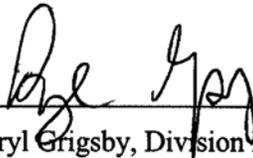


Fall City Natural Area Site Management Guidelines

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King County Water and Land Resources Division



King County

Department of Natural Resources and Parks
Water and Land Resources Division

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Executive Summary

Fall City Natural Area is King County Department of Natural Resources and Parks Ecological Land managed for the protection of ecological values and where appropriate public access. The Fall City Natural Area is located 1.5 miles north of Fall City and lies between the Snoqualmie River to the west and Neal Road to the east and north. The 46.9-acre property lies within the Snoqualmie River's 100-year floodplain and is one of the few substantial blocks of forested riparian habitat in the Snoqualmie Valley.

The Fall City Natural Area was purchased to protect the site's remaining high quality salmon habitat, specifically chinook winter rearing and juvenile habitat. The site was purchased between December 2000 and April 2001 with a combination of funding from the Governor's Salmon Recovery Office, Salmon Recovery Funding Board Grant and King County Shoreline Improvement Funds.

Fall City Natural Area contains significant habitat for a variety of fish and wildlife species. The Snoqualmie River in the vicinity of Fall City Natural Area sustains runs of chinook salmon, which are listed as threatened under the federal Endangered Species Act (ESA), provides spawning habitat for up to half of the chinook salmon that spawn in the river. The site is identified as a wildlife habitat corridor in the King County Comprehensive Plan and offers habitat for a variety of birds, mammals and amphibians.

Current public use at Fall City Natural Area supports a relatively low number of visitors engaged in recreational activities such as walking, nature observation and fishing. No formal public trails exist on the site, although pedestrians use the primitive access road as a trail. The level of public use appears to have no adverse effect on the ecological resources of the site. Currently, the Fall City Natural Area access is not suitable for vehicle traffic or parking.

The Neal Road Riparian Enhancement Project has been underway since April 2002. The project aims to restore the lowland-forested floodplain through the planting of native trees species and control of noxious, invasive and non-native plant species. The restoration project is scheduled through 2005 and to date well over 1,000 trees have been planted.

The goals for the Fall City Natural Area are 1) to conserve and enhance ecological value, and 2) accommodate appropriate public uses that do not harm ecological resources. The following are planning and management recommendations that are designed to support these goals.

- Implement preserve and protect measures to limit inappropriate public use in rare and sensitive areas.
- Monitor public use, types of use and impacts on the ecological systems to inform management decisions.
- Plant native trees and shrubs and control noxious, invasive and non-native plant species to provide a structurally diverse and functioning forested floodplain.
- Consider conducting floodplain reconnection to enhance natural floodplain processes.
- Complete comprehensive biological inventory to provide thorough baseline information.

Fall City Natural Area Site Management Guidelines

Introduction

Fall City Natural Area is a King County Department of Natural Resources and Parks (DNRP) Ecological Land. Ecological Lands are a category of Water and Land Resources Division (WLRD) properties managed for the protection and enhancement of environmental values such as wetlands, key riparian corridors and key wildlife, fish and plant habitat. Appropriate public access and educational opportunities are accommodated on these sites where they do not harm the ecological values of the site.

This document provides general property information, a description of existing site conditions, an analysis and a list of management objectives and recommendations for the Fall City Natural Area. These site management guidelines have been developed using the guidance established in the King County Ecological Lands Handbook (2003).

Part 1. General Property Information

The Fall City Natural Area, also known as the Neal Road Site, is located about 1.5 miles north of Fall City and lies between the Snoqualmie River to the west and Neal Road to the east and north. The southern boundary is shared with a private property owner and was not demarcated at the time of purchase. The western boundary is adjacent to Washington State Department of Fish and Wildlife lands that are primarily used for recreational fishing. The largely forested 46.9-acre natural area provides one of the few substantial blocks of forested riparian habitat in the Snoqualmie Valley. The site includes one third of a mile of Snoqualmie River frontage between approximately RM 33 and RM 33.3 and lies within the Snoqualmie River's 100-year floodplain (King County Department of Natural Resources and Parks, 2002 and King County Department of Parks, Planning and Resources, 1990). The Fall City Natural Area contains high quality salmonid habitat, specifically salmon winter rearing and juvenile habitat. Two levees the Carlson Upper and Number 5, have been built through the entire reach.

The Fall City Natural Area is zoned A-35 in accordance with the 2000 King County Comprehensive Plan. The zoning designation refers to agricultural land use with a minimum of 35-acres. The purpose of the agricultural zone (A) is to preserve and protect irreplaceable and limited supplies of farmland well suited for agricultural uses by their location, geological formation and chemical and organic composition and to encourage environmentally sound agricultural production. The Fall City Natural Area lies within the Snoqualmie River Agricultural Production District (APD).

The APD was designated under the requirements of the Washington Growth Management Act (GMA) as "agricultural lands that are not already characterized by urban growth and that have long-term significance for the commercial production of food or other agricultural purposes. Under the GMA "a county or a city may use a variety of innovative zoning techniques in areas designated as agricultural lands of long-term commercial significance to conserve agricultural lands and encourage the agricultural economy. The GMA also states that the non-agricultural uses should be encouraged in the APD on lands with poor soils or other wise no suitable for agricultural purposes. Although the Fall City Natural Area is within the APD, it is not suited for agricultural purposes because at present the site is not farmable due to its heavily forested nature.

