ecological processes in altered channels. As an initial diagnostic step in addressing this question, the Commission is planning to conduct a hydrologic analysis that will investigate the ways in which the present managed instream flow regime differs from the unregulated flows that would have occurred prior to human development.

### **Financial Summary**

The Year 1 cost commitment for this program element is \$265,100. Expenditures in Year 1 were approximately \$39,000. Several high priority studies were implemented in Year 1 although expenditures were substantially lower than commitments because efforts were made in study planning and development. Commitment costs will fund implementation of these studies.

**HCP Program Element: Improvements to the Cedar Falls Powerhouse and Masonry Dam**  
**HCP Program Category: Instream Flow Management**

**Contact:** Liz Ablow, Senior Fisheries Biologist; Pat Steele, Project Manager; Seattle City Light

**Objectives & Goals**

As part of the City of Seattle's HCP, Seattle City Light will be making changes at the Masonry Dam and the Cedar Falls Powerhouse to improve fish habitat within the Seattle's municipal watershed. These are important components of the HCP, as downstream improvements at Landsburg will allow migrating anadromous salmonids access to this reach of the Cedar River for the first time in nearly 100 years.

**Status of Work (2000-01)**

***1) Cedar Falls Tailrace Barrier***

A tailrace barrier is to be installed at the Cedar Falls Powerhouse to prevent injury to adult salmon and steelhead when anadromous fish passage occurs above Landsburg. HCP year-1 accomplishments include:

- Alternatives were analyzed and a preferred design was chosen.
- River survey, HEC-RAS Modeling and a physical hydraulic model testing were done.
- Final Design and environmental permitting were completed. King County permits are still pending. Seattle City Light worked closely with agency fish engineers throughout the process including Ken Bates (WDFW), Larry Swensen (NMFS) and Jim Stowe (USFWS).
- The writing of the specification for public works contract that will build the structure is in the final stages.

***2) Cedar Falls Flow Modification***

Modifications to the dam are required to provide a continuous minimum river flow of 30 cfs in the canyon reach (between lower Cedar Falls and the Powerhouse) and to improve the control system for downramping. These changes include the installation of a new low-level valve in Masonry Dam. HCP year-1 accomplishments include:

- Electrical design of the control system is complete.
- Writing of the specifications for the installation of the new low level valve began
- Final Design is currently underway

The costs for this element are combined with the costs for Emergency Bypass Improvements (see below), since these improvements are part of the same construction contract.

***3) Cedar Fall Emergency Bypass Improvements***

This project will install mechanical devices and electronic controls on the bypass valves in the powerhouse to maintain and regulate flow in the event of a load rejection or load reduction. This will protect against stranding of fish and dewatering of redds as a result of such events. HCP year-1 accomplishments include:

- New equipment referred to as the "Gripper system" was installed in 1999 and operating in HCP Year 1.
- Additional modifications were analyzed and Design Basis Memorandum was developed.
- Electrical design of the control system is complete.
- Construction commenced at the end of 2001.

#### ***4) Installation of USGS gage***

Installation of a new USGS gage upstream of the Cedar Falls Powerhouse is required to monitor the flow for compliance purposes once fish passage above Landsburg occurs. Accomplishments in HCP year-1 include:

- Gage site location was determined and plans for installation were finalized.
- Gage permitting was completed.
- Installation of the new USGS was completed and gauge is providing real-time flow data. Rating curve is under development.

#### **Looking Ahead (Planned 2002 Accomplishments)**

Completion of these capital projects is scheduled for the fall of 2002 to allow time to test its automatic coordination for several months prior to fish passage.

#### **Financial Summary**

Year 1 cost commitments total \$385,000; expenditures for the Emergency Bypass project totaled approximately \$1.57 million and were substantially higher than commitments because a decision was made to develop a more reliable emergency bypass system than was called for in the agreement. For the tailrace rack, expenditures were originally planned to occur in HCP Year 3 but the project was accelerated to ensure that the project would be completed prior to the completion of the Landsburg Fish Passage improvements and access to this reach by anadromous fish. See Program Element Summary for Streamflow Gaging and Technical/Engineering Studies for financial information on the new stream gage above the Cedar Falls Powerhouse.

## **HCP Program Element: Locks Improvements – Smolt Passage Improvements and Freshwater Conservation**

### **HCP Program Category: Instream Flow Management**

**Contact:** Melinda Jones, Resource Planning Division

#### **Objectives & Goals**

One of the objectives of the instream flow management component of the HCP is to help support measures that will contribute to improving downstream migration conditions for juvenile salmonids at the Hiram Chittenden (Ballard) Locks. The Smolt Passage Improvements project commits funding for smolt passage improvements at the Ballard Locks in co-sponsorship with King County and the Muckleshoot Indian Tribe. The Freshwater Conservation project commits funding for a feasibility study and implementation of cost-effective long-term water efficiency improvements at the Ballard Locks, with the aim of providing improved fish passage conditions.

#### **Status of Work (through end of HCP Year 1)**

- The City provided partial funding and sponsorship, along with King County, the Muckleshoot Tribe, and other local jurisdictions, for the purchase and annual installation of four smolt passage flumes at the Locks spillway dam by the Corps of Engineers. Aimed at increasing the survival of smolts out-migrating to Puget Sound, the four flumes were installed in 2000. Recent monitoring indicates that a majority of the migrating smolts now pass through the flumes rather than through other, more hazardous pathways through the Locks facility.
- Feasibility studies for long-term water efficiency improvements at the Locks as well as studies related to water management concepts and restoring ecological processes and functions in the Cedar/Lake Washington basin to benefit salmon were initiated through a joint general investigation study sponsored by the Corps of Engineers, King County and the City. Work accomplished in 2000 and 2001 included scoping; reconnaissance-level investigations of water use efficiency alternatives; analyses of approaches for water quantity and water quality modeling; preliminary environmental and economic analyses of several alternatives for possible structural and operational long-term water efficiency improvements at the Locks and basin-related water management concepts; post-installation monitoring, analysis, and operational refinement of the smolt flumes; and technical field research and analyses related to salmon habitat use and migration upstream and downstream of and through the Locks.

