Winter 2013

South Skagit Highway realignment: ENVS 493 winter 2013

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South Skagit Highway Realignment
ENVS 493 Winter 2013

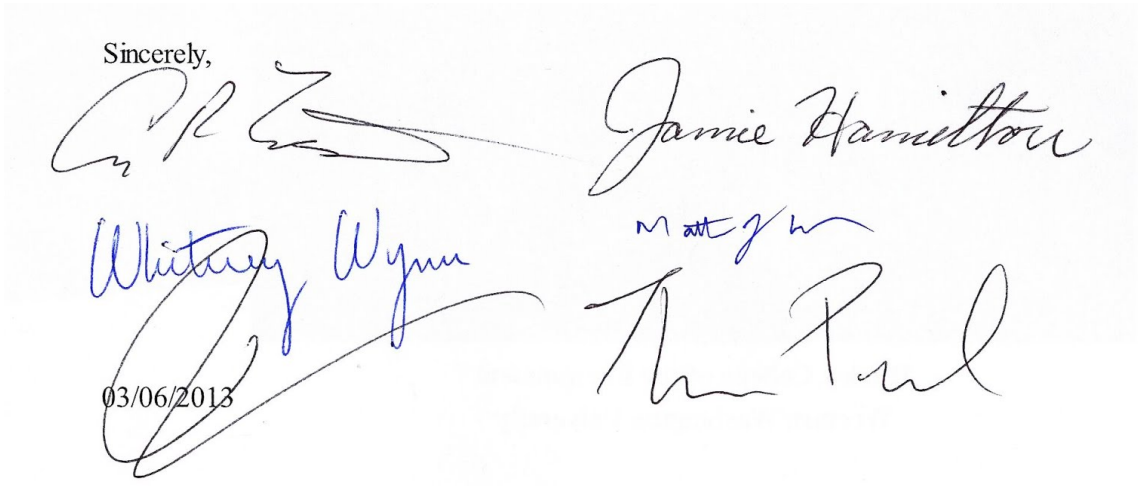
Huxley College of the Environment
Western Washington University

Dear Concerned Citizen:

This Environmental Impact Assessment was performed as an ENVS 493 class project through Huxley College of the Environment at Western Washington University. A team of student researchers analyzed the environmental effects of the realignment of a portion of South Skagit Highway, in order to reconnect salmon habitat and restore ecosystem services of the Skagit River and its associated wetlands. With Salmon Recovery Funding Board (SRFB) grant #09-1450 Seattle City Light acquired approximately 212 acres on the Skagit River in the vicinity of Mill and Savage Creeks. Seattle City Light, Skagit River System Cooperative, and Skagit County have been working together to restore the property including demolition, riparian floodplain plantings, culvert removals, and scoping the realignment of South Skagit Highway in the project area.

The current highway completely isolates 62 acres of floodplain, disconnects and blocks fish access to 5.2 acres of wetlands, and significantly degrades hydrologic and fish connectivity to an additional 21.7 acres of slough and wetland habitat. Approximately 900 feet of Savage Creek runs in the highway ditch and Savage Slough flows under the highway through an undersized culvert periodically blocked by sediment from Mill Creek during floods. The Mill Creek bridge is undersized resulting in repetitive maintenance projects, including dredging and channelization. In addition to the proposed realignment, two alternative actions are also evaluated in this EIS. Alternatives have already been evaluated based on engineering feasibility, cost, habitat benefits and risks. The actions are 1) The Proposed Project: the relocation of approximately 1.5 miles of the highway outside the existing Skagit River flood plain, 2) The Alternative: the preservation of the existing highway alignment but with the construction of modifications or 3) No Action. A future restoration project would provide additional habitat for all salmonid species.

Sincerely,



03/06/2013

Title Page

Environmental Impact Assessment: South Skagit Highway Realignment
Leo Bodensteiner ENVS 493 Western Washington University Huxley College of the Environment

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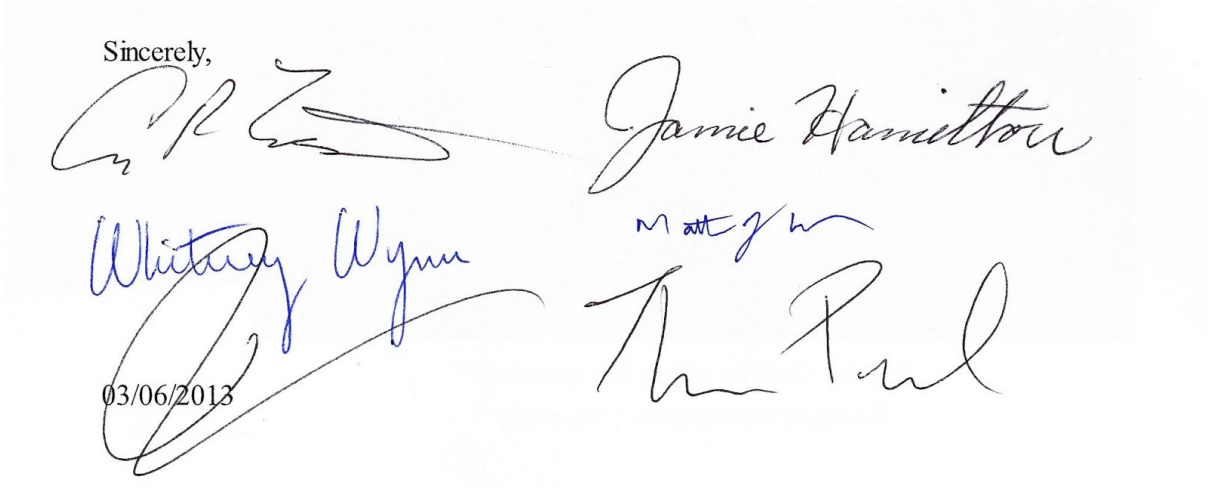

Fact Sheet

South Skagit Highway Realignment

This Environmental Impact Assessment was performed as an ENVS 493 class project through Huxley College of the Environment at Western Washington University. A team of student researchers analyzed the environmental effects of the realignment of a portion of South Skagit Highway, in order to reconnect salmon habitat and restore ecosystem services of the Skagit River and its wetland subsidiaries. With Salmon Recovery Funding Board (SRFB) grant #09-1450 Seattle City Light acquired approximately 212 acres on the Skagit River in the vicinity of Mill and Savage Creeks. Seattle City Light, Skagit River System Cooperative, and Skagit County have been working together to restore the property including demolition, riparian floodplain plantings, culvert removals, and scoping the realignment of South Skagit Highway in the project area.