Land use in the upper Snoqualmie Basin above Snoqualmie Falls is varied. Much of the upper watershed area contains National Forest land, land managed by Washington State Department of Natural Resources and land that is primarily managed for timber by private companies. A majority of the watershed has been logged since the turn of the 20th century with little or no old growth forest remaining except in those areas set aside as reserves such as the Alpine Lakes Wilderness. As King County continues to grow, several cities in the upper basin will have expanding commercial and residential development.

The lower Snoqualmie River basin below the falls is largely dominated by agricultural land use (70.4%) and rural residential land use (22.2%) (Solomon and Boles, 2002). The valley floodplain passes through the communities of Fall City, Carnation and Duvall. While these communities have historically supported rural land use activities such as agriculture, both urban land use and population is increasing. Between 1980 and 2000, the population in the Snoqualmie Basin nearly doubled, from just under 20,000 to approximately 40,000 residents. The population will further increase to over 70,000 residents by 2020 (Puget Sound Regional Council, 2001). Private timber companies also intensively harvest trees in the Raging River, Tolt River, Griffin Creek and Tokul Creek watersheds (King County Department of Natural Resources, 2001).

In a 1936 aerial photograph of the natural area, the site was an island in the middle of the Snoqualmie River. A significant portion of the site was clear, though it is not evident whether it was used for agricultural purposes. Mature trees growing on site suggest that intensive use was discontinued not long after the 1936 aerial photos were taken (King County Department of Natural Resources and Parks, 2002).

Table 1. Fall City Natural Area General Information

Best Available Address	3000 Block of Neal Road SE, one mile north of Fall City
Thomas Guide Map	Page 599
Legal Description	Section 9, Township 24 N, Range 7 E
Acreage	46.9-acres
Drainage Basin	Snoqualmie River
WRIA	7
Council District	3
King County Sensitive Areas	100-year floodplain, wetlands, erosion and seismic hazards, channel migration zone

Table 2. Fall City Natural Area Parcel Information

Parcel Number	Acreage	Recording Numbers	Purchase Date	Ownership Type/price	Previous Names	Zoning	Funding Source
0924079081	6.09	20010104000050	12/18/2000	Owned in Fee \$109,000	Richmond West	A-35 APD	Combination of Governor's Salmon Recovery Office; Salmon Recovery Funding Board; King County Shoreline Improvement Funds
1024079008	23.01	20010104000050			Richmond East	A-35 APD	
1024079036	14.26	20010430001179	4/20/2001	Owned in Fee \$82,500	Dike	A-35 APD	
1024079035	3.51	20001227001895	12/13/2000	Owned in Fee \$18,000	Klein	A-35 APD	

*Acreage taken from King County Assessor's data

Part 2. Acquisition Purpose and Funding Source

The Fall City Natural Area was purchased to protect the site's remaining high quality salmon habitat, specifically chinook winter rearing and juvenile habitat.

The acquisition action commenced in early 1999 when the Snohomish Basin Salmon Recovery Technical Committee recommended that salmon recovery funds be used to protect connected, side-channel habitats at the downstream end of high density spawning areas (King County Department of Natural Resources, 2000). After reviewing the most significant potential salmonid spawning areas in the Snoqualmie/Skykomish watershed, the Fall City Natural Area parcels were identified as a priority site.

The Fall City Natural Area property was acquired between December 2000 and April 2001 as Endangered Species Act (ESA) early action – Snoqualmie. The four parcels, totaling 46.9 acres, were purchased with a combination of funding from three separate sources: the Governor's Salmon Recovery Office; a Salmon Recovery Funding Board Grant; and King County Shoreline Improvement Funds. Since the grant funding was combined the exact amount allocated from each funding source per parcel is unknown (F. Roland, Personal Comm., 2003). Below is a summary of the three funding sources.

- The Salmon Recovery Funding Board (SRFB) administers funds for salmon recovery (Salmon Recovery Funding Board, 2002). The mission of SRFB is to support salmon recovery by funding habitat protection and restoration projects and related programs and activities that produce sustainable and measurable benefits for fish and their habitat. SRFB salmon recovery projects may include acquisition; in-stream passage or diversion; in-stream, riparian, upland, or estuarine habitat actions; or assessments and studies. The projects funded by SRFB grants are intended to maintain habitat value, integrity and functionality over time. Lands acquired in fee with SRFB assistance must be dedicated to habitat conservation, outdoor recreation or salmon recover uses in perpetuity. This is done through a recorded Deed of Right to Use Land for Habitat Conservation, Salmon Recovery, or Outdoor Recreation Purposes. This Deed conveys property interests to the public forever. Natural resources

and facilities purchased or assisted with SRFB funds cannot be converted to uses other than those for which the funds were originally approved in accordance with WAC 420-12.