#### **Looking Ahead (Planned 2002 Accomplishments)**

- Monitoring and operational refinement of the smolt flumes will continue in 2002, as will technical research and analyses of water efficiency improvements, water management alternatives, and fish passage and habitat improvements. Completion of the joint general investigation study is currently scheduled for 2004, though the study schedule is dependent on availability of Federal funding.

#### **Financial Summary**

- The HCP Year 1 commitment for the Smolt Passage Improvements is \$687,500; cost commitment expenditures for HCP Year 1 totaled \$534,154 with continued expenditures planned in 2002 and beyond related to refinement and possible additional smolt passage improvements.
- The HCP Year 1 commitment for Freshwater Conservation is \$275,000; cost commitment expenditures for HCP Year 1 totaled \$148,744 with additional expenditures planned in 2002 and beyond related to possible structural and operational changes at the Locks.

**HCP Program Element: Conservation Messages for Fish**  
**HCP Program Category: Instream Flow Management**

**Contact:** Rich Gustav, Resource Conservation Division

**Objectives & Goals**

The goal of this HCP activity is to educate consumers about the linkage between water use and salmon habitat in an effort to reduce diversions and keep more water in the river. Conservation efforts are being carried out under SPU’s “One Percent Conservation Initiative”, which is described below.

The One Percent Conservation Initiative is a water conservation *goal* to reduce personal and business water consumption one percent every year for ten years. The One Percent Conservation Initiative consists of a long-term expansion of existing and research and development of new regional water conservation programs identified as cost effective in Seattle’s Regional Conservation Potential Assessment (CPA).

If each person and business in the region can become 10% more efficient in using water over the next ten years, it will save approximately 18 million gallons of drinking water per day. This amount of water will meet the needs of 130,000 new households or the estimated level of growth within King County over the next ten years. In essence, the one percent initiative can hold water demand constant - with the region using no more drinking water in ten years than it uses today. Leveling out the impact of growth on the region’s water supplies will reduce diversions and keep more water in the Cedar River for salmon and other aquatic life. Conserving water is an integral part of our commitment to wise management of natural resources.

**Status of Work (through end of HCP Year 1)**

There were a number of materials distributed that provided “conservation for salmon” educational messages. The table below describes the general message, the audience and distribution of these materials.

<i>Product</i>	<i>Type of Promotion</i>	<i>General Message</i>	<i>Target Audience</i>	<i>Size of Distribution</i>
Natural Lawn Care Booklet	Booklet	Leaving grass clippings, careful watering, using less soluble fertilizers and avoiding herbicides causes less impact on local bodies of water and salmon, and makes the lawn healthier, and a safer place for kids and pets.	Residential yard owners in Seattle and purveyor water districts	40 – 50,000 per year
How To Be A Salmon Friendly Gardener	Brochure	Suggests behaviors in the landscape that are “salmon-friendly”, relating to soils, watering, plant selection, use of chemicals, etc.	Primarily home gardeners	70,000 since 2000
Why Conserve?	Fact Sheet	People need to conserve water because resources are finite and salmon and other creatures also depend on this water for their survival	Home owners and anyone who pays a water bill	3,000
Regional Water Conservation Accomplishments	1990 – 1998 success report	Importance of conservation to the region and for salmon habitat. Conservation accomplishments described in detail.	Purveyors, public officials, key stakeholders and decision makers	5,000

Smart Watering	Booklet – Natural Lawn & Garden series	Using less water leaves more water available for fish and other wildlife. Smart watering can reduce need for pesticides, and can lessen runoff of chemicals.	Primarily high interest home gardeners.	60,000 between 2/01 and 2/02
Water Smart Technology	Booklet for businesses	Saving water can help reduce business expenses and leave more water available for fish and other wildlife.	All non-residential SPU and purveyor customers	2,500

**Looking Ahead (Planned HCP Year 2 Accomplishments)**

Most of this year’s focus will be on completing the package of educational materials that define Natural Lawns and Gardens, a comprehensive approach to responsible landscaping by residential customers in our service region. This effort integrates our water conservation messages with waste reduction, stormwater pollution prevention, and household hazardous waste management. Within also will be working to develop tenant educational materials as part of our initial efforts to begin working with multifamily buildings and residents, a huge and largely untapped conservation resource.

**Financial Summary**

Conservation messages cost commitments are \$33,000 for HCP Year 1. Expenditures exceeded the commitment because the communication of water conservation for fish messages was included within SPU’s larger One Percent Conservation program.

**HCP Program Element: Cedar River Downstream Habitat Protection and Restoration Program**  
**HCP Program Category: Landsburg Mitigation and Instream Flow Management**

**Contact:** Cyndy Holtz, Acting HCP Program Manager, Resource Planning Division

**Objectives & Goals**

Protection and restoration of salmonids and their habitat is vital to successful long-term recovery in the Lake Washington Basin. The goal of this program is to protect and restore fish habitat in the lower Cedar River downstream of the City's ownership boundary. Projects will be designed in a manner that will benefit any or all anadromous salmonid species, especially chinook salmon, and enhance natural ecological processes that shape and maintain riparian and aquatic habitat.

**Status of Work (2001)**

• ***Develop program proposal and obtain City Council endorsement***

HCP staff at SPU developed program guidelines that include the following:

™ Guiding principles that provide the basis for management of the program and project evaluation criteria

™ Project evaluation criteria that are used to evaluate potential projects for funding (in conjunction with consideration of unique opportunities and varying circumstances). Criteria place emphasis on habitat characteristics (stream complexity, diversity, gravel deposition and erosion areas, pools/riffles, large woody debris, intact floodplain, absence of channel confinement, overhanging vegetation, native vegetation, adjacent forest cover, absence of roads and structures)

The program proposal was presented to the City Council in May 2001 and received full endorsement. City Council requested a future briefing when specific projects have been identified.

