Riverview Wildlife Refuge Master Plan

City of Snohomish
Steering Committee Report
June 18, 2013

Birds are important because they keep systems in balance: they pollinate plants, disperse seeds, scavenge carcasses and recycle nutrients back into the earth.

But they also feed our spirits, marking for us the passage of the seasons, moving us to create art and poetry, inspiring us to flight and reminding us that we are not only on, but of, this earth. ***—Melanie Driscoll, Director of bird conservation for the Gulf of Mexico and the Mississippi Flyway***

Mallards; Top photos-clockwise from top left: Pine Siskin, Osprey nest platform, Rufous-Sided Towhee, Snow Owl.

In Grateful Acknowledgement
to all who contributed to the Riverview Wildlife Refuge Master Plan.

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Riverview Wildlife Refuge

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At Arlington Stormwater Ponds (L-R) Bob Krull, Bill Fulton, Kathleen Snyder, Bill Blake (Arlington), Ann Stanton, Jamie Bails

Riverview Wildlife Refuge

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Cover photo: Red-Tailed Hawk at Refuge. Cover and page *i* photos by Bill Fulton

EXECUTIVE SUMMARY

Birds represent a link to both our natural environment and to the possibility of freedom to soar without boundaries. —***Rue Map**, Founder, Outdoor Afro*

Wastewater Treatment Plant Levee Path – Mike Johnson 2012

Introduction

The City of Snohomish and Pilchuck Audubon Society are partnering to improve local wildlife viewing opportunities. This report describes a vision for long term use of an extraordinary public waterfront resource on the Snohomish River.

City Council appointed a Steering Committee in 2012 to develop plans for improving the quality of the public's experience along the Snohomish River. Snohomish School District representatives provided input on educational activities the site could support. Snohomish police officers, State Department of Fish & Wildlife habitat biologists, Boeing Bluebill volunteers, City of Arlington stormwater staff, Lively Environmental Center managers and others contributed valuable support and inspiration to the work of the Committee.

Refuge Goal

Manage for wildlife habitat, low-impact human presence and City utility needs.

Compatible Long-Term Public Uses

Examples of compatible recreational and educational uses include walking, bird watching, photography, and school activities related to data gathering, etc. These recreational activities can be supported within selected areas of the City's portion of the wildlife refuge with minimal harm to wildlife. Further limiting access to specific areas or particular seasons can provide additional tools to protect critical wildlife activities such as bird nesting and rearing while maintaining recreational opportunities.

General Concepts

- Improve and protect the area's wildlife habitat, especially riparian habitat.
- Create topographic and habitat variety within the former lagoon area.
- Provide wildlife viewing and interpretive features.
- Strengthen physical connections to existing wildlife corridors.
- Enhance scenic views into natural vegetation along Second Street, a city entry.

Guiding Principles

Guiding principles for development and operation of the wildlife refuge can secure a vital and thriving future of this resource. The concepts listed below are expanded in the Design Report section of this plan.

Management
To promote the City's ability to meet its long-term commitments to provide quality public services, refuge improvements should be durable, low maintenance, and flood-friendly. Uses should be compatible with City utility operations and maintain site availability for other utility needs. Improvements should support visitor security.

Environment
Adaptive management is the overall principle for improving habitat values in the refuge. Management actions should be monitored and adapted as they can be evaluated for their effects.

Recreation and Learning
Public use recommendations are for passive recreation and education activities, with an emphasis on the rich opportunities present to observe wild birds.

SNOHOMISH
WASHINGTON

RIVERVIEW WILDLIFE REFUGE

MASTER PLAN

GAR CEMETERY
85TH AVE SE
RIVERVIEW RD
WILDLIFE HABITAT
CEMETERY CREEK
WILDLIFE HABITAT
PAVED SHOULDER TO CITY LIMITS
SR 9
AVENUE J
LUDWIG RD
COVINGTON CT
FIFTH ST
ACCESSIBLE VIEWPOINT
8' CONCRETE SIDEWALK
PEDESTRIAN-ACTIVATED SIGNAL
JANSSEN POND
P.A.S.
P.A.S.
FUTURE BREACH POINT/BRIDGE
EXISTING SIDEWALK
EX. VEHICLE GATE
VISITOR PARKING (3 STALLS)
Sno. Co. Fields Riffle
D.O.E. REMEDIATION AREA (1 AC. LAGOON SITE)
MEADOW BORDER
HILL
STORMWATER TREATMENT
HIGH VIEWPOINT
SECOND ST
RIVERVIEW LN
AVENUE J
MARSH
WASTEWATER TREATMENT
WETLAND RESERVE
ISLAND
FUTURE PUMP TO EVERETT
EX. RIPARIAN
PEDESTRIAN-ACTIVATED SIGNAL
BOARDWALK
WETLAND
ACCESSIBLE VIEWPOINT
POSSIBLE SR-9 ROW PATH
RESTROOMS
HILL
HABITAT STUDY AREA
PROPOSED PARK
PATH
REFUGE ENTRY GATE
OHOMISH
SNOHOMISH RIVER

KEY

P.A.S.	Pilchuck Audubon Society
	Proposed Pipeline to Everett
	Future Pump
	Future Storm Outfall
	City Limits
	Path
	Fence
	Levee

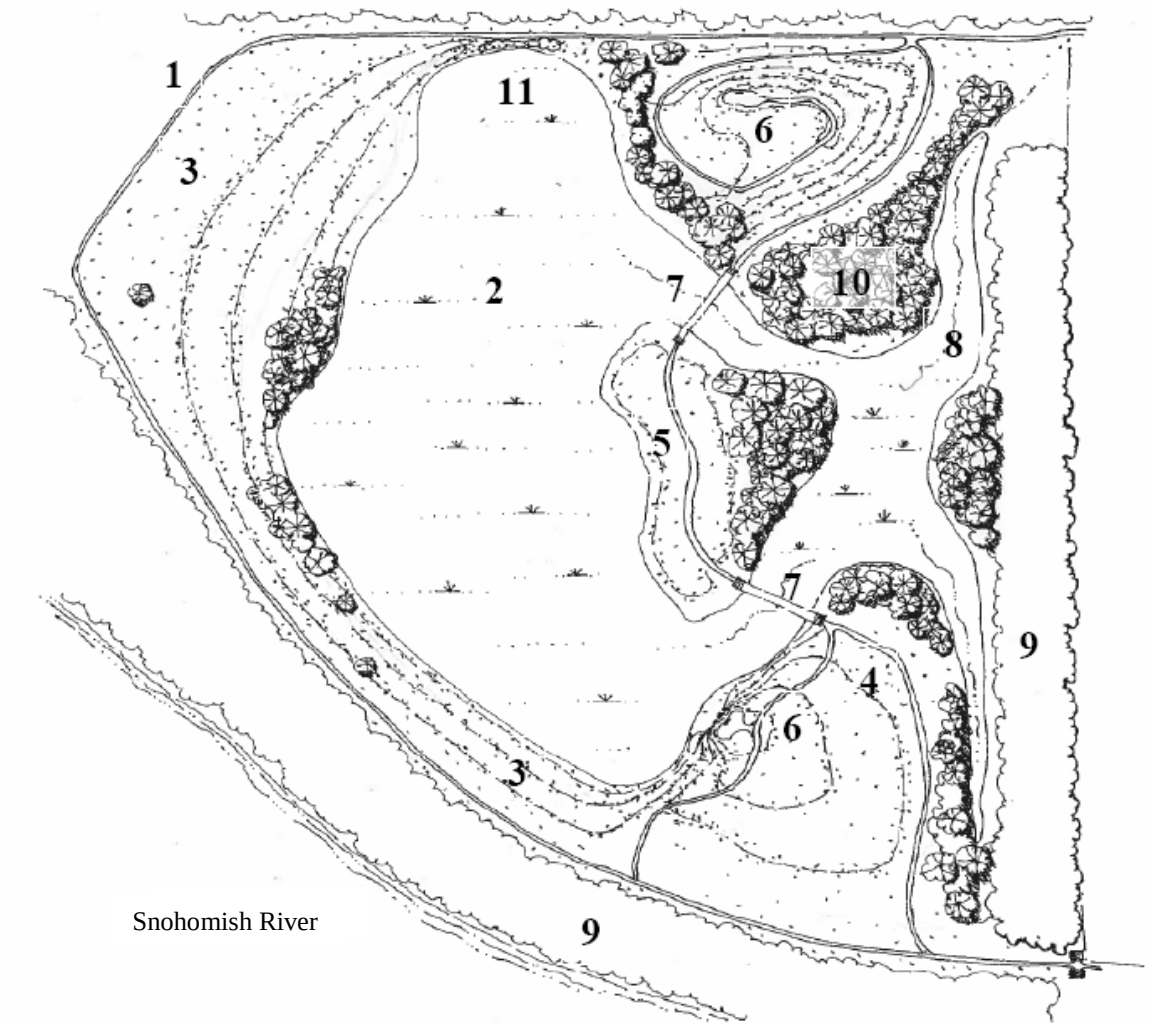
NORTH

250' 0' 250' 500'
HORIZ. SCALE IN FEET

DATE: 6/18/2013

Remove this page

Lagoon Conceptual Plan



Stormwater Treatment and Refuge Development for Former Lagoon Area – Ann Stanton 2013

Lagoon Development Concept

1. Retain existing perimeter path around former lagoon
2. New marsh where fill removed
3. New meadows - on fill placed to path elevation along inside shoulder of levees
4. Loop paths on filled areas, including new "island"
5. New island on fill from marsh and stormwater treatment areas
6. Viewpoints on new hills of onsite fill, 15-30 feet in height above existing path elevation
7. Boardwalks across stormwater treatment channels/marsh
8. Delivery channel for incoming offsite stormwater runoff
9. Retain existing riparian vegetation alongside river and wastewater treatment ponds
10. Add new riparian vegetation along banks of new filled upland
11. Potential breach point on levee for floodwater access and side channel formation
12. (Not shown) park elements: signage, benches, nest platforms, viewing platforms

DESIGN REPORT

Birds matter because they give us wings. And because if we save the birds, we will save the world. —***Pepper Trail**, USFWS forensic ornithologist*

Counterclockwise from upper left: Cemetery, Cemetery Creek, Snohomish River, Wastewater Treatment Plant, SR-9 and City Shop

Project Area Description

Cemetery Creek flows into the Snohomish River through an ancient oxbow, creating a 25-acre marsh and forested wetland rich in birds and other wildlife. This area has been difficult to access, located between a steep hillside, the Snohomish River and the City's fenced Wastewater Treatment Plant. The Pilchuck Audubon Society owns four acres of this confluence wetland. Another twenty acres of the wetland are under a single private ownership; acquisition of this property would enable restoration of its wetland functions.