- A portion of King County's Shoreline Improvement Fund is set aside for the protection of marine resources, including the restoration and acquisition of anadromous fish habitat. These funds are the accrued interest from West Point and Renton wastewater treatment plant mitigation money (K. Anderson, Personal Comm., 2003). No other conditions are known to be attached to these funds.
- The Governor's Salmon Recovery Office distributes federal appropriations for early action salmon recovery efforts. King County was granted the funds for the acquisition of lands essential for the protection of listed chinook salmon. No other conditions are known to accompany the funding source (K. Anderson, Personal Comm., 2003).

Part 3. Ecological Resources

This section describes the natural resources and ecological processes present at the Fall City Natural Area. A complete biological inventory has not been completed at this location. Therefore, the information present here is not comprehensive.

Topography and Climate

Fall City Natural Area is predominantly flat and lies within the Snoqualmie River's 100-year floodplain. The maximum elevation is approximately 77 feet above sea level and the minimum is approximately 65 feet above sea level. The levee appears to be as much as five feet higher than the adjacent natural topography.

The Snoqualmie River Basin in the vicinity of the Fall City Natural Area experiences relatively mild wet winters and warm, drier summers typical of the Puget Sound region. Snow and freezing temperatures are common in the upper elevations. The Pacific Ocean moderates the climate and summers rarely exhibit hot weather. Orographic effects from the Cascade Range cause precipitation to increase with elevation. Average annual precipitation ranges from about 60-inches in the Snoqualmie River Valley to over 180-inches in the Cascade crest. The majority of precipitation falls within a period from November to April.

Soils

The soil survey, King County Area, Washington (Snyder et al, 1973) maps soils within the property boundaries as largely Puyallup fine sandy loam and, to a much lesser extent riverwash. Puyallup fine sandy loam is generally found on flat areas, in natural levees or in the valley bottoms. It is not listed on the soil survey list of hydric soils. Riverwash consists of long, narrow areas of sand, gravel, and stones along channels of larger streams. It is mapped in the area of the former meander bend and is considered hydric. These soils were developed under conditions representative of floodplain landforms sufficiently wet to support the growth and regeneration of hydrophytic vegetation. A soil sample taken from the reed canary grass field did not meet the color criteria for hydric soils (King County Department of Natural Resources and Parks, 2002).

The site is also recognized as a seismic and erosion hazard according to the King County Sensitive Areas Ordinance, King County Code Chapter 21.54 (King County Department of Parks, Planning and Resources, 1990).

Snoqualmie River Basin Hydrology

The Snoqualmie River originates in the Cascade Mountains and flows a total of 85 miles to the confluence with the Skykomish River. The Snoqualmie River Basin comprises 692 square miles and nearly a third of the Snohomish River Basin (Water Resource Inventory Area [WRIA] 7). Approximately 75% of the Snoqualmie Watershed lies within the Forest Production District (Solomon and Boles, 2002). A system of levees and revetments has fundamentally altered the dynamic flooding processes of the Snoqualmie River in terms of its in-channel and riparian habitat, sediment load, channel migration and interaction with its floodplain.

The upper basin above Snoqualmie Falls has three principal tributaries, the Middle, North and South forks of the Snoqualmie River. These tributaries are characterized by moderate to steep channel gradients and relatively broad river channels with portions of the tributaries confined by valley walls. Emerging from mountainous terrain the three tributaries converge just upstream of the city of Snoqualmie where channel gradients begin to decline. The decline continues as the river approaches Snoqualmie Falls. Slack-water conditions caused by geologic features just above Snoqualmie Falls form an effective coarse sediment trap for most of the material transported for the upper basin. Snoqualmie Falls, which plunges 267 feet over the bedrock ledge, is an upstream fish-passage barrier (King County Department of Natural Resources, 2001).

In the lower basin below Snoqualmie Falls the river only drops 100 feet in 40 river miles. The channel follows a strongly meandering course through the lower Snoqualmie Valley. The Tokul River, Raging River, and the Tolt River are the major contributors of coarse sediment to the Snoqualmie River. Minimal coarse sediment is carried all the way to the Snohomish River and is instead distributed as substantial gravel and cobble bars below each of the respective confluences (King County Department of Natural Resources, 2001).

River Morphology within the Fall City Reach

The Snoqualmie River meanders for most of its course across a broad alluvial floodplain through the lower Snoqualmie Valley. The upper meandering reach is well developed and includes numerous oxbow lakes, relict channels and wetlands. At the confluence of the Raging River and Snoqualmie River (RM 36) the broad lower valley floodplain commences and loses much of its gradient, virtually eliminating its capacity to move sediment. The Snoqualmie River, as it flows in close proximity to the Fall City Natural Area, is characterized by extensive riffle and run combinations (Snohomish Basin Salmon Recovery Forum, 2001). Remnant side channels are evident below the confluence indicating the presence of greater channel diversity in the past (Collins and Sheikh, 2002).

At the Fall City Natural Area the main channel of the Snoqualmie River (RM 34.3) was relocated in the 1930's cutting off a former meander bend in the right-bank (Snohomish Basin Salmon Recovery Forum, 2001). A large back channel now connects to the Snoqualmie River at the downstream end of the property. The channel fills from the downstream end when the mainstem floods. Two levees (Carlson Upper and Number 25) running the length of the site prevent high flows from maintaining a larger side channel (Snohomish Basin Salmon Recovery Forum, 2001).