• ***Collaborate with Cedar River Legacy program staff to identify potential land acquisition projects***

Staff worked with staff from King County's Cedar River Legacy program to identify land acquisition projects that the City and County could provide matching funds for. A list of river reaches and parcels within those reaches were identified.

• ***Evaluate proposed acquisition projects using program evaluation criteria***

The list of proposed acquisitions was evaluated and prioritized according to the program criteria. The list was reviewed by the HCP Internal Steering Committee, the Cedar River Council and the Anadromous Fish Committee.

• ***Begin development of interlocal agreement with King County for cost-sharing on land acquisition projects***

Staff is working with King County acquisitions staff to develop an interlocal agreement between King County and the City that would serve as the mechanism for collaborating on land acquisition projects. Lands acquired under this agreement would be owned by King County and managed by its Resource Lands and Open Space Section.

**Looking Ahead (Planned 2002 Accomplishments)**

The interlocal agreement, which will identify parcels that the City and County will pursue acquisition of, once drafted, will go before the City Council along with authorizing legislation to proceed with acquisition.

**Financial Summary**

Because efforts during HCP Year 1 focused on program development and project identification and prioritization, funds identified in Year 1 will be rolled over into Year 2. Total funds available in 2002 are \$1.2 million.

**HCP Program Element: Walsh Lake Restoration**  
**HCP Program Category: Instream Flow Monitoring and Research**

**Contact:** Dave Beedle, Senior Watershed Hydrologist  
Watershed Management Division, Cedar River Watershed, Cedar Falls

**Objectives and Goals**

The objective of this element is to help protect and restore aquatic, riparian, and floodplain habitat in the lower (below Landsburg) Cedar River by restoration of the Walsh Lake system within and just outside the municipal watershed. The goal is to help restore some ecological function and fish habitat within the Walsh Lake basin, include Webster and Hotel creeks.

**Status of Work (2001)**

The Walsh Lake Restoration element is closely related to aquatic and riparian habitat restoration (streambank stabilization, streambank revegetation, large woody debris, riparian thinning, and conifer under-planting) and road improvement and maintenance (road abandonment, road improvement, and road maintenance) restoration elements. Walsh Lake Restoration must be integrated with plans for these other elements.

No specific projects are specified in the HCP. An option originally considered was improvement of in-channel fish habitat in specific locations throughout the Walsh Lake basin. One possibility was to improve habitat in the Walsh Lake Ditch, a human-made diversion created in the 1930s to shunt water polluted by human habitations around the Landsburg water intake to protect the drinking water supply, rather than having it enter Rock Creek (and the water intake), the original discharge for Walsh Lake. This ditch was constructed along Rock Creek, in a riparian zone. It includes barriers to fish passage and areas of very poor habitat, and is extremely unstable and expensive to maintain. Given that the source of water pollution is no longer present in the Walsh Lake Basin, the option of re-diverting water from Walsh Lake back into Rock Creek was identified, with support from the WRIA 8 (Lake Washington Basin) group, as a potentially better ultimate condition.

**Looking Ahead (Planned 2002 Accomplishments)**

The plan is to complete a fatal flaw analysis for the re-diversion proposal, using a consultant, that will consider drinking water quality, legal, environmental, and financial issues, as well as alternative projects. If the analysis does not reveal any fatal flaw with this proposal, further analysis and planning will occur later. If fatal flaws are discovered, other options will be identified and evaluated. The alternatives analysis will help the City and King County to determine the best approach to achieve the highest ecological recovery throughout the entire system within the limitations of a water supply and other legal mandates.

**Financial Summary**

No HCP cost commitment funds were allocated for 2001, and none have been expended to date. The evaluation of alternatives is expected to occur 2002-2004, with potential implementation in 2005 (or later).

**HCP Program Element: Streamflow Gaging and Technical/Engineering Studies**  
**HCP Program Category: Instream Flow Monitoring and Research**

**Contact:** George Schneider, Water Resources Manager and Alan Chinn, Senior Civil Engineer, Water Management Section

**Objectives and Goals**

To effectively perform water management responsibilities as well as monitor compliance with conditions of the Instream Flow Agreement, Seattle participates in a *cooperative streamgaging program* with the USGS. The IFA requires the maintenance of certain existing streamgages and the installation and maintenance of some new gages. The *Accretion Flow Study*, a component of the instream flow research and monitoring program that will require installation of temporary streamgages, is intended to validate certain hydrologic assumptions that were used in the development of the instream flow regime. The objective of the *Switching Criteria Study* is to develop criteria that would be used by the IFC to help decide the appropriateness of moving from a normal to a critical instream flow regime.

**Status of Work (2000-01)**

Existing gages to monitor compliance with elevations and flow and downramping rate requirements were maintained continuously throughout this reporting period. Installation of a new USGS gage upstream of the Cedar Falls Powerhouse is required to monitor the flow for compliance purposes once fish passage above Landsburg occurs. For this new gage, in HCP Year 1:

- Gage site location was determined and plans for installation were finalized.
- Gage permitting was completed.
- Installation of the new USGS was completed and gauge is providing real-time flow data. Rating curve is under development.

**Looking Ahead (Planned 2002 Accomplishments)**

It is anticipated that the Accretion Flow and Switching Criteria Studies will commence in 2002. The Accretion Flow study is a 10-year program that is expected to require installation of temporary and possible permanent streamgages.

**Financial Summary**

During HCP Year 1, Seattle Public Utilities and Seattle City Light made cost commitment expenditures for two stream gages. For the new stream gage above the Cedar Falls Powerhouse, there was no cost commitment in Year 1; however, in order to develop a rating curve prior to passage of fish above Landsburg Dam, the City decided to accelerate the schedule for installing this gage and spent approximately \$83,700 for the work described above. This included approximately \$81,100 for capital installation costs for the gage and \$2,600 for gage operations and maintenance. (Please also reference the Program Element Summary for Improvements to Cedar Falls Powerhouse and Masonry Dam.)