The current highway completely isolates 62 acres of floodplain, disconnects and blocks fish access to 5.2 acres of wetlands, and significantly degrades hydrologic and fish connectivity to an additional 21.7 acres of slough and wetland habitat. Approximately 900 feet of Savage Creek runs in the highway ditch and Savage Slough flows under the highway through an undersized culvert periodically blocked by sediment from Mill Creek during floods. The Mill Creek bridge is undersized resulting in numerous maintenance projects over the course of many years, including dredging and channelization. In addition to the proposed realignment, two alternative actions are also evaluated in this EIS. Alternatives have already been evaluated based on engineering feasibility, cost, habitat benefits and risks. The alternatives include 1) the relocation of approximately 1.5 miles of the highway outside the existing Skagit River flood plain, 2) the preservation of the existing highway alignment but with the construction of modifications or 3) no action. A future restoration project would provide additional habitat for all salmonid species.

Legal Description of Location:

Skagit County
T35N R07E
Section 14 SE ¼
Section 15 SW ¼
Section 22 NE ¼
Section 23 NW ¼

Project Proponent/Contact

Seattle City Light
Denise Krownbell
denise.krownbell@seattle.gov
(206) 615-1127

Lead Agency

Huxley College of the Environment
Western Washington University
Bellingham, WA 98225

Required Licenses and Permits

United States Army Corps of Engineers (USACOE) Section 404 Nationwide Permit (NW) 14, Linear Transportation Projects

Washington State Department of Ecology (WSDOE) Section 402 National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit

Any construction, expansion, modification, or improvement of linear transportation projects in waters of the U.S.

Washington State Department of Ecology

Washington Department of Fish
and Wildlife (WDFW) Hydraulic
Project Approval (HPA)

Any construction activity that will
use, divert, obstruct, or change
the natural flow or bed of state
waters Hoping to restore the natural flow

Washington Department of Fish and
Wildlife (WDFW)

Washington State Department
of Transportation (WSDOT)
Biological Assessment
Commitments & Service
Concurrences

Washington State Department of Transportation
Skagit County Transportation Planning

Contributions:

Justin Eastman Table of Contents,Topography, Unique Environment, Surface water, Runoff water, Aquatic Animals, Land and Shoreline Use

Jamie Hamilton Cover Page, Dear Concerned Citizen, Title Page, Fact Sheet, Executive Summary: Project Objectives and Proposal Summary, Site Description, Description of Proposed Action and Alternatives, Recommendation, Table of Contents, Air, Housing, Aesthetics, Conclusion, Editing

Thomas Peal Soils, Erosion, Geology, Ground Water, Fish and Aquatic Animals

Amy Tibbetts Transportation, Washington DOT Project Plans

Matt Warren Decision Matrix, Terrestrial Plants and Animals, Environmental Health, Noise, Risk of Explosion and Release of Toxic or Hazardous Material

Whitney Wynn Aquatic and Riparian Plants, Fish and Aquatic Animals, Table of Contents, Site Description, Recommendation, Editing

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Acknowledgements

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Western Washington University

Public Presentation
Whatcom Educational Credit Union
Address:
Whatcom Educational Credit Union
Main Meeting Room
600 East Holly Street
Bellingham, WA 98225
Date: Tuesday, March 12, 2013
Time: 5:30-6:30 pm

1. Executive Summary

1.1 Project Objectives and Proposal Summary

The existing placement of the South Skagit Highway disconnects the Skagit River from approximately 62 acres of floodplain in the project area alone and has direct impacts on habitat conditions. Approximately, 5.2 acres of wetlands are completely inaccessible to fish due to the current highway alignment. An additional 21.7 acres of slough and wetland habitat have only partial fish access due to restricted hydrologic connectivity with the river. Routine dredging and maintenance is required for the 900 feet of Savage Creek which currently runs in the highway ditch. Savage Slough runs under the highway through an undersized culvert that is often blocked by flooding from Mill Creek. An alluvial fan of Mill Creek runs under an undersized bridge making the channel prone to migration, avulsion, and erosion. The channel has been subject to numerous maintenance projects, including dredging and channelization.

Seattle City Light (SCL) purchased approximately 212 acres of property on the Skagit River near Mill and Savage Creeks. A large portion of the acquired property has been deforested and disturbed by the South Skagit Highway, which runs through the Skagit River's floodplain and disconnects a variety of existing tributary and wetland habitats. In order to implement habitat restoration and protect the property for conservation, SCL has been working with Skagit River System Cooperative (SRSC) and Skagit County to restore the floodplain to its original ecological functionality, providing habitat for several species. Maintenance costs of the current road would also be reduced. The restoration is likely to include demolition, riparian and floodplain plantings, and culvert removals.

Possibilities for floodplain restoration were evaluated after an initial scoping procedure. Suggested restoration would either demolish and realign the existing road or install new bridges and culverts on the existing road. The initial scoping and evaluation narrowed the list of feasible projects down to two, mostly due to the Washington State Department of Transportation's (WSDOT) high cost estimate of the other projects. Project funding has come from both SCL and the Salmon Recovery Funding Board (SRFB, project #09-1450) and several additional sources.

1.2 Site Description

The location of the proposed project is on and around a portion of the South Skagit Highway between milepost 17.8 and milepost 19.4. This section of the highway is just off of State Route 20 where Baker Lake Road, North Cascades Highway and South Skagit Highway intersect and south of Lake Shannon. The highway continues running along the Skagit River eastward up until the river reaches the coast. The area is a wetland where several creeks join into the skagit river and provide salmon habitat. The wetland experiences frequent flooding throughout the year.

1.3 Description of Proposed Action and Alternatives

Proposed Action: Highway Realignment

The proposed action will realign the South Skagit Highway between milepost 17.8 and milepost 19.4. This portion of the highway will be moved southward to a higher elevation where less water will collect. The proposed action provides greater habitat benefits, costs less, and will require less future maintenance. After the proposed action was selected, Skagit County prepared a design drawing (See the "Maps" Section). Based on an evaluation of LiDAR elevations and field reconnaissance, it is feasible to construct a new alignment outside of the Skagit River floodplain and the channel migration zone for Mill Creek while meeting engineering and transportation standards for a county highway. The proposed action will have a smooth transition with the existing highway and is offset from the existing logging road in order to maintain low enough grades and a smooth turning radius. A 240-foot span bridge with one pier in the middle to cross the channel migration zone of Mill Creek and a 60 foot span bridge to cross Savage Creek are also included in the proposed action.

The proposed action would restore the functionality of all existing habitat features, but does not restore full connectivity between Skagit River and the floodplain unless Savage Road could also be removed or relocated.

This would greatly reduce maintenance requirements associated with Savage Creek flowing in the highway ditch and with the existing Mill and Savage Creek crossings. The new bridges would be located out of the floodplain and could span nearly all of the channel migration area of Mill and Savage Creeks and would therefore require much less maintenance than is currently required.