Wetlands

The property contains two inventoried wetlands (129b) in the north-central portion of the property that are identified on the U.S. Fish and Wildlife Service's National Wetland Inventory (King County Department of Parks, Planning and Resources, 1990). The "b" indicates that the wetlands have been mapped in the

inventory but the location has not been verified in the field. The wetlands are classified as palustrine, scrub-shrub and seasonally flooded (Cowardin et al., 1979). Each of the wetlands is approximately two or three acres in size. According to the King County classification system (King County Code 21A.06.1415) they are Class 2 wetlands. A 50-foot buffer measured from the wetland edge is required (King County Code 21A.24.320).

A third wetland has been identified on the National Wetland Inventory in the former meander bend (King County Department of Natural Resources and Parks, 2002). It is classified as palustrine, forested and seasonally flooded. Water is present year-round in parts of the former river channel. The King County Code classifies these forested wetlands as Class 2.

Standing water has been observed in and adjacent to the deeply rutted access road in many locations. Small-fruited bulrush, sawbeak sedge and other obligate wetland vegetation have been identified in these areas (King County Department of Natural Resources and Parks, 2002). No wetland delineations have been performed.

Vegetation

A majority of the site is heavily forested (70%), almost exclusively with mature native deciduous trees and shrubs. Red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa*), and big-leaf maple (*Acer macrophyllum*) dominate the deciduous tree layer. Most of the cottonwood and big leaf maple trees appear to be greater than 40 years old. The alders range from 20 to 60 years of age. Some cascara (*Rhamnus purshiana*) is found. Only a few Western red cedar (*Thuja plicata*) and Sitka spruce (*Picea sitchensis*) are found on the site and they appear to be greater than 50 years old. Also found are non-native cherry trees, possibly remnants of a former orchard.

The dominant plants in the understory shrub layer are salmonberry (*Rubus spectabilis*) and snowberry (*Symphoricarpos alba*). Also growing on the site are Indian plum (*Oemleria cerasiformis*), Pacific willow (*Salix lasiandra*), red elderberry (*Sambucus racemosa*), hazelnut (*Corylus cornuta*), and vine maple (*Acer circinatum*). Piggyback (*Tolmiea menziesii*), fringe cup (*Tellima grandiflora*), lady fern (*Athyrium filix-femina*), and sword fern (*Polystichum munitum*) are found in the groundcover layer. Two emergent wetland plants, small-fruited bulrush (*Scirpus microcarpus*) and sawbeak sedge (*Carex stipata*), are found on-site.

Non-native plant species are prevalent on about 15 percent of the site. Many species are on the King County Noxious Weed List (2002) and their control is strongly encouraged. Japanese knotweed (*Polygonum cuspidatum*), Himalayan (*Rubus discolor*) and evergreen blackberry (*Rubus laciniatus*), reed canary grass (*Phalaris arundinacea*), and clematis (*Clematis spp.*) are the most prevalent non-native plants. Manroot (*Marah oreganus*), considered to be a native plant, is also growing on the site. Because of its fast growth and climbing nature, it can be very destructive to other plants (King County Department of Natural Resources and Parks, 2002).

Fish and Wildlife

The Snohomish River system sustains two genetically distinct runs of chinook salmon (*Oncorhynchus tshawytscha*); the fall run uses the Snoqualmie River system (Washington State Department of Fisheries, 1993). The Snohomish River fall chinook salmon are listed as threatened under the federal Endangered Species Act and are part of the larger Puget Sound chinook salmon evolutionary significant unit (Washington State Department of Fisheries, 1993). Adults generally start to enter the Snoqualmie River system in August and the spawning period lasts from the last half of August through October. The

Washington State Salmon and Steelhead Stock Assessment (1993) describes the stock as native with wild production.

The Snoqualmie River and its tributaries contain the largest amount of high quality salmonid habitat in King County. The Snoqualmie River supports wild populations of coho, chinook, chum and pink salmon as well as steelhead, cutthroat and rainbow trout and bull trout, which is a native char (King County, 2001). The portion of the Snoqualmie River that contains the Fall City Natural Area provides spawning habitat for up to half of the chinook salmon that spawn in the Snoqualmie River basin.

The annual escapement from 1965 to 1976 averaged 1,187 fish while the annual escapement from 1987 to 1998 averaged 1,778, a nearly 50% increase over the base period (Snohomish Basin Salmonid Recovery Technical Committee, 1999). The range of escapements between 1987 and 1998 has been from a low of 908 to a high of 2,725 fish (Snohomish Basin Salmonid Recovery Technical Committee, 1999). Other numbers show average escapement from 1996 to present as 2,005 fish (K. Anderson, Personal Comm., 2003). This positive trend is somewhat surprising considering the frequent flooding episodes and habitat problems in the Snohomish River system. However, recent data provided by the Puget Sound Salmon Forum (2001) indicates that annual escapement from 1996 to 2000 averaged only 1,200 fish.

