CITY OF FERNDALE
SHORELINE MASTER PROGRAM

ADDITIONAL INFORMATION

Shoreline Jurisdictional Boundary Justification and Description
Assumptions Made Concerning Scientific Information
Data Gaps in Scientific Information
Risks To Ecological Functions
Cumulative Impact Analysis
Area-By-Area Shoreline Analysis

June 2009

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Executive Summary

This section is meant as a supplement to the City's Shoreline Master Program (SMP). As such it provides additional information related to the design and implementation of the Shoreline regulations.

The regulated shore lands within the City of Ferndale are those associated with the Nooksack River, a shoreline of statewide significance, and Ten-Mile Creek, a stream of greater than 20 cubic feet per second mean annual flow. For SMP regulatory purposes however, the City has also included wetlands within the 100-year floodplain.

Thus, as the enclosed maps demonstrate, the shoreline jurisdiction within Ferndale consists of those areas surrounding the Nooksack River, Ten-Mile Creek and the wetlands within the 100-year floodplain.

Included in this supplement is a more detailed discussion of the ecological functions of those areas within Shoreline jurisdiction, the assumptions made regarding Best Available Science (BAS) and any deviations there from, risk to ecological functions associated with the SMP provisions, and any identified data gaps that might have impacts to this analysis and regulation.

Overall, the City believes that sufficient Best Available Science exists to appropriately designate Shoreline jurisdiction. The assumptions made as to the sufficiency of the BAS, the data gaps in scientific data and the risks associated with the SMP provisions have been identified, discussed, and determined to be adequate for the preparation of an updated SMP.

Given the three distinct SMP jurisdictional areas (river, streams, and 100-year floodplains), the following approach is adopted by the City:

Nooksack River

Normally preclude development in the "conservancy" zone unless restoration/enhancement is tied to development and where the restoration/enhancement's potential increase in ecological function outweighs the potential negative effects of development on the area's ecological function. It is the

City's position that restoration/enhancement along the River within the conservancy zone, when it includes the construction of off-channel habitat, will offset an associated limitation of this area for flood attenuation. The City's position is that off-channel habitat serves a greater ecological function within Ferndale than flood attenuation.

Creeks (10-Mile, Schell, Whiskey, and Silver)
The City's position relative to the creeks is to require setbacks and buffers in line with the requirements of the City's Critical Areas Ordinance (CAO). The City feels that the requirements of the CAO by and unto itself are sufficient to ensure the ecological functions of the area's creeks.

Wetlands Within the 100-Year Floodplain
With the exception of the wetland complex in Area 13 (see map on page 91) and the wetland complex in Area 15 (see map on page 93), the City's position is that the majority of wetlands within the 100-year floodplain within Ferndale demonstrate low value functions. The majority of the wetland complex in Area 13 is not within the City limits. The high value wetland complex in Area 15 include areas zoned General Commercial and Manufacturing. For this wetland complex in Area 15, the City has established two new Shoreline designations entitled "General Commercial Conversancy" and "Manufacturing Conservancy". The purpose of these designations is to recognize the value of the wetlands in these areas and to alert prospective developers of the increase likelihood of additional impediments to development.

As noted above, it is the position of the city that, other than those wetlands within the 100-year floodplain discussed above the remainder of these areas, in most cases, should not be included in the SMP jurisdiction due to these wetlands not being "associated" with a shoreline and therefore should not be avoided, restored, or enhanced. It is the City's preference for these low quality wetlands (many of which are Prior Converted Cropland) that they be filled and developed with appropriate off-site mitigation. Following the guidance of Best Available Science (BAS), it is the City's position that ecological function is enhanced when off-site mitigation is tied to a mitigation bank site or another appropriate site where existing high quality wetlands can be expanded, restored and enhanced. Expanding and enhancing existing high quality wetlands, per the results of BAS, yield far better results than attempts to preserve isolated low quality wetlands.

The City has broken the SMP jurisdictional areas into 16 distinct areas whose characteristics and ecological processes are discussed. Please refer to these area-by-area discussions for more information. In addition, a generalized discussion of the City of Ferndale's shore lands is included in the following section.

Process Overview

PROCESS BACKGROUND

The City of Ferndale has embarked on a multi-year process of updating our 1983 SMP. This process has included intensive field work and public involvement. During this update process, a new SMP manual was developed and adopted by the Department of Ecology. For this reason, the City has attempted to modify the existing SMP to comply with these new standards.

PROCESS UNERPINNING

The SMP jurisdictional areas in Ferndale can be broken down into three distinct areas. First there is the Nooksack River and its related floodway. Second are the wetlands associated with the 100-year floodplain and third are the area's creeks – 10-Mile Creek (as a result of flow volume), Schell Creek, Whiskey Creek, and Silver Creek (included due to their unique ecological function).

As is discussed below, new Whatcom County flood modeling was used to determine the floodway of the Nooksack River, the dimensions of the 100-year floodplain, and the wetlands associated with the 100-year floodplain.

PROCESS TIMELINE

Following an extensive public process between 1999 and 2001, the City of Ferndale submitted a new SMP to the DOE on 5 December 2001 for their review. The new SMP replaced the 1983 Shoreline Master Program. That submittal package included:

* December 5, 2001 cover letter for submittal of Shoreline Master Program
* November 19, 2001 City of Ferndale Ordinance 1263 adopting SMP
* City of Ferndale, November 19, 2001 Shoreline Master Program
* City of Ferndale, November 19, 2001 Shoreline Master Program Map
* City of Ferndale, 1999 through 2001 Shoreline Master Program Record of Development Process
* City of Ferndale, August 8, 2001, SEPA Documentation
* City of Ferndale, Comments received up to November 2001
* City of Ferndale, Interested Parties up to November 2001

This work, while extensive, was insufficient to update our Shoreline Master Plan to meet the new requirements adopted by DOE. As a result, the City continued to complete work on the SMP following the adoption of a revised budget and work plan by the City Council.

The City continued to work on updating the SMP and in 2004, after several discussions with DOE, the city obtained grant funding to complete the required additional work. During 2004 and 2005 a revised SMP Map was prepared (and is currently in use per DOE), and the SMP text was revised. That map and text were considered by the City Council following public hearings, after which the Council authorized the submittal of the May 2, 2005 SMP map and March 24, 2005 SMP text to DOE for review.

Upon review, DOE then suggested that additional revisions to the SMP text be made, and additional supporting documentation be developed and submitted. The additional supporting documentation was completed in 2006 and 2007 and is included in this supplemental report. The SMP text revisions are included in the attached SMP dated January 2008. The location of all required text revisions and additional supporting documentation is shown in the attached SMP Submittal Checklist.

Nooksack River – looking south from Main Street Bridge

PROCESS APPROACH

The unique underlying approach to SMP jurisdictional boundaries adopted for the update to the Ferndale SMP was "no net rise". With the Nooksack River bisecting the City and "feeding" (via associated groundwater) many of the wetlands within the 100-year floodplain, it was believed that utilizing BAS related to the dynamics of the Nooksack River would best serve to protect and enhance the ecological functions of the critical areas under SMP jurisdiction.

This approach was embodied in the use of flood modeling data produced by the Whatcom County Flood Division. This modeling project has been underway for many years by the County and has received support from various state agencies including the Department of Ecology. The use of the flood modeling data was crucial in determining a new map of the Ferndale "floodway".

The City had completed previous projects whose purpose was to determine the floodway of the Nooksack River as it flows through the City. Naturally this floodway information was used to determine appropriate SMP boundaries, including the determination of the 100-year floodplain. The floodway determination was directly used to map any wetlands within the 100-year floodplain.

As noted on the 1983 SMP jurisdictional map and the 2006 SMP jurisdictional map, the expansion of the modeled floodway and expansion of the 100-year floodplain had the effect of dramatically expanding the new SMP jurisdictional areas. See the map on page 77 for a visual presentation of the different SMP jurisdictional areas.

Given the dynamics of the Nooksack River and its important ecological function, the City, in conjunction with the Whatcom County Flood Division and the Department of Ecology attempted to determine probable future development (and needed fill) at the fringe of the newly mapped floodway. Various versions of potential fill scenarios were

inputted into the flood model until the maximum probable fill was identified that had the effect of “no net rise” in the Nooksack River (given the effects of a 100-year flood event).

Following this review of various fill/flood scenarios, the City and DOE determined appropriate SMP boundaries along the Nooksack River and its floodway. By using this approach, it was believed that appropriate SMP/DOE involvement will occur in those areas where excessive fill might negatively effect the ecological flood function of the floodway. Conversely, it was also believed that SMP/DOE involvement will appropriately be precluded on those parcels whose probable fill patterns will not adversely effect the ecological function of the river and its floodway.

LIST OF INVENTORY SOURCES USED

The following inventory sources were used in the preparation of Ferndale’s SMP. In addition, there are included inventory sources that were used as reference material in the compilation of the Plan.

Ferndale Floodway Analysis – prepared by Scott Wenger 2000 – delineation of Nooksack River floodway with city limits

Ten-Mile Creek Floodway Analysis – prepared by ATSI Inc. 2004 – delineation of floodway using soils analysis and on-site wet season inundation

Nooksack River Flood Modeling – prepared by Northwest Hydraulic Consultants 2001 – flood modeling for Nooksack River in Ferndale jurisdiction – west of Interstate 5 and north of Main Street

NRCS soil maps for Ferndale Washington

Wetland and Stream Mapping and Analysis – prepared by ATSI Inc. 2004

Ordinary High Water Analysis – Nooksack River – prepared by ATSI 2004

Nooksack River Flood Modeling – prepared by Whatcom County Surface Water Division 2005 – analysis of “no net rise” and cumulative fill scenarios using projected 100-year flood elevations

FEMA Base Flood Elevation Data

Ferndale Topographic Elevations – derived from April 2002 aerial photographic mapping

The following additional references sources were also used to update Ferndale’s Shoreline Master Program:

Azous, A.L. and R.R. Horner, eds. 2001. *Wetlands and Urbanization: Implications for the Future*. Boca Raton, FL: CRC Press (Lewis Publishers).

Cooke, S.S. May 1996. Wetland and Buffer Functions Semi-Quantitative Assessment Methodology. Cook Scientific Services. Seattle, WA.

Cooke, S.S., Editor. 1997. *A Field Guide to the Common Wetland Plants of Western Washington and Northwestern Oregon.* Seattle Audubon Society, Washington Native Plant Society. Seattle, WA.

Cowardin, L.M. V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. Office of Biological Services, Fish and Wildlife Service, U. S. Dept. of the Interior. FWS/OBS-79/31.

Cronk, J.K. and M.S. Fennessy. 2001. *Wetland Plants: Biology and Ecology.* Boca Raton, FL: CRC Press (Lewis Publishers).

Department of Natural Resources. 1995. *Washington Forest Practices.* Department of Natural Resources, Forest Practices Division: Olympia, WA.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Federal Register. 15 January 2002. Part II. Final Notice of Issuance of Nationwide Permits; Notice.

Ferndale, City of. 2004. *City of Ferndale Critical Areas Ordinance, Chapter 16.08*. Ferndale, WA.

Franklin, J.F., and C.T. Dyrness 1973. *Natural Vegetation of Oregon and Washington.* Oregon State University Press. Corvallis, Oregon.

Goldin, A. 1992. *Soil Survey of Whatcom County Area, Washington.* U.S.D.A. Soil Conservation Service, Washington State Department of Natural Resources, and Washington State University, Agriculture Research Center.

Haeussler, S., D. Coates, and J. Mather. 1990. *Autecology of Common Plants in British Columbia: A Literature Review*. FRDA Report 158. B.C. Ministry of Forestry and Canada - B.V. Forest Resource Development Agreement; Victoria, B.C.

Hickman, J.C, ed., 1993, *The Jepson Manual, Higher Plants of California*, University of California Press, Berkeley, CA.

Hitchcock, C.L. and A. Cronquist. 1973. *Flora of the Pacific Northwest*. University of Washington Press. Seattle, Washington.

Holling, C.S. (ed.). 1978. *Adaptive Environmental Assessment and Management*. John Wiley, New York.

Hruby, T., T.Granger, K. Brunner, S. Cooke, K. Dublanica, R. Gersib, L. Reinelt, K. Richter, D. Sheldon, E. Teachout, A. Wald, and F. Weinmann. July 1999. Methods for Assessing Wetland Functions Volume 1:

Keddy, P. A. 2000. *Wetland Ecology: Principles and Conservation.* New York: Cambridge University Press.

Kollmorgen Corporation. 1998. *Munsell soil color charts*, Baltimore, MD.

Leonard W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, and R.M. Storm. 1993. *Amphibians of Washington and Oregon.* Seattle Audubon Society. Seattle, WA. 168 pp.

Mitsch, W.J. and J.G. Gosselink. 2000. *Wetlands*, 3rd ed. John Wiley & Sons, New York. 920 pp.

National Wetland Inventory, 1987. U.S. Department of the Interior: Fish and Wildlife Service.