For the existing stream gage below Landsburg, the City spent \$11,286 for gage monitoring to maintain downramping requirements. This represents 94% of the cost commitment amount for HCP Year 1.

For the following activities, there were no cost commitments and also no cost commitment expenditures made: (see Financial Monitoring Report Comments column for details)

- Existing stream gage at Cedar Falls
- New gage at Renton
- Temporary Gages in Lower River
- Switching Criteria Study
- Accretion Flow Study

**HCP Program Element: Cedar Permanent Dead Storage Project Evaluation**  
**HCP Program Category: Instream Flow Monitoring and Research**

**Contact:** George Schneider, Water Resources Manager, Water Management Section; Dwayne Paige, Senior Watershed Ecologist, Watershed Management Division

**Objectives and Goals**

Water stored below the natural outlet of Chester Morse Lake is known as “dead storage”. Currently, this significant amount of water can be accessed only by operating the Morse Lake Temporary Pumping Plants, and is permitted only during water shortage emergencies and under other very limited situations. In the context of the Cedar River Instream Flow Agreement, Seattle Public Utilities (SPU) has committed to evaluate use of dead storage to provide additional water for both instream uses and municipal and industrial water supply.

The reservoir currently supports healthy populations of fish and wildlife, including bull trout, which have been listed as threatened under the Endangered Species Act, and approximately one quarter of the breeding loon population in Washington State. Increased frequency and/or deeper reservoir drawdowns may prevent bull trout upstream spawning migrations and impair loon nesting during some years. Project elements would include environmental studies, engineering and water rights evaluations, cost estimates, yield analyses, negotiations over instream flow augmentation, and other studies. The environmental impact and mitigation study would include literature search and model effects of increased reservoir drawdown on fish, wildlife, and wetland vegetation over a three-year period. If lower than usual drawdown occurs during the study period, effects on biota would be directly observed.

**Status of Work (2000-01)**

SPU and the Cedar Instream Flow Commission (IFC) are currently embarking on an ambitious program of research and monitoring that is intended to increase understanding of the effects of flow management on chinook and other fish species. These studies may take up to 6 or 8 years to complete. On the water supply planning side, current forecasts place the need for another increment of supply (after the Tacoma Second Supply Project) beyond 20 years from now. It became apparent this year that some engineering, economic and environmental evaluations performed over the next 5 years would likely become outdated well before conditions that would drive development of this project are present.

This matter was discussed at the September and December 2001 IFC meetings. SPU presented information on aspects of the environmental evaluation that we proposed should proceed at the original schedule. These relate to impacts of reservoir drawdown on resident species and plant communities. These studies are relevant even without the development of permanent dead storage since low reservoir conditions may occur whenever there is a period of severe drought. At the December meeting, the IFC accepted the proposed deferral of other studies, and agreed to recommend to the Parties to the IFA that the overall schedule for completion of this full suite of studies be extended five years. The *first amendment to the IFA* addresses this and this amendment has been recently approved by the Parties to the IFA.

**Looking ahead: Planned 2002 accomplishments:**

The approved amendment to the IFA, noted above, calls for commencement of scoping for four environmental components of the Cedar Permanent Dead Storage Project. These components are:

- Delta Fans Geomorphological Investigations and Modeling;
- Pygmy Whitefish/Rainbow Trout Studies;
- Delta Plant Community Monitoring; and,
- Assessment of Common Loon Nesting Habitat

This work will be initiated this year.

If it is determined during the scoping processes that consultants and/or other professional services are required to conduct all or part of these investigations, procedures for hiring such project support can also be initiated during 2002.

**Financial Summary:**

The recently approved amendment to the IFA delays the start of cost commitments on this project to 2002. Therefore, there are no cost commitments in HCP Year 1 and no expenditures were made.

## FINANCIAL OVERVIEW

Previous sections of this report have provided information about each of the HCP's program elements, including the goals and objectives, status of work for HCP Year 1, planned accomplishments for this current year, and the amount of dollars the City has spent towards HCP cost commitments. This section provides a more comprehensive look at the financial aspects of HCP implementation during 2000 and 2001.

The table "HCP Year 1 Financial Monitoring Report" follows this section; this report provides detailed financial information regarding cost commitments for each program element, the amount of cost commitment funds expended during HCP Year 1, performance commitment information, and other specific information regarding our progress on each element. It is important to note that the values in the "cost commitment" column of the table often denote annual expenditure goals for the element rather than an exact spending requirement for a given year. These figures are taken from Table 5. 3.2 of the HCP, are inflated from 1996 to 2001 values, and are based upon average annual costs and approximate timing of activities and expenditures. The exact timing may vary for specific activities and Chapter 4 of the HCP provides details regarding this. We have included some of this information in the "Comments" column of the enclosed table along with other pertinent performance commitments for the program elements.

It is also important to realize that this table reports on cost commitment expenditures only, whereas the total expenditure of funds by the City on program elements is often significantly higher, due to administrative and project management costs that are not included in the cost commitments. In addition, the cost to achieve the desired conservation objective for some elements, such as the Landsburg Fish Passage Project, has turned out to be higher than the total commitment amount, due to many factors including more advanced planning and better scientific knowledge today on how to achieve the objectives of the element than known previously. In this particular case, the City has made a policy decision to continue funding the project above the cost cap amount, due primarily to the high priority the City places on achieving the project's goals.

With the new financial challenges brought on by the recession and the drought of 2000/2001, the City's ability to fund elements above "cost cap" levels may be severely limited. Therefore, it will be important for the HCP Oversight Committee to provide guidance on how best to utilize the program's financial resources to achieve the overall objectives of the HCP and to help the program team make decisions on priorities and tradeoffs.