The Fall City Natural Area itself has been identified as a “focus area” in the Snohomish River Basin Chinook Salmon Near Term Action Agenda (2001). Focus areas are regarded as important links to the recovery of the chinook salmon evolutionary significant units and are determined from biological data on the level of habitat use. The Fall City Natural Area lies within the Focus Area VII, encompassing the mainstem of the Snoqualmie River at the confluence with the Raging River. Riparian habitat conditions are fair to good through much of the reach, with about 33% of the riparian area in public ownership (Snohomish Basin Salmon Recovery Forum, 2001).

The Snohomish River Basin Salmonid Habitat Conditions Review (2002) evaluated the Snoqualmie River’s upper mainstem habitat conditions (RM 34.8 – RM 23.9) in the vicinity of the Fall City Natural Area reach. The review indicates that habitat conditions are “moderately degraded” or “degraded” in terms of the basin processes and habitat structure essential for the natural productivity of chinook salmon and other salmonids.

The presence of a sizable back channel and mature riparian cover along the river and in the floodplain provides high quality salmon habitat in the Fall City Natural Area, specifically good chinook salmon winter rearing and juvenile habitat. Several other salmonid species may use the natural area, including coho salmon (*O. kisutch*), chum salmon (*O. keta*) and cutthroat trout (*O. Clarkii*).

The Snoqualmie River corridor at the Fall City Natural Area is identified as a wildlife habitat corridor in the King County Comprehensive Plan (2000). The Fall City Natural Area offers significant habitat for a variety of mammalian wildlife. Deer, black bear, coyote, cougar and bobcat use the site. Raccoons, beaver and muskrat are believed to exist along the river’s edge. The site provides habitat for a variety of birds including, raptors. In addition, waterfowl, great blue herons and a variety of amphibians are present.

Part 4. Land Use and Infrastructure

This section describes public use, access points and site infrastructure such as trails and roads at Fall City Natural Area.

Current and Public Use

Public use of the Fall City Natural Area is minimal since it was previously private land and therefore has no history of regular public use. In addition, the site's limited access and general undeveloped character discourage use. No formal trails exist on site although informal passive recreation activities such as walking, nature observation and fishing occur on the site. However, as people become more aware of the site and its recreational opportunities visitation will increase.

Access

One unpaved access road located on Neal Road about 1.5 miles from the Neal Road-Hwy 203 intersection serves as the entry point to the property. In the past the road likely provided a means to bisect the property and access the river. However, over time the road has deteriorated and is virtually impassable. The access road is currently secured with ecology blocks and chain. Currently the access is not suitable for vehicle traffic or parking. Visitors usually park along the shoulder of the road or in the Washington State Department of Fish and Wildlife's undeveloped parking area one mile to the west.

Trails and Roads

Fall City Natural Area offers no formal trails, although pedestrians use the access road as a trail. The road provides public users with river access and a means of bisecting the property. The road crosses the former river channel, travels roughly through the center of the property, turns south and closely parallels the levee, ending on the southern portion of the property. The road is deeply rutted, overgrown with vegetation and traverses wetlands areas. The road is not maintained for public use. A small number of public users also access the property from the Washington State Department of Fish and Wildlife property to the west via a primitive trail on the levee.

King County Stewardship and Restoration Activities

The Fall City Natural Area's yearly on-going maintenance and stewardship is provided by King County DNRP staff under the direction of the Water and Land Resource Division and documented in the annual Site Maintenance Plan (SMP). The SMPs document on site tasks including but not limited to: site inventory, park inspection, natural area monitoring, public relations/compliant resolution, invasive and non-native weed removal, litter/pick-up and natural area restoration.

The Neal Road Riparian Enhancement Project funded through the Small Habitat Restoration Program (Project 2M1798) has been underway since April 2002. The project's restoration goals are to enhance lowland-forested floodplain conditions by establishing a mixed deciduous and coniferous forest buffer. Restoration is to be primarily targeted along the old road and adjacent the former meander channel. The benefits of the restoration will include shading of the channel, sediment trapping, erosion protection during flooding, a source of large woody debris, creation of a forest canopy that will help control non-native plants by shading, enhanced wildlife habitat, preservation of the rural character and recreational opportunities. The project is to be implemented through 2005.

In the 2002/2003 planting season the restoration project successfully planted 1,000 bare-root conifers along the old road and former meander channel. Damage by deer and beaver occurred and nearly 100 trees were replaced. For protection against beaver, 65 conifers were caged. Approximately 5000 square feet of weed fabric was also laid down to control primarily Japanese knotweed and non-native blackberry.

Maintenance for 2003 includes stomping reed canary grass and continued monitoring. In the 2003/2004 planting season restoration will continue along the old road and former meander channel.

Flood Reduction

Flooding of the Fall City Natural Area occurs with relative frequency. Beginning in the 1930's the main channel of the Snoqualmie River at the Fall City Natural Area was relocated to promote agriculture by reducing the persistence of flooding (Snohomish Basin Salmon Recovery Forum, 2001). King County embarked on a River Improvement Program in the 1960's and 1970's to improve flood control along the Snoqualmie River. The improvement program focused primarily on an aggressive campaign of levee construction, river channel dredging and flood emergency preparations. The Carlson Upper and Number 5 levees were built along the entire Fall City Natural Area reach to prevent mainstem channel migration.