Peterson, R.T. 1990. *A Field Guide to Western Birds*. Peterson Field Guides. Houghton Mifflin Co. Boston, Massachusetts.

Reed, P.B., Jr. 1988. *National List of Plant Species that occur in Wetlands: 1988 Northwest*. Biological Report 88 (26.9), U.S. Fish and Wildlife Service, St. Petersburg, Florida.

Richardson, J.L. and M.J. Vepraskas (Eds.). 2001. *Wetland Soils: Genesis, Hydrology, Landscapes, and Classification.* Lewis Publishers, Boca Raton, Florida.

Stebbins, R.C. 1985. *A Field Guide to Western Reptiles and Amphibians*, 2nd edition. Houghton Mifflin Co. Boston, Massachusetts.

Tiner, R.W. 1999. *Wetland Indicators, A Guide to Wetland Identification, Delineation, Classification, and Mapping.* Lewis Publishers, Boca Raton, Florida.

United States Department of the Interior, Fish and Wildlife Service. 1977. National Wetlands Inventory Maps, Scale 1:24,000. Office of Biological Services.

Washington Department of Ecology. 1993. *Washington State Wetlands Rating System for Western Washington.* Publication #93-74.

Washington State Department of Ecology, *Washington State Wetlands Identification and Delineation Manual,* March, 1997; Pub. No. 96-94.

LIST OF MAP SOURCES USED

The following map sources were used in the preparation of Ferndale's SMP. In addition, there are included map sources that were used as reference material in the compilation of the Plan.

City of Ferndale Comprehensive Plan Map – land use designations – 1998

City of Ferndale Zoning Map – land use designations – 2005

City of Ferndale Shoreline Master Plan – shoreline designations - 1995

City of Ferndale Shoreline Master Plan – shoreline designations – 2005

Ferndale Aerial Photo Maps – shoreline areas #1 thru #16 – 2005

Whatcom County Surface Water Division – flood modeling maps – 1005

FEMA Flood Maps – FIRM

City of Ferndale Critical Areas Ordinance Maps – critical area summary delineation – 1997

City of Ferndale Critical Areas Ordinance Maps – critical area summary delineation – 2004

City of Ferndale Aerial Photography Series – 2002 – mapping for topography and land use
Whatcom County Soils Survey – 1988
Whatcom County Critical Areas Map – fringe areas analysis – 1994
Whatcom County Critical Areas GIS Mapping – fringe area analysis – 2002
Washington State Priorities Species and Habitat Maps – fish habitat – 2003
Whatcom County Aquifer Well-Head Protection Maps – 1997
Whatcom County Aquifer Recharge Maps – 2000

USGS Seismic Analysis and Zone Maps - 1983

Shoreline Characterization, Inventory and Use Analysis – Ecosystem Wide

As noted in previous sections, the City used a wide array of inventory material, maps, and ecological function analysis reports to compile and prepare the Shoreline Master Program. Please refer to the "list of inventory sources used" and the "list of map sources used" for more information.

Shoreline Inventory Overview

The Shoreline jurisdiction within Ferndale can be broken into three (3) distinct categories; 1) the Nooksack River, 2) wetlands within the 100-year floodplain, and 3) four creeks (Whiskey, 10-Mile, Schell, and Silver). Refer to the map on page 76 for the location of these features.

Shoreline Inventory Characteristics & Function Overview

Given the three classifications of the City's shoreline jurisdiction from above, the following general characteristics exist:

Nooksack River View South from Main Street

Nooksack River

Contained and armored shoreline within limited riparian habitat. Best riparian habitat exists on the west side of the river from the Vanderyacht Park north to the Interstate 5 Bridge. River area on east side (golf course side) characterized by a narrow strip of riparian habitat (moderate habitat). Lowest quality habitat located from the railroad bridge south to the southern city limits. The primary function of the River is fish passage.

100-Year Floodplain Wetlands

Limited function. These areas have been extensively farmed and graded with drainage ditches and culverts installed. Little or no direct connection to the Nooksack River. Following the guidance in WAC 173-22-030(1) and 173-22-040(3c) these wetlands may not be within Shoreline jurisdiction. The primary function of these wetlands is for migratory waterfowl habitat. The exception is two large wetland complexes mapped as Area 13 and Area 15. Area 13 includes Schell Creek and is a major drainage for the hillsides surrounding Ferndale. Area15 are the wetlands associated with Tennant Lake. Even though these wetlands have been separated from Tennant Lake by both the

Burlington Northern Railroad line and a city street, they still preserve many of their high quality wetland features.

Streams (Whiskey, 10-Mile, Schell, and Silver)
Whiskey Creek – degraded salmonid habitat (lower reaches), channalized and culverted with Reed Canary Grass. Limited spawning and juvenile habitat – limited by access culvert under the Interstate 5 bridge.

10-Mile Creek – Salmonid habitat, extensive Reed Canary Grass, spawning areas north of city, remnants of a man-made lake. Modest function as water quality (Reed Canary Grass). Primary function as salmon habitat (juvenile rearing and adult passage).

Schell Creek – ditched and channalized, little or no spawning habitat, is connected to Red River, good site for enhancement. Could function as juvenile salmon habitat.

Silver Creek – very much like Whiskey Creek, small stretch in city, creek in ravine. Primary function is for adult salmon passage.

10-Mile Creek

Shoreline Characterization - Overview
To understand the characterization of the shoreline area within the City of Ferndale, reference to the maps included in this appendix will prove useful. As can be seen, the Nooksack River, as it passes through the City is severely channalized with rip-rap. Due to the existence of the Interstate 5 bridge to the north and the Burlington Northern Railroad Bridge and Main Street Bridge to the south, the channel of the Nooksack is well defined, armored, and not permitted to migrate between the “book-ends”.

Due to the urban-level of development within Ferndale along the river, there is also low ecological functionality. From a fish habitat standpoint, there are no redds, no off river channels, and little other areas that would provide refuge for salmon or other species. In essence, the river serves as a fish passage corridor. This is the characterization of the river as it passes through the City and from an ecological standpoint, it is the City contention that these limited functions are appropriate for an urban setting.

Given the small amount of river that is included in our jurisdiction, the physical constraints posed by the I-5 bridge (there is no opportunity for channel migration to the north of the bridge – the river must pass under the bridge in its current configuration) and its urban setting, the characterization of the river as it passes through Ferndale is drastically different that the settings both upstream and down.

As will be noted in the restoration section, there exists little quality restoration opportunities within Ferndale. The areas best suited for restoration are south of the City (as the river nears the bay) and upstream of the City (where spanning and rearing habitat exists).

Another factor that both limits the ecological function of the river and defines its characteristics within Ferndale is the existence of rip-rap dikes on both sides of the river. From the point that the river passes under the I-5 bridge to the point that it exists the city to the south, both sides of the river are confined by dikes.

The Nooksack River bisects the City of Ferndale, a shoreline of statewide significance (Figures 1 and 2). Interstate-5, the Main Street Bridge, and the railroad bridge have historically altered and affected the ecological condition of the river by constricting flow, altering flood patterns, restricting the channel migration zone, and functionally isolating faunal habitats to the north and south of this area.

Land use outside of the City of Ferndale within the 100-year floodplain, along the river, is primarily agricultural. The shoreline jurisdiction area within the city limits is a combination of undeveloped, recreational, commercial, and residential land. Land within the floodway is mostly undeveloped agricultural land, city parks, or golf course. Land along the major arterial, Main Street, and at the intersection of Interstate-5 and Main Street is developed with commercial businesses.

The Nooksack River and immediate shoreline provide habitat for listed species such as bald eagles (*Haliaeetus leucocephalus*) that use this portion of the shoreline for feeding and resting (perch) habitat. Listed fish such as the Puget Sound Chinook (*Oncorhynchus tshawytscha*) and bull trout (*Salvelinus confluentus*) and proposed listed species such as Coho (*O. kisutch*) are present in the river. The river is a corridor for fish, waterfowl, passerine birds, and small and large mammals. Swans (*Cygnus spp.)* have been observed in the surrounding agricultural fields.

The Nooksack River is mostly contained either within man-made dikes or a well defined channel with steep banks that restrict regular seasonal flooding. Large woody debris is sparse, the riparian vegetation is narrow, and sand bars are exposed during low summer flow.

The shoreline area with moderate function and value (floodway) have been designated as conservancy or are zoned as floodway and will not be developed without corresponding restoration and/or enhancement. The areas that are zoned floodway and have a land use designation of conservancy will be used as mitigation sites.

The conditions of the City of Ferndale within shoreline jurisdiction are such that few areas remain that will be developed. Those areas that will be developed have city services, are adjacent to roads, or have the lowest functions and values regarding the

shoreline environment. As discussed, these areas are appropriate for development with the elimination of these low quality wetlands and appropriate off-site mitigation.

The goals of the City of Ferndale are to protect the existing functions of the environment of the shoreline, to increase habitat functions within areas of the shoreline that have the greatest habitat value, protect those areas of high ecological value from development, develop those areas within shoreline jurisdiction that are currently served by public roads and city utilities, and focus development in areas with the lowest ecological value.

The shoreline land use designations for the shoreline areas have been updated and increased in scope and area. The new designations were selected by combining the following information:

1. Existing conditions (i.e., residential, commercial, parks, golf course, undeveloped).

2. Placement of fill to affect a no-net-rise of the river during a 100-year storm event.

3. A new map of the 100-year floodplain was produced that uses best available information and provides better protection to infrastructure and the environment.

4. Protection of the floodway.

5. Increased protection over the previous land use designations based on environmental concerns (flooding and habitat).

6. To provide suitable and appropriate development of homes, business, and utilities.

Shoreline Characterization - Shoreline and Adjacent Land Use Patterns

Ferndale, while on the Nooksack River, does not have any current or proposed uses that would be considered “water-dependent” or “water-orientated”. This is due to two factors. First, the river is armored as it passes through the City and secondly, with the Nooksack being a wild river and Ferndale being very far upstream from the bay, there have been no viable water-dependent or water-orientated uses that have been financially feasible. With Ferndale being a growing urban center, there exists opportunities for water-enjoyment uses related to restaurants and other public facilities. In addition, the Riverside Golf Course is situated on the eastern side of the Nooksack River as it passes through the City.

Shoreline Characterization - Transportation and Utility Facilities
As noted previously, Ferndale is book-ended by the Interstate 5 bridge to the north and the railroad and city bridges to the south. In addition, the Public Utility District (PUD) has its primary water extraction point at the southern end of the Nooksack (south of the railroad and city bridge). The City's water treatment facility and wastewater treatment facility are also located at the southern portion of the city next to the PUD water facility. These two city facilities are not located on the river but rather are across the river frontage street, approximately 300 feet from the river's edge.

Nooksack River – View North from Hastings Park

It should be noted that both the Interstate 5 bridge and the Burlington Northern Railroad Bridge can be considered essential public infrastructure that serve both a Homeland Security function as well as vital economic transportation links for Washington State and the west coast of America.

With the existence of the freeway bridge, railroad bridge, city access bridge, PUD water plant, city water plant, and city wastewater plant, the need for the armoring of the Nooksack as it passes through Ferndale becomes apparent. As noted, it is necessary for the Nooksack to flow through the City in a defined and stable built environment. The very survival of the bridges and public water and wastewater facilities depends on the stability of the Nooksack in this area. This combined with the limited ecological function of the Nooksack as it passes through Ferndale (as opposed to the function of the river both upstream and downstream), means that the characterization of the Shoreline environment within Ferndale is less dynamic than for other jurisdictions.

Shoreline Characterization - Critical Areas
The City has identified and roughly mapped the City critical areas for use in our Critical Areas Ordinance (CAO). As detailed in the CAO, there exists wetlands scattered throughout the City. There are little fish and wildlife conservation areas within the City due to its urban nature and limitations due to the characterization of the river environment in Ferndale (as discussed above) and there are limited geologically hazardous areas.

In the arena of frequently flooded areas, there exists a defined floodway of the Nooksack River as it passes through the City. This area includes the Riverview Golf

Course located on the eastern side of the Nooksack. This golf course area has been designated as conservancy due to the flood attenuation purposes that this area represents. With this said, it should be noted that even this floodway area of the golf course serves a limited function. With the man-made flow restriction embodied in the Interstate 5 bridge, there is a limited amount of water that can flow under the bridge during flood events. This not only limits the amount of floodwater that can flow over the golf course during flood events but it also serves to drive the flood characteristics for the land north of Ferndale.

This land area surrounding the Nooksack River north of Ferndale is outside of our SMP jurisdiction but with much of it being undiked, there exists much opportunity for the river to dynamically alter its course and utilize the land on either side of the river for floodplain use. As you might expect, the functionality of the Nooksack north of the City is dramatically difference than its functionality as it flow through the City.

Shoreline Characterization - Degraded Areas with Potential for Ecological Restoration

The potential for restoration for sites and areas with degraded ecological function will be discussed in greater depth in the Restoration Section of the SMP and you attention is directed there. With this said, there are limited opportunities for restoration in the City due to the limiting factors discussed above.