Alternative: Current Highway Alignment with New Crossings

The alternative would maintain the existing road alignment while providing sufficient bridge and culvert crossings to restore connectivity with existing floodplain habitats and adequately span the Mill Creek alluvial fan; improving habitat conditions. This would be a complex undertaking that would need more detailed design work to fully evaluate. For scoping purposes and to compare to other alternatives, the project elements were assumed to be the following: construct a multi-span trestle type bridge with a total length of 800 feet where Mill and Savage Creeks currently cross the highway, install 3 culverts or small bridges to connect 5.2 acres of wetlands across the highway (total span length estimated at 140 feet), install at least one 60 foot bridge for the outlet channel from the large pond on the SE portion of the project area.

The alternative would restore the functionality of most existing habitat features, but does not restore full connectivity between Skagit River and the floodplain, and would not restore that functionality

even if Savage Road could be removed.

The alternative would substantially reduce maintenance requirements compared to the existing Mill Creek bridge, and the large trestle crossing would allow Mill and Savage creeks to migrate much more freely. However, large woody debris might rack up on the trestle structure and channels may still move to locations on the highway that do not have bridges or culverts, requiring additional maintenance activities.

1.4 Recommendation

The authors recommend the Proposed Action for this project. The current South Skagit Highway alignment negatively affects wetland habitat, impairs ecosystem functioning, and impedes critical fish access to the Skagit River. Realignment between milepost 17.8 to 19.4 would result in increased habitat, improved water quality, increased wetland connectivity, and a more productive ecosystem. Highway realignment allows for greater benefits per unit cost. The proposed action meets all of the goals of the project while providing the maximum net environmental benefits.

Realigning the highway will restore habitat and environmental services while avoiding future maintenance costs associated with the alternative or taking no action. The removal of the existing road and the installation of new bridge and culvert system structures will allow for fish passage that was previously blocked. The proposed action will confine construction impacts to the immediate roadway and cleared area. Any native vegetation that is disturbed during the construction process will be replanted, providing terrestrial habitat and ecological services, such as a filtration buffer. After the initial construction period, the proposed action will not cause a noticeable inconvenience for those who use the existing road.

1.5 Decision Matrix

Key: (+) Significant positive impact (-) Significant negative impact (0) No significant impacts		Proposed action		Alternative action		No action	
		Short term	Long term	Short term	Long term	Short term	Long term
Earth	Soils	0	0	0	0	0	0
	Topography	-	+	0	0	0	0
	Unique environment	+	+	+	+	-	-
	Erosion	-	-	-	-	0	0
Air		-	0	-	0	0	0
Water	Surface water	-	+	-	+	-	-
	Groundwater	?	?	?	?	?	?
	Runoff	-	+	-	+	-	-
Plants	Aquatic and riparian plants	-	0	-	0	0	0
	Terrestrial plants	-	-	0	0	0	0
Animals	Aquatic animals	-	+	-	+	-	-
	Terrestrial animals	-	0	0	0	0	0
Transportation		-	+	-	-	-	-
Housing		-	0	-	0	0	0
Aesthetics		-	+	-	+	0	0
Environment and health	Noise	-	0	-	0	0	0
	Explosion/hazardous materials	-	0	-	0	0	0
Land and shoreline use		0	+	0	0	0	0

Table of Contents:

2.1 Glossary

Anastomosis: The branching or braiding of two or more stream channels that have many complex connections.

Avulsion: A sudden or abrupt change in streamflow which results when a stream bank is breached or eroded.

Channel migration: The process by which a stream moves over time. This important ecosystem process supports a number of ecological functions, including wildlife habitat.

Chronic Environmental Deficiencies: Existing locations along the state highway system where recent, frequent, and chronic maintenance repairs to the state transportation system are causing impacts to fish and fish habitat.

Chronic Migration Zone: The area where a stream or river is susceptible to channel erosion.

Competence: The ability of flowing water to pick up and carry solid material.

Culvert: A sewer or drain crossing under a road or embankment.

Geomorphological Potential: A streams ability to create complex links between a multitude of habitats through natural channel movement

High flow event: Any event that creates conditions in which the water of a river or stream is flowing higher and/or faster than normal conditions would induce, such as a storm or seasonal flood.

Hydromodified Banks: Anthropogenic alteration of stream banks including armouring, pilings, and concrete slabs.

Parr Migrant: A specific life history of a salmonid, referring to the stage in development between a fry and smolt.

Rearing: The time period of growth of a juvenile salmonid

Salmonid: Of, belonging to, or characteristic of the family Salmonidae, which includes the salmon, trout, and whitefish.

Salmon run: The time at which salmon swim back up the rivers in which they were born to spawn.

Siltation: The pollution of water by fine particulate terrestrial material.

Spawn: The eggs of aquatic animals such as bivalve mollusks, fishes, and amphibians.

Stocks: Fish species that are adapted to local conditions unique to each watershed that produces differences in life history and physical characteristics. Many stocks can be combined to make up a single species, but not the other way around.

Threatened Species: A species whose existence is vulnerable to extinction in the near future

Yearling: A specific life history stage of a salmonid which rears in a freshwater stream for one year before migrating to the ocean.

2.2 Acronyms

BMP: Better Management Practices
CED: Chronic Environmental Deficiencies
CMZ: Chronic Migration Zone
ESA: Endangered Species Act
ESU: Evolutionarily Specific Unit
HPA: Hydraulic Project Approval
MP: Mile Post
NMFS: National Marine Fisheries Services
NPDES: National Pollutant Discharge Elimination System
SCL: Seattle City Light

SRFB: Salmon Recovery Funding Board
TESCP: Temporary Erosion and Sediment Control Plan
USFWS: United States Fish and Wildlife Services
WSDOE: Washington State Department of Ecology
WDFW: Washington Department of Fish and Wildlife
WSDOT: Washington State Department of Transportation
USACOE: United States Army Corps of Engineers

3. ELEMENTS OF THE NATURAL ENVIRONMENT

3.1 Earth

3.1.1 Soils:

Existing Conditions:

A soil survey conducted in 1989 shows that the Skagit County Area contains a variety of soil types with location and depth that range in texture, drainage, and other characteristics. The project site sits on and near three primary soil types that are all generally well drained, have high water capacity and are produced from glacial outwash/alluvium and/or volcanic ash. The soil upslope of the existing South Skagit Highway is primarily a loam called "Gilligan silt loam", which is common in river valleys at lower elevations (200-500 ft.). Gilligan silt loam is well drained and has a moderate water capacity (8.0 inches). The existing highway is set primarily on "Pilchuck loamy sand", an excessively drained soil predominantly found in floodplains. Pilchuck loamy sand is found in river valleys at lower elevations (20-500 ft.) and has a low water capacity (~3.6 inches) resulting in frequent flooding. The soil directly downslope of South Skagit Highway is a fine, well drained loam common to terraces and floodplains known as "Larush fine sandy loam." Larush fine sandy loam is common in river valleys at lower elevations (100-500 ft.), has a moderate water capacity (7.1 inches) and floods occasionally (United States Department of Agriculture: Soil Survey). The highway is currently set in the existing floodplain and is susceptible to flooding damage during periods of high flow and precipitation. Moving the highway upslope to the more permeable soil bed would reduce risk of flood damage.