An analysis of the Financial Monitoring Report shows that HCP Year 1 expenditures were higher than the annual cost commitment goals for three of the eight Cost Categories. These tended to occur in categories where large capital project costs for design and construction work occurred or where the schedule for accomplishment of activities was accelerated. Areas where expenditures were lower than the annual goals tended to be in categories that focus on research and monitoring activities or where capital projects are highly dependent on landscape level, interdisciplinary, and inter-project planning. In some of these cases, City staff believe that attention to proper planning efforts in the first "year" of implementation will yield valuable efficiency and quality benefits as we move forward on these elements in the years to come. In other cases, the necessity of achieving a good level of consensus on study topics and study design among the parties necessitated some delay in cost commitment expenditures. Consequently, dollars expended on these planning and development efforts are not included in our cost commitment expenditures but are a real and necessary cost to the City.

Finally, it is noteworthy that the City spent approximately \$800,000 more in cost commitment expenditures on the HCP Program overall than the annual cost commitment goal for HCP Year 1. Looking at a financial accomplishment rate of greater than 100% for the overall program and taking stock of the performance accomplishments for the various program elements, the HCP Team believes that we have taken a big first step in our implementation of this 50-year program.

















**Cedar River  
Anadromous Fish Committee**

**Annual Report 2001**

by Bruce Bachen and Paul Faulds

## Introduction

The City of Seattle owns 90,546 acres in the upper Cedar River Watershed. Within that watershed Seattle Public Utilities operates water supply facilities that provide 2/3 of the drinking water for 1.3 million people in the Seattle metropolitan area. Providing a reliable supply of high quality drinking water to our customers is the first priority of Seattle Public Utilities, however some water supply operations and land management activities may inadvertently affect species listed as threatened or endangered under the Endangered Species Act (ESA). The Cedar River Habitat Conservation Plan (HCP) was developed with the intent of making significant contributions to maintaining and restoring diminished salmon and steelhead stocks in the Lake Washington Basin as well as protect and enhance habitat for a broad range of wildlife species.

### ***HCP Committees and Commission***

The legal agreements (i.e., Landsburg Mitigation Agreement) implementing the HCP established three oversight groups:

- ❖ HCP Oversight Committee
- ❖ **Anadromous Fish Committee**
- ❖ Instream Flow Commission

### ***AFC Oversight Responsibility***

The Anadromous Fish Committee (AFC) provides advice and consultation to the City relating to the implementation of the Landsburg Mitigation Agreement (LMA). The primary objective of the LMA is to implement biologically sound measures that assist in the recovery and persistence of healthy, harvestable runs of sockeye, coho, and chinook salmon and steelhead trout in the Cedar River. The LMA commits the City to long-term measures to help restore anadromous fish runs and mitigate for the blockage at Landsburg Dam. The AFC serves as a forum for coordinating and communicating information on the status, condition, and trends of anadromous fish stocks in the Cedar River and provide guidance with the implementation and oversight of interim and long-term mitigation measures for these stocks.

### ***AFC Membership***

Members of the AFC include representatives of the signatory Parties to the LMA (US Fish and Wildlife Service, National Marine Fisheries Service, Washington Department of Fish and Wildlife, the City of Seattle), the Muckleshoot Indian Tribe, and four stakeholders representing the Northwest Marine Trade Association, Puget Sound Anglers-Lake Washington Chapter, Washington Council of Trout Unlimited, and Washington Trout. See table at the end of this section for the names of current members and alternates.

### ***Comments from the Chair of the AFC, Bruce Bachen***

The committee members represent a range of perspectives and include agency and tribal representatives as well as stakeholders. The result is a mix of technical expertise and result-oriented focus that is applied to the variety of subjects that are considered by the AFC. Members of agencies are expected to invite other members of their organizations or solicit their advice as topics warrant. Milestone dates in the LMA and HCP drive the development of projects, but there is considerable latitude in terms of monthly agendas that reflect the committee's sense of priorities.

The committee has met monthly through 2000-2001 with the exception of a couple of months. These meetings last about 4 hours. Most members attend regularly and attendance has never been low enough to impede the committee's work. Committee members receive meeting materials approximately one week in advance. All meetings are open to the public, but attendees are usually the committee members, alternates, agency staff members, consultants and invited guests. Detailed minutes of each meeting are prepared, approved and distributed. A summary version of these minutes is more widely distributed to allow a larger group to follow activities of the committee in a more concise format. The summary minutes are also posted on the City's website.

Since the AFC is an advisory group to the Parties and the City, much of the value of the committee is to provide a forum for discussion to ensure that multiple perspectives are considered in the recommendations of the committee. These recommendations fall into three general categories:

- 1) Advice to the Parties regarding actions that are required in the LMA (an example would be a recommendation to approve the design of fish passage facilities)
- 2) Advice to the City regarding implementation of actions required in the HCP or LMA (examples include monitoring study objectives, methods)
- 3) Advice to the City and its consultants during the development of complex projects, like Landsburg Fish Passage, to ensure that committee members' concerns and ideas are considered in a timely and effective way.

The committee functions by consensus as much as possible. In most cases, the committee has been able to reach consensus in forming their recommendations. When necessary, voting can be used to determine recommendations when consensus cannot be reached. Formal motions are voted when key recommendations are made to the Parties.

### **Successes**

The AFC has been established and appears to be functioning as intended in providing an important forum for the discussion of fisheries issues that are important to the Cedar River and the region. During the first year of the HCP, the committee completed the organizational challenges of establishing a new committee and has been operating for a long enough period of time to establish a sense of its ability to carry out its role in the implementation of the HCP. The AFC has successfully assumed most of the responsibilities of the Cedar River Technical Committee, which was established under State law to guide the development of the City's mitigation efforts on the Cedar River. The AFC has provided support, collectively and through its individual members, by helping to further the timely implementation of actions associated with the LMA. This function has been very important in discussions with permitting agencies by providing credible, third party support for designs as well as encouragement of timely responses to allow project schedules to be met. The fish passage project, in particular, has received a great deal of individual and committee support that has addressed technical and regulatory issues. This support has resulted in a better project design and aided movement of the project through the regulatory process.