The built environment in Ferndale is the result of over 200 years of human activity. There is literally nothing within Ferndale's SMP jurisdictional areas that is not the result of human activity. The entire area has been diked, plowed, farmed, developed, and logged. In fact much of the SMP jurisdictional areas (Barrett Creek for example) are the result of damming and diking. The existence of Tennant Lake (outside of our SMP jurisdiction to the south) is a direct result of the construction of Interstate 5 and the Burlington Northern Railroad.

The reach of the Nooksack River between the bridges represents a functionally isolated area of the river that has substantial impediments to restoration due to the critical infrastructure facilities located in this area.

The area of the golf course could serve as a restoration site with the potential for the construction of off-river channels. As will be discussed in the Restoration Section however, this area is designated as Conservancy, is private property, and may only have hopes of restoration if such private land owner restoration is tied to a limited development proposal.

The area where Barrett Creek enters the Nooksack could be a candidate for restoration but this area is outside of our SMP jurisdiction.

Shoreline Characterization - Areas of Special Interest

Within Ferndale there are no developing or redeveloping harbors or waterfronts, no previously identified toxic or hazardous material clean-up sites, no dredged material disposal sites, and no eroding shoreline sites. In the area of priority habitats, there are limited opportunities along the Nooksack River due to the required armoring and the majority of Tennant Lake (to the south of the City) is outside of our SMP jurisdictional boundaries.

There does exist limited opportunities to improve the habitat within Whiskey Creek and this area has been identified in our CAO as an area of concern. In addition, the area of Schell Ditch (Area 13) can and does serve water quality and flood attenuation purposes.

The last area of special interest is the wetland complex near Tenant Lake in Area 15. These high quality wetlands are currently zoned General Commercial and Manufacturing. Due to the existence of these wetlands, specific areas within Area 15 have been designated as "General Commercial Conversancy" and "Manufacturing Conversancy".

Shoreline Characterization - Shoreline Public Access

Due to the limited public uses on the Nooksack, its wild and dynamic characteristics, and the armored shoreline of the river as it passes through Ferndale, there are limited opportunities for shoreline public access. There does exist a public boat launch on the eastern shore of the Nooksack just to the south of the City (boat launch is outside of our jurisdiction).

State Boat Launch - Ferndale

Shoreline Characterization - Channel Migration Zones and Flood Plains

Due to many factors previously highlighted, the Nooksack River's channel will not be allowed to migrate as it passes through the city. In addition the floodway within the city is also limited and cannot be expanded. With this said however, there exists much opportunity for both channel migration and flood plain utilization to the north of the city and in a limited sense, to the south of the City.

Shoreline Characterization - Archaeological Resources

With Ferndale located on the shoreline of the Nooksack River, the existence of Native American archaeological sites is not unusual. This is tempered with the extensive human diking and armoring of the Nooksack as it passes through the City. There is one known archaeological site to the north of the Interstate 5 Bridge. Prior development activity unearthed this site and the property owner has worked with State and Tribal agencies regarding the site.

Shoreline Analysis of Ecological Function – Ecosystem Wide

Identified Shoreline Ecosystem-Wide Process & Functions

As discussed, the ecosystem processes at work within Ferndale are uniquely limited in scope and applicability. With the Nooksack River bisecting the City, it could be assumed that a major ecological function would be flood attenuation and fish habitat. In actuality neither function is at work within the Ferndale SMP jurisdiction.

From a flood attenuation standpoint, there is little flood storage capability within the city due to the river being "book-ended" by the Interstate 5 bridge to the north and the Railroad and City access bridges to the south. This physical constraint on the river means that there is a) little or no ability to functionally increase the flow of the river under the I-5 Bridge and b) the "floodway" flow between the bridges is physically constrained by the size of the golf course and the flow limitation under the I-5 Bridge.

The City can do nothing to increase the flow capability under the I-5 Bridge which means that the flood plain to the north of the city (outside of our SMP jurisdiction) is crucial for flood attenuation.

Tennant Lake

The same can be said for fish habitat. Given Ferndale's physical location on the river, the aquatic system within Ferndale's SMP jurisdiction offers neither spawning nor rearing habitat. The Nooksack River, as it flows through Ferndale, has no off-river channels, though the possibility exist for the creation of such habitat (see the Restoration Section for this discussion). The greatest opportunity for increased fish habitat lies in the City partnering with other jurisdictions to the north and south of the City.

The other aquatic ecosystem areas within Ferndale include the 100-year floodplain wetlands associated with Tennant Lake (Tennant Lake is actually outside of Ferndale), the wetlands associated with Barrett Creek (Barrett "lake"/creek is outside of our SMP jurisdiction), certain portions of Whiskey Creek (where Whiskey Creek joins the Nooksack is outside of our SMP area), and certain portions of Silver Creek (southern portion of Silver Creek – where it enters the Nooksack – outside of our SMP).

For the remainder of the critical areas within our SMP jurisdiction (wetlands generally associated with the 100-year floodplain), their habitat functions can best be protected through application of the avoidance/buffer requirements contained in the City's Critical Areas Ordinance.

Shoreline Ecosystem – General Measures Necessary to Protect/Restore Functions

As noted above, Ferndale's SMP jurisdiction includes areas that have been drastically altered by the effects of Human civilization. It is also the City's contention that restoration of the potential ecological functions of the Nooksack as it passes through Ferndale are very limited and may not be feasible. With the flow-restriction of the Interstate 5 bridge and the limited floodplain function for the golf course that fronts on the rivers as it passes through Ferndale, there is little that could be done to alter this arrangement. As has been shown by the flood modeling conducted for the revision to the SMP, there is adequate floodway area in Ferndale to accept the 100-year flood waters of the Nooksack.

Also, from a fish habitat standpoint, there is little that can be done on the Nooksack as it passes through Ferndale. The identified measures that can be taken on the River to improve its ecological functionality are discussed in the Restoration Section of the SMP.

The identified scientific measures that can be taken to protect an/or improve the ecological function of the other areas of SMP jurisdiction within Ferndale (areas around 10-Mile Creek, Whiskey Creek, and Silver Creek) are embodied in the requirements of the City's Critical Areas Ordinance.

Shoreline Ecosystem – Specific Measures Necessary to Protect/Restore Functions

Regarding the River, streams, and associated floodplain within Ferndale, the City has considered the following:

Hydrologic

Regarding the transport of water and sediment across the natural range of flow variability, the City has relied on the BAS incorporated into the Whatcom County flood modeling completed for this update to our SMP. As discussed previously, the City used a "no net rise" approach to the determination of maximum fill scenarios that would not adversely affect the ability for flood water to flow through the City while not causing any upstream or downstream deterioration of flood attenuation ability.

In the very short stretch of the Nooksack that passes through Ferndale, the rivers bank is armored and therefore there are no pools or riffles, one small gravel bar and virtually no recruitment of woody debris.

Shoreline Vegetation

There is a moderate amount of native vegetation along the River as it passes through Ferndale. On one side of the river is the Riverfront Golf Course and on the other a city park (near the water) and residential housing (on higher banks above the river). For both sides of the river, there is a moderate amount of bank stabilization but little in the way of provision for large woody debris or other organic material. Please refer to the Restoration Section for more information regarding riverside vegetation capability.

Habitat for Native Species

As noted, the Nooksack – as it passes through Ferndale – offers little in the way of redds, resting, hiding, or food production capability. The ability to increase this ecosystem function is discussed in other sections of the SMP.

Shoreline Jurisdiction Boundary, Justification, and Description

Overview and Justification

Meetings between City staff, City consultants, the DOE, and Whatcom County were held during 2004 and 2005 to finalize the shoreline jurisdiction boundary. The boundary was determined by flood elevation and safety, and, protection of the shoreline ecological functions. We combined information from the following to determine the final Shoreline Jurisdictional Boundary.

1. The flood analysis that Mr. Scott Wenger completed for the city, regarding the floodway of the Nooksack River.

2. On-site determination of the floodway of Ten-Mile Creek based on soils and ATSI staff observations of wet season inundation.

3. Flood models of the Nooksack River prepared by Northwest Hydraulic Consultants Inc. for the DOE west of Interstate-5 and north of Main Street.

4. NRCS soil maps.

5. Wetlands and stream maps prepared by ATSI.

6. OHWM determined by ATSI and topographic data.

7. Modeling completed by Ms. Paula Cooper and Ms. Nicci Bourne, of the Whatcom County Surface Water Division, to analyze a no-net-rise (cumulative fill area) in flood elevation based on a projected 100-year flood elevation of the Nooksack River and the placement of fill within the 100-year floodplain.

The 100-year floodplain was determined using a combination of the FEMA base flood elevation data and the most recent topographic map based on elevations generated during the April 2002 aerial photographic mapping. A new map of the 100-year floodplain based on best available information was developed for use in the SMP.

Multiple meetings were held during 2004 between the DOE staff, Ferndale staff, Ms, Cooper and Ms. Bourne, and ATSI staff to produce a final shoreline jurisdictional boundary and overall shoreline jurisdiction. This shoreline jurisdiction area is a combination of factors that include:

1. Areas that are a minimum 200 feet landward from the floodway.

2. Areas that protect the riparian functions of the Nooksack River (a water of statewide significance) and Ten-Mile Creek (a stream with greater than 20 cfs mean annual flow).

3. Areas within the floodway of Ten-Mile Creek.

4. An area that will affect a no-net-rise from cumulative fill and within the 100-year floodplain of the Nooksack River.

Shoreline jurisdiction boundary description

For purposes of the SMP, the City has determined the jurisdictional boundaries using the following geographical descriptions. Please refer to the map on page 76 to further understand these boundary descriptions.

1. Beginning on the right bank of river at the southern city limits to Main Street, the Shoreline Jurisdiction (SJ) is 200 feet landward from the floodway of the Nooksack River.

2. The jurisdictional line begins at toe of slope of the railroad tracks to the southern edge of fill from the feed mill east of Second Street because of no-net-rise in the 100-year flood elevation of the Nooksack River.

3. The line continues along the 100-year flood elevation line to between Willard Street and Somerset Street.

4. The line continues north at 200 feet landward from the floodway of the Nooksack River.

5. The line continues at 200 feet landward from the floodway of the Nooksack River until the north city limits.

6. Beginning on the left bank of the river at the southern city limits to Main Street the line is greater than 200 feet from the floodway because of no-net-rise in the 100-year flood elevation of the Nooksack River.

7. The area from Main Street to the northeast corner of Samuels Furniture is based on 200 feet from the floodway of the Nooksack River.

8. The jurisdictional area from the northeast corner of Samuels Furniture to Interstate-5 is based on project fill along Main Street and no-net-rise in the 100-year flood elevation of the Nooksack River.

9. The line continues area along the west edge of Interstate-5 is at the toe of the slope of Interstate-5 based on no-net-rise in the 100-year flood elevation of the Nooksack River.

10. The jurisdictional area adjacent to the bridge abutments of Interstate-5 is based on 200 feet from the floodway of the Nooksack River.

11. The line continues on the eastern side of Interstate-5 to Barrett Road is 200 feet from the floodway of the Nooksack River.

12. The jurisdictional area from Barrett Road east to the eastern city limits is 200 feet landward of the edge of the floodway of Ten-Mile Creek or as in the eastern portion of this reach where the line abuts Main Street; the line is beyond the 100-year floodplain to protect the riparian area of Ten-Mile Creek north of Main Street.

13. In addition, all wetlands within the 100-year floodplain are included.

Changes to Shoreline Jurisdictional Boundaries and Designations

This revision to the City of Ferndale's Shoreline Master Program has included both alterations to the SMP jurisdictional boundaries as well as changes to the SMP land use designations. For the most part, this revision increases the SMP jurisdictional areas and also increases the SMP areas designated as "conservancy". The city believes that these changes will enhance the opportunities to preserve and enhance the ecological functions of land within the SMP area.

Changes to SMP Jurisdictional Boundaries

Referring to the "old" SMP map on page 75, you can see that the jurisdictional boundaries included basically two areas. First, the SMP boundary for the Nooksack River only included a 200 foot area adjacent to the river along its bank. Secondly, the old SMP boundary included a small strip of land on the southern edge of 10-mile Creek.

The "new" SMP jurisdictional map on page 76 reflects that these two areas have been expanded. For the Nooksack River, the SMP boundary was expanded to include all of the land within the floodplain that was identified through the County flood modeling as areas that would experience a net increase in flooding given various fill scenarios.

Regarding the 10-Mile Creek area, the new map on pages 76 & 81 also reflects an increased SMP area that corresponds to the 200 foot jurisdictional SMP boundary. Increased and more refined mapping has allowed the City to more closely define shoreline jurisdiction boundaries as reflected on these maps. The last change in SMP jurisdictional boundaries that are reflected in Ferndale's revised SMP are the

wetlands within the 100-year floodplain. As reflected on the page on page 76, these wetland areas have been identified and mapped.