Proposed Action:

Soil compaction during road construction will alter soil composition by reducing the amount of organic matter, water, and air in the soil. There will be a reduction in pore spaces thus limiting aeration, water infiltration, and physical space for roots (Cooperative Soil Survey, 2012). The newly exposed soil that will be present after removal of the old highway will likely be infertile. Compaction by the impermeable road will have left the soil with little pore space and therefore little space for water to accumulate and roots to grow (Stakland, 2012). There could be temporary erosion caused by clearing and grubbing as

vegetation helps to hold soil structure intact. This is covered in the erosion section of this assessment.

Mitigation:

Stockpiling and retention of topsoil that is cleared for the construction and retention of plant trimmings from clearing could then be used to cover newly exposed soil on former highway route to increase organic matter. Environmentally sound soil bonding chemicals, soil mats, and planting of native vegetation could be used to reduce erosion of newly laid topsoil while soil structure restabalizes over time.

Alternative Action:

Reconstructing creek crossings and culverts on South Skagit Highway will not have a significant effect on existing soil conditions.

No Action:

No action will leave the existing soil structure as is.

3.1.2 Topography:

Existing Conditions:

South Skagit Highway currently runs through the existing floodplain in the proposed project site which was created by the middle reaches of the Skagit River. (personal observation). Elevation is approximately 170 ft above sea level (GoogleMaps). The current slope of the road is relatively flat and crosses the floodplain of the Skagit River and the alluvial fan created by Savage Creek and Mill Creeks. Both creeks have a reasonably steep gradient in the vicinity of the project with a quick release of sediments as the slope decreases and flow slows and spreads out at the confluence. Alluvial fans are highly subjected to avulsion and anastomosis resulting in varied channel paths.

Proposed Action:

The reroute of South Skagit Highway would move the road to the southwest, rising approximately 30 ft in elevation up the nearby hill slope which was estimated from the use of google maps and project diagrams. To complete the realignment, the new course would need to be cut and regraded. The chance of a mass wasting event after the construction will be mitigated by construction techniques, but if to occur, a debris flow would move down slope to the north east depositing just above the floodplain. The current course of the highway would be re-graded to its natural slope and state after the pulverization and removal of the existing highway (Tori Nelson, affiliation personal communication). Many mitigation

steps are taken during road construction aimed at dampening or avoiding harm to the environment. By rerouting the highway, there are many opportunities for negative impacts to occur, but the mitigation steps required by Washington State Department of Transportation (DOT) have proven to be relatively successful. More detail is provided in Section 3.1.4.

Alternative Action:

If current road alignment were to remain, there would be no changes to the topography of the project or effects that it may have on the project.
No Action:

If no actions were taken, the existing topography would remain the same.

3.1.3 Unique environment

Existing Conditions:

The middle reaches of the Skagit River are in a low-lying, multiple use valley with steep hills on either side. A well developed floodplain, wetland and backwater system has been created over time, giving the river its meandering course (Skagit River Basin Hydrology Report: Existing Conditions, 2008). This results in many areas of slow moving water which is preferred habitat for rearing juvenile Chinook (*Oncorhynchus tshawytscha*) which are threatened. Two specific life histories of Chinook Salmon within the Skagit River have been identified to specifically need this type of habitat for rearing as juveniles. The Savage Creek reach has been identified as the third most important reach for Chinook juveniles within the Skagit River (Skagit Chinook Recovery Plan, 2005).

Proposed Action:

If South Skagit Highway was relocated further upslope and out of the floodplain, a significant portion of viable rearing habitat would be opened up to Chinook juveniles. The reroute would provide the benefits of: restoring natural habitat development of 62 acres of isolated floodplain, restoring connectivity of 21.7 acres of wetland and slough habitat, restoring 5.2 acres of existing wetland habitat on the north side of the highway, restoring the natural channel conditions and connectivity of Savage Creek, eliminating hazardous maintenance issues such as dredging, and restore natural channel configuration, habitat development, and channel migration in the alluvial fans of both Mill and Savage creeks (Project Description).

Alternative Action:

The construction and improvement of bridges and culverts as proposed in the alternative action would eliminate fish migration barriers and establish some reconnection to the existing wetland and slough habitat (Project Description). However, this would not change the disconnection between the 62 acres of inaccessible floodplain and Skagit River.

No Action:

The current location of South Skagit highway creates a hydrologic disconnection between 62 acres of wetland, 21.7 acres of slough and wetland habitat, 5.2 acres of wetlands, and causes migration barriers entering Savage Creek and Mill Creek from the Skagit River (Project Description). No action would not change these conditions and disruptive maintenance of bridges and culverts would remain necessary.

3.1.4 Erosion

Existing Conditions:

The section of South Skagit Hwy that is under review acts as a dam by preventing upland sediments from eroding into the lower floodplain. 900 feet of Savage Slough runs along S. Skagit Highway and requires continuous dredging and maintenance. Savage Slough drains under the highway by way of an undersized culvert that is blocked by sediment from Mill Creek during flood event. The undersized bridge over Mill Creek currently crosses an alluvial fan. This channel has been subject to consistent maintenance, including dredging and channelization to correct the damage caused by channel migration, avulsion and erosion (Initial project scoping, 2012). The road is susceptible to landslides as seen in November, 2011 when a massive landslide closed the highway for an extended period (Martin, 2011).

Proposed Action:
The clearing and grading process required to put in the new section of highway could result in increased short term erosion of the surrounding area. The newly exposed soil after pulverization and disposal of the old highway will be at risk from significant erosion and loss of soil structure if mitigation measures are not taken. Pollutants leached during the construction process can affect the surrounding habitat by bonding with soil and eroding or infiltrating the groundwater. The new road will utilize culverts and bridges to allow sediment drainage into the lower Skagit River Basin, and will not decrease natural erosion processes at creek crossings. The new road is susceptible to damage from landslides but will eliminate the possibility of roadway failure from creek erosion during high flow events.