The committee began work on the replacement hatchery in 2001 and will continue to provide guidance about the program and design through 2002.

### **Challenges**

Some of the most time-consuming and challenging work of the AFC has been to identify specific actions for funding within the Interim Mitigation Program for Coho, Chinook and Steelhead. The HCP and LMA provide broad guidance, but leave the specific actions to case by case decisions of the Parties with the advice of the AFC. It is typically difficult to address complex natural resource questions like why a population is declining and what should be done about it. The bottom line is that resources available in 2000-2001 were not fully utilized.

While the need for some response has been discussed for steelhead and chinook, determining what should be done is challenging, in part due to uncertainty about the cause(s) of the recent declines in returns. Low numbers of chinook returning to the Cedar River in 2000 and low numbers of steelhead in both 2000 and 2001 have raised concerns about these populations (chinook numbers in 2001 were relatively good). The interim program was established to provide resources to develop additional information or to implement supplementation. The AFC has relied on the fishery co-managers, WDFW and the Muckleshoot Tribe to propose actions that are consistent with the guidelines of the HCP and those established by the committee. This is challenging and difficult work. The committee has been careful to see their role as providing advice concerning funding of proposed actions. Few proposals have been generated to date and only one action was funded during the first year of the HCP. In 2002, the AFC will need to reevaluate how to improve the process for identifying actions under this program. A possible approach would be to use

some of the resources to try to establish a better understanding of the factors that are contributing to the decline.

**Summary**

The AFC is functioning as intended in the LMA. The forum has proved to be important to the successful implementation of HCP projects through actions as a whole and through the actions of individual members outside the committee meetings.

## ***Activities and Progress***

### ***Long-term Measures for Steelhead Trout, and Coho and Chinook Salmon Landsburg Fish Passage***

The fish passage project includes the development of passage facilities at the Lake Youngs aqueduct crossing and the Landsburg Diversion Dam, as well as a new water intake screen for the City's municipal water supply. The AFC is responsible for advising the Parties to the LMA on the fish passage design, construction, and operation as well as reviewing reports of independent experts regarding potential water quality impacts of fish passage. If the City were unable to obtain permits for construction of fish passage the AFC would advise the Parties on alternative mitigation measures.

Early in the conceptual design phase of the project the AFC agreed to rely on a team of agency engineers and design consultants to develop the technical elements of the passage facilities and intake screen. Bill Wells the SPU Project Manager for the Landsburg Fish Passage Project serves as the primary liaison between this group and the AFC. The team was composed of representatives from Seattle Public Utilities, Washington Department of Fish and Wildlife, United States Fish and Wildlife, National Marine Fisheries Service, Army Corps of Engineers, Montgomery Watson Harza, and Geomax. The committee asked the team to identify biological concerns in the design process so the AFC could help find potential resolutions. At each AFC meeting the project manager provided members with project updates, covering issues from passage design to permitting. Members often engaged in useful discussion and dialog with the design team and permitting agencies. This process assisted in identifying the preferred approach to fish passage, exploring different construction techniques, reviewing and commenting on 30%, 60%, and 90% design drawing, discussing operational criteria, and guiding the project through the complicated mitigation and permit process.

Many projects undertaken by the AFC demanded significant involvement by its members. Ultimate success was highly dependent on their effort. Members participated on special subcommittees that addressed the flow bypass between the dam and aqueduct, integrating the facilities with the park at Landsburg, and development of the construction mitigation plan. Furthermore, in an effort to address potential issues with the project the AFC met with King County Department of Development and Environmental Services, Washington Department of Ecology, Washington Department of Fish and Wildlife Habitat Division, and the Army Corps of Engineers.

#### **Motions and Actions**

May 17, 2001

The Committee voted unanimously to recommend to the Parties to the Landsburg Mitigation Agreement to approve the Basis of Design Report.

September 20, 2001

The Committee voted unanimously to send a letter to King County DDES asking for priority consideration with regards to the permit process for the Landsburg Fish Passage Project.

#### **Year End Results**

The AFC met all of its responsibilities to the parties and the City for long-term measures for steelhead trout, and coho and chinook salmon in HCP Year 1.

#### **Challenges for Next Year**

With regards to fish passage, the year 2002 will be both rewarding and challenging for the AFC. Construction for the project is slated to begin this spring and members will actually be able to witness fish moving over obstacles that have been in place for almost 100 years, however the permit process is still underway and could offer a few challenges.

### ***Interim Steelhead, Chinook, and Coho Supplementation and/or Monitoring and Restoration Studies***

The AFC is tasked with advising the Parties to the LMA on the forms of interim measures for steelhead trout, and coho and chinook salmon. The LMA requires the City to make available up to \$90,000 per HCP year for interim measures from HCP Year 1-8. The LMA states these funds are designated for the implementation of life history, genetic, demographic and/or ecological studies to fill information gaps; implementing emergency supplemental production; and/or other measures deemed appropriate by the Parties to achieve the objectives of the LMA.

In December 2000 SPU sent a letter to the Parties, suggesting clarifications to the process of identifying interim mitigation projects, including the role of the AFC. The Parties approved these measures which including making the AFC responsible for advising the Parties on proposals for interim measures. The AFC invited the co-managers, Washington Department of Fish and Wildlife (WDFW) and Muckleshoot Indian Tribe (MIT) to submit proposals under this program.

### ***Steelhead Supplementation***

Earlier in HCP Year-1 WDFW approached the AFC with a request for funding for its steelhead collection program at the locks however WDFW withdrew the request when an alternative funding source was identified.