Changes to Shoreline Designations

The greatest change in designations is the expansion of the "conservancy" designation for the floodway areas associated with the Riverview Golf Course. With the expansion of the SMP boundary to encompass the golf course, this area has also been designated conservancy. In addition, the conservancy designation has also been expanded on the western side of the Nooksack as it passes through Ferndale. As was the case for the golf course property, this expansion to the conservancy designation was in response to the remapping (and expansion) of the floodway area within Ferndale.

Wetland "Water Hazard" on Riverfront Golf Course

Shoreline jurisdiction descriptions by area

For SMP purposes, the City has divided the jurisdictional area of the City into 16 distinct areas. These areas were determined through a combination of similar ecological function and geographical similarities/differences. A description of each area follows and includes a map showing the jurisdictional boundaries, the location of the area in relation to the city itself and the existing comprehensive plan land use designations.

Jurisdictional Determination Process

City consultants walked and reviewed areas that are within and adjacent to the 100-year floodplain of the Nooksack River that are within the City of Ferndale and immediate surrounding area. This enabled the consultant to work with City staff and the DOE to document the existing ecological conditions, to understand existing and planned development conditions, and determine potential rehabitation areas that fall within shoreline jurisdiction. This report has divided the shoreline jurisdiction into 16 discrete areas for discussion purposes. These areas are:

Area 1. Wetlands within 100-year floodplain south of Main Street, east of Interstate-5. See map on page 79.

Area 2. Residential area north of Main Street adjacent to Ten-Mile Creek on the eastern edge of the city limits. See map on page 80.

Area 3. Commercial area north of Main Street adjacent to Ten-Mile Creek east of Barrett Road. See map on page 81.

Area 4. Ferndale Town Center within 200 feet of floodway. See map on page 82.

Area 5. Whiskey Creek wetlands within 100-year floodplain. See map on page 83.

Area 6. Agricultural land in the northeast corner of Interstate-5 and the Nooksack River. See map on page 84.

Area 7. Residential area in the northwest corner of Interstate-5 and the Nooksack River. See map on page 85.

Area 8. Riverside golf course. See map on page 86.

Area 9. Vander Yacht Park and vicinity south to Main Street. See map on page 87.

Area 10. Commercial area in northeast corner of Main Street and the Nooksack River. See map on page 88.

Area 11. Residential area in the southwest corner of Main Street and the Nooksack River, to Tosco Park. See map on page 89.

Area 12. Tosco Park area. See map on page 90.

Area 13. Wetlands in the 100-year floodplain south and north of City Hall. See map on page 91.

Area 14. Southeast corner of Main Street and the Nooksack River. See map on page 92.

Area 15. Wetlands in the 100-year floodplain near Tennant Lake. See map on page 93.

Area 16. Silver Creek. See map on page 94.

Potential Conflicts Between SMP and Comp Plan Land Use Designations

As noted in the SMP, most development within the shoreline areas will be subject to the conditions contained in the city's Critical Areas Ordinance (as well as others). While we believe that any conflicts in designated land use will be reconciled through this process, there exist certain areas that have the potential for land use conflicts. These areas are specifically discussed below.

POTENTIAL CONFLICT #1 - Area 1
Wetlands within 100-year floodplain south of Main Street, east of Interstate 5

Area 1 includes the wetlands within the 100-year floodplain of the Nooksack River south of Main Street, east of Interstate-5 (Figures 2 and 4). This area is mostly agricultural land (PCC) but contains some commercial, residential, and forested areas.

Comprehensive Plan Designation – Area 1 - "General Commercial"

Shoreline Master Program Designation – Area 1 - The SMP boundary is at the northern edge of this area of the City. As such, the majority of the land within this area is outside of Shoreline Jurisdiction. There are however, wetlands within the 100-year floodplain within this area. These wetlands however fail the "proximity" and "influence" tests contained in WAC 172-22-030(1) and 173-22-040(3c) and therefore should be precluded from shoreline jurisdiction.

Comp Plan & SMP Conflicts – Area 1 – The areas of conflict include those wetlands within the 100-year floodplain contained in Area 1 that are designated "Commercial" per the City's Comprehensive Plan.

This potential conflict is mitigated by the preliminary mapping of critical areas within this area (wetlands within 100-year floodplain). As specific projects are proposed in this area, on-site wetland delineation will be required per city development regulations. These wetland areas are roughly mapped on the City's Critical Areas Ordinance and once confirmed through delineation, development will only be allowed following the adoption of appropriate mitigation measures. This can include avoidance, on-site mitigation and off-site mitigation. Sufficient and appropriate buffers will be required per our CAO and any proposed development will be accomplished through a cooperative process between the City, developer and the Department of Ecology.

It is the city's position however that these wetlands are isolated, have no direct connection to the river, are of low quality and should be filled and developed with appropriate off-site mitigation.

POTENTIAL CONFLICT #2 - Area 3
Commercial area north of Main Street adjacent to Ten-Mile Creek east of Barrett Road.

Area 3 includes the commercial area north of Main Street adjacent to Ten-Mile Creek east of Barrett Road. This area is within 200 feet of the floodway of Ten-Mile Creek and a portion of Ten-Mile Creek. The southern portion of this area consists of a hotel, bank, drive-up restaurant, and gas station/truck stop. The northern portion of this area is an agricultural field.

Comprehensive Plan Designation – Area 3 - "General Commercial

Shoreline Master Program Designation – Area 3 – The majority of Area 3 is within Shoreline Jurisdiction with a portion of the area designated "Conservancy" and a portion designated "Urban"

Comp Plan & SMP Conflicts – Area 3 – The areas of conflict include those areas designed "Commercial" per the Comp Plan but "Conservancy" per the SMP. In addition there may be a conflict between appropriate development in the areas designated "urban" in the Comp plan but adjacent to the areas designated "Conservancy" per the SMP.

Specific development proposals for this area will include on-site delineation and appropriate setback, buffers and/or mitigation. Overall, the City believes that appropriate development can occur in this area.

POTENTIAL CONFLICT #3 - Area 5
Whiskey Creek wetlands within 100-year floodplain.

Area 5 includes the Whiskey Creek wetlands and Whiskey Creek within the 100-year floodplain of the Nooksack River. The wetlands are all Category III and IV farmed palustrine emergent wetlands that are dominated by non-native herbaceous species such as reed canary grass. Whiskey Creek provides salmonid, waterfowl, and large and small mammal habitat. This area is currently not developed.

Comprehensive Plan Designation – Area 5 – "Residential" –

Shoreline Master Program Designation – Area 5 – The SMP designates that there are wetlands within the 100-year floodplain within Area 5. These areas are also mapped on the City's Critical Areas Ordinance and roughly include Whiskey Creek and associated wetlands.

Comp Plan & SMP Conflicts – The only areas of potential conflict exist between the wetland mapping and designation per the SMP and those designations included in the City's Critical Areas Ordinance. While the entire area is zoned "residential", this zoning designation will be subservient to the requirements of the SMP and the CAO. When specific land use proposals are brought to the City, critical areas mapped on the CAO and confirmed via on-site designation will be precluded from development. In addition, buffers will be required per the CAO.

Given the inherent limitations of mapping and zoning specifics, the City believes that it is best served by project-driven delineation to determine "no build" areas and appropriate buffers to protect identified critical areas within Area 5.

POTENTIAL CONFLICT #4 - Area 13
Wetlands in the 100-year floodplain south and north of City Hall.

Area 13 includes the wetlands in the 100-year floodplain near City Hall. These wetlands are a combination for palustrine forested and palustrine emergent.

The forested and emergent wetlands south of City Hall are dominated by cottonwood and red alder trees with an understory of hard hack (*Spiraea douglasii*) and salmonberry (*Rubus spectabilis*) and predominantly reed canarygrass and cattails (*Typha latifolia*) respectively. Portions of these wetlands are ditched. These wetlands are Category III wetlands because of their dominance of the reed canarygrass and lack of habitat features.

The wetlands north of City Hall are all small, functionally isolated, dominated by reed canarygrass, provide little habitat functions, and are Category IV Wetlands. Per the "associated" test (WAC 173-22-030(1) and 173-22-040(3)), these wetlands may be determined to not be within Shoreline jurisdiction.

Comprehensive Plan Designation - Area 13 - "General Commercial

Shoreline Master Program Designation – Area 13 – This area includes wetlands that are within the 100-year floodplain.

Comp Plan & SMP Conflicts – Area 13 – The areas of conflict include those wetlands within the 100-year floodplain contained in Area 13 that are designated "Commercial" per the City's Comprehensive Plan.

This potential conflict is mitigated by the preliminary mapping of critical areas within this area (wetlands within 100-year floodplain). As specific projects are proposed in this area, on-site wetland delineation will be required per city development regulations. These wetland areas are roughly mapped on the City's Critical Areas Ordinance and once confirmed through delineation, development will only be allowed following the adoption of appropriate mitigation measures. This can include avoidance, on-site mitigation and off-site mitigation. Sufficient and appropriate buffers will be required per our CAO and any proposed development will be accomplished through a cooperative process between the City, developer and the Department of Ecology.

POTENTIAL CONFLICT #5 - Area 15
Wetlands in the 100-year floodplain near Tennant Lake.

Area 15 includes the wetlands in the 100-year floodplain of the Nooksack River north and east of Tennant Lake. These wetlands are a combination of Category II and Category III palustrine forested wetlands. Most of this area is undeveloped and undisturbed. The area is bisected by the railroad tracks and a narrow paved road. Few homes occur in the area with commercial buildings and businesses on the eastern edge along LaBounty Road. Commercial structures include a concrete batch plant and light industry adjacent to LaBounty Road.

Comprehensive Plan Designation – Area 15 – "Industrial" and "General Commercial"

Shoreline Master Program Designation – Area 15 – The SMP identifies this area as having wetlands

within the 100-year floodplain. While the majority of this mapped wetland complex falls outside of the City's Urban Growth Area, there are areas of the identified wetland areas that extend into the UGA.

Comp Plan & SMP Conflicts – Area 15 – The areas of conflict include those high quality wetlands within the 100-year floodplain that extend into the Industrially designated area of the City within Area 15.

This potential conflict is mitigated by the preliminary mapping of critical areas within this area (wetlands within 100-year floodplain). Additionally, certain portions of this area have been assigned an additional "General Commercial Conversancy" and "Manufacturing Conversancy" designation for Shoreline Management purposes so as to additionally alert developers of the potential for limited development activity. As specific projects are proposed in this area, on-site wetland delineation will be required per city development regulations. These wetland areas are roughly mapped on the City's Critical Areas Ordinance and once confirmed through delineation, development will only be allowed following the adoption of appropriate mitigation measures. This can include avoidance, on-site mitigation and off-site mitigation. Sufficient and appropriate buffers will be required per our CAO and any proposed development will be accomplished through a cooperative process between the City, developer and the Department of Ecology.

POTENTIAL CONFLICT #6 - Area 16

Silver Creek.

Area 16 includes the area of Silver Creek that is within the 100-year floodplain of the Nooksack River. Silver Creek provides habitat for Coho salmon and resident trout. The riparian area is narrow, approximately 100 to 150 feet in width, within and adjacent to the immediate channel and ravine. This area provides habitat for fish within the stream and habitat for a variety of large and small mammals, passerine birds, and raptors. Interstate-5 functionally isolates this western portion of the stream corridor with the eastern portion of the stream; however, fish passage is possible under Interstate-5.

Comprehensive Plan Designation – Area 16 – "Industrial

Shoreline Master Program Designation – Area 16 – The SMP identifies this area as having wetlands within the 100-year floodplain.

Comp Plan & SMP Conflicts – Area 16 – The areas of conflict include those wetlands within the 100-year floodplain that extend into the Industrially designated area of the City within Area 16.

This potential conflict is mitigated by the preliminary mapping of critical areas within this area (wetlands within 100-year floodplain). As specific projects are proposed in this area, on-site wetland delineation will be required per city development regulations. These wetland areas are roughly mapped on the City's Critical Areas Ordinance and once confirmed through delineation, development will only be allowed following the adoption of appropriate mitigation measures. This can include avoidance, on-site mitigation and off-site mitigation. Sufficient and appropriate buffers will be required per our CAO and any proposed development will be accomplished through a cooperative process between the City, developer and the Department of Ecology.

ASSUMPTIONS MADE CONCERNING SCENTIFIC INFORMATION

The major assumption related to the Shoreline areas of Ferndale is that the majority of these areas are primarily influenced by groundwater (for the wetlands within the 100-year flood plain) and influenced by the Nooksack River and 10-Mile Creek (for those associated and connected shoreline areas). The City has conduced extensive study of the critical areas within the City and this information is detailed in the above section related to inventory sources used for the update. These studies are assumed to be sufficient to form the basis of the SMP work contained in this update.

The two broad areas determined to be within SMP jurisdiction (200 feet from a shoreline of state significance and wetlands within the 100-year flood plain) have, as their basis of designation various assumptions as to their ecological function and related scientific information. It is assumed that the areas abutting the Nooksack River within Ferndale's SMP jurisdiction (basically the area along the river [and floodway] "book-ended" by the I-5 bridge to the north and the Main Street Bridge to the south) are appropriately designated as "conservancy". The assumption is that to fully maximize the potential ecological functions, this should be a "no build" zone. The assumption is that by not allowing development within these areas and identifying appropriate restoration techniques, the identified ecological functions of these areas can be preserved and enhanced. Additionally, however, the City believes that development within the Conservancy Zone would be appropriate if such development tied to restoration and/or enhancement whose effect outweighs the detrimental effect of development. Please refer to the Restoration Plan of the SMP for more information.