Mitigation:
The contractor will be required by the Washington State Department of Transportation to adhere to a Temporary Erosion and Sediment Control Plan (TESCP) that includes Best Management Practices (BMP) specific to the project. Projects that disturb soil must comply with the 12 TESCP elements in order to retain the maximum quantity of natural soil structure and vegetation practicable. The surrounding wetland area cannot be used to disperse and infiltrate water for this project because it is labeled as a "sensitive" area. Sediment and flow rate can be controlled during the project with and application of several control techniques such as detention tanks, sediment traps, temporary sediment ponds, silt fences, inlet/outlet protection, street cleaning and filter berms. It is required that exposed soils on the project site must be covered when not being worked on for the duration specified for Western Washington in the WSDOT "Temporary Erosion and Sediment Control Design Guidelines and Processes." Different covers, such as compost blankets or plastic covering, can be selected depending on site specific conditions. Newly exposed soils can also be stabilized with the use of several BPM techniques such as mulch and polyacrylamide, sodding, dust control, seeding and planting, and temporary mulching. The contractor will also have to adhere the the TESC pollution control guidelines during the construction process (WSDOT, 2011)

Alternative Action:

The clearing and grading process required to put in the new section of highway could result in increased short term erosion of the surrounding area. The new road will utilize culverts and bridges to allow sediment drainage into the lower Skagit River Basin, and will not decrease natural erosion processes at creek crossings. The new road is susceptible to damage from landslides but will eliminate the possibility of roadway failure from creek erosion during high flow events.

Mitigation:

The contractor will be required by the Washington State Department of Transportation to adhere to a Temporary Erosion and Sediment Control Plan (TESCP) that includes Best Management Practices (BMP) specific to the project. The TESCP is designed to protect water quality and reduce erosion-related costs. The same mitigation concerns laid out for the proposed action will apply to the alternative action.

No Action:

No action will result in continued sediment blockage due to undersized culverts and bridges. The existing roadway will be vulnerable to erosive processes during high flow events and will need

continuous maintenance to keep the road safe for car traffic. 62 acres of floodplain will remain blocked from the Skagit River. 900 ft. of Savage creek will continue to run alongside the highway.

3.2 Air

Existing Conditions:

Air quality meets all requirements of the Clean Air Act

Proposed Action:

Construction activities will lead to increased dust particles and engine emissions. These conditions are temporary, and air quality will return to pre-construction conditions when the project is completed.

Mitigation:

The contractor will be required to adhere to all federal, state, and local air quality regulations, including temporary construction conditions such as dust, smoke, and emissions. The WSDOT will also require compliance with a "No Idle Policy" to avoid unnecessary emissions.

Alternative Action:

Construction activities will lead to increased dust particles and engine emissions. These conditions are temporary, and air quality will return to pre-construction conditions after completion of the project.

No Action:

There would be no change in air quality conditions.

3.3 Water

3.3.1 Surface Water

Existing Conditions:

Savage Creek and Mill Creek, Savage Slough, and 5.2 acres of other existing wetland area are tributaries of the middle reaches of the Skagit River in the immediate vicinity of the proposed project site. Savage Creek's upper reaches are downcut through glacial deposits, thus well confined in its steep banks (Skagit River Basin Hydrology Report: Existing Conditions, 2008). The lower reaches, on the other hand, have moderate flood plains and capacity for development of other habitat and channel migration. Savage Creek runs through approximately 900 ft of a drainage ditch on the south side of South Skagit highway before crossing under the highway. Mill Creek is not as channelized at Savage Creek. Mill Creek tends to have a web of braided channels which rapidly change course due to the easy erosion and avulsion in the alluvial fan which the creek flows through. The bridge which Mill Creek flows under is undersized, needing routine maintenance and floods regularly. Savage Slough passes under the road through an undersized culvert which requires routine maintenance due to alluvial deposits from Mill Creek. The existing wetlands create reservoirs for storm peak flows, but are disconnected from the river.

Proposed Action:

During the realignment of South Skagit Highway, all of the major surface water tributaries would regain connection with Skagit River. The 240-ft bridge would would provide sufficient channel migration areas for both Savage Creek and Mill Creek. Savage Creek's channel would no longer run along South Skagit Highway in a drainage ditch. The removal of all undersized culverts would increase the connectivity of Savage Slough and all other existing wetlands as well as eliminate maintenance needs caused by side channel flooding, culverts, and sediment buildup. Construction, demolition, deforestation would all contribute to erosion and siltation, ultimately depositing in the surrounding water bodies. Mitigation techniques to dampen potential impacts are described in Section 3.1.4.

Alternative Action::

If the road were to remain in place, but all fish passage barriers were upgraded, the connectivity of existing wetlands, Savage slough, Savage Creek and Mill Creek would be restored. Savage Slough would flow freely under the highway and the connectivity to existing wetlands would be increased. Channel migration in Savage Creek and Mill creek would increase giving rise to natural habitat development. Savage Creek would no longer be directed into the channelized drainage ditch along the highway and less vulnerable to polluted runoff. However, the 62 acres of isolated floodplain would remain isolated and could not be utilized as habitat by fish. Installation of bridges and culverts would potentially increase the rates of erosion during construction but mitigation techniques aimed to decrease erosion are outlined in Section 3.1.4.

No Action:

The disconnection between the various side channels would remain constant and no immediate changes in the surface water would occur.

3.3.2 Groundwater

Existing Conditions:
Information on the groundwater characteristics directly beneath the project site are currently unavailable, however significant inflows from tributaries to major creeks in the proposed area suggest the presence of groundwater discharge from upland areas underlain by bedrock. Data gathered by the USGS in 1982 found the groundwater level to be approximately 15 ft. below the ground surface where Cumberland Creek flows into the Skagit River, approximately 4 miles west of mill creek (USGS: National Water Information System). Pre-project boring would be necessary to determine the depth of underlying groundwater and determine if groundwater could be reached during excavation.

Proposed Action:
The construction of the new road should not significantly impact the groundwater in the long term. During construction, contaminants from heavy machinery might infiltrate the groundwater supply depending on groundwater presence directly beneath and downslope of the site. Clearing will temporarily increase isolated soil permeability. Pulverizing the old road will leave bare bed that will be susceptible to increased permeability as well.

Alternative Action:
The construction of new culverts and creek crossings should not significantly impact the groundwater in the long term. During construction, contaminants from heavy machinery might infiltrate the groundwater supply in low quantities. The hydraulic connection between the groundwater and the channel would be allowed to occur naturally, therefore eliminating the challenges of localized permeability. If significant excavation is required, bore analysis will be required to find the depth of the water table.

Mitigation:
Restoration by laying down an erosion mat and replanting native vegetation along the path of the removed highway will increase soil stability and permeability will return to a natural state after vegetation has been established.

No Action:
If no action is take, there will be no affect to existing groundwater conditions.

3.3.3 Stormwater

Existing Conditions:

Stormwater and runoff is impacted by areas with high compaction and high antecedent soil moisture. South Skagit Highway is an impermeable surface as well as an area of high compaction. Precipitation is given little chance for infiltration and percolation because soil grains have been forcefully pushed together. Given the small amount of space between soil grains, any moisture within the soil increases antecedent soil moisture leading to greater stormwater runoff. Increases in stormwater runoff ultimately result in greater peak flows, faster flow, and an increase in erosion. Stormwater and precipitation currently flows off South Skagit Highway into drainage ditches on either side of the road. Consequently, since 900 ft. of Savage Creek is confined to the drainage ditch along the south side of South Skagit highway, much of the overland flow immediately enters the Skagit River.