### ***Chinook Monitoring***

The AFC advised the Parties to fund the collection of biological samples from Cedar River chinook carcasses to aid in understanding their biology and escapement. This project proposed by the co-managers accounted for approximately 19% of the total available funding for HCP Year-1 and the remaining funds were carried into HCP Year-2.

### **Motions and Actions**

March 2001

The AFC sent a letter to WDFW explaining that no action was taken on the request for funding for the steelhead collection program at the locks in with 2001, after WDFW found alternative funding. The committee also agreed to delay consideration of any supplementation proposals not submitted by the co-managers until the end of three months. At the end of three months, the committee may consider other proposals for interim mitigation, which may include research as well as emergency supplementation.

July 2001

The co-managers were granted a one-month extension for the development of a proposal for chinook recovery in the Cedar River.

August 2001

The AFC unanimously recommended partial funding (\$22,500) of a co-manager proposal that would gather additional information on chinook spawners in the Cedar River. The AFC took no action on the other portion of the proposal that included supplementation activity pending receipt of further information.

September 2001

The committee agreed upon guidance for submittal deadlines and proposal content for funding requests under the program and requested that this information be sent to the co-managers.

November 2001

The members requested that co-managers provide a steelhead supplementation proposal at the next meeting.

December 2001

WDFW presented a steelhead proposal developed by the co-managers that would supplement the steelhead run in the Cedar River if escapement levels are low again this year. The AFC postponed a decision on the proposal for one month allowing WDFW additional time to answer questions raised at the meeting.

#### Year End Results

The AFC met all of its responsibilities to the parties and the City for Interim Steelhead, Chinook, and Coho Supplementation and/or Monitoring and Restoration in HCP Year-1. However, only 19% of the available funding were allocated to recovery activities in Year 1.

#### Challenges for Next Year

The AFC will continue to look to the co-managers for interim proposals in 2002; however the AFC is scheduled to reevaluate the process for the development of interim proposals to see what could be changed to fully utilize the available resources. One milestone that is driving that process is by September 30, 2002 the AFC is required to provide the Parties a status report on the interim activities and identify the preferred form(s) of interim mitigation.

#### ***Sockeye Salmon Monitoring Program***

The AFC is responsible for oversight of the monitoring and evaluation activity associated with the sockeye hatchery program. The HCP describes specific monitoring actions, which serves as guidance to the City for conducting its monitoring program. Changes in this program are possible through action by the Parties with advice from the AFC.

#### ***Fry Marking and Mark Evaluation***

The AFC was advised of marking plans for sockeye that in 2001 were focussed on the requirements of the short term rearing study. WDFW was contracted to develop, apply and verify marking protocols for the 2001 brood year sockeye.

#### ***Wild and Supplemental Fry Trapping and Counting***

Trapping and estimating the numbers of fry leaving the Cedar River is an essential part of the evaluation of the numbers of wild and hatchery origin fry entering Lake Washington. The HCP provides partial support for this activity and AFC members were advised of the contract with WDFW to conduct this work. Funding was provided to WDFW through a two-year agreement to support fry trapping operations on the Cedar River. This agreement provides the full HCP funding commitment for the period.

#### ***Short-term Sockeye Fry Rearing***

The AFC was consulted during the development of the study plan that would allow an assessment of the effects of short-term rearing (less than 2 weeks) on survival of fry released by the hatchery.

#### ***Adult Survival, Distribution and Homing***

The AFC has been consulted on the sampling of adult sockeye to gather otolith samples. These samples are used to compare the performance of hatchery release groups and to separate wild origin fish from those that originated from the hatchery. WDFW was contracted to do the fieldwork and provide a report.

#### Genetic Analysis

The AFC was consulted during the development of a contract with the University of Washington to conduct a genetic investigation of sockeye and kokanee populations in the Lake Washington Basin and from other selected sites. Additional work was discussed with the AFC concerning an investigation of the spatial and temporal structure between sockeye populations in the Cedar River.

#### Motions and Actions

September 2000

Members recommended continued funding for the UW genetics study.

September 2001

Members discussed a (UW) Genetics Study Proposal – Investigation of Spatial and Temporal Structure between Sockeye Salmon Populations Spawning in the Cedar River.

### ***Cedar River Sockeye Hatchery Program***

The selected approach for sockeye mitigation is the construction and operation of a replacement hatchery capable of producing up to 34 million fry. This project requires the development of operating protocols, an adaptive management plan, a capacity analysis and design for approval by the Parties in 2003. The AFC will advise the Parties on the approval of these elements and provides regular input and guidance to the Design Consultant (TetraTech/KCM). This requires regular informational presentations to the committee and the distribution of draft materials for comments.

The AFC began its involvement in the hatchery program development process in October 2000, when the committee was advised of the timeline for the hatchery project and consultant selection process. In November, the AFC reviewed the potential tasks that would become the scope of work for the consultant. In December 2000, the AFC approved the creation of the Hatchery Subcommittee whose members would be those who were on the Cedar River Sockeye Technical Committee. The purpose of the subcommittee was to provide oversight of the existing sockeye hatchery. Further detail on the design consultant process, criteria and scope of work was provided to the AFC in January 2001. After the conclusion of the process, John McGlenn, project manager for KCM was introduced to the AFC at the March 2001 meeting where he described his design team and talked with the committee about how they would interact during the development of the project.

In April, the AFC reviewed a list of documents and information that SPU had drafted to provide the TT/KCM design team with information relevant to the hatchery. Plans were announced to hold a transitional meeting where AFC members would be invited to hear the Science Panel present their report findings on guidelines that should be used to structure the hatchery and its operations. Copies of the Science Panel's report were distributed at the May meeting and discussed. The schedule for the development of program documents was presented to the AFC in June. Also, coordination with WDFW for review of the hatchery program was planned.