The Snoqualmie River in close proximity to the Fall City Natural Area frequently floods. In response, King County has proposed several projects in the vicinity of the natural area to limit flood damages. The King County Flood Hazard Reduction Plan (1993) identifies two potential projects: 1) Neal Road project (#213) which called for bioengineered bank stabilization, road relocation and road abandonment to alleviate damages to Neal Road and 2) Fall City project (#214) which called for dredging the river channel and raising and setting back levees to protect property. A gravel removal study is also being conducted on the Snoqualmie River near the Fall City Natural Area to respond to community concerns that sediment accumulation is causing flooding (King County Department of Natural Resources, 2002). However, the listing of salmonid species as threatened under the federal Endangered Species Act may affect the likelihood of the flood reduction projects.

Part 5. Site Management Chronology

This section chronicles management activities at the Fall City Natural Area. When known, costs associated with these activities are included.

Date	Action	Associated Costs (if known)
Fall 2001	Secure entrance with ecology blocks and chain.	
Fall 2001 – Spring 2003	Neal Road Riparian Enhancement Project (Small Habitat Restoration Program). Planted approximately 1,400 plants and installed 5,000sq.ft. weed block fabric.	Cost: \$15,000 including labor and materials

Part 6. Analysis

This section is intended to integrate site-specific information, public access considerations and the larger landscape considerations described in the conservation principles section of the King County Ecological Lands Handbook (2003). This section presents the analysis from which site management recommendations will be made.

Species of Concern

Due to the lack of a comprehensive biological inventory at the Fall City Natural Area, the species identified in this document very likely do not account for all species that use the Fall City Natural Area for one or more stages of their lifecycles.

Documented evidence of two threatened species listed under the federal Endangered Species Act, chinook salmon and bull trout, make habitat preservation and enhancement the central priorities at the Fall City Natural Area. Activities that have the potential to harm these species should be undertaken cautiously, if at all. Habitat for salmon and bull trout should be protected and enhanced where necessary and appropriate. The intact forested riparian habitat of the Fall City Natural Area (which is in general decline from its historical abundance in the Snoqualmie Valley) is relatively scarce within the basin and therefore contributes significantly to the protection of chinook and bull trout.

Since chinook and bull trout protection is of critical importance long-term sustainable management actions must address foremost ecological process and structure on site.

Information Gaps

In the absence of more complete site information, actions intended to restore parts of the systems present at Fall City Natural Area may inadvertently harm rare or critical species and habitats, or negatively affect the ecological processes at the site. To avoid this, it would be prudent to complete a biological inventory designed to gain a more thorough understanding of the ecological species that use the area. This information can be used when evaluating the full spectrum of ecological impacts from natural disturbances, proposed habitat restoration, public use activities and management recommendations.

Ecological Processes

Ecological processes must be maintained for ecosystems and habitats to be sustained. Current conservation theory suggests that where ecological processes are intact, systems are likely to recover – or be recovered – more easily from disturbances or inappropriate actions if the actions themselves are not permanent. Conversely, the more interference there has been with the basic ecological processes the greater the severity and longevity of effects (King County Ecological Lands Handbook, 2003). If systems are not functioning properly management activities should focus on system-wide processes instead of the affected elements. Ultimately, management actions that do not consider the processes are less sustainable.

Bearing this concept in mind, management interventions within the Fall City Natural Area should strive to maintain and restore basic ecological processes through floodplain reconnection activities. As a result of levee construction that constrained the river, the Fall City Natural Area has been deprived of the free-flowing movement of water in the river channel, which sustains the floodplain. When a river is constrained, the river's natural processes, such as meandering and flooding are curtailed, thus diminishing riparian ecosystem complexity, diversity and function. Meandering, a natural response to sediment deposition, allows for habitat complexity and the recruitment of large woody debris, both critical to creating habitat features (log-jams, pools and side channels) necessary for healthy salmon habitat. Flooding carries nutrient rich silt and seeds of plants onto the floodplain for the natural regeneration of riparian forests. Essentially, without the dynamic natural ecological processes associated with the natural floodplain conditions, restoration will be difficult.

At the Fall City Natural Area, many strategies exist to conduct floodplain reconnections and hence target the enhancement of ecological process. Complete levee removal is a possible alternative although the need to protect the nearby road and farmland may be a constraint (along with budget considerations). The Snohomish River Basin Chinook Salmon Near Term Action Agenda (2001) proposed removing part or all of the entire levee within the Fall City Natural Area reach, to “increase the frequency and amount of flow through the side channel to improve habitat conditions” for salmon. Other possible alternatives include strategies to increase over-bank flooding or increasing the velocity of flow thorough the large back channel. Any floodplain reconnection strategies should consider flood-related impacts and consequences and include a comprehensive feasibility study and impact assessment.

Although over the short-term floodplain reconnection interventions may have undesirable effects (for example on structure and public use), they will likely help restore hydrologic and ecological processes over the long-term. Thus, these interventions will likely lead to improved ecosystem diversity, riparian habitat and succession as well as improved water quality by increasing residence times for sediment, water and nutrients. As a result they would also likely provide greater rearing and over wintering side-channel habitat conditions for salmon by providing food and refuge.