For the wetlands within the 100-year floodplain. The assumption is that they are primarily influenced by groundwater and that by applying appropriate buffers and other mitigation techniques, that the ecological functions of these areas can be

preserved. Another underlying assumption is that these wetlands may not be the best areas for restoration. With this said, there may be specific wetlands within the 100-year floodplain that would benefit from restoration. This is discussed in more depth in the restoration section of the SMP.

Tennant Lake, Railroad & Associated Wetlands

Another key assumption is that the provisions of the City's Critical Areas Ordinance (CAO) will be sufficient to regulate areas within SMP jurisdiction. The City completed an update to their CAO in late 2004 and the BAS available at the time is substantially the same as that available for this SMP update.

The CAO represents an overlay to the other regulations established by the city and, in the event of any conflict between the CAO and other regulations, the more restrictive shall apply. The City is also making the same assumption related to the SMP, that is, the more restrictive regulations regarding development of parcels within SMP jurisdiction shall apply.

The CAO identifies buffers for critical areas and the assumption is that these buffers are sufficient to protect critical areas. Another critical assumption incorporated into the CAO and included in the SMP is that development surrounding wetlands, if developed in compliance with the provisions of the CAO, will be sufficient to not detrimentally effect wetlands.

As part of the CAO, the City has produced maps that define the locations of known or potential critical areas. These maps were based on best available scientific information and includes information gathered through field inventory work and information available from state and federal sources. The assumption is that these maps will be used as a source of generalized information and shall not be a substitute for site specific assessments. The actual type, extent, and boundary of critical areas (including wetlands but exempting frequently flooded areas) shall be determined by a qualified consultant on a site-specific basis according to the provisions then in effect.

The City is also relying on the provisions of the Floodplain Management Ordinance to regulate the areas considered to be frequently flooded per RCW 36.70A and WAC 365-190. This ordinance was based on BAS and is assumed to be sufficient for its intended purpose.

The last major assumption underpinning this revised SMP is the accuracy of the new flood modeling conducted by Whatcom County. While the use of this new tool undoubtedly served to expand SMP jurisdiction, this should not be used as a justification for the new models effectiveness. It is the belief of the City that the new flood model represents best available science and appropriately serves as the basis for SMP jurisdictional boundaries.

From a global perspective, the following assumptions also underlie the drafting of the SMP:

- new shoreline designations adequately include all areas appropriate to the SMP
- limited and appropriate development within the Conservancy Zone (between I-5 and Railroad Bridge) will maintain this area's ability to continue its ecological function
- With more area under Shoreline jurisdiction, appropriate development will occur in compliance with provisions of SMP
- Areas slated for "Conservancy" may be best suited for restoration
- Areas not designated as Conservancy will be appropriately designed to mitigate adverse environmental impacts
- Using the "no net rise" approach for SMP jurisdiction will best protect these critical areas while permitting appropriate development within the city.
- Areas mapped as wetlands within the 100-year floodplain are roughly mapped and will need detailed site-specific delineation tied to specific development proposals and may be determined to fail the "associated" test for inclusion in Shoreline jurisdiction.

DATA GAPS IN SCENTIFIC INFORMATION – CITY WIDE

This section is intended to discuss the city-wide data gaps and their associated risk to SMP assumptions. For an area-specific discussion of these data gaps and any unique risk and data gaps, please refer to the data gap discussion for each of the 16 SMP areas designated by the City.

Given that the SMP jurisdictional areas are primarily influenced by 1) surface water flow and flooding related to the Nooksack River and 2) ground water flow related to the wetlands within the 100-year floodplain, there are two primary data gaps.

The first relates to the flood modeling conducted to determine the "no net rise" calculations used to determine the new SMP jurisdictional boundaries along the Nooksack River. River dynamics are particularly difficult to model and the wild river characteristics of the Nooksack make this modeling even more challenging. As detailed in the SMP, the City working in conjunction with the Department of

jurisdictional boundaries following a likely set of development (and fill) scenarios. This work, while extremely valuable in determining the effects of fill and development in areas adjacent to the river, carries the risk of gaps in scientific knowledge that underpins the flood modeling mathematics. Therefore, as it relates to SMP jurisdictional boundaries and mitigation techniques identified in the SMP, the potential gap in scientific knowledge related to flood modeling carries a risk to the appropriateness of the SMP provisions.

There is a risk that the "conservancy" designation for the expanded floodway areas along the Nooksack River are inadequate to permit sufficient unrestricted floodway flow. There is also a risk that the modeling has identified an area of floodway/conservancy areas that are too expansive and therefore restrict appropriate development from occurring.

The other gap in BAS associated with the flood modeling is related to the expanded 100-year floodplain identified as a result of the flood modeling. The assumption is that the flood modeling accurately and appropriately expanded the mapped 100-year floodplain which had the effect of expanding the mapped wetlands within the 100-year floodplain.

Just as was the case for the flood modeling itself (in relation to floodway sufficiency), there is a potential data gap associated with these associated wetlands. On one hand, there is a risk (as a result of the data gap) that certain wetland areas associated with the revised 100-year flood plain might have been omitted from SMP jurisdiction. Conversely, there is a data-gap related risk that more wetlands associated with the 100-year floodplain have been identified thus precluding appropriate development on wetland areas whose ecological function have been erroneously assumed.

The remaining data gap is associated with the assumptions as to the effect of groundwater and the related wetlands. While the topography of Ferndale is well documented, generalizations have been made as to the exact subsurface groundwater dynamics at play within the City. Soil type information is generalized and assumptions have been made as to the accuracy (at depth) of the soil analysis.

Thus, with data gaps on the stratification of soil characteristics and subsurface hydrological dynamics, the exact factors at play related to the site-specific wetlands carry risks of overly broad jurisdictional boundaries as well as overly restrictive jurisdictional boundaries.

RISKS TO ECOLOGICAL FUNTIONS ASSOCIATED WITH SMP PROVISIONS – CITY WIDE

Discussed briefly above were the data gaps as well as some of the risks associated with the data gaps. This section is intended to discuss the risks to the ecological functions

associated with the provisions of the SMP. As was the case for data gaps, this discussion is intended to be a city-wide discussion. For a detailed area-specific discussion of risks associated with SMP provisions, please refer to the area-specific discussion in later sections.

As noted, the primary area of SMP jurisdiction is the Nooksack River and its associated floodway. While the City is bisected by the Nooksack, it is also book-ended by the Interstate 5 bridge to the north and the Burlington Northern Railroad and City bridge to the south. The result of this arrangement is that the river is channalized as it passes through the city. This is an important factor as the primary purpose of the river's floodway is to attenuate the effects of seasonal flooding. Given the dynamics of the Nooksack and this channelization, an important factor to be considered in designating the SMP provisions was the sufficiency of the floodway determination.

As noted on the SMP maps, the floodway areas of the City have been designated as "conversancy" in order to preserve the ecological function of the area (flood attenuation). In addition, flood modeling has been performed to determine the level of appropriate fill while preserving the effectiveness of the floodway.

The risks associated with the floodway determination, mapping of conservancy areas and appropriate fill mass is that the modeling performed is insufficient to attenuate the effects of a 100-year flood. This risk is somewhat offset by the "book-ending" noted above. With the physical flow restriction associated with the I-5 bridge, there is literally a limited of water that can flow under the bridge. Thus the real risk is that the water flow in the Nooksack associated with seasonal flooding will be such that the river water backs up and spreads over the floodplain to the north of the Interstate 5 bridge.

Looking South to Interstate 5 Bridge

This upriver flooding was built into the flood modeling performed by Whatcom County and the maximum fill line as established through this modeling took into consideration the effects of bridge flow restriction and floodway sufficiency in the city.

The other risk to ecological function relates to the wetlands within the 100-year floodplain. As was the case for the floodway determination, these designations were an outgrowth of the Whatcom County flood modeling. As a result, there is a risk that the mapping was insufficient to delineate all of the wetlands within the 100-year floodplain.

The other associated risk is that the requirements of the City's Critical Areas Ordinance (CAO) and its associated buffers are insufficient to mitigate the potentially adverse effects of development. As is the case for other jurisdictions, the wetlands mapped through our CAO have been classified by function. The result being that there are larger buffers for higher quality wetlands. Given the best available science through which the CAO and the SMP were developed, it is the belief of the City that the ecological functions of these wetlands can be preserved through implementation of the provision of the CAO and SMP.

CUMULATIVE IMPACT ANALYSIS

The City of Ferndale anticipates the full build-out of the City. Given the City's location on Interstate 5 and the regional nature of anticipated future retail development, Ferndale, currently at a population of 10,000, will be substantially larger in the future. With this said, it is also the City's position that this cumulative impact of development should have no net adverse impact of the ecological function of the shoreline. As it relates to the three classifications of shoreline within the City, the following applies:

Nooksack River – The flood modeling developed by Whatcom County and used by the City and DOE in determining the shoreline jurisdictional boundaries utilized a "no net rise" approach wherein different fill vs. flood scenarios were inputted into the computer model to determine the maximum amount of fill that could be placed on the fringes of the floodway while not affecting upstream or downstream flooding. In effect, this approached used a cumulative impact approach.

As a result, it is the City's belief that the anticipated cumulative effect of anticipated future development surrounding the river will have no net detrimental effect on the ecological function within this area. This assumes that development will occur at the fringe of the floodway but no development within the floodway area unless the development is tied to increased ecological function and restoration/enhancement.

Should development be proposed within the floodway and should this development be tied to restoration and/or enhancement, it is also the City's belief that this development can proceed because the allowability of development within the conservancy zone (river floodway) is appropriate if the effect of restoration and/or enhancement is at least equal to the effect of development.

City Streams – Given eventual build out of the city, it is the position of the city that the current buffers and setbacks contained in our development regulations and Critical Areas Ordinance are sufficient to ensure that there is no net loss of ecological function. In addition, the City's new Stormwater Program, begun in May of 2006, provides long-

term funding to begin the process of constructing stormwater facilities that will have a positive effect on the water quality of our areas streams.

Thus, it is the City's position that the effects of the City's storm drainage program will offset the effects of future residential construction in the areas surrounding the shoreline jurisdiction.

Wetlands within 100-year Floodplain – As was the case for the streams, the City's current development standards and provisions of the Critical Areas Ordinance should be sufficient to ensure the ecological function of these wetlands. With either an avoidance or mitigation approach, future development on sites where there exists 100-year floodplain wetlands should provide reasonable assurance of the ability for these areas to maintain their ecological function.

Also, as noted, only specific wetlands have been identified as having sufficient ecological function to warrant avoidance, restoration and/or enhancement. For the majority of the City's wetlands, fill and development (tied to appropriate off-site mitigation) is the preferred development scenario.

For these low quality isolated wetlands within the 100-year floodplain, the "associated" test included in WAC 173-22-030(1) and 173-22-040(3) will be the determining factor in establishing specific Shoreline jurisdiction.

Wetlands within the 100-year floodplain must meet the two-pronged associated test in order to be under shoreline jurisdiction. The two prongs are "proximity" and "influence". Proximity is a general determination of location and proportionality of the size of the system under review. Proximity to a small stream is usually a much shorter distance compared to proximity to a larger river system. Influence may work in one direction or in both directions (i.e. the wetland influences the water body or the water body influences the wetland). Influence includes but is not limited to one or more of the following: periodic inundation, location within a floodplain, or hydraulic continuity.

Silver Creek

Area by Area Shoreline Analysis

As previously noted, the City has divided the shoreline jurisdiction into 16 distinct areas. What follows is an overview of each of these areas:

Area 1. – Map on page 79

Area 1 includes the wetlands within the 100-year floodplain of the Nooksack River south of Main Street, east of Interstate-5. This area is mostly agricultural land but contains some commercial, residential, and forested areas.

Identification and analysis of ecological processes and functions

There is no natural connection between this area and the Nooksack River. The area is functionally isolated from the river by Main Street to the north and Interstate-5 to the west. The area seldom floods because of protected commercial development to the north and Main Street that acts as a berm. The areas within shoreline jurisdiction are functionally isolated wetlands within the 100-year floodplain. Ecological function considered to be low with full development with off-site mitigation considered the best option.

Characterization of shoreline ecological systems

The wetlands in the area are primarily low function Category III and IV palustrine emergent wetlands. This is explained below in “Critical Areas”. Much of the area is Prior Converted Cropland appropriate for development.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of URBAN. The northern portion is serviced by Main Street utilities, there is an adjacent Whatcom Transit authority bus terminal nearby, the area is adjacent to easy access to Interstate-5, is zoned Highway Commercial and General Commercial, and is designated Commercial on the Comprehensive Plan. Because of the proximity of this area to a major Interstate interchange, zoning, services, and low functioning wetlands (those areas within shoreline jurisdiction), this area was determine suitable for commercial development.