The City owns seventy acres of riverfront property south of Cemetery Creek on the west side of Highway 9. About fifteen of these acres are dedicated to the City's Wastewater Treatment Plant, leaving approximately fifty acres of meadow (former sewage lagoon), forested river edge and raised levees that may be considered for compatible public access. The levees are above the 100-year flood elevation, but the area is inundated fairly often. The most recent floods occurred in 2006, 2007, 2008 and 2009.

The City also owns an eight-acre site just east of Highway 9 that currently functions as the City's operations and maintenance shop. Five acres are wetland and wetland buffer. The public properties under consideration in this master plan are those areas of the Wastewater Treatment Plant property and city maintenance shop site not currently anticipated to be required for future utility uses.

In 2011, the City completed a paved walking path along First Street just east of State Route 9 that improved public access to almost a mile of walkable levee along the Snohomish River. This levee path offers views into the bird-rich Pilchuck Audubon Society's property within the Cemetery Creek marsh, but further work remains to fully realize the conservation, recreation, and education opportunities of the area.

Former Lagoon

Public use is not appropriate of the former lagoon (low meadow area) in its current state. The presence of unscreened biosolids deposited in the lagoon from approximately 1958 to 1995 indicates that physical access to the meadow should be physically restricted and this restriction publicized with signage. Currently bordered with blackberry-covered side slopes, the meadow area is effectively cordoned off from walking paths on top of the levees.

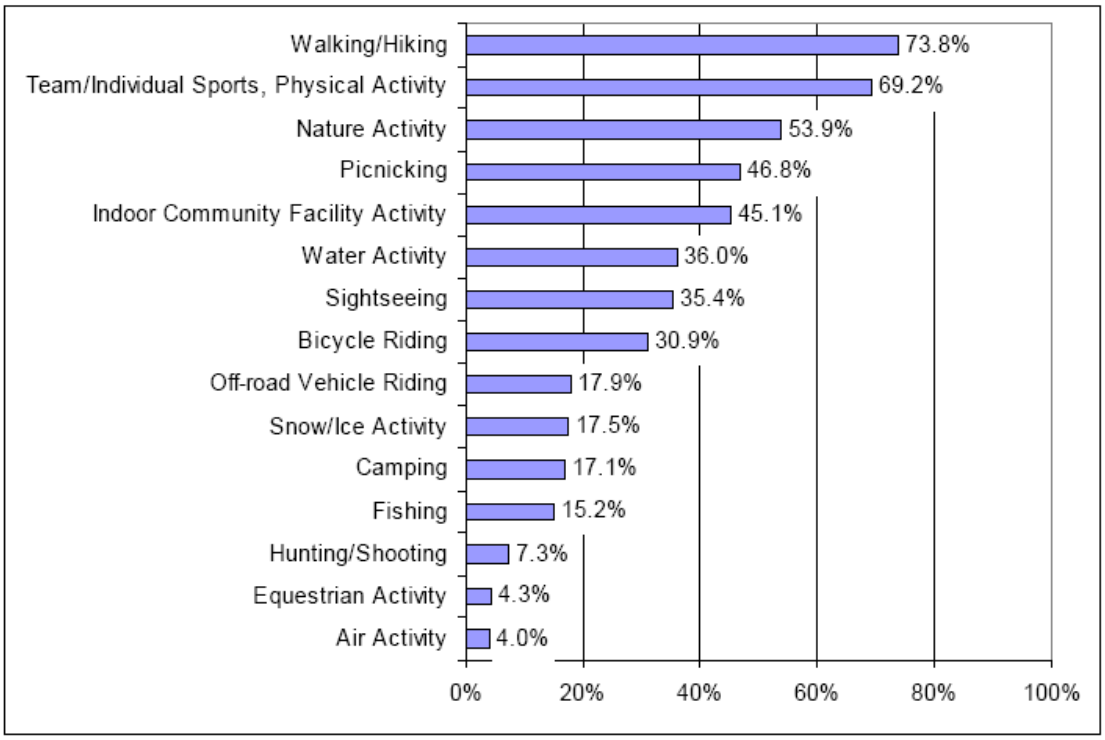
Removal of biosolids, while physically possible, and even desirable from an environmental perspective, would likely be prohibitively expensive. This plan recommends investigating the feasibility of moving existing sediments around within the lagoon's footprint, excavating some areas and filling others to create topographic variety including marshes, ponds, meadows and hills up to thirty feet in height. Biosolid materials can be capped with a layer of clean fill for public access areas and stabilized with gabions, shotcrete slopes and other means to create topographic variety and flood-resilience.

Recreational and Economic Benefits of the Wildlife Refuge

Recreational Benefits

"Walking without a pet" was the most prevalent **outdoor recreation** activity in Washington State in the average month in 2006. 67% of Washington State's population was determined to have participated in this activity. The most frequent **nature** activity in the state in 2006 was "observing or photographing wildlife or nature," performed by at least 39% of Washingtonians (Washington State Recreation and Conservation Office's 2006 Outdoor Recreation Survey Final Report, dated August 1, 2007). The full report is available online and in the Snohomish Library's reference binder on the Snohomish Wildlife Refuge. The following chart is from the report's Executive Summary:

Figure 1: Ranking of Major Activity Areas by Average Month Participation



2006 Outdoor Recreation Survey Final Report-2007

The most frequently occurring recreational activities in 2006 included walking without a pet (3.5 million times), observing or photographing wildlife or nature (3.1 million times), walking with a pet (2.7 million times), jogging or running (2.3 million times), and playground recreation (2.2 million times).

The most frequently mentioned activities that Washingtonians wanted to do more of in the 12 months following the survey interview included sightseeing (46.9%), picnicking or cooking outdoors (39.4%), hiking (33.5%), tent camping with a car or motorcycle (33.4%), and swimming or wading at a beach (28.4%).

Residents of Snohomish may find the Snohomish Wildlife Refuge to be a convenient option for walking and for observing/photographing wildlife and nature.

Economic Benefits of Recreation

17.8 million Americans travelled 1 mile or more in 2011 to watch birds according to the USFWS 2011 National Survey of Fishing, Hunting & Wildlife Recreation. Out-of-town visitors commonly make various purchases; the refuge may promote longer stays to experience a Snohomish which offers a greater variety of activities. The refuge may also support more frequent visits due to seasonal changes in the Refuge.

Bird watching is a popular activity in Washington, and the refuge offers a high-quality birding experience. Birdwatchers have identified over 140 bird species in the refuge. This compares well to the about 330 bird species that are full- or part-time residents in our state. Seattle Audubon Society publishes list of birding sites around Puget Sound which indicates a distributional niche which the refuge could fill for Snohomish County. This map of Puget Sound birding sites is from www.birdingwashington.info.

Birding Trails

The eastern portions of these maps include the Puget trough region:

- Olympic Loop
- Southwest Loop

Birding Sites

1. Blaine/Semiamhoo/Drayton Harbor
2. San Juan Islands
3. Samish Flats
4. Port Susan Bay
5. Crockett Lake
6. Sequim/Dungeness
7. Marrowstone Island/Oak Bay
8. Point No Point
9. Snoqualmie River Valley
10. Marymoor Park
11. Seattle - Discovery Park
12. Seattle Green Lake
13. Seattle - Union Bay Natural Area (Montlake Fill
14. Kent Ponds
15. Quartermaster Harbor
16. Nisqually National Wildlife Refuge
17. Mima Mounds
18. Scatter Creek Wildlife Area
19. Ridgefield National Wildlife Refuge
20. Steigerwald Lake National Wildlife Refuge

www.birdingwashington.info - 2012

Economic Benefits of Watershed Restoration

Recent Oregon studies showed that every $1 million spent on watershed restoration results in fifteen to thirty-three new or sustained jobs, $2.2 million to $2.5 million in total economic activity, and that eighty percent of grant money is spent in the county where the project was located. The Snohomish Wildlife Refuge site contains significant opportunities to promote environmental restoration benefitting salmon recovery, water quality in Puget Sound, and riparian habitat.

The following excerpts from the *2012 Action Agenda for Puget Sound* summarize economic benefits of investment in our regional estuaries and riparian areas like ours:

"There are 68 state parks and 8 national parks, wildlife refuges, forests and other public lands that border Puget Sound. These assets help drive approximately $9.5 billion in travel spending, including 88,000 tourist-related jobs that bring $3 billion in income to the region."

"Restoration projects in estuaries and riparian areas create almost twice as many jobs per $1 million spent than infrastructure projects such as roadwork. Investing in the health of Puget Sound has a higher rate of return on investment and more certain return than most built capital investments."

"In 2010 the investment in Puget Sound protection and restoration was in excess of $251,312,605 in funding, which created 7476 jobs across 565 projects."

Goals & Opportunities

The Wildlife Refuge Master Plan addresses two prime issues: (1) compatible long-term public uses, and (2) management strategies and opportunities for improving habitat values of the refuge.

Long-Term Public Uses

Public use recommendations are for passive recreation and education activities, with an emphasis on the rich opportunities present to observe wild birds.

Examples of **compatible uses** include walking, bird watching, photography, and school activities related to data gathering, etc. Bird observation platforms, walking paths, interpretive information, and benches are compatible developments that would support these passive uses. These recreational activities can be supported within selected areas of the City's portion of the wildlife refuge with minimal harm to wildlife. Further limiting access to specific areas or particular seasons can provide additional tools to protect critical wildlife activities such as bird nesting and rearing while maintaining recreational opportunities.

Public use of the former lagoon (low meadow area) is not appropriate in its current state. The presence of biosolids deposited in the lagoon from approximately 1958 to 1995

indicates that physical access should be physically restricted and this restriction further publicized with signage. Currently bordered with blackberry-covered side slopes, the meadow area is effectively cordoned off from walking paths on top of the levees. Removal of biosolids, while physically possible, and even desirable from an environmental perspective, would likely be very expensive. Alternatives to removal of all biosolids, such as regrading into high and low areas onsite, may be more feasible.

Incompatible activities around the former lagoon include sports, group picnicking, fireworks, children's play equipment, parking, musical events, hunting, and dog-walking.

While opportunities to accommodate dogs in other areas of the city-owned properties are under study, use of the lagoon area and perimeter trail for dog use, either on or off-leash, is not appropriate to the wildlife refuge concept. The energy demands on wild birds by their alarm response to the sight and sound of dogs is harmful. Enforceability of a leash law in the remote areas of the Riverview Refuge is problematic and, as a result, allowing dogs on leash has significant potential to reduce the ability of the refuge to support wildlife.