In July, the AFC discussed the results of analysis of otolith samples collected from adult returns to the Cedar River with Kurt Fresh. A report on the effectiveness of the broodstock collection weir protocols in avoiding adverse effects on chinook was presented to the AFC and comments were requested. The AFC was asked for input on the structure of the process associated with the proposed adaptive management plan. In August, the AFC discussed adaptive management, including which uncertainties were most important to address in the plan. Design details were discussed with the AFC and co-manager staff in a special briefing after the regular AFC meeting in August. In September, John McGlenn provided an update on the hatchery schedule and showed draft plans of the facilities. Discussion about broodstock collection alternatives was held. The EIS scoping plans were discussed.

In November, the AFC voted to recommend a 6-month extension of the time allowed under the LMA for setting annual production targets, since work associated with the hatchery design process was addressing this issue. The AFC had no objection to the program objectives that were included in the project scoping notice for the hatchery EIS. In December, the AFC voted to recommend that the establishment of annual production targets for the hatchery be set through the adaptive management process. Further details about this process were discussed with the committee.

The AFC will continue involvement with the development of the hatchery project through 2002, with emphasis on the refinement of the design and program documents and on the EIS process.

### **Related HCP Activity**

Evaluation of Broodstock Collection Alternatives – The AFC has discussed how to identify the best method and location for capturing broodstock. The following actions were taken in Year-1.

### ***Evaluation of current broodstock collection facility and recommend improvements***

Northwest Hydraulic Consultants was hired to evaluate the temporary fence and trap structure operated at River Mile 6.5 each year between September and November. A set of objectives was developed and an assessment was done to determine how well the present design met the objectives. Recommendations were developed that would allow the present facility to better reach the goals. A final report was issued.

### ***Evaluation of alternative broodstock capture methods and facilities and recommendations***

Chinook Engineering, Inc. was hired to gather information from agencies from Alaska to Oregon about fish capture methods and facilities. The range of options is described in their final report along with a preferred alternative. Potential sites for a broodstock collection facility were described. The report assesses how the various methods meet design goals. A final report has been completed.

### ***Evaluation of beach and purse seining as methods for broodstock capture***

Two forms of active netting were tested this year as alternative capture methods. Beach seining was attempted in the lower Cedar River, but densities were too low to allow this technique to work effectively. Purse seining in Lake Washington was attempted during the third week of October with poor results. The sockeye run abruptly diminished this year and may have affected the evaluation of this gear. Plans have been made to try again next year beginning at an earlier time.

### ***Evaluation of sonar to count sockeye migrating up the Cedar River***

A pilot project was initiated to test the efficacy of using sonar to count fish moving up the Cedar River. The test proved that sonar could be used to enumerate salmon. This would be important information so broodstock can be collected in proportion to the run as it develops.

### ***Interim Hatchery Program***

The AFC has the responsibility to oversee the operations of the interim hatchery. To help with this responsibility, the AFC created the Hatchery Subcommittee comprised of the members of the Cedar River Technical Committee, a group that was superceded by the AFC. The AFC establishes the annual egg take goal and monitors reporting and permitting needs of the interim program.

### ***Downstream Habitat Program***

The AFC advises the City and the Parties on habitat acquisition, primarily by reviewing and approving the list of proposed reaches where such acquisitions would be sought. In 2001, the AFC was consulted on the process for developing the list and the proposed list was to be voted on in 2002.

### ***AFC Roster for 2000-2001***

<b>Name</b>	<b>Agency/Organization</b>	<b>Committee Status</b>
Bruce Bachen	Seattle Public Utilities	Chair
Tom Sibley	National Marine Fisheries Service	Member
Matt Longenbaugh	National Marine Fisheries Service	Alternate Member
Steve Foley	Washington Department of Fish and Wildlife	Member
Ron Warren	Washington Department of Fish and Wildlife	Alternate Member
Paul Seidel	Washington Department of Fish and Wildlife	Alternate Member
George "Gwill" Ging	U.S. Fish and Wildlife Service	Alternate Member
Tim Romanski	U.S. Fish and Wildlife Service	Member
Roger Tabor	U.S. Fish and Wildlife Service	Alternate Member
Dennis Moore	Muckleshoot Tribe	Member
Eric Warner	Muckleshoot Tribe	Alternate Member
Nick Gyeski	Washington Trout	Member
Sam Wright	Washington Trout	Alternate Member
Frank Urabeck	Northwest Marine Trade Association	Member

Bill Robinson	Washington Council of Trout Unlimited	Member
Dave Paden	Puget Sound Anglers Lake Washington Chapter	Member
Bill McKay	Puget Sound Anglers Lake Washington Chapter	Alternate Member
Chuck Wischman	Puget Sound Anglers Lake Washington Chapter	Member
Scott Brewer	King County Water & Land Resource Division	Non-voting Member

\*Eight-teen AFC (including the two chartering sessions) meetings were held in HCP year-1 (2000-2001) and voting member and alternate member often attended the same meeting.

***AFC Meetings Schedule***

06/29/00, 06/30/00, 07/20/00, 08/22/00, 09/14/00, 10/19/00, 11/16/00, 12/14/00, 01/18/01, 03/15/01, 04/19/01, 05/17/01, 06/21/01, 07/19/01, 08/23/01, 09/20/01, 11/15/01, 12/13/01

***Changes In Membership***

Over the last year there has been several changes in the AFC membership. Tom Sibley of the National Marine Fisheries Service (NMFS) is now the main contact with NMFS rather than Matt Longenbaugh. Paul Seidel from Washington Department of Fish and Wildlife (WDFW) replaced Ron Warren from WDFW. Tim Romanski from the U.S. Fish and Wildlife Service (USFWS) is a new member. Dennis Moore from the Muckleshoot Indian Tribe (MIT) is now a member replacing Mike Mahovich. Sam Wright from Washington Trout is a new member. Bill McKay and Chuck Wischman from Puget Sound Anglers Lake Washington Chapter replaced Dave Paden who passed away.