Ecological Structure and Function

Although addressing the ecological processes is a top management priority, the uncertainty of doing so in the Fall City Natural Area makes it appropriate to restore structure as an interim measure.

A structurally diverse and functioning forested floodplain area provides numerous ecological benefits such as shading the river, trapping sediment and detritus in the floodplain, preventing excessive erosion during flood events, delivering large woody debris and creating a canopy that shades out noxious and invasive plant species. The Fall City Natural Area offers opportunity for restoring the floodplain through native tree and shrub plantings as well as controlling noxious, invasive and non-native plant species.

The Neal Road Riparian Enhancement Project currently being implemented on site has planted over 1,000 trees since the spring of 2002. The plantings represent a mixture of coniferous and deciduous species commonly associated with riparian areas in western Washington. Inherent in the restoration efforts are attempts to maintain structural complexity, plant diversity and multiple canopy layers in order to provide a variety of vegetative and physical features that would provide a number of niches for wildlife. It is important to note that restoring structure to the site through tree plantings provides benefits for some species (salmon and songbirds) while potentially degrading conditions for others (raptors and deer).

In the event that floodplain reconnection projects are ultimately implemented to restore ecological processes, current restoration projects to restore structure and function may be lost in the short-term due to processes of hydrologic connectivity, flooding and river meander. However, over the long-term structure and function will likely be restored by these processes.

Monitoring

There are two types of monitoring: 1) monitoring of management actions to determine if they are succeeding in their objectives; and 2) monitoring of processes on lands where no management action is taking place to determine if management action is needed (King County Ecological Lands Handbook, 2003). Since natural and social systems are uncertain, dynamic and in a constant state of flux monitoring information is used to adaptively manage the site.

While a long-term monitoring regime of the Fall City Natural Area would provide an early warning of ecological change on the site, it is not feasible at this time. If future projects are initiated to enhance the ecological processes on site or if public use increases substantially, an appropriate monitoring framework should be administered. However, King County Department of Natural Resources and Parks staff should monitor public use and noticeable ecological impacts to the site as much as possible. Photographic evidence should be kept in order to visualize short and long-term changes.

Public Use

Aquatic and riparian habitats are especially vulnerable to recreational activities (Washington State Department of Fish and Wildlife, 1997). Currently, Fall City Natural Area supports low numbers of visitors engaged in recreational activities such as nature observation and fishing. The current level of use appears to have no adverse effect on the ecological resources. However, future public use of the Fall City Natural Area will likely increase as King County Department of Natural Resources and Parks publicizes the available resources and the public becomes more aware of them. If public use does increase, then substantially improved trails, parking facilities and interpretative/educational opportunities should be explored.

Regardless of the amount of public use on site, recreational use should remain confined to the upland areas and away from rare and sensitive portions of the site. These riparian areas lack the capability to resist changes in environmental conditions and/or lack the resilience to recover from change. At this time, there appears to be no reason to install visitor infrastructure such as improved trails or parking facilities at the Fall City Natural Area. Monitoring changes in public visitation, types of use and impacts on the ecological systems will alert land use managers to needed management adjustments.

Other public access sites that offer recreational opportunities in the area include the adjacent Washington State Department of Fish and Wildlife lands (one mile west) and Fall City Park (two miles south). Currently these public lands meet the local demand for recreational facilities making development of additional facilities or access at the Fall City Natural Area a low priority. However, future opportunities may exist to partner with the Washington State Department of Fish and Wildlife to provide access to the Fall City Natural Area via a low impact trail on top of the levee and through the upland portions of the site.

In the future King County may want to explore expanding the Fall City Natural Area through conservation easements and/or the acquisition of adjacent lands to establish greater habitat connectivity and to better preserve the integrity of this important reach of the Snoqualmie River. However, a key consideration in the acquisition process must be its impact on neighboring agricultural lands and regional agriculture. Since adjoining properties are within the designated APD it might be more beneficial if retained in private ownership to support agricultural uses.

At this point in time no revenue generating opportunities are foreseeable at the Fall City Natural Area.

Part 7. Management Goals, Objectives and Recommendations

The objectives and recommendations in this section are derived from the analysis in the previous section. Office of Rural and Resource Programs staff will revise the recommendations for the Fall City Natural Area when new information from site monitoring programs and other initiatives indicate a need to change management strategies.

Goals for Fall City Natural Area

The King County Department of Natural Resource and Parks staff will strive to:

- conserve and enhance ecological value, and
- accommodate appropriate public use that does not harm the ecological resources on site

The objectives and recommendations that follow are designed to support these goals when practicable at the Fall City Natural Area. The corresponding matrix (Table 3) designates the King County Department of Natural Resources and Parks staff involved in implementing the specific recommendations.

Objective: Enhancement of natural floodplain conditions

➤ *Recommendation: Consider conducting floodplain reconnection*

King County Department of Natural Resources and Parks should initiate and conduct a feasibility analysis to develop and evaluate strategies for floodplain reconnection. The feasibility analysis should provide cost estimates as well as enhancement alternatives that attempt to restore ecological processes on site, optimizing hydrologic connectivity and habitat conditions (in-stream and riparian). Project design should define monitoring strategies and ensure that necessary baseline data is collected. Any floodplain reconnection project should consider flood-related impacts to adjacent properties and infrastructure and include a comprehensive feasibility study and impact assessment.