Wild birds can be divided into two general groups: (1) human-adapted species are birds that occur in higher densities close to developments and lower densities farther away; and (2) human-sensitive species, birds that occur in highest densities farthest from homes and in lowest densities close to development. Birds in the second category are the purpose of a wildlife refuge; these bird species need the additional protection a refuge provides.

Most of the 140 bird species in residence at the Riverview Refuge are not seen in residential back yards or public parks even where water is present, because of their sensitivity to disturbance by humans and their pets. These sensitive species include hooded mergansers, American bitterns, soras, wood ducks and rails.

Off-leash dogs are observed to disturb low-lying nests and trample nestlings. In the Riverview Refuge, the Savannah sparrow's nest is on or near the ground. Marsh wren nests are placed lower than the tops of the reeds they build in. Bushtit nests can be as low as 3 feet off the ground, and Swainson's thrush nests are built in the forest understory.

Reasons for excluding dogs in the Riverview Wildlife Refuge include the following:

1. While some birds do co-exist with humans; birds that don't include many of the 140 species of waterfowl and other bird species observed at the refuge.
2. While dogs kept on leash reduce the direct harm of their presence, other refuges have found poor visitor compliance with leash laws, up to 40% noncompliance.
3. Birds do not differentiate between off-leash and on-leash dogs.
4. Dogs chase/startle wildlife, especially ground-nesting birds and can harm/ kill birds directly and indirectly by separating young from parents and disturbing normal feeding/resting activities.
5. Disturbance by each successive dog results in cumulative disturbance of wildlife daily activities. Recovery time for each disturbance is often significant.

6. Dog walking, (unlike bird-watching and interpretation), is not wildlife-dependent and therefore can be done elsewhere.
7. Visitors concerned about personal safety have other solutions available, including walking with partners and going when other visitors are present.
8. The presence of dogs increases hiding behavior of wildlife and drives sensitive species away entirely. This reduces the number and variety of wildlife to see.
9. Dogs, especially off-leash, can behave aggressively to other visitors and dogs, spoiling the experience or resulting in physical harm to other visitors.
10. Unscooped feces (a) create aesthetic issues, (b) are disease vectors and (c) affect wild predator behavior. Scooping feces of off-leash dogs is often not feasible.
11. Dogs pass disease between humans and wildlife, harming both. Examples: parvovirus, leptospirosis, plague, rabies, fleas, ticks, tapeworms, giardia.
12. Until the lagoon sediments are resolved, off-leash dogs entering the lagoon may dig up needles, etc. and carry contaminants back to their owners' cars and homes.

While common practice and observational data indicate the need to prohibit dogs in the Riverview Refuge, detailed scientific studies of the effect of dogs on wildlife may not be strictly achievable. As explained by Carol Sime, the author of *Effects of Recreation on Rocky Mountain Wildlife*:

"Published data specific to wildlife disturbances attributable to companion dogs are lacking. Furthermore, because of concerns about animal welfare and treatment during scientific investigations, evaluation of direct dog harassment of various wildlife species may not be feasible. Experimental protocols may not conform to ethical standards set by oversight committees."

An overview of available research and current practices regarding dogs in parks and wilderness areas is included in Appendix B of this report.

Management Strategies and Opportunities for Improving Habitat Values

Adaptive management is suggested as the overall principle for improving habitat values in the refuge. Management actions should be monitored and adapted as their impacts can be observed and evaluated for their effects.

Riparian habitat is considered by the Washington State Department of Fish and Wildlife and others to be of critical concern in this area of Puget Sound, and the refuge's likely greatest value to wildlife is by managing to enhance this particular habitat.

Other habitats present in the study area are wetland, deciduous forest, river, and grassland. The diversity of habitat and proximity to the Snohomish County Parks Department Field's Riffle property and the open farmland of the Snohomish valley contribute to the extraordinary bird presence in the refuge.

Examples of Management for Improving Wildlife Habitat:

1. Protect and enhance existing riparian features of the shoreline. Examples include (a) provide future nesting snags by planting tree seedlings; (b) remove invasive species; (c) install nesting platforms for osprey; (d) install bat boxes. More strategies are discussed in the Washington State Department of Fish & Wildlife Site Recommendations section of this report.

2. Treat street runoff to improve stormwater quality. This use of a portion of the lagoon could reduce demands on the City's wastewater treatment plant during periods of heavy rainfall. Temporary stormwater treatment ponds could provide additional habitat diversity for birds and other wildlife. Improved water quality of the Snohomish River contributes to overall improvement of wildlife habitat.

3. Reduce identified shortfall in critical salmon rearing habitat along the river main-stem. A possible management strategy within portions of the former lagoon area is to remove sections of the levee and replace them with pile-supported bridges. This would allow the river to more regularly overflow into the area, and help re-create historic river side channels that are of particular importance as rearing habitat for juvenile salmon and other fish.

Additional wildlife management strategies and observations are included in the Washington State Department of Fish & Wildlife site visit memo beginning on page 24.

Guiding Principles

Project Goal

Manage site for wildlife habitat while also supporting City utility programs and low-impact human presence.

Management Principles

1. Financially sustainable development (durable, low maintenance, flood-resistant)
2. Compatible with City utility operations
3. Maintain availability for stormwater quality projects and other utility needs
4. Promote visitor security

Environmental Principles

1. Limit wildlife-disturbing intrusions, human presences to sensitive areas
2. Manage site for riparian habitat
3. Seek options to increase biodiversity (avoid monocultures)
4. Restore native habitat through successional stage approach
5. Remove invasive species
6. Value "Maturing" vision over short-term improvements

7. Plan for adaptive management of site
8. Connect to larger environmental context (all vegetated areas south of Second Street east to and including City Shop, Cemetery Creek wildlife corridor, Snohomish River, Snohomish County "Field's Riffle" property, Pacific Flyway)
9. Acquire nearby sensitive lands where available

Recreation and Learning Principles

1. Provide passive wildlife viewing opportunities
2. Support bird watching, in particular
3. Support recreational uses such as tours, walking, picnicking, riverbank fishing
4. Prohibit incompatible recreational uses: off-leash dog area, active sports, gardening
5. Duck hunting – Not allowed within city limits
6. Provide "Universal Access" features within site
7. Provide nature-based learning opportunities. (May include interpretive elements, tours, school-related studies and projects, web information such as bird identification, birdcalls & sightings, night or 24-hour web cameras. Fish hatcheries are not supported currently for fishery purposes.
8. Interpretive subjects may include birds, mammals, fish, amphibians, reptiles, insects, native plants; potential related topics such as climate change, habitat loss, invasive species, wastewater treatment as habitat preservation.
9. Provide opportunities for closer interaction with environment
10. Seek offsite improvements to create safer pedestrian and motor vehicle circulation
11. Sample interpretive exhibit topics:
    a. Snohomish River facts, history, hydrology, flooding
    b. History of sewage treatment, environmental value and effect on nature
    c. Remediated small lagoon area per Department of Ecology
    d. Geology, formation of land forms (glaciers, oxbow, creek confluence)
    e. History of site use (pre-history, explorers, farm, dump, wastewater, park.)
    f. Spring (Summer, Fall, Winter) in the Refuge (commonly seen bird species, activities; typical weather)
    g. Invasive species along rivers (bullfrog, Japanese Knotweed, Himalayan blackberry) and how you can help
    h. Weather records
    i. Maps and aerial photos: 1874, 1933, 1955, 1965, 2011
    j. Pilchuck Audubon Society parcels, history of environmental protection – Clean Water Act, ESA
    k. Ways to watch birds, Cascade Loop birding trail, migration patterns
    l. How you can support wildlife at home, locally, and worldwide (dog education here?)

Design Elements

Near-Term Improvements

1. View points
2. Signage, interpretive and regulatory
3. Bat boxes
4. Osprey or other nesting platforms where habitat supports it
5. Benches
6. Environmentally-related art
7. ADA-accessible elements
8. Stormwater treatment channels
9. Loop trails – including past north side of Wastewater Treatment Plant
10. Safety elements such as hazard area signage, fall protection, trail closures

Long-Term Improvements

1. Create, enhance, and acquire high-quality riparian habitat where feasible.
2. Seek opportunities for salmon-rearing habitat off main-stem of Snohomish River.
3. Grade lagoon meadow to raise some areas, lower other areas to original grade, creating accessible viewpoints over the valley as much as twenty-five to thirty feet above levee. Balancing cut and fill within regulated flood zone can help comply with flood regulations limiting fill. Once above the regulated elevation, clean fill may be placed to cap off biosolids. Armoring of side slopes within flood zone will likely be necessary. Steep armored banks/cliffs can provide additional bird and other habitat. Fill against the inside of the levee path can widen the meadow area and create more scenic, naturalistic slopes down to the marsh and preserve field bird habitat.
4. Breach one or more selected areas of levee; replace with pile-supported bridges, if study determines this is feasible and will maintain Cemetery Creek water quality.
5. Construct additional paths and boardwalks; preferring loop trail configurations.
6. Add a path connection between Second Street and the Riverfront Trail along the west fill slope of the proposed new southbound lanes SR-9 as a part of the new WSDOT Snohomish River bridge project. This connection can provide a link in the growing regional trail network.
7. Parking : utilize First Street parking initially. Add approximately fifteen stalls parking when shop site is redeveloped as a community park. Add three stalls of parking at entry to Wastewater Treatment Plant including accessible stalls. If needed, wetland fill areas can be mitigated with wetland creation in lagoon.
8. Develop park on current city shop site. Improvements may include:
    a. Signage
    b. Parking
    c. Paths
    d. Fenced play area
    e. Dogs on leash permitted
    f. Lighting

g. Seasonal fishing pier
h. Restrooms
i. Picnic tables, Benches
j. Drinking water
k. Boat launch
l. Bat boxes, nesting platforms, other wildlife habitat elements.
m. Small meeting/classroom facility/museum/possible bird hospital

Off-Site Improvements

1. Within City limits, add viewing platform destination and new sidewalk/ paved shoulder along south side of Riverview Road.
2. Pedestrian-actuated crosswalk signals on 2nd at both Avenue J and Ludwig Road.
3. Install sidewalks/widen asphalt road shoulders along Riverview Road and Second.
4. Replace Riverview Road culvert with bridge to reduce flood closures of Riverview Road; and improve wildlife access to Cemetery Creek.
5. Acquire critical area properties along Cemetery Creek as available.
6. Manage roadside vegetation for scenic views from First Street and Riverview Rd.
7. Connect riverfront trails.

Gold Finch at Refuge – Bill Fulton 2011

To abuse, to waste, to overuse—that's immorality. For me, it's very much a question of doing the right thing. And I wake up every morning and listen to the birds and take their song to heart and go back and sing for them. —***Brian Rutledge***, *Vice President Rocky Mountain Region*

Point No Point Low Viewing Platform

Hawk's Pond Viewing Tower –Kathleen Snyder, 2013

Preliminary Construction Estimate

Costs listed here are provided only as a very preliminary overall look to implement the full refuge master plan. They are not based upon engineering plans or surveys. Earthwork, drainage and other elements may be funded as part of road or utility projects such as stormwater treatment. Costs do not include park development of the city shop or the WSDOT trail.