Structures, impervious surfaces, and modifications

The area currently has about 2 percent impervious surfaces as roads and homes. Future development of the site will require current DOE stormwater standards be applied.

Critical areas

The wetlands in the area, those within shoreline jurisdiction are predominantly Category III and IV palustrine emergent wetlands that have been historically farmed. Some areas are Category III palustrine scrub-shrub and palustrine forested wetlands. All impacts to wetlands functions are required by the SMP and the CAO to be fully mitigated. Preference would be for full development with off-site mitigation.

Degraded areas/ sites – restoration potential

There are no degraded areas or suitable restoration sites in Area 1.

Areas of special interest

None identified at this time.

Adjacent land conditions/regulations

The surrounding area (to the east and south) is zoned low density residential and/or within Whatcom County. Interstate-5 and a main arterial, Barrett Road, border the western edge and Main Street, a major arterial, borders the northern edge.

Existing and potential public access sites

The shoreline jurisdiction areas are functionally isolated wetlands, there is no public access required nor warranted.

General channel migration zone

The area is south of the historic channel migration zone (CMZ). The CMZ no longer functions in this area because the 3 bridges "funnel" all river flow under the bridges. If the river were allowed to migrate in it's historic zone in this area, it would remove portions of Interstate-5, a major interchange, the main arterial to Ferndale, and the main line of the railroad.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area. All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

None identified at this time or deemed appropriate for this area.

Shoreline ecological functions altered by permitted and exempt actions
The areas of shoreline jurisdiction, i.e., functionally isolated wetlands, when impacted will be fully mitigated. Suitable restoration sites are discussed for other areas.

Area 2. – Map on page 80

Area 2 is the residential area north of Main Street adjacent to Ten-Mile Creek on the eastern edge of the city limits and a portion of Ten-Mile Creek. This area is within 200 feet of the floodway of Ten-Mile Creek and extends outside of the 100-year floodplain to protect the riparian functions of Ten-Mile Creek.

The residential area is fully developed into homes and yards. Ten-mile Creek is within a depressional channel. It is dominated by reed canarygrass (*Phalaris arundinacea*) within the floodway and surrounded by willows (*Salix spp.*) and red alder (*Alnus rubra)* trees from the toe of the slope (the area landward of the floodway) to the top of the slope in most areas.

Identification and analysis of ecological processes and functions

Ten Mile creek lies within the 100-year floodplain of the Nooksack River and is situated within a depressional, wide channel. Ten Mile Creek is a salmonid stream. Most of Area 2 is within the depressional channel of Ten Mile Creek. The area from the top of the bank (the south or left bank of the creek) is developed into a residential area and is out of the direct influence of the main channel of the creek.

Characterization of shoreline ecological systems

The wetlands within the channel have a moderate function and are Category III palustrine emergent and scrub/shrub wetlands. The wetlands and creek attenuate flood flow to the Nooksack River which become dry (other than the main channel) in the summer months and form into a continuous ponded area in the winter months. This portion of Ten Mile Creek filters upgradient sediment transport and is “filling” up and has become a “wetland” as compared to it’s historical characterization as “Barrett Lake”. The portion of Ten Mile Creek is also a series of beaver ponds that are predominantly emergent vegetation.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of RESIDENTIAL and CONSERVANCY Area 2 is zoned RS 8.5-Single Family Residential where there are homes, and Floodway within the Ten-Mile Creek drainage/floodway. The area is designated Residential and Floodway on the Comprehensive Plan. Ten-Mile Creek, its floodway

and riparian area, the area of highest functional value within shoreline jurisdiction, will remain protected because of the fish and wildlife habitat protection requirements in the SMP and CAO.

Structures, impervious surfaces, and modifications

The area currently has about 20 percent impervious surfaces as roads and homes. Any future development in the residential area will likely not occur as this area is fully developed. No development will occur within the Ten Mile Creek floodway.

Critical areas

Ten-Mile Creek provides habitat for beaver and waterfowl and is a salmonid stream. Listed species do not occur in this area.

Degraded areas/ sites – restoration potential

Although the edges of Ten-Mile Creek are dominated by native canopy and shrub vegetation, the floodway of the stream is dominated by reed canarygrass. Ten-Mile Creek is a salmonid stream, provides habitat for beavers and waterfowl, is a corridor directly connected to the Nooksack River and is within both the 100-year flood plain of the Nooksack River and is within shoreline jurisdiction because the mean annual flow of Ten-Mile Creek exceeds the shoreline standard. Because of the dominance of reed canarygrass, the habitat functions are reduced. It is recommended that the floodway of Ten-Mile creek be enhanced by planting native trees and shrubs to increase habitat and reduce the dominance of reed canarygrass.

Areas of special interest

Ten Mile Creek and its associated wetlands.

Adjacent land conditions/regulations

The area to the north of Area 2 is in Whatcom County and zoned agricultural. The area to the south is residential and Main Street. There are no land use conflicts in this area.

Existing and potential public access sites

There is no public access for this area other than the residential area by the inhabitants. Ten Mile Creek will remain protected with no public access unless the “Friends of Barrett Lake” provide a means of access.

General channel migration zone

Area 2 is not within the historic CMZ of the Nooksack River because it occurs within a well defined depressional channel of Ten Mile Creek. The CMZ of Ten Mile Creek is active and within the well defined depressional channel.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area. All impacts to areas within shoreline jurisdiction or their buffers will likely not occur because the area is designated conservancy. The residential area will remain residential.

Restoration plans

None identified at this time. The "Friends of Barrett Lake" may utilize Ten Mile Creek and it's associated wetlands as a restoration project.

Shoreline ecological functions altered by permitted and exempt actions

The areas of shoreline jurisdiction that have the greatest ecological functions are protected with a conservancy designation.

Area 3. – Map on page 81

Area 3 includes the commercial area north of Main Street adjacent to Ten-Mile Creek east of Barrett Road. This area is within 200 feet of the floodway of Ten-Mile Creek and a portion of Ten-Mile Creek. The southern portion of this area consists of a hotel, bank, drive-up restaurant, and gas station/truck stop. The northern portion of this area is an agricultural field. Ten-Mile Creek is discussed in Area 2 above.

Identification and analysis of ecological processes and functions

See Area 2 above.

Characterization of shoreline ecological systems

See Area 2 above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of URBAN and CONSERVANCY. Area 3 is zoned Highway Commercial and designated Commercial on the Comprehensive Plan. The area is currently 90 percent developed or being developed. The developed area has a land use designation of URBAN and Ten-Mile Creek has a land use designation as CONSERVANCY. Ten-Mile Creek is protected under the wetlands and streams Chapters within the SMP and have a required buffer.

Structures, impervious surfaces, and modifications

This area is approximately 50 percent impervious, with future impervious surfaces projected. Stormwater generated runoff from the truck stop pavement likely degrades the water quality of Ten Mile Creek and requires attention.

Critical areas

See description of Area 2 above.

Degraded areas/ sites – restoration potential

See description of Area 2 above.

Areas of special interest

See description of Area 2 above.

Adjacent land conditions/regulations

The surrounding area (to the east and south) is zoned low density residential and/or within Whatcom County. Interstate-5 and a main arterial, Barrett Road, border the western edge and Main Street, a major arterial, borders the northern edge.

Existing and potential public access sites

See Area 2 above.

General channel migration zone

See description of Areas 1 and 2 above.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

Future shoreline demands or potential conflicts in this area occur as the commercial area continues to develop. All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

Refer to Area 2 above. Area 3 has potential water quality problems from stormwater runoff generated by the truck stop parking area and gas station. This potential problem requires analysis.

Shoreline ecological functions altered by permitted and exempt actions

The areas of shoreline jurisdiction within Ten Mile Creek will not be developed. The riparian area, i.e., the commercial area will require buffer restrictions, and water quality/quantity mitigation.

Area 4. – Map on page 82

Area 4 includes the northern portion of the proposed Ferndale Town Center within 200 feet of Nooksack River floodway.

Identification and analysis of ecological processes and functions

This area consists of fill material and provides little habitat, ecological process or functions.

Characterization of shoreline ecological systems

See discussion for Area 2.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of URBAN. Area 4 is zoned Highway Commercial and designated Commercial on the Comprehensive Plan. Area 4 is fill material, provides little habitat, and is being developed.

Structures, impervious surfaces, and modifications

This area is and will be entirely impervious (compacted fill material or parking lot).

Critical areas

Critical areas do not occur in this area.

Degraded areas/ sites – restoration potential

None identified at this time.

Areas of special interest

None identified at this time on the site. Swans have been observed in the general area, particularly on the agricultural fields to the north.

Adjacent land conditions/regulations

The surrounding area is agricultural land to the north (Whatcom County) and developed land (commercial to the south).

Existing and potential public access sites

The shoreline jurisdiction area is a filled site that will soon be a commercially developed area and does not require public access.

General channel migration zone

This area is within the historic channel migration zone (CMZ). The CMZ no longer functions in this area because the 3 bridges "funnel" all river flow under the bridges. If the river were allowed to migrate in its historic zone in this area, it would remove portions of Interstate-5, a major interchange, the main arterial to Ferndale, and the main line of the railroad.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

This area is going to be developed but does not conflict with the SMP or CAO.

Restoration plans

None identified at this time.

Shoreline ecological functions altered by permitted and exempt actions

The areas of shoreline jurisdiction, i.e., that area within 200 feet of the Nooksack River floodway are designated URBAN and zoned commercial.

Area 5. – Map on page 83

Area 5 includes the Whiskey Creek wetlands and Whiskey Creek within the 100-year floodplain of the Nooksack River. The wetlands are all Category III and IV farmed palustrine emergent wetlands that are dominated by non-native herbaceous species such as reed canarygrass. Whiskey Creek provides salmonid, waterfowl, and large and small mammal habitat. This area is currently not developed but has surrounding residential development.

Identification and analysis of ecological processes and functions

This area is the lower reach of Whiskey Creek within the 100-year floodplain of the Nooksack River and is described above.

Characterization of shoreline ecological systems

See description above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of RESIDENTIAL. Area 5 is zoned Multiple Residential and designated High Density Residential and Low Density Residential on

the Comprehensive Plan. The wetlands and Whiskey Creek are provided protection under the wetlands and streams Chapters of the SMP and provisions of the CAO. There is a proposal to develop this site into residential. The proposal will not impact the wetlands within the 100-year floodplain. All wetland impacts outside of the 100-year floodplain will be mitigated. There will be a no-net-loss of wetland functions in this area post development.

Structures, impervious surfaces, and modifications

The area currently is currently not developed.

Critical areas

Whiskey Creek is a salmonid stream and the stream corridor and associated wetlands are dominated by reed canarygrass. This area can be planted with native trees and shrubs such as willows, red osier dogwood (*Cornus serica*), cottonwood (*Populus balsamifera*), and alder. This will increase wildlife habitat and provide shading for Whiskey Creek. Portions of Whiskey Creek have been ditched and could be rechanneled to better mimic natural conditions. Large woody debris and snags could be added as well.

Degraded areas/ sites – restoration potential

See description above.

Areas of special interest

None identified at this time

Adjacent land conditions/regulations

The surrounding area to the west is zoned low density agricultural and within Whatcom County. The area within shoreline jurisdiction is that portion of Whiskey Creek within the 100-year floodplain and will not be developed.

Existing and potential public access sites

The area is under private ownership. There is no public access for this area and is not recommended to protect the functions and values of Whiskey Creek.

General channel migration zone

The area is not within the CMZ of the Nooksack River.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area. All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

This area is not slated for restoration but will be encourage if residential development is to occur in the immediate area. A development plan for the area to the west of the shoreline jurisdictional area has been applied for to the City of Ferndale. This proposed development will not occur within shoreline jurisdiction but will include mitigation by enhancing that portion of Whiskey Creek within shoreline jurisdiction.

Shoreline ecological functions altered by permitted and exempt actions

The areas of shoreline jurisdiction, i.e., that area of Whiskey Creek within the 100-year floodplain of the Nooksack River will not be altered.

Area 6. – Map on page 84

Area 6 includes the agricultural land in the northeast corner of Interstate-5 and the Nooksack River that lies within 200 feet of the floodway. This area is predominantly agricultural land, palustrine emergent wetlands, and riparian vegetation. An archeological site occurs at this location. Most of this area is currently farmed for row crops or pasture. The native riparian area of the river is sparse, concentrated along the slopes of the bank of the river. The vegetated area is dominated by red alder, bigleaf maple (*Acer macrophyllum*), and Himalayan blackberry (*Rubus procerus*). A small ditched stream conveys water from an agricultural drainage system into the river. Juvenile salmonids have been observed in the “lower” portion of this ditched stream.

Identification and analysis of ecological processes and functions

This area often floods, is within the riparian corridor of the Nooksack River, and is undeveloped. See comments above.