➤ *Recommendation: Plant native trees and shrubs*

King County Department of Natural Resources and Parks staff should work to plant native trees and shrubs on site to facilitate the enhancement of the forested floodplain. Staff should initiate opportunities such as volunteer tree planting events and solicit donations of native tree starts. Priority areas for plantings should be identified.

Native tree and shrub plantings in the Fall City Natural Area have been implemented since the summer of 2002 as part of the Neal Road Riparian Enhancement Project. The plantings are likely to continue during 2003 and 2004 if funding is available.

King County Department of Natural Resource and Parks staff should remove weed fabric and protection installed around tree plantings when monitoring indicates the trees will prosper without such protection measures. All plantings should be monitored often to estimate tree survival and health as well as to assess watering needs, disease, animal damage and competition.

King County Department of Natural Resources and Parks staff should consider future long-term enhancement programs that seek to plant native trees and shrubs since current projects are proposed only through 2004. Funding sources and grants should be established to cover expenses. Overall goals and objectives of the Fall City Natural Area will require long-term commitments to future enhancement projects, studies and monitoring.

➤ *Recommendation: Control noxious, invasive and non-native plant species*

King County Department of Natural Resources and Parks staff should manage the noxious, invasive and non-native plant species that infest a large portion of the Fall City Natural Area. To accomplish this task efficiently, staff should prioritize areas of high infestation.

Currently, noxious, invasive and non-native plant species controls have been implemented as part of the Neal Road Riparian Enhancement Project in a small area close to the former access road and along the meander channel.

Methods of control should include cutting the plant species where they are found and if possible using weed fabric or similar materials to cover invested areas until monitoring indicates success. If necessary, staff should explore and implement alternative methods of control as part of an Integrated Pest Management program. After several years successful tree plantings should also begin to shade out noxious, invasive and non-native plant species in the Fall City Natural Area.

Objective: Fill data gaps

➤ *Recommendation: Complete comprehensive biological inventory*

The absence of complete information limits the scope and accuracy of management decisions. A comprehensive and thorough biological inventory should be completed by the King County Department of Natural Resources and Parks to provide the necessary baseline information.

Objective: Allow levels of public use that do not impact ecological resources

➤ *Recommendation: Implement preserve and protect measures*

Limited low-impact public use is compatible with the site goals provided that the ecological resources are not impacted, access is feasible and parking is adequate. King County Park staff should recommend, install and maintain any necessary capital improvements to protect the site from inappropriate public uses. Currently, since public use is low and no formal trails exist on site, no capital improvements are scheduled.

King County Park staff should install and maintain more visible signs at the entrance of the site or along Neal Road to indicate King County ownership of the property. The signs should indicate the ecological value of the Fall City Natural Area and its importance to salmon conservation efforts as well as the purpose for site restoration. Staff should explore installing a “rules” sign if public use warrants.

King County Department of Natural Resources and Parks staff should explore expanding the Fall City Natural Area through conservation easements and/or acquisition of adjacent lands to establish greater habitat connectivity, public use opportunities and to better preserve the integrity of this important reach of the Snoqualmie River. However, a key consideration in the acquisition process must be its impact on neighboring agricultural lands and regional agriculture. Since adjoining properties are within the designated APD it might be more beneficial if retained in private ownership to support agricultural uses.

➤ *Recommendation: Monitor public use*

King County Park staff should note and record changes in visitor numbers and types of public use activities at the Fall City Natural Area. Noticeable visitor impacts on the ecological values of the site should be recorded. This information should be reported annually to the King County Natural Resource Lands Program for updating and adapting site management guidelines.

Objective: Implement Site Management Guideline Recommendations

➤ *Recommendation: Site Maintenance Plan Creation*

King County Park staff should prepare a site maintenance plan for Fall City Natural Area that incorporates these site management plan recommendations. King County Natural Resource Lands staff and the Snoqualmie River Basin Steward should collaborate on this effort.

➤ *Recommendation: Coordinate implementation of Site Management Guideline Recommendations*

King County Natural Resource Lands staff should monitor the recommendations in the site management guidelines and coordinate with the various programs responsible for implementing these recommendations to facilitate their timely accomplishment.

King County Natural Resource Lands staff should coordinate with Snoqualmie River Basin Steward and King County Park staff to revise the site management guidelines as needed.

Table 3. Matrix of Fall City Natural Area Management Recommendations

Recommendations	Cost	Year	Park Resource Staff	Basin Steward	WRIA Project Coord.	CPOSA/ Contract	WEAT	FHRS	NRL staff
Priority One									
Site maintenance plan creation		Annual	X	X					X
Monitor public use		On-going	X						
Implement preserve and protect measures		On-going	X						X
Priority Two									
Plant native trees and shrubs		2003-2005	X	X		X			
Control noxious, invasive and non-native plant species		On-going	X	X		X			
Complete comprehensive biological inventory		2003-2004	X	X		X	X		X
Coordinate implementation of site management guideline recommendations		On-going	X	X					X
Conduct floodplain reconnection		N/A	X	X	X	X	X	X	X

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