Item	Quantity	Unit	Unit Cost	Subtotal
Signage	12	EA	400	4,800
Fencing	100	LF	20	2,000
Benches	5	EA	1,500	7,500
Seeding	1	SF	105,600	105,600
Plantings	40,000	SF	2	80,000
Gravel path	3,000	LF	25	75,000
Concrete sidewalk	1,600	SF	20	32,000
Curb, gutter, drainage	200	LF	18	3,600
Pedestrian Crossings	2	EA	100,000	200,000
Asphalt shoulder	750	SF	110	82,500
Earthwork	10,000	CY	5	50,000
Drainage	500	LF	55	27,500
Gateways	1	EA	18,000	18,000
Invasive plant removal	10,000	SF	2	20,000
Nesting platforms	10	EA	100	1,000
Boardwalk	2,500	SF	30	75,000
Viewpoints	4	EA	12,000	48,000
Construction Subtotal				832,500
WSST			0.088	73,260
Design				208,125
Permits				33,300
Construction Mgt				124,875
Agency Costs				83,250
Total Project Estimate				1,355,310

Site Needs for Wastewater Conveyance Plans: Pipeline to Everett

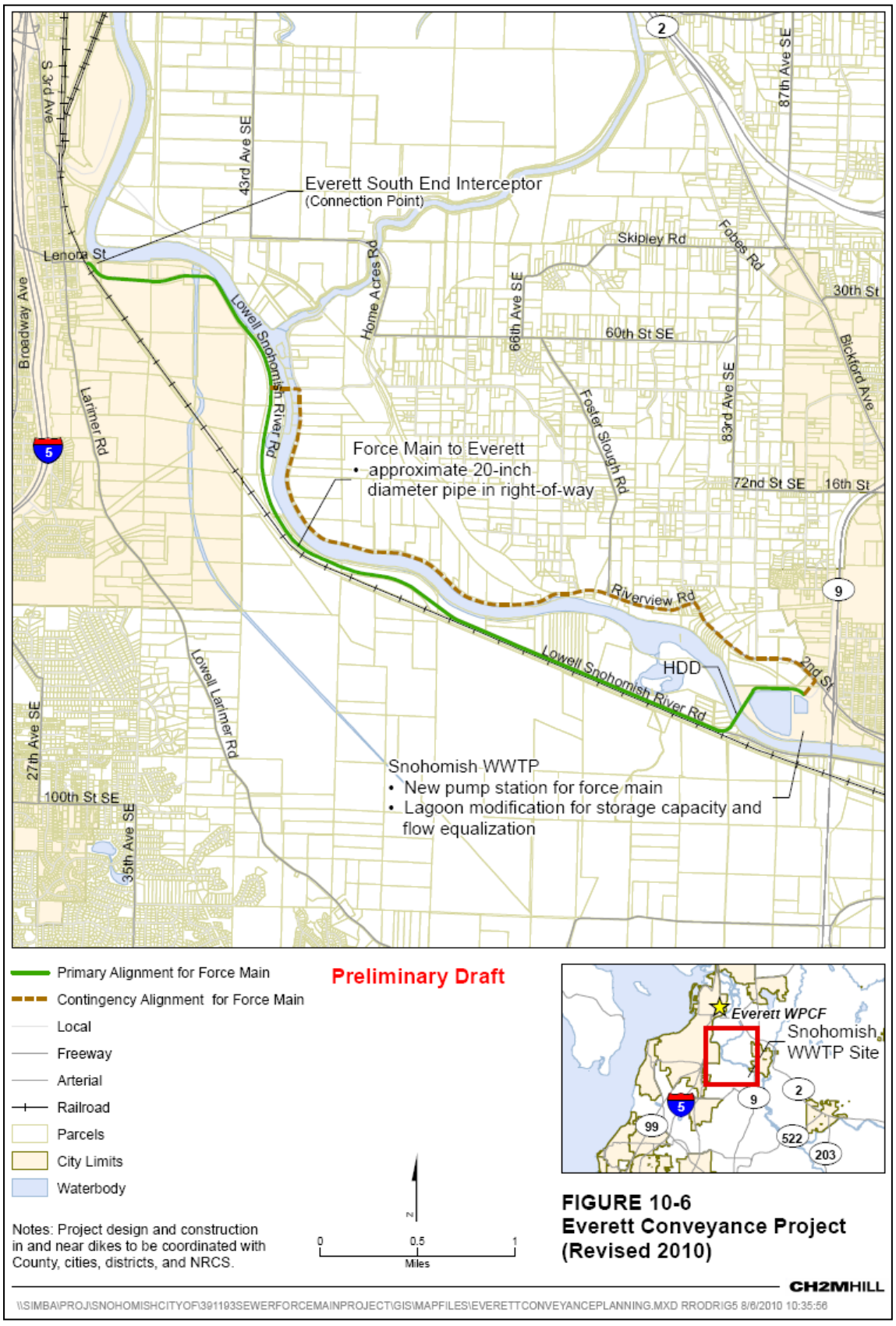


FIGURE 10-6
Everett Conveyance Project
(Revised 2010)