Characterization of shoreline ecological systems

Associated wetlands are present in this area. However, much of this area is under row-crop cultivation, including the wetlands, which affect the ecological functions. There is a very narrow corridor of native vegetation directly adjacent to the river. See comments above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of CONSERVANCY and RURAL. Area 6 is zoned Floodway and designated Floodway on the Comprehensive Plan, and is in the floodway of the Nooksack River. The designations CONSERVANCY and RURAL apply within the area of the floodway of the Nooksack River and the area within the no-net-rise in the 100-year flood elevation, respectively. The area of highest habitat value, the "lower riverine bench" will remain undeveloped because of its conservancy designation.

Structures, impervious surfaces, and modifications

There are no structures in Area 6.

Critical areas

See comments above.

Degraded areas/ sites – restoration potential

There are no degraded areas however this area is suitable for restoration for a combination of upland, riparian, and wetland enhancement. Himalayan blackberry should be eradicated and the entire area planted into a native forest.

Areas of special interest

There is a complex of recorded archaeological sites in this area.

Adjacent land conditions/regulations

The land to the north of Area 6 is zoned rural. This area is on an upper bench out of the floodplain of the Nooksack River and is adjacent to Interstate-5. Development of this area will not affect the functions of the area within shoreline jurisdiction. The land to the east is in Whatcom County and is agricultural land, within the floodway and will not be developed.

Existing and potential public access sites

This area does not have public access and is not recommended.

General channel migration zone

This area is likely within a small portion the channel migration zone but is not likely because of the proximity of the Interstate-5 bridge (the site is directly adjacent to the bridge) and there is a natural topographic shift that directs all flood flow towards the bridge. The historic CMZ is primarily on the left bank of the river, away from Area 6.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

There is a complex of recorded archaeological sites in this area.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area.

Restoration plans

This area is recommended for riparian restoration.

Shoreline ecological functions altered by permitted and exempt actions

Area 6 is mostly within the floodway, zoned conservancy, and will not be developed.

Area 7. – Map on page 85

Area 7 includes the residential area in the northwest corner of Interstate-5 and the Nooksack River. This area is within 200 feet of the floodway of the Nooksack River. The area that is immediately adjacent to the river and within the floodway is dominated by a combination of forested/scrub-shrub wetlands and upland forest. This riparian area is not developable because it is in the floodway. The dominant vegetation along the river includes cottonwood, red alder, willows, red osier dogwood, and Himalayan blackberry. The area that is above the floodway is developed into residential homes.

Identification and analysis of ecological processes and functions

Most of this area is out of the floodway and riparian area of the Nooksack River and therefore lacks the influence of the river. The area that is within the floodway and directly influenced by the river is a narrow corridor that frequently floods, is vegetated with native forested vegetation, and on a “lower” bench. There is a topographic shift up, out of the 100-year floodplain where the residential structures occur. This area is also directly adjacent to Interstate-5 and the bridge that directly influences the hydrological conditions.

Characterization of shoreline ecological systems

See comments above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of RESIDENTIAL and CONSERVANCY. Area 7 is zoned Multiple Residential and Floodway and designated High Density Residential and Floodway on the Comprehensive Plan. The area has a land use designation of CONSERVANCY in the floodway and RESIDENTIAL in the 100-year floodplain of the Nooksack River. The riparian area will remain undeveloped because it has a conservancy designation. The area in the floodway is undeveloped or a city park and will remain open space. The area designated residential is currently developed as residences.

Structures, impervious surfaces, and modifications

This area is approximately 80 percent impervious surfaces from homes and roads.

Critical areas

The wetlands in the area are Category III Wetlands and occur within the floodway of the Nooksack River.

Degraded areas/ sites – restoration potential

None identified at this time.

Areas of special interest

None identified at this time.

Adjacent land conditions/regulations

The northern portion of Area 6 is a residential area that is currently "built-out". The southern portion is within the floodway and in a native forested area directly adjacent to the river. Current zoning and conditions are not in conflict.

Existing and potential public access sites

There are no public access sites in Area 6 and none are recommended.

General channel migration zone

This area is not in the CMZ.

Data gaps

An on-site confirmation of wetlands is needed.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area. All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

None identified at this time.

Shoreline ecological functions altered by permitted and exempt actions

With implementation of the SMP, no loss of shoreline functions or values are anticipated in this area.

Area 8. – Map on page 86

Area 8 is the 9-hole Riverside Golf Course. This area is within the floodway of the Nooksack River and extends landward to encompass a no-net-rise in the 100-year flood elevation. The golf course is a combination of mowed turf, palustrine emergent wetlands, ponded areas, sparse trees and shrubs between the fairways, and a sparse vegetated riparian edge of the river. Dominant vegetation along the immediate river includes cottonwood, red alder, willows, red osier dogwood, and Himalayan blackberry.

Area 8 lies between Interstate-5 and Main Street, to the east and south respectively and the Nooksack River, to the west and "north". This area of the river is functionally isolated by the Interstate-5 and railroad bridges. Although the area does flood and is within the floodway and 100-year floodplain, the fact that there are two main transportation corridors that restrict the river, plus the main arterial road to Ferndale, Main Street, is on the southern edge of Area 8, restrict the ecological and hydrological processes of the shoreline area.

Identification and analysis of ecological processes and functions

See comments above.

Characterization of shoreline ecological systems

See comments above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of CONSERVANCY. Area 8 is zoned Floodway and designated Floodway on the Comprehensive Plan. Area 8 is within the floodway of the Nooksack River and extends landward to encompass a no-net-rise in the 100-year flood elevation. The small wetlands within the 100-year floodplain of the Nooksack River, those wetlands out of the floodway (adjacent to Main Street and the golf course access road) will likely be filled and mitigated. The area of highest ecological value, i.e., the golf course, is protected because it is in the floodway and is designated CONSERVANCY. The CONSERVANCY designation is conditional in that the city recognizes that there is great potential commercial and public benefit to be derived from appropriate redevelopment of the existing golf course/club house complex, and has specifically addressed this potential in the text of the SMP. Mitigation if the form of enhancement of wetlands and the riparian area would be made a part of any such redevelopment plan.

Structures, impervious surfaces, and modifications

This area is about 1 to 2 percent impervious surface from buildings, a gravel parking area, and a road.

Critical areas

The wetlands in the area, those within shoreline jurisdiction are predominantly Category III and IV palustrine emergent wetlands that are within the golf course or directly adjacent to Main Street. There are a few wetlands nearer the river that are higher functioning scrub/shrub wetlands. All impacts to wetland functions are required by the SMP and the CAO to be fully mitigated.

Degraded areas/ sites – restoration potential

Redevelopment of the golf course can be designed to reduce the size of the fairways (reduced turf); the edge of the river could be enhanced with native trees and shrubs, Himalayan blackberry eradicated, and increase public access with the construction of a trail with viewing areas near the edge of the river.

Areas of special interest

See above.

Adjacent land conditions/regulations

Area 8 is bordered by the Nooksack River to the west and north, Interstate-5 to the east and Main Street to the south. Only the area directly adjacent to Main Street is developable. However, it is likely that the golf course will be reconstructed as discussed above.

Existing and potential public access sites

See above

General channel migration zone

This area may be within the historic channel migration zone (CMZ) but the CMZ no longer functions in this area because the 3 bridges "funnel" all river flow under the bridges. If the river were allowed to migrate in its historic zone in this area, it would remove portions of Interstate-5, a major interchange, the main arterial to Ferndale, and the main line of the railroad.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

See above.

Shoreline ecological functions altered by permitted and exempt actions

With implementation of the SMP, no loss of overall shoreline functions or values are anticipated in this area.

Area 9. – Map on page 87

Area 9 includes the city owned Vander Yacht Park south to Main Street, and residential and commercial areas to the west and south of the park. This area is within the floodway of the Nooksack River and extends landward to encompass a no-net-rise in the 100-year flood elevation. Vander Yacht Park consists of mowed turf, a stormwater detention pond, a forested area on the northern portion, scattered trees within the park, and a sparse vegetated area along the river. The northern forested area and the area along the river include cottonwood, red alder, Douglas fir (*Pseudotsuga menziesii*), willows, red osier dogwood, Himalayan blackberry, and Japanese knotweed (*Polygonum cuspidatum*). The western portion of this area is developed as residential homes. The southern portion of this area, that area immediately north of the Main Street bridge and near the railroad tracks, is a combination of residences and commercial businesses.

Identification and analysis of ecological processes and functions

Area 9 is within the floodway of the Nooksack. However, natural flood flow in this area is constrained because the area lies between the Interstate-5 bridge and a combination of the railroad and Main Street bridge.

Characterization of shoreline ecological systems

There is a city stormwater detention pond, and associated emergent wetland, regularly mowed turf (a city park), and a narrow (50 feet) riparian corridor of primarily native forest.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of RESIDENTIAL and CONSERVANCY. Area 9 is zoned Multiple Residential and Floodway and designated High Density Residential on the Comprehensive Plan. Area 9 is within the floodway of the Nooksack River and is designated CONSERVANCY within the floodway of the Nooksack River and RESIDENTIAL outside of the floodway within the no-net-rise in the 100-year flood elevation area. The area in the floodway is city land, including Vander Yacht Park and undeveloped land.

Structures, impervious surfaces, and modifications

The area of impervious surface is negligible.

Critical areas

A palustrine emergent wetland, that is regularly mowed, occurs on the northern edge of a stormwater detention pond. The stormwater detention pond is permanently ponded, and is used by waterfowl, and has an emergent fringe of cattails. Impacts to wetlands are not anticipated.

Riverine wetlands do not occur in this location. There is a steep bank along the edge of the river that has an approximate 8 foot drop.

Degraded areas/ sites – restoration potential

This area could have the immediate edge of the river planted with additional native trees and shrubs, the non-native plants (Himalayan blackberry and knotweed) eradicated, additional trees and shrubs planted on the western edge of the field, a public restroom constructed, and improvements made to the parking area.

Areas of special interest

None identified at this time.

Adjacent land conditions/regulations

Area 9 is a city park that lies within the floodway and is surrounded by residential land. There are no land use conflicts in this area.

Existing and potential public access sites

Area 9 has public access, a gravel parking area, and trails to the rivers edge.

General channel migration zone

The historic CMZ no longer functions in this area because the 3 bridges “funnel” all river flow under the bridges. If the river were allowed to migrate in its historic zone in this area, it would remove portions of Interstate-5, a major interchange, the main arterial to Ferndale, and the main line of the railroad.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area. This area is a city park and will remain a city park.

Restoration plans

A trail/riverfront plaza project is planned that would connect Area 9 with Tosco Park, Area 12. Riparian restoration will be made a component of this redevelopment plan.

Shoreline ecological functions altered by permitted and exempt actions

There are no permitted or exempt actions that will alter this area. It is a city park.

Area 10. – Map on page 88

Area 10 includes the commercial structures, parking lots, and immediate vicinity in the northeast corner of Main Street and the Nooksack River. This area is within 200 feet of the floodway of the Nooksack River. This area is immediately north of the railroad bridge and the Main Street bridge. Approximately 80 percent of this area is developed into commercial businesses as buildings and parking areas (impervious surfaces). The immediate edge of the river has been rip-rapped and contains sparse vegetation.

Identification and analysis of ecological processes and functions

There is no natural connection between this area and the Nooksack River. The area is functionally isolated from the river by a dike.

Characterization of shoreline ecological systems

See comment above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of URBAN. Area 10 is zoned Highway and General Commercial and designated Commercial on the Comprehensive Plan. These designations do not conflict.

Structures, impervious surfaces, and modifications

Approximately 80 percent of this area is developed with impervious surfaces.

Critical areas

Critical areas do not occur in this area.

Degraded areas/ sites – restoration potential

There are no degraded areas or suitable restoration sites in Area 10, excluding the edge of the river. However, there is limited opportunity to restore the riparian area because it is rip-rapped.

Areas of special interest

None identified at this time.

Adjacent land conditions/regulations

Area 10 occurs on the northern edge of Main Street and is developed. A golf course that is within the floodway occurs to the immediate north.

Existing and potential public access sites

Public access to the river is limited in this location because of the Main Street bridge and the rip-rapped shoreline.

General channel migration zone

The area is not in the CMZ

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area. All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

None identified at this time.

Shoreline ecological functions altered by permitted and exempt actions

With implementation of the SMP, no loss of overall shoreline functions or values are anticipated.

Area 11. – Map on page 89

Area 11 includes the residential area in the southwest corner of Main Street and the Nooksack River. This area is within 200 feet of the floodway of the Nooksack River. This area has been diked along the river (the dike continues to the mouth of the river) and is developed as commercial and (single family and multifamily) residential. The dike is rip-rap and contains sparse vegetation. A narrow road is landward of the dike.

Identification and analysis of ecological processes and functions

There is no natural connection between this area and the Nooksack River. The area is functionally isolated from the river by a dike and a paved road.

Characterization of shoreline ecological systems

See comments above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of URBAN. Area 11 is zoned Multiple Residential and Central Business, and designated High Density Residential and Commercial on the Comprehensive Plan. These designations do not conflict.

Structures, impervious surfaces, and modifications

This area is approximately 70 percent impervious (roads and structures).