Proposed Action:

Highway specifications mandate that surface water runoff be efficient and may not allow any water pockets to form on the highway surface whatsoever (Standard Specifications for Road, Bridge, and Municipal Construction, 2012). Roads should be sloped in a manner in which water will run off the road surface, paying special attention to areas such as steep transitions. Surface ditches may be necessary above cut slopes, as proposed, in order to detour water from uphill. Ditches should be diverted in a way to reduce erosion. Due to the increased distance of the highway from the Skagit River, more time and area are available for infiltration and filtration of surface runoff. Techniques described in Section 3.1.4 will be used to mitigate the erosive potential and competence of storm water. No dispersion techniques are currently being used in the existing wetlands. Therefore, the wetlands contribute directly to the water table and Skagit River. By devising a mitigation plan which disperses wetland flow, the wetlands natural capacity could be utilized to effectively and naturally filter to and increase the quality of the water before it enters the river. Other retention ponds or constructed wetlands could be constructed on site with ditches to direct water ultimately serving the same functions of the natural wetlands.

Alternative Action:

If the road were to remain where it was, surface run off would be directed in a similar fashion. The only change would be the improved flow drainage of upland sources to the Skagit River as a result of the enhanced culverts and bridge installations.

No Action:

If no action is taken, surface runoff will remain the same.

3.4 Plants and Animals

3.4.1 Flora

3.4.1a Riparian Plants

Existing Conditions:

Riparian vegetation provides streambank stability, sequesters nutrients from the water, creates microclimates and supplies nutrients to various species. The riparian area is dominated by deciduous trees, primarily red alder (*Alnus rubra).* Coniferous riparian trees include western hemlock (*Tsuga heterophylla)* and douglas-fir (*Pseudotsuga menziesii).* Coniferous species contribute large woody debris to the environment which is vital for a thriving stream environment and quality salmon habitat. The floodplain contained a variety of invasive marsh grasses including scotch broom (Cy*tisus scoparius)* and reed canary grass (*Phalaris arundinacea),* as well as the invasive Himalayan blackberry (*Rubus armeniacus)* (Meredith 2007).

Proposed Action:

The project proposal roadway realignment will require approximately 2.60 acres of clearing and grubbing vegetation. The clearing will take place in the area designated for the newly aligned roadway. The vegetation that will be displaced for the new roadway includes Douglas-fir, western hemlock, and understory species. An emphasis on bank stabilizing vegetation will be important for controlling erosion and limiting excessive sediment deposition into the river. Moosewood (*Viburnum edule),* lady fern (*Athyrium felix-femina),* slough sedge (*Carex obnupta),* and nine-bark (*Physocarpus capitata)* have all been used successfully as revegetation species (Meredith 2007).

Alternative Action:
Some clearing and grubbing will take place in isolated areas to put in culverts and replace creek crossings. The installation of the bridge in place of the culvert will allow for natural riparian vegetation to thrive.

Mitigation:

The project proposal roadway realignment will leave the existing roadway useless. The removal of the impervious surface will leave a natural bed that will be replanted with native vegetation. This period of transition will leave the area very vulnerable to invasive species colonization. Invasive species are very detrimental to freshwater ecosystems and natural riparian processes. Steps should be taken to ensure that common invasive species such as the Himalayan blackberry *(Rubus armeniacus)* and knotweed grass *(Polygonum aviculare)* are not given a chance to colonize. Successful revegetation of native species may require some maintenance work over the next several years to ensure restoration of a healthy ecosystem (Meredith 2007).

No Action:

Riparian vegetation would not be affected.

3.4.1b Upland Plants

Existing conditions

The project area is located within Western Washington's western hemlock vegetation zone. Upland areas are dominated by western hemlock (*Tsuga heterophylla*), Douglas-fir (*Pseudotsuga menzeisii*), western red cedar (*Thuja plicata*), red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*). Salmonberry (*Rubus spectabilis*), thimbleberry (*Rubus parviflorus*), sword fern (*Polystichum munitum*), vine maple (*Acer circinatum*), and bracken fern (*Pteridium aquilinum*) are common in the understory, as well as the non-native English ivy (*Hedera* spp.) and Himalayan blackberry (*Rubus armeniacus*).

One state threatened terrestrial plant species could potentially occur on the project area, western jewel-weed (*Impatiens noli-tangere*). There is little information available regarding the distribution and ecology of western jewel-weed. However, the species is typically found in moist forests, wetland margins, and riparian areas (Camp and Gamon 2011). The closest documented population of western jewel-weed was found north of the town of Concrete, near the intersection of Baker Lake Road and Burpee Hill Road, roughly six miles from the project area (Burke Museum of Natural History and Culture Herbarium Database 2013).

Proposed Action

Approximately 4.85 acres of upland habitat will be cleared in order to build the new highway. This area

is primarily composed of western hemock, Douglas-fir, western red cedar and red alder forest.

Mitigation

The new roadway should be surveyed for western jewel-weed prior to the beginning of construction. This species flowers in July and August in Washington (Burke Museum of Natural History and Culture Herbarium Database 2013).

Alternative Action

Upland vegetation would not be disturbed under the alternative action.

No Action

Upland vegetation would not be impacted.

3.4.2 Fauna

3.4.2a Aquatic Fauna

Existing Conditions:

The lower Skagit River and contributing tributaries provide critically important habitat to ten different salmonid species including the largest known population of Puget Sound bull trout (*Salvelinus confluentus*) .The species include Chinook stocks (spring, summer, and fall runs); pink salmon (*Oncorhynchus gorbuscha*); chum salmon (*Oncorhynchus keta)*; sockeye salmon (*Oncorhynchus nerka*); summer and winter run steelhead (*Oncorhynchus mykiss*); sea run cutthroat trout (*Oncorhynchus clarkii*); Dolly Varden (*Salvelinus malma malma*) and bull trout (Skagit Chinook Recovery Plan, 2005). Currently, coho and sockeye are under review by the state and federal agencies to investigate their potential to be listed under the Endangered Species Act (ESA). Puget Sound Chinook salmon Evolutionarily Specific Unit (ESU) was listed as a threatened species in 1999 by the National Marine Fisheries Service (NMFS).