Site Needs for Wastewater Conveyance

Pump Station in Former Lagoon

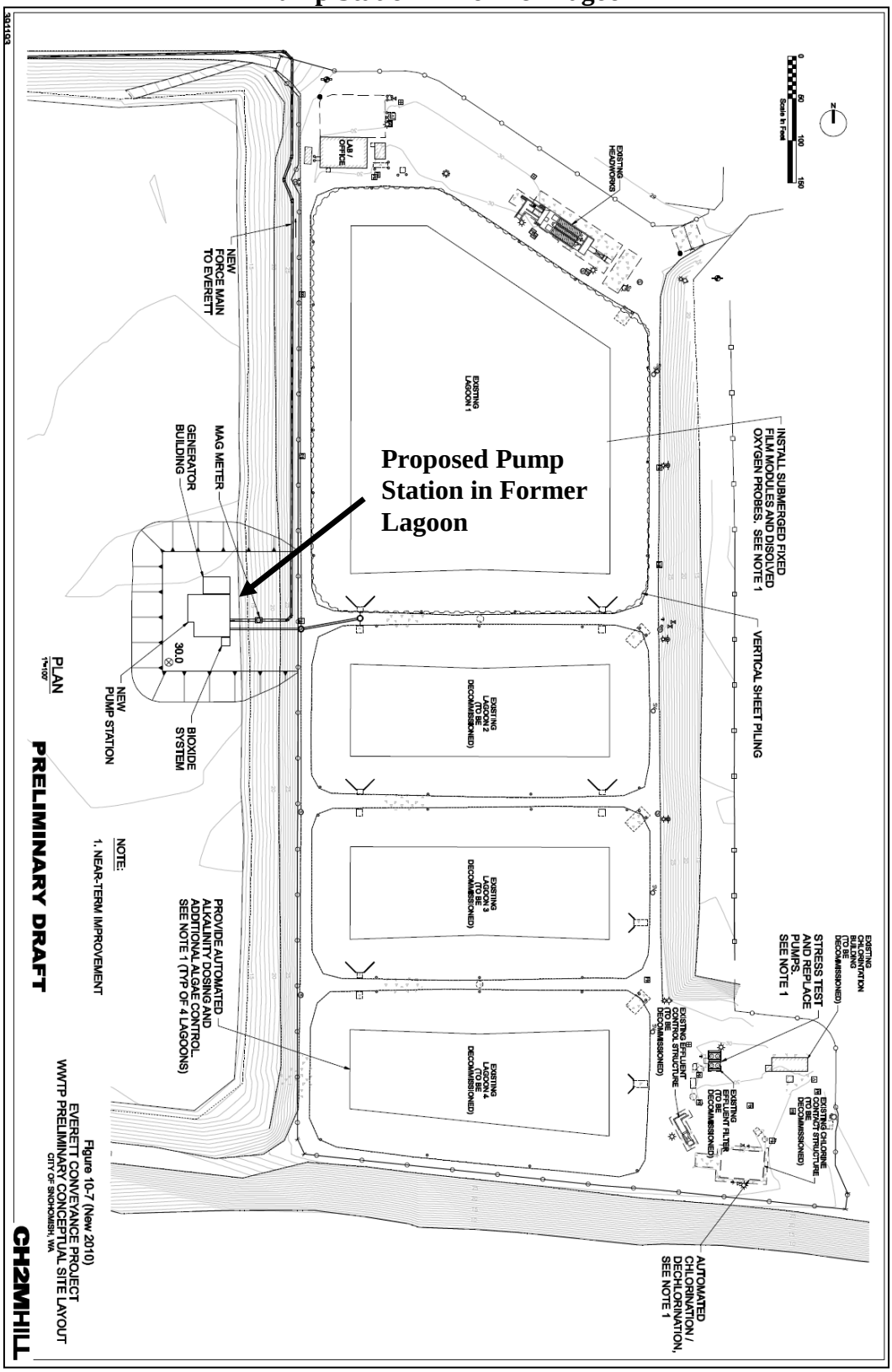


Figure 10-7 (New 2010)
EVERETT CONVEYANCE PROJECT
WWTP PRELIMINARY CONCEPTUAL SITE LAYOUT
CITY OF SNOHOMISH, WA

Refuge Song Sparrow – Bill Fulton 2011

Long Range Planning

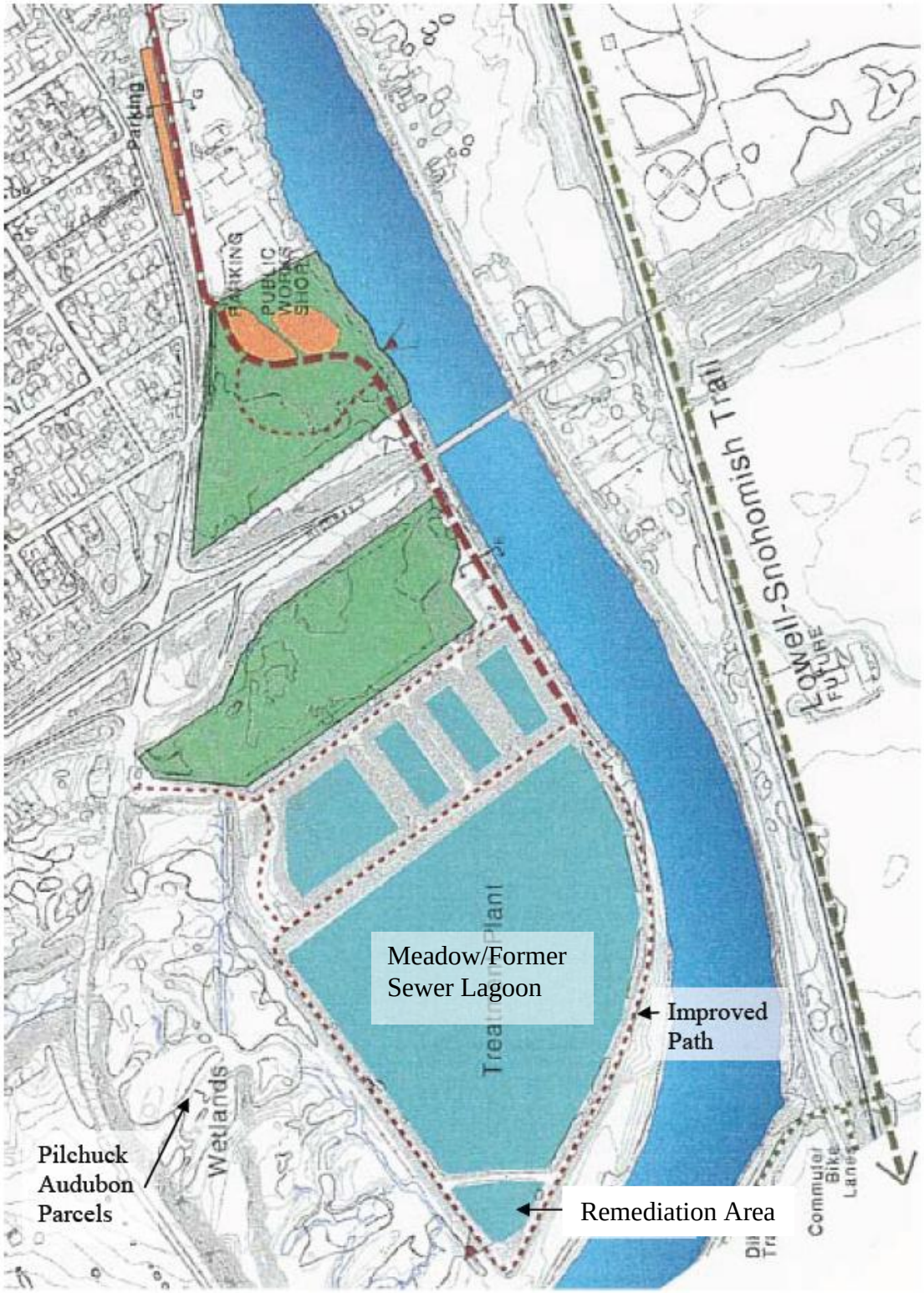
The proposed Wildlife Refuge development is supported by past City planning activities. Two of the adopted plans are (1) Snohomish Riverfront Master Plan and (2) Long Range Parks, Recreation and Open Space Plan. Regional planning efforts for salmon recovery are briefly summarized here. Please refer to the original documents for more information.

1998 Riverfront Master Plan

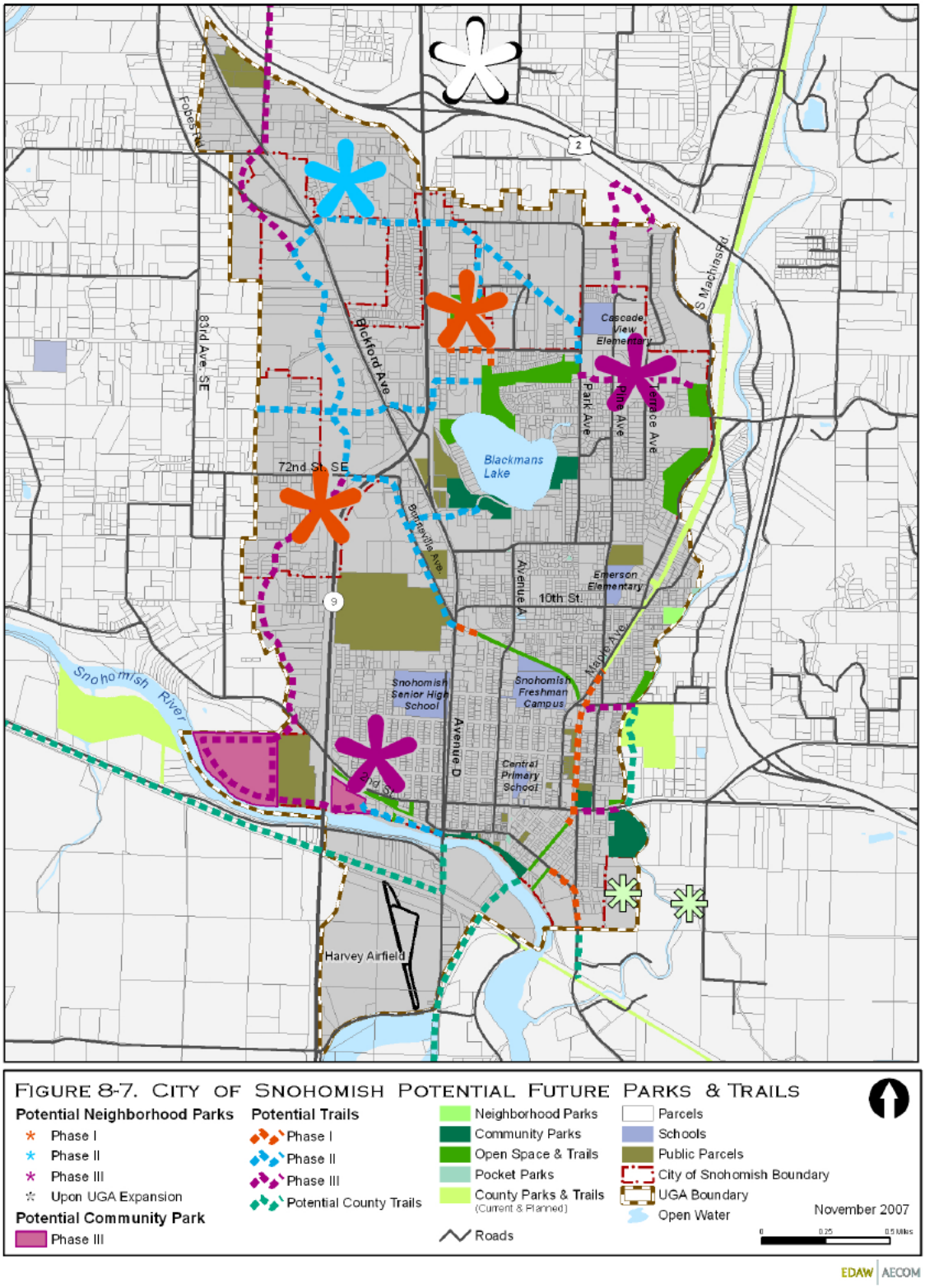
The 1998 Riverfront Master Plan identifies trail use around the lagoon and development of the city's maintenance shop site as a community park. (See next page.)

2007 Long Range Parks, Recreation and Open Space Master Plan

The City of Snohomish Long Range Parks, Recreation and Open Space Master Plan recommends walking trails around the lagoon, connecting to Second Street, and extending the Riverfront Trail. It also identifies the lagoon to be developed for future community park uses in Phase III of the Capital Facilities Plan (CFP) implementation schedule. Because construction of the community park and trail improvements incorporating the current shop site and the lagoon is included in the Long Range Plan CFP, the work is eligible for park impact fee funding. It is noted, however, as lower priority than both Phase I and II projects, which have not yet been completed.



← North 1998 Riverfront Master Plan – Interim Plan Not to Scale



2007 Parks, Recreation and Open Space Long Range Plan

Snohomish River Basin Salmon Conservation Plan

The Snohomish River Basin Salmon Conservation Plan identifies ten-year habitat gains needed in key sub-basins. Along the main stem of the Snohomish River, 256 acres of restored riparian habitat, 167 acres of restored off-channel habitat, and 10.4 miles of restored edge habitat are needed. The refuge site could contribute toward all these goals.

2012 Action Agenda for Puget Sound

The following is excerpted from the Puget Sound Partnership's 2012 Action Agenda:

"Cities and counties are at the front lines in the effort to protect and restore Puget Sound. From updates to Shoreline Master Programs, to adoption of Critical Areas Ordinances in Growth Management Act comprehensive plans, to hundreds of millions of dollars in investments in stormwater protections, to supporting salmon recovery – cities and counties are the implementers of many Puget Sound recovery strategies. They must be given adequate support and resources to accomplish the job. The financial burden must be shared by all levels of government.

Strategic Initiatives for 2012 and 2013
The Puget Sound Partnership has achieved consensus on three strategic initiatives that guide our priorities for 2012 and 2013. These are the areas where we intend to focus time and resources, to increase funding, to seek changes that improve policy, to report success and apply lessons learned, and to educate and engage citizens in the recovery effort.

The three strategic initiatives are:

Prevention of pollution from urban stormwater runoff
This is an immense challenge, and although we have many of the tools and technologies for stormwater, we need to make much fuller use of them if we are to stop contamination from flowing into the Sound.

Protection and restoration of habitat
We must stop destroying habitat, protect what we have left and substantially restore the critical habitats that we have lost;

Recovery of shellfish beds
…Shellfish health begins on land, through reduction of pollution from rural and agricultural lands and maintenance and repair of failing septic tanks."

Washington State Fish & Wildlife Department
Observations and Recommendations

The following information summarizes observations and recommendations provided by Washington State Department of Fish and Wildlife biologists during a site visit on July 17, 2012. It has been prepared for use by the City's Wildlife Refuge Master Plan Steering Committee.

Observations and recommendations have been organized into the following topics:

Contents:

1. Project Goal
   a. Determine the goal for the project. Wildlife habitat is generally harmed by human activity. The project goal can be one of the following: (1) true refuge for wildlife, which would require exclusion of humans, (2) promote presence of humans, or (3) seek a compromise between these two conflicting goals, i.e. some loss of habitat value in exchange for recreational use by visitors.
   b. Narrow the goals for wildlife habitat: Managing for maximum diversity is different from focusing on maximum benefit for particular species.
   c. Riparian habitat is comparatively rare in Snohomish County.
   d. The physical properties of this area are best suited to provide riparian habitat.

2. Habitat Types Present on Site
   a. Riparian stream with likely saltwater intrusion from tides
   b. Freshwater pond
   c. Marsh
   d. Shrub/scrub wetland (areas of the shrub/scrub wetland are in good shape)
   e. Wooded corridor on west edge of treatment ponds-good habitat for both prey and predator
   f. Grassland is mix of reed canarygrass (brighter yellow-green color) and other species.