Critical areas

Critical areas do not occur in this area.

Degraded areas/ sites – restoration potential

See below.

Areas of special interest

See below.

Adjacent land conditions/regulations

The surrounding area has the same land conditions and regulations. There are no conflicts.

Existing and potential public access sites

This area is central to an adopted Riverfront Plaza Plan, which includes a trail system connecting Vander Yacht Park with Pioneer Park, closure of Front Street adjacent to the Nooksack River to vehicular traffic, and development of a “pedestrian promenade” and “plaza” adjacent to the existing dike. These improvements will substantially increase public access to and enjoyment of the shoreline in this area.

General channel migration zone

The area is not in the CMZ.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

There are known historic sites within this area, parts of which have been previously investigated without discovery of any historic materials.

Future shoreline demand and potential conflicts

All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

Planting of riparian vegetation will be incorporated into the Riverfront Trail/Plaza Plan.

Shoreline ecological functions altered by permitted and exempt actions

With implementation of the SMP, no loss of overall shoreline functions or values are anticipated.

Area 12. – Map on page 90

Area 12 is the Connoco-Philips Sport Complex and other City owned property. It is city owned land that is developed as a city park, a water intake facility, and a sewage treatment facility. This area is within 200 feet of the floodway of the Nooksack River and contains wetlands within the 100-year floodplain of the Nooksack River. The area adjacent to the river has been diked; the dike is rip-rap and contains sparse vegetation. A narrow road is landward of the dike.

The wetlands in Connoco-Phillips Sports Complex area include a palustrine emergent area that is seasonally ponded and dominated by willows and cottonwood trees on the perimeter, mostly reed canarygrass in the shallow portions, and cattails (*Typha latifolia)* and water lily (*Nuphar sp.*) in the interior of the pond. The area is also a wetland mitigation site that is under construction for wetland fill that has occurred during the development of the ball fields for the park.

Identification and analysis of ecological processes and functions

There is no natural connection between this area and the Nooksack River. The area is functionally isolated from the river by a dike and paved road. The areas within shoreline jurisdiction are functionally isolated wetlands within the 100-year floodplain or within 200 feet of the floodway.

Characterization of shoreline ecological systems

The wetlands in the area are primarily low function Category III and IV palustrine emergent wetlands.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of RESIDENTIAL and RURAL. Area 12 is zoned Multiple Residential and Floodway, and designated High Density Residential and

Floodway on the Comprehensive Plan. The regional park use is consistent with these designations.

Structures, impervious surfaces, and modifications

The area has about 5 percent impervious surfaces, but is entirely modified.

Critical areas

See above.

Degraded areas/ sites – restoration potential

A portion of this area is a wetland mitigation site and currently under construction. The remaining area is developed as residential, city park, sewage treatment, and water intake.

Areas of special interest

The Pioneer Park and Connoco-Phillips Sports Complex.

Adjacent land conditions/regulations

The area to the west is agricultural and in Whatcom County, the area to the north is residential, the area to the south is a combination of sewage treatment and agricultural land. The river abuts the eastern edge. There are no land use conflicts in this area.

Existing and potential public access sites

The edge of the river is diked with limited public access.

General channel migration zone

Although this area may lie in the CMZ, the edge of the river is diked and there is a water intake facility and sewage treatment facility in this area. Flooded is unlikely and discouraged.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time. However, Pioneer Park includes relocated historic buildings.

Future shoreline demand and potential conflicts

There will be on-going demand for use of the Connoco-Phillips Sports Complex and possible expansion of the facility in the future. All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

A portion of the site is currently under construction as a wetland mitigation area.

Shoreline ecological functions altered by permitted and exempt actions
With implementation of the SMP, no loss of overall shoreline functions or values are anticipated.

Area 13. – Map on page 91

Area 13 includes the wetlands in the 100-year floodplain near City Hall. These wetlands are a combination for palustrine forested and palustrine emergent.

The forested and emergent wetlands south of City Hall are dominated by cottonwood and red alder trees with an understory of hard hack (*Spiraea douglasii*) and salmonberry (*Rubus spectabilis*) and predominantly reed canarygrass and cattails (*Typha latifolia*) respectively. Portions of these wetlands are ditched. These wetlands are Category III wetlands because of their dominance of the reed canarygrass and lack of habitat features.

The wetlands north of City Hall are all small, functionally isolated, dominated by reed canarygrass, provide little habitat functions, and are Category IV Wetlands.

Identification and analysis of ecological processes and functions

There is no natural connection between this area and the Nooksack River. The area is protected from the river by a dike. The areas within shoreline jurisdiction are wetlands within the 100-year floodplain. However, this area is adjacent (to the south) to agricultural fields and low density rural areas to the south, increasing habitat value and stormwater attenuation.

Characterization of shoreline ecological systems

See comments above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of URBAN and CONSERVANCY. Area 13 is zoned Central Business and Residential/Office, and designated Commercial on the Comprehensive Plan. The northern portions of these lots are currently used for residential, office, and central business or upland areas that are undeveloped. The southern portions of these lots lie within wetlands. The land use designation of the wetlands is CONSERVANCY. The wetland portions of these parcels will likely not be developed. If wetlands are filled, the functions of the wetlands will be replaced as per the SMP wetlands regulations.

Structures, impervious surfaces, and modifications

The area currently has about 5 percent impervious surfaces as commercial buildings and roads all occurring on the northern portion. The remaining area is wetlands.

Critical areas

Small isolated wetlands occur on the northern portion of Area 13. These wetlands will be filled and mitigated.

Degraded areas/ sites – restoration potential

That portion of Area 13 south of City Hall, the wetlands, could be planted and enhanced with native vegetation, ponded areas constructed to remove reed canarygrass, water quality improved from the stormwater outfall, and the area used as a regional stormwater detention facility.

Areas of special interest

None identified at this time.

Adjacent land conditions/regulations

The northern portion of Area 13 is mostly developed. The southern portion, that area that is entirely wetlands, will remain undisturbed. If impacts to wetlands do occur, the impacts will be mitigated.

Existing and potential public access sites

There is currently no public access to this area but is recommended.

General channel migration zone

The area is not within the CMZ.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area. All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

There is potential for enhancement to the wetlands on the southern portion of this area.

Shoreline ecological functions altered by permitted and exempt actions

There are no use conflicts in Area 13.

Area 14. – Map on page 92

Area 14 includes the southeast corner of Main Street and the Nooksack River. This area is within 200 feet of the floodway of the Nooksack River. This area is a combination of commercial development and a P.U.D. water intake on the northern portion, residential development on the central portion, and pasture and a stormwater detention pond to the south. The northern portion of this area is rip-rapped and sparsely vegetated. The southern area has a narrow vegetated riparian corridor along the rivers edge. This riparian vegetation is dominated by cottonwood, red alder, red osier dogwood, and Himalayan blackberry.

Identification and analysis of ecological processes and functions

Not applicable in this location because of it's proximity to the Main Street Bridge and the occurrence of rip rap on the rivers edge.

Characterization of shoreline ecological systems

See comment above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of URBAN and CONSERVANCY. Area 14 is zoned Central Business and General Commercial and designated Commercial on the Comprehensive Plan. The URBAN designation applies to the existing developed area. There is an area waterward of this area that has a CONSERVANCY designation. This area is within the floodway and will not be developed.

Structures, impervious surfaces, and modifications

There is about 30 percent impervious surface in this area.

Critical areas

Critical areas do not occur in this area.

Degraded areas/ sites – restoration potential

None identified at this time.

Areas of special interest

None identified at this time.

Adjacent land conditions/regulations

The surrounding area is developed and does not conflict with this area.

Existing and potential public access sites

There is no public access required nor warranted.

General channel migration zone

Although this area may lie in the CMZ, the edge of the river is diked, and this area is directly south (downriver) of the Main Street bridge. Flooding is unlikely and discouraged.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

There are recorded historical sites in this area, much of which was investigated in conjunction with the Main Street and bridge improvement project.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area. All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

None identified at this time.

Shoreline ecological functions altered by permitted and exempt actions

With implementation of the SMP, no loss of overall shoreline functions or values are anticipated.

Area 15. – Map on page 93

Area 15 includes the wetlands in the 100-year floodplain of the Nooksack River north and east of Tennant Lake. These wetlands are a combination of Category II and Category III palustrine forested wetlands. Most of this area is undeveloped and undisturbed. The area is bisected by the railroad tracks and a narrow paved road. Few homes occur in the area with commercial buildings and businesses on the eastern edge along LaBounty Road. Commercial structures include a concrete batch plant and light industry adjacent to LaBounty Road. The wetlands in this area require a detailed description and better location mapping because of the potential use conflicts from additional development in the area.

Identification and analysis of ecological processes and functions

See comments above. The area is functionally isolated from the Nooksack River by the main line of the railroad tracks. However there is a natural connection/corridor (although severed by the railroad) and a hydrological connection between this area and the Nooksack River. Flooding of the Nooksack River in this area is unlikely because of the railroad.

Characterization of shoreline ecological systems

See above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of URBAN and CONSERVANCY. Specifically, certain areas have been designated as "General Commercial Conversancy" and "Manufacturing Conversancy" as a subset of URBAN. Area 15 is zoned General Commercial, Highway Commercial, and Manufacturing, and is designated Commercial and Industrial on the Comprehensive Plan. The area is developing consistent with current zoning. In addition, it is likely that at some point in the future, the Smith Road interchange will be redeveloped in order to provide an east-west connector across Whatcom County. Smith Road is the only practical alternative to providing that through connection, and it is further likely that a roadway corridor will need to be developed west of I-5 and through this general area. It is therefore important that the precise extent of critical areas are known so a "least impact" corridor can be identified for future development. Mitigation of impacts associated with this probable future development would be appropriately mitigated. Areas may be identified which conflict with the CONSERVANCY Designation and would be considered for redesignation at that time.

Structures, impervious surfaces, and modifications

Impervious surfaces are negligible.

Critical areas

See comments above.

Degraded areas/ sites – restoration potential

Area 15 is the wetlands that are adjacent to Tennant Lake and within and outside of the 100-year floodplain. The area should be mapped with greater accuracy and documented for actual wetland boundaries, functions, values, attributes, and species abundance, distribution, and occurrence. Restoration areas and concepts could be determined and mapped at that time.

Areas of special interest

Areas of special interest are the wetlands.

Adjacent land conditions/regulations

There is a potential conflict between the land use designations and occurrence of wetlands in this area. This area requires further study.

Existing and potential public access sites

There is no public access required nor warranted at this time. There is public access to Tennant Lake, a Whatcom County park.

General channel migration zone

Although historically this area was in the CMZ, this area is not in the CMZ because of the natural (elevation gain) and manmade features (such as Interstate-5) that block flood flow.

Data gaps

See above.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

See comments above.

Restoration plans

See comments above.

Shoreline ecological functions altered by permitted and exempt actions

See comments above.

Area 16. – Map on page 94

Area 16 includes the area of Silver Creek that is within the 100-year floodplain of the Nooksack River. Silver Creek provides habitat for Coho salmon and resident trout. The riparian area is narrow, approximately 100 to 150 feet in width, within and adjacent to the immediate channel and ravine. This area provides habitat for fish within the stream and habitat for a variety of large and small mammals, passerine birds, and raptors. Interstate-5 functionally isolates this western portion of the stream corridor with the eastern portion of the stream; however, fish passage is possible under Interstate-5.

Identification and analysis of ecological processes and functions

This area is within the 100-year floodplain of the Nooksack River but has no physical connection as it is separated by a main arterial, Slater Road. The area only floods from high water within Silver Creek.

Characterization of shoreline ecological systems

See comments above.

Demonstration of how characterization shaped policies and regulations

This area has a SMP land use designation of CONSERVANCY. Area 16 is zoned Manufacturing and Highway Commercial, and is designated Industrial on the Comprehensive Plan. The area is essentially a stream corridor and associated wetlands which are protected in accordance with wetlands and fish and wildlife regulations.

Structures, impervious surfaces, and modifications

The area within shoreline jurisdiction, the channel of Silver Creek, has no impervious surfaces.

Critical areas

The wetlands in this area are directly associated and adjacent to Silver Creek.

Degraded areas/ sites – restoration potential

There is potential for Riparian habitat enhancement.

Areas of special interest

None identified at this time.

Adjacent land conditions/regulations

The surrounding area is zoned highway commercial. However, the buffers of Silver Creek are regulated in the SMP.

Existing and potential public access sites

Public access is not recommended.

General channel migration zone

The area is not in the CMZ.

Data gaps

None identified at this time.

Historic/archeological/cultural sites

None identified at this time.

Future shoreline demand and potential conflicts

There are no significant future shoreline demands or potential conflicts anticipated in this area. All impacts to areas within shoreline jurisdiction or their buffers will be fully mitigated.

Restoration plans

None identified at this time. However, potential exists for riparian enhancement projects.

Shoreline ecological functions altered by permitted and exempt actions

With implementation of the SMP, no loss of overall shoreline functions or values are anticipated.