The loss of channel habitat has been identified as one of the most significant limiting factors in the recovery of Skagit River Chinook (Draft Skagit River Flood Damage Reduction Study, 2008). Puget Sound/Coastal cutthroat trout and bull trout have been listed as threatened by the U.S. Fish and Wildlife Service(USFWS). Two specific life histories of Chinook Salmon within the Skagit River have been

identified (parr migrants and yearlings) which rear in slow moving water such as wetlands, sloughs, and floodplains, the proposed project area being particularly viable habitat (Skagit Chinook Recovery Plan, 2005). Parr are restricted to freshwater habitat during early growth before migrating to the ocean. They require a few months of rearing in off channel habitat or within the floodplain where water speeds are greatly reduced. Yearlings require a similar habitat, but rear within the river for approximately one year. In late March to early May, they generally move towards deep inter-tidal areas before moving on to nearshore marine habitat. Many acres of viable habitat in the proposed project area are disconnected from the main stem of the Skagit River due to the alignment S. Skagit Highway. The current culverts that pass under the highway create fish passage barriers that make migration difficult as well.

Proposed Action:

By rerouting S. Skagit Highway, the road will be completely removed from the floodplain. This will restore natural channel migration and habitat development. Savage Slough will no longer be disconnected from the Skagit River and will open new habitat. There will also be another 21.7 acres of wetland habitat that will regain connection with Skagit River. Road crossings at Savage Creek and Mill Creek will be designed in a way that does not impede fish migration. The bridges will be large enough to span the creeks and allow channel migration and habitat development. There will be some deleterious impacts that will occur during construction such as increased erosion and riparian disturbance but many steps will be taken to mitigate these effects. Removing vegetation, regrading, and demolition will all introduce sediments and nutrients into the Skagit River through water runoff. Sediments can smother fish eggs and reduce water quality, but mitigation described in Section 3.1.4 will greatly reduce the amount of sediments that will be allowed to enter the river.

Alternative Action:

By leaving S. Skagit highway where it currently is, 62 acres of floodplain will remain disconnected and will be reestablished as viable fish habitat. The installation of the the new bridges and culverts will restore connectivity of Savage Slough and the existing wetlands. Savage Creek and Mill Creek will also become more accessible with the removal of the current fish passage barriers. There would also be much less sediment loading. The construction effects would be minimized and temporary sediment loading would be be minimal.

No Action:

There would be no change to the current habitat conditions.

3.4.2b Terrestrial Fauna

Existing Conditions:

The project area is located in the Puget Sound lowland forest ecoregion, and includes wetland, riparian, and mixed deciduous/coniferous forest habitat. Common mammals in this area include mule deer (*Odocoileus hemionus),* raccoon (*Procyon lotor*), beaver (*Castor canadensis*), and several species of smaller mammals (Moskowitz 2010). Coyote (*Canis latrans*) and mule deer scat has been observed on the project area. Reptiles and amphibians frequently observed in these habitats include the western garter snake (*Thamnophis sirtalis*), Pacific tree frog (*Hyla regilla*), and several species of salamanders (Dvornich et al. 1997; Moskowitz 2010). Prominent birds of the Skagit Valley include the great blue heron (*Ardea herodias*), bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), and numerous species of songbirds (Moskowitz 2010).

Threatened and Endangered Species:

The project area has been identified as potential habitat for the state-listed Endangered fisher (*Martes pennanti*) (Johnson and Cassidy 1997). This species is currently considered extirpated from the Cascade Range. However, future reintroduction efforts are planned in the Cascades (Hayes and Lewis 2006). Three sensitive status species of birds may use the project area: the marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina)*, and bald eagle (*Haliaeetus leucocephalus*). The lack of old-growth trees and mature conifers on the site likely preclude nesting by the marbled murrelet and northern spotted owl. The Skagit River attracts large numbers of bald eagles in the winter when chum salmon are returning to spawn; up to 400 have been counted in a single season (Stinson et al. 2007). Bald eagles may nest, roost, and forage within the project area. The only potentially occurring state-listed Endangered amphibian in the project area is the Oregon spotted frog (*Rana pretiosa*). While no known breeding sites exist within the project area, the Oregon spotted frog has been documented within the Skagit River watershed (WDFW 2012).

Proposed action: Clear-cutting and road building would permanently destroy 4.85 acres of mixed deciduous/coniferous forest habitat. Nesting and roosting trees for bald eagles could potentially be removed. Bald eagles may benefit from increased salmonid abundance following an increase in stream and wetland habitat and connectivity of these habitats. If present, egg masses of the Oregon spotted frog could be harmed during removal of the old roadway. Many species of wildlife may temporarily avoid or leave the area during construction and removal of roadways.

Alternative action: Construction activity and noise could disturb bald eagle nesting and roosting. Bald

eagles may benefit from increased salmonid abundance following an increase in stream and wetland connectivity. If present, egg masses of the Oregon spotted frog could be harmed during bridge and culvert construction. Many species of wildlife may temporarily avoid or leave the area while construction is taking place.

Mitigation: If construction is taking place between January and August, the project area should be surveyed for active bald eagle nests before construction begins. Similarly, wetland and stream areas should be surveyed for Oregon spotted frog egg masses from late winter through early spring.

No action: Terrestrial wildlife would not be impacted.

4. ELEMENTS OF THE BUILT ENVIRONMENT

4.1 Transportation

Existing Conditions:

The existing South Skagit Highway system is a east/west flowing two-lane highway that runs loosely parallel to the south side of the Skagit River (River Miles 45-46). Much of the route lies in a Channel Migration Zone (CMZ), an area where Mill Creek and Savage Creek occupy, making this area susceptible to erosion and channel migration. During a flood event, storm and flood water may cause the closure of one or more lanes of the South Skagit Highway (WSDOT). The location of this site lies approximately 18 miles southeast of the town of Sedro Woolley. Sedro Woolley lies directly on the north/south route of Highway 9. Directly south two-miles of the Sedro Woolley, Highway 9 meets the South Skagit Highway. The existing site location lies between milepost (MP) 17.8 to MP 19.4. on the South Skagit Highway, approximately 18 miles west of Highway 9.

As of 2010, Seattle City Light acquired 212 acres of property in the vicinity of Mill Creek and Savage Creek along the South bank of the Skagit River. Within this 212 acres runs the South Skagit Highway, which interrupts the flow of sediment from upslope and divides the Skagit River from 62 acres of floodplain (Skagit County Public Works). This has direct impacts on existing habitat conditions. In addition, the highway completely blocks fish access to 5.2 acres of wetlands and partially blocks access to 21.7 acres of slough and wetlands habitat. Within the 21.7 acres, the hydrologic connectivity with the river is significantly degraded by the placement of the existing highway.

Parallel to the existing South Skagit highway, lies approximately 900 feet of highway drainage ditch with no crossing structure, holding Savage Creek within the South Skagit Highway boundary (see figure 1).