3. Habitat Opportunities
   a. Stormwater ponds – should (1) attract mallards and widgeons, and (2) increase presence of Yellowthroat Warblers, Wilson's Warbler, Barn and Cliff Swallows (all noted during July site visit).
   b. Restoring the creek confluence and connection to Snohomish River into the former lagoon area might restore side channel habitat for trout and Coho salmon.

4. Existing Natural Processes – Recommend Study

Currently, sediment may be trapped and collecting in estuary area of creek as a result of water impoundment by dike, culvert and other man-made restrictions where Cemetery Creek meets the Snohomish River. This could have caused the creek channel to lose its definition, and the creek channel was very likely realigned (straightened) by early farming activities in this low, flat area. The estuary topography shows evidence of being an oxbow created during the earlier, highly-dynamic channel migration activity natural to the Snohomish River. The Snohomish Basin Salmon Recovery Forum may have funding available to complete a study on the feasibility of restoring more natural functions of this estuary based upon the benefits to salmon as a feeder estuary. There may also be funds to remove dikes or culverts that obstruct water flow between the river and the creek.

5. Habitat Management Recommendations ("Guiding Principles")
   a. Remove invasives (these include reed canarygrass, blackberry, Japanese knotweed, snapping turtle, bullfrog)
   b. Add suitable riparian natives to replace invasives. Appropriate choices include willows, alder, and ninebark.
   c. Add woody debris in stream channel of Cemetery Creek.
   d. Add Spiraea douglasii on banks of Cemetery Creek.
   e. Manage for a mix of tree sizes and species.
   f. Increase flow through existing ponds and better define the channel of Cemetery Creek through the wetland/estuary.
   g. Restrict human access into the Cemetery Creek wetland/oxbow area.
   h. "Grow" (plant to provide) future snags; existing snags are good but won't last forever.
   i. Cattails, reed canary grass and Himalayan blackberries have some seed value but are not best habitat for widest variety of birds; they invade and supplant plant species with greater wildlife habitat value.
   j. Native crabapple was historically prevalent in this area; good species to restore.
   k. Planting of conifers not considered to be of significant value to habitat quality.

6. Visitor Safety
   a. Dense vegetation along the narrow path which passes along the south side of the Wastewater Treatment Plant fence presents a potential safety issue for refuge visitors. It provides hiding space within close proximity to pedestrians, with opportunity for attack without advance notice and a place to pull victims out of sight of others. Treatment to reduce the risk could include a wider cleared corridor and addition of a railing-type fence along the wooded edge. This change

would help slow an attempt to physically assault a passer-by, providing time for defensive reactions.

b. Cottonwood trees are a hazard tree for people due to their extremely brittle branches. Several of these are located too close to the dike trail and should be removed anywhere they overhang a trail.
c. Snohomish River access–physical access to riverbank may present hazard to visitors, especially children and teens; consider if design should be for visual access only. Viewing platforms at key locations could provide views over bank vegetation and might be preferred over clearing sight lines for both riverbank stabilization and maintenance cost concerns.

7. Wildlife Species Information
   a. Osprey
      Mainly fish-feeders, occasionally prey on ducks. Nest in snags, thought to defend airspace from eagles. They like tall structures that are flat on top. It should be feasible to add Osprey nesting this close to eagles by building a nesting platform as near to the Snohomish River edge as possible. Birdcall heard sounding like offspring begging call near northwestern corner of site during July site visit.
   b. Great Blue Heron
      Naturally abandon rookeries periodically; this rookery has been abandoned for five years or more, and may not have been related to the presence of the nesting eagles. Heron prefer live alders, conifers, and cottonwoods for rookeries. They feed on sticklebacks, fish, frogs and rodents.
   c. Cormorant
      Double-Crested Cormorant colony exists south of the Avenue D Bridge; this species is a cross-over to fresh water. They eat smolts of listed salmon species.
   d. Tern
      Terns (not observed during site visit) do not appear to eat smolts of listed salmon species.
   e. Eagle
      Nesting presence in vicinity. WDFW requests email reports of new sightings and nesting information. Other than maintaining nesting data, WDFW no longer regulates human activities near eagle nests ever since bald eagles were removed from the Endangered Species List about five years ago. Enforcement is deferred to USFWS under the federal Endangered Species Protection Act. Snohomish County is within the jurisdiction of the USFWS office in Lacey.
   f. Amphibian
      This area provides tree frogs breeding habitat; native red-legged frogs and red-necked salamanders mature in two months. Bullfrogs are invasive and mature over the winter; they need permanent water to persist. Bullfrogs were introduced to the region in the 1880s as a food source for settlers and again in the 1920s and 1930s.
   g. Butterfly: Swallowtails observed during July site visit.
   h. Reptile: Snapping turtles observed on site in past are invasive and deleterious to native species.

8. Invasive Plant Species – Comments on Control Methods
    a. Reed canary grass (1) spray, disc, turn over, repeat (2) flood out by raising water levels or excavating pond areas but only if local hydrology supports either alternative. (3) Willow saplings planted in reed canarygrass won't survive; need to replace whole soil section with new, and this works best if work in from edges of existing established shrub/scrub masses.
    b. Knotweed (Snohomish County Weed Control Board has experience with this.)
    c. Himalayan Blackberry – roots must be removed for control.

9. Design Issues, Opportunities, Constraints
    a. Adding a trail directly alongside the west levee of the WWTP would disturb wildlife and favors people over refuge quality. Not recommended.
    b. Don't expect trees to grow in rip rap areas of the dike alongside the river.
    c. Raptor poles would be appropriate additions for wildlife.
    d. Bat houses would be appropriate additions.
    e. Creation of ponds in lagoon area would be appropriate additions.
    f. View corridors cut through riparian corridors reduce habitat quality.
    g. Riser boards (weirs) in creek channel weirs or at outlet could provide flexible pond management if the hydrology supports this option.
    h. Improve mouth of Cemetery Creek for fish access (Culvert? Remove?)
    i. Screen the chain link fence along the city shop with Black Hawthorn hedge (drought-tolerant and native).
    j. Add interpretive signage to the chain link fence along the city shop.

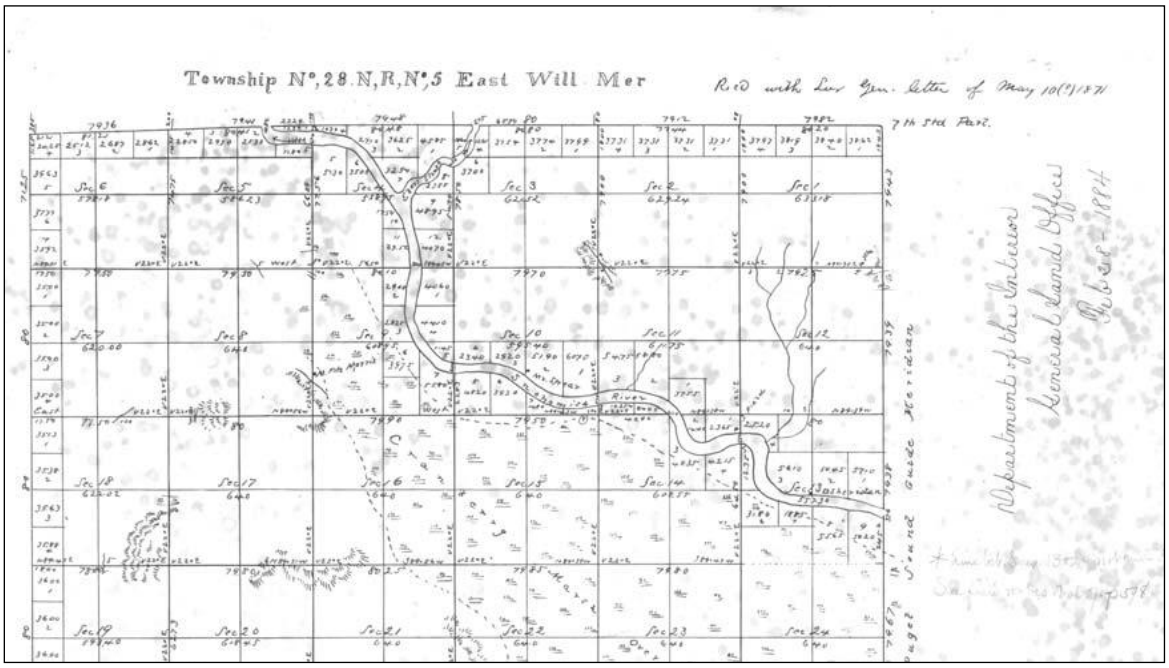
10. Permit Issues
    a. Dredging might be opposed by DOE and COE unless benefits of dredging to create habitat and remove invasives described strongly enough.
    b. HPA required if fishing piers are proposed along Snohomish River; these piers should be seasonal (HPA required for work affecting the bed or flow of the river.)
    c. HPA required if a "toe ditch" is added to the lagoon-side bank of the dike if there is a tide gate in the dike. Digging stormwater treatment ponds in the lagoon probably don't require an HPA.

11. Other Refuges
    a. Marymoor Park heron rookery coexists in close proximity with popular dog park.
    b. Ridgefield Wildlife Refuge has experience eliminating reed canary grass (spray, disc, turn over, repeat) but this is very expensive.
    c. Cherry Valley project of Salmon Recovery Forum work is an example of incremental improvement of habitat.

12. References
    a. Janet Carroll at Snohomish Co. Storm & Surface Water - Cemetery Creek.
    b. Sonny Gohrmann, Snohomish County Weed Control Board - Knotweed control.
    c. Ducks Unlimited, based in Vancouver, WA - improving duck habitat.
    d. USFWS office is in Lacey.

e. Snohomish Basin Salmon Recovery Forum may have funding to complete a study on the feasibility of restoring more natural functions of this estuary based upon the benefits to salmon. WDFW could be asked to be a project sponsor.
f. Snohomish County Public Works - historical aerial photos to help determine stream channel history.
g. GLO maps - original stream conditions and pre-settlement vegetation.

1871 General Land Office (GLO) Map



North half of quarter section map, Government Land Office 1871 Survey

In an age when we experience so much of our world through glass—screens, windows, windshields—birds are a vital connection to the wild. They reach across any barrier, flitting, surprising, and dazzling, always there to refresh my sense of wonder. —***Thor Hanson***, *Author*, Feathers, the Evolution of a Natural Miracle

Educational Use Concepts

The Snohomish School District representatives participated in a series of planning meetings to assess educational roles and appropriate site features of the refuge. This outline summarizes the concepts discussed.

A. Objectives of Snohomish School District Advisory Group
1. Uses of refuge for learning
2. Site improvements to support education uses
3. Educational applications (history, writing, testing, math, critical thinking)

B. Concepts for Educational Use of Wildlife Refuge
1. 1st -6th grade "Summer Academy" studies flora and fauna, does leaf pressings.
2. There is a "Summer Science Institute" that could use the site for its studies. Improvements: benches, picnic tables for up to 400 kids per event. Pilchuck Park hosts up to 200 kids for field trip activity. The refuge site will probably not provide infrastructure to support activities involving this many participants.
3. Individual classes generally have 15-25 students.
4. Walking access from Snohomish High School was noted as a plus.
5. Outline invasive species survey in May; fence area to experiment with controls.
6. Complete biodiversity sampling studies, continue over time for comparison.
7. Fence off small plots, compare to an unfenced control area to measure effects on vegetation by deer, rabbits.
8. Invasive species control studies.
9. Study transects across site to establish baseline vegetation survey.
10. Sample plot: start with bare earth and observe natural succession.
11. Create signs by shop class students (especially interpretive signs.) Students can be given design as well as fabrication (preferred). Can work in metals and plastics Example: clear acrylic with printed cards embedded between layers of plastic.
12. Signage idea: a turning wheel with bird information.
13. Photography classes can supply content for signs, use site as photo location.
14. Monroe school made topsoil out of food waste: composting studies here?
15. Riverview 2nd grade salmon program planting - Coho fingerlings (at Brightwater now and to creek near 83rd in Snohomish – Myrick's Fork?) Use Refuge?
16. The science bin program used by the Lively Environmental Center would be welcomed for salmon, geography studies and could be based on Refuge site.
17. Web activities: bird id., post sightings, real-time information posting.
18. Tour of wastewater treatment plant for older students.
19. Stormwater runoff using scientific method: test plots at park, measure pH, temperature.
20. Eagle Scout projects (benches, picnic facilities, bat boxes, signage, etc.)
21. Community Service hours could provide development, maintenance services.
22. Science project location – all students in school district have this requirement.
23. Interpretive information: Species lists and identification keys for birds, amphibians, vegetation, fish, insects, salmon; life cycles by season.

Web Page for Refuge-Based School Science Program

Everett Public Schools
Inquiry Science Program

Learning science is something students do, not something that is done to them.

(National Science Education Standards, 1996)

Where is the Science Resource Center (SRC)?

Where is Lively Environmental Center?

Science has been described as a "way of thinking." Science is a way to look at the world that involves special principles of conduct:

- Observe carefully;
- Record accurately;
- Try to look for patterns in an objective, unbiased way;
- Share observations (or results) honestly and in a way that allows others to test the data;
- Realize that mistakes can be made;
- Respect curiosity; and
- Stay open to criticism and change.

from U.S. Dept. of Ed. "Helping Your Child Learn Science"

Contact Information

Robert (Bob) Sotak, Ed.D	Curriculum & Instruction Director (Science, Environmental Education, and Summer School)
Shirley Maynard	SRC Administrative Assistant
Debbie Hickman	SRC Secretary: Kit refurbishment, living materials orders and delivery, Lively registration
Tonya Neisinger	SRC Secretary: Kit refurbishment, 6-12 materials and supplies, SRC inventory
Brian Day	Science Facilitator
	Lively maintenance and Center Caretaker (contact Maintenance Office)

Lively Enviornmental Center Classroom and Field Trip scheduling is done through Debbie Hickman, x4670 .
After hours and weekend use is scheduled through community services ext. 4045.

http://cms.everett.k12.wa.us/science

Process and Next Steps

Steering Committee Mtg #	Complete	Date	Meeting Purpose
		April 23, 2012	Review Schedule
		April 25, 2012	Parks Board Discussion
		May 21, 2012	Review Schedule and Committee Proposal for Council
		June 18, 2012	City Council - Authorize Steering Committee
1		July 16, 2012	Introductory Committee Meeting
2		August 13, 2012	Tour Other Refuge - Lively Environmental Center
3		September 17, 2012	Draft Guiding Principles
4		October 15, 2012	Narbeck, Draft Guiding Principles and Design Elements
		October 23, 2012	Snohomish School District Input - Meeting #1
5		November 5, 2012	Tour Arlington Stormwater Ponds
6		December 10, 2012	Draft Base Map, Site Analysis, Site Opportunities
		December 11. 2012	School District Meeting #2
		January 22, 2013	School District Meeting #3
		January 23, 2013	Parks Board Discussion, Public Meeting
7		February 4, 2013	Incorporate Public Input, Prepare for Council Meeting
		February 19, 2013	City Council Update and Discussion
8		March 4, 2013	Draft Alternatives
9		April 8, 2013	Recommended Plan, Refuge Name
10		May 13, 2013	Recommended Plan, Refuge Name
		May 22, 2013	Parks Board Discussion, Public Meeting
11		June 3, 2013	Incorporate Public Input into Recommended Plan

Immediate and ongoing low-cost improvements including interpretive signage, benches, and wildlife habitat projects, could be funded in the annual budget. Some elements may be donated by the Snohomish Parks Foundation, Boeing Community Fund, and/or constructed by volunteers. Scouts and other community volunteers can provide habitat and recreation improvements. The Snohomish School District high school technology department can provide design and construction of interpretive and other signage in durable metal and plastic.

To implement the master plan, the next step is to secure funding for engineering studies and design of major elements such as roadway improvements and lagoon.

Birds make any place a chance for discovery, they make a garden seem wild, they are a little bit of wilderness coming into a city park, and for a bird watcher every walk is filled with anticipation. What feathered jewel might drop out of the sky next? —***David Sibley**, Author*

Funding Opportunities for Snohomish Wildlife Refuge

While interim improvements are achievable within local resources, the full m aster plan is not. Stormwater utility funds could be used to implement lagoon elements, and WSDOT might find the site appropriate for SR-9 bridge mitigation requirements. Grants could supplement City funds, especially from RCO and Puget Sound recovery programs.

The Watershed Company provided the following list of potential funding sources to implement design, permitting and construction of long-term phases of the refuge. While stated deadlines may have passed, most programs are ongoing. Other funding sources include City Stormwater Utility funds, donations and city bonds.

- **Municipal Stormwater Capacity Grants Program- Available to NPDES Phase I and II cities, towns, and counties. City of Snohomish received ~$100K in 2011. 2012 application date is past.**
- **Stormwater Retrofit and LID Grants: A competitive grant process for retrofit and low impact development facility projects offered to NPDES Phase I and II permit holders. 2012 application data is past.**
- **Centennial Grant: The City does not meet the low-income criteria. Assuming that the City does not meet the hardship community status, the Centennial grant could be used for low impact development, and stormwater/land use planning not otherwise required by a NPDES permit. Application date is approaching.**
- **Washington Wildlife and Recreation Program: Public access- State lands development and renovation, state parks, local parks, water access, trails. 2012 application date is past.**
- **Estuary and Salmon Restoration Program: Funding and technical assistance for nearshore restoration and protection efforts in Puget Sound. 2012 application date is past.**
- **Salmon Recovery Funding Board/Puget Sound Acquisition and Restoration: Funds for projects that contribute to salmon recovery. 2012 application date is past.**
- **FEMA pre-disaster mitigation grants: If the project increases floodway area, it could limit flooding of surrounding properties upstream and downstream. Alternatively, if a levee setback were pursued, such a project could have the potential to be used in a city-wide National Flood Insurance Program (NFIP) Biological Opinion mitigation plan.**
- **Clean Water State Revolving Fund: Loan for water quality infrastructure. The loan would be repaid over time with interest. This loan can be used as cash match for grants.**

Looking west over City shop site and path to proposed refuge area, Highway 9 over Snohomish River, Wastewater Treatment Plant, Lagoon and Cemetery Creek wetland. Across river at top right of photo is Snohomish County Field's Riffle property. BHC 2011

Lazuli Bunting - Bill Fulton, 2012

Other Puget Sound Refuges

Discovery Park Environmental Learning Center
3801 Discovery Park Blvd.
City of Seattle
206 386-4236
Discovery@Seattle.gov

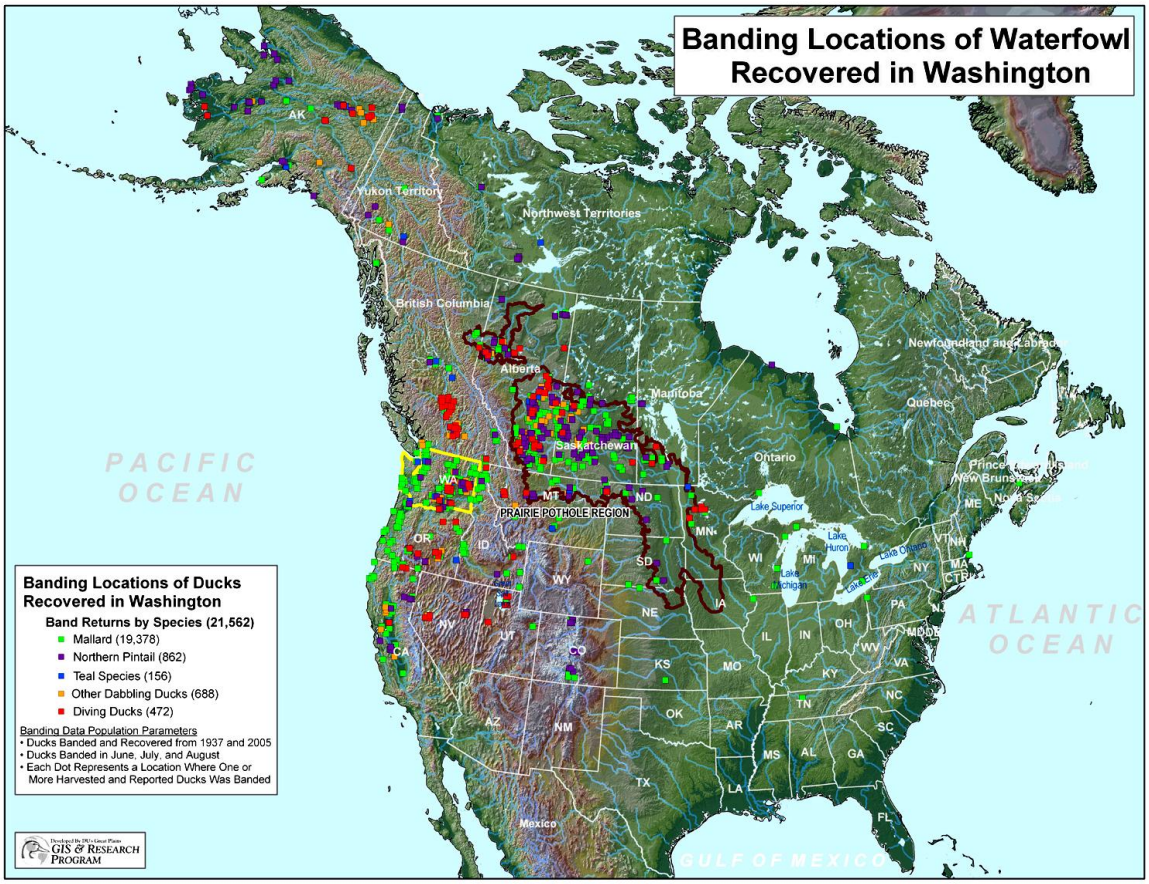
Auburn Environmental Park
413 Western Ave NW
City of Auburn
253 931-3090
www.auburn-wa.gov/community/parks.asp

Mercer Slough
1625 118 Ave. SE
City of Bellevue
(425) 452-2565
http://www.bellevuewa.gov/mseec.htm
Pacific Science Center programs: 425-450-0207 or visit
http://www.pacsci.org/slough/http://www.pacificsciencecenter.org/slough.

Narbeck Wetland Sanctuary (Wetland Mitigation Bank, i.e. "created wetland")
Directions: From Interstate 5, take Exit 189, following the lane that heads west to Highway 526. Pass the Evergreen Way exit, and take the next exit to head north on Seaway Boulevard. At the third stoplight, turn right at the large wooden park sign, then right again into the parking lot. 888-338-0976
narbeck.org or painefield.com/wetland.html

Nisqually National Wildlife Refuge – USFWS
(360) 753-9467
Directions: Nisqually National Wildlife Refuge is located 8 miles northeast of Olympia, Washington. From Interstate 5 southbound, take exit 114. Make a right at the traffic light, go under the freeway and make a right into the Refuge. Follow entrance road to the two public parking lots. Daily fee is $3.00 per four adults. An Interagency Annual Pass, Senior Pass, Access Passport, Federal Duck Stamp, or an Annual Refuge Pass will admit the pass holder and 3 additional adults (over age 16). Children 16 and under enter free. Each of these passes is available for purchase at the Nisqually National Wildlife Refuge Administration Office and Visitor Center.

Lively Environmental Center – Everett School District
1918 Seattle Hill Road, Mill Creek, WA 98012
http://www.everett.k12.wa.us/science/Lively_location



Birds matter not least because amazing migrations remind us what an interconnected web we live in, from pole to pole.

—***Bill McKibben**, Author, environmental advocate*

		SP	S	F	W
___	Lincoln's Sparrow	O	O	O	O
___	White-crowned Sparrow	C	C	C	C
___	Golden-crowned Sparrow			C	C
___	House Sparrow	C	C	C	C
___	Black-headed Grosbeak	C	C		
___	Lazuli Bunting	O	O		
___	Red-winged Blackbird	C	C	C	C
___	Western Meadowlark			O	O
___	Spotted Towhee	C	C	C	C
___	Brewer's Blackbird	C	C	C	C
___	Brown-headed Cowbird	C	C	C	O
___	Bullock's Oriole	O	O		
___	Purple Finch	C	C	C	C
___	House Finch	C	C	C	C
___	Bushtit	O	O	O	O
___	Pine Siskin	C	C	C	C
___	American Goldfinch	C	C	C	O
___	Northern Shrike	O			O

Enjoy your time in Snohomish! You might also like:

- **Riverfront Trail** built on the route of the Milwaukee Railroad between Avenue D and Maple Avenue.
- **Pilchuck Park** on the bank of the Pilchuck River, rich in spawning pink salmon in August-Sept. of odd years (2015, 2017…) 169 Cypress Ave.
- **Blackman Museum** in the historic home of a Blackman brother. Seasonal hours Sat-Sun 12-3pm. 118 Avenue B.
- **Snohomish Visitor Center Transportation Museum** offers both current event and historical information. 1301 First Street.
- 6 blocks east on First Street, the **Snohomish National Historic District** is filled with shops and restaurants.

The City of Snohomish welcomes you to **Snohomish Riverview Sanctuary**, a mile of riverside paths for walking and wildlife viewing. This sanctuary is valuable for its riparian (waterside) habitat and its location on the Pacific Flyway which is traveled by millions of migrating birds every year. The wetland just north of the sanctuary supports an especially wide variety of birds. Unusual birds seen over the years include **American Black Duck, American Avocet, Black Tern, Northern Mockingbird** and **Swamp Sparrow**. Given ongoing development in the watershed, these species may not be found here again but you have a very good chance of seeing many species listed in this brochure.

The famous **Milwaukee Railroad** ran through this property in the early 20th century, connecting Snohomish to Chicago. After the **Graafstra** farm operated here for generations, levees were constructed to build the city's first sewage lagoon in the 1950s. Those levees are the paths we walk today and served Snohomish sewage needs for about fifty years. The triangular area at the northwest corner is a capped and pipe-vented remediation site where stormwater catch-basin sediments containing heavy metals were once dumped. The lagoon was decommissioned when improved technology decreased the treatment area to the four much smaller ponds visible east of the sanctuary. Waterfowl flock to these ponds, effectively enlarging the "habitat" available to our wild birds!

We hope you enjoy and respect this special place. Please do not feed the wildlife. To help the birds of **Snohomish Riverview Sanctuary**, donations of time and money would be appreciated by the City of Snohomish and the Pilchuck Audubon Society for further habitat restoration. If you see a bird species not listed, please contact Pilchuck Audubon through the website address listed.

PILCHUCK AUDUBON SOCIETY
Champion for the Environment

www.pilchuckaudubon.org

Snohomish Riverview Sanctuary

1805 First St., Snohomish

Bird Checklist

Red-tailed Hawk by Cathy Clark

SNOHOMISH WASHINGTON

City Hall
116 Union Avenue
Snohomish, WA 98290
(360) 568-3115
www.ci.snohomish.wa.us

Abundance Key	
R	Rarely seen
O	Occasionally seen
P	Usually present
C	Common

Season Key	
SP	March-May
S	June-August
F	Sept.-Nov.
W	Dec.-Feb.

	SP	S	F	W
Ducks, Geese, Swans				
___ Snow Goose			O	O
___ Canada Goose	C	C	C	C
___ Trumpeter Swan			O	O
___ Wood Duck	O	O	O	
___ Eurasian Wigeon	O		O	O
___ American Wigeon	C	O	C	C
___ Gadwall	C	C	C	C
___ Green-winged Teal	C		C	C
___ Mallard	C	C	C	C
___ Blue-winged Teal	R		R	
___ Northern Shoveler	C	O	P	C
___ Redhead			R	R
___ Ring-necked Duck	P			P
___ Greater Scaup	C		C	C
___ Lesser Scaup	C	O	C	C
___ Common Goldeneye				O
___ Bufflehead	C			C
___ Hooded Merganser	P			P
___ Common Merganser	C		C	C
___ Red-breasted Merg.	O		O	
Grouse, Quail, and Allies				
___ California Quail	O	O	O	O
___ Ring-necked Pheasant	O	O	O	O
Loons, Grebes				
___ Pied-billed Grebe	O	O	O	O
Pelicans, Herons, Ibises and Allies				
___ Great Blue Heron	C	C	C	C
___ Green Heron	R	R	R	R
___ American Bitten	O	O	O	O
___ Double-crested Cormorant	C	C	C	C
Raptors				
___ Osprey	O	O		
___ Bald Eagle	C	C	C	C
___ Northern Harrier	C	C	C	C
___ Sharp-shinned Hawk	O	O	O	O
___ Cooper's Hawk	O	O	O	O
___ Red-tailed Hawk	C	C	C	C
___ Merlin				R
___ Peregrine Falcon	O	O	O	O
Cranes and Rails				
___ Virginia Rail	O	O	O	O
___ Sora	R	R		
___ American Coot	C	C	C	C
Shorebirds, Gulls				
___ Killdeer	C	C	C	C
___ Wilson's Snipe			O	O
___ Spotted Sandpiper	R	R		
___ Mew Gull	C		C	C
___ Ring-billed Gull	C		C	C
___ California Gull			O	O
___ Glaucous-winged Gull	C	C	C	C
Pigeons and Doves				
___ Rock Dove	C	C	C	C
___ Band-tailed Pigeon	O	O	O	
___ Mourning Dove	O	O	O	O
Owls				
___ Barn Owl	P	P	P	P
___ Great Horned Owl	P	P	P	P
Swifts and Hummingbirds				
___ Vaux Swift	O		O	
___ Anna's Hummingbird	P	P	P	P
___ Rufous Hummingbird	C	C		
Kingfishers and Allies				
___ Belted Kingfisher	C	C	C	C
Woodpeckers				
___ Downy Woodpecker	C	C	C	C
___ Hairy Woodpecker	C	C	C	C
___ Northern Flicker	C	C	C	C
Perching Birds				
___ Willow Flycatcher	C	C		
___ Pacific Slope Fletcher	C	C		
___ Steller's Jay	C	C	C	C
___ Warbling Vireo	C	C		
___ American Crow	C	C	C	C
___ Common Raven	C	C	C	C
___ Tree Swallow	C	C		
___ Violet-green Swallow	C	C		
___ Cliff Swallow	O	O		
___ Barn Swallow	C	C		
___ Northern Rough-winged Swallow	O	O		
___ Black-capped Chickadee	C	C	C	C
___ Chestnut-backed Chickadee	C	C	C	C
___ Brown Creeper	C	C	C	C
___ Bewick's Wren	C	C	C	C
___ Marsh Wren	C	C	C	C
___ Golden-crowned Kinglet	C	O	C	C
___ Ruby-crowned Kinglet	C		C	C
___ Townsend's Solitaire	R			
___ Swainson's Thrush		C		
___ American Robin	C	C	C	C
___ Varied Thrush	O	R	O	C
___ European Starling	C	C	C	C
___ Cedar Waxwing	C	C	C	
___ Dark-eyed Junco	C	C	C	C
___ Orange-crowned Warbler	C	C		
___ Yellow Warbler	C	C		
___ Yellow-rumped Warbler	C	C	C	O
___ Common Yelllowthroat Warbler	C	C	C	
___ Wilson's Warbler	C	C		
___ Western Tanager	P	P		
___ Savannah Sparrow	C	C	C	
___ Fox Sparrow			O	O
___ Song Sparrow	C	C	C	C

Great Blue Heron at Refuge – Bill Fulton 2012

Without birds, nature would lose her voice and the planet its most engaging envoys. Birds matter precisely because they matter to us. Environment is a concept. Nature a label. Birds are real, elements that live within our sensory plane. They spread their wings and bridge the gap between our world and the natural world. —***Pete Dunne**, Author & Director, Cape May Bird Observatory*