This existing ditch requires routine maintenance and dredging to keep the road passable. Savage Slough flows under the highway in an undersized culvert that can and has been blocked by sediment from Mill Creek during a flood event, requiring maintenance to control this issue. Approximately milepost (MP) 18.1 the highway crosses over the undersized Mill Creek bridge(Skagit County Public Works, 2012). Mill Creek lies within the alluvial debris fan. Due to the location of the highway on the alluvial fan and the undersized bridge over Mill Creek, the creek channel is prone to migration, erosion and avulsion within this alluvial fan location. As a result, regular cost of maintenance projects have occurred and will continue if not addressed, including dredging and channelization and temporary road closure of one or more lanes (WSDOT).

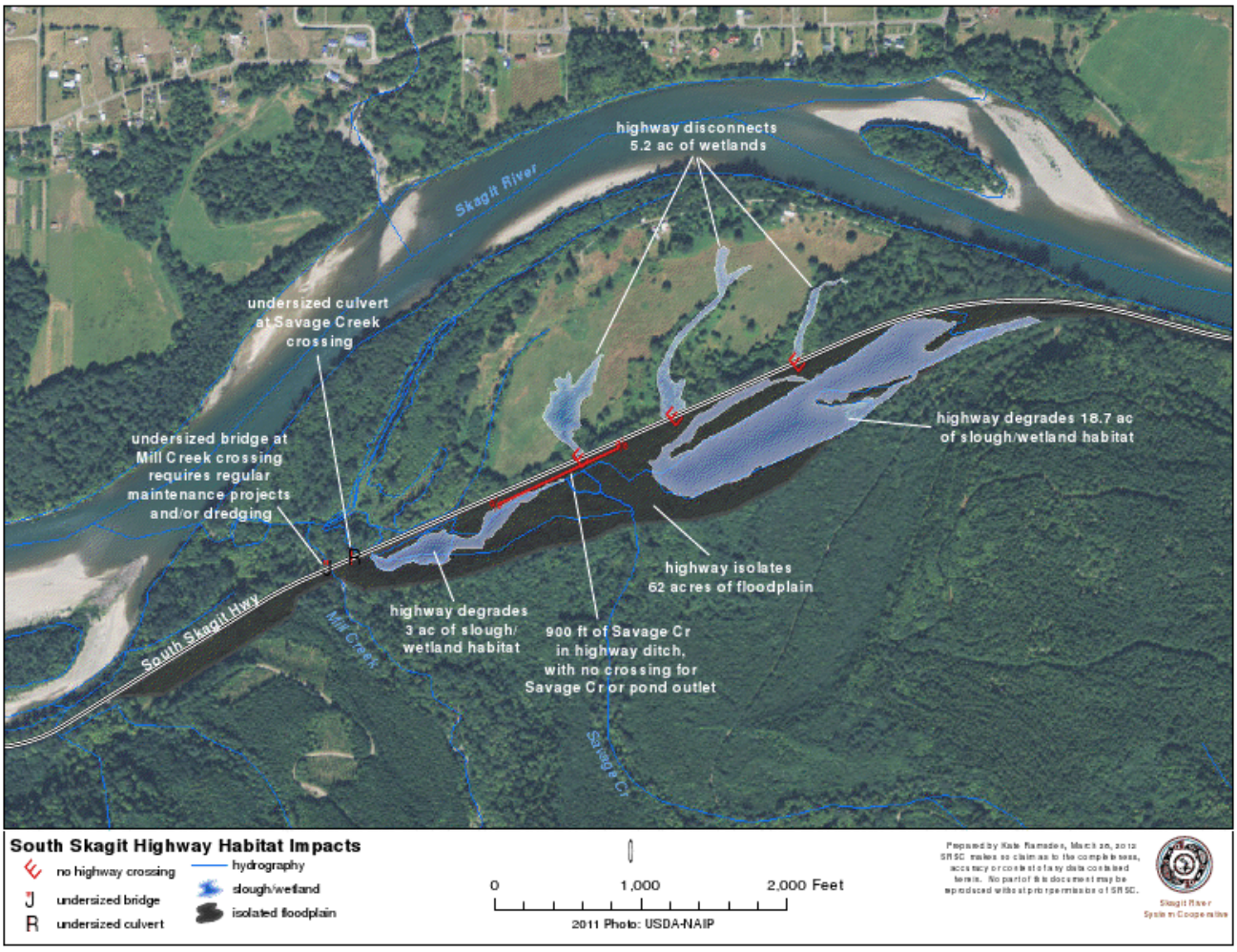

Figure 1: This image shows the existing South Skagit Highway with the undersized culverts, 900 foot lng ditch and undersized bridge.

Conflicts between South Skagit Highway, Savage Creek and Mill Creek pose problems for the traveling public, homeowners, timber industry, Seattle City Light and Skagit County. In the event of a

washout or flood, homeowners, logging trucks, and users of the South Skagit Highway who live and work east of the site, may be forced to wait while emergency repairs are conducted on South Skagit Highway or be rerouted to Highway 20 (Skagit County Public Works, 2012). However, in a flood event that creates a closure on Highway 20, South Skagit Highway is the alternate route for the people and businesses of the towns of Concrete, New Halem and Diablo.

Due to the nature of periodic closures, the South Skagit Highway milepost 17.8 to milepost 19.4 may fall under the Chronic Environmental Deficiency (CED) criteria laid out by WSDOT, which states " Chronic environmental deficiencies(CED) are locations along the state highway system, where recent, frequent and chronic maintenance repairs to the state transportation system are causing problems to fish and fish habitat" (WSDOT). In 2002, WSDOT and WDFW established a partnership, *Memorandum of Agreements,* to move away from repetitive maintenance of WSDOT roads and to concentrate on long term solutions to "optimize the improvement for fish and fish habitats, while addressing transportation needs"(WSDOT).

4.1.1 Proposed Action:

Several alignment locations were considered. However, the best option through Lidar images and field research determined the *Figure 2* location as the best option. Alignments that to the north would begin overlap with the Skagit River floodplain restrictions for the new highway. Eventually an alignment was identified that was outside the Skagit River floodplain, had acceptable finished highway grades, and could provide reasonable crossings for both Mill Creek and Savage Creeks (Skagit County Public Works, 2012). The 1.5 mile realignment would occur from MP 17.8 to MP 19.4 on the existing highway. This alternative includes a 240 foot span bridge with one pier in the middle to cross the channel migration zone of Mill Creek and a 60 foot span bridge to cross Savage Creek. The Skagit Highway realignment proposal accounts for the heavy loads from commercial Semi-trucks hauling timber, meeting engineering and transportation standards for a county highway.

The proposed highway realignment would restore the functionality of all existing habitat features, but does not restore full connectivity between Skagit River and the floodplain unless Savage Road could also be removed or relocated, which will happen over time (Seattle City Light). The savage road divider is a result of the homes that use it. The road is not necessary in the future because the homes and property have been purchased by Seattle City Light. See *Housing 4.2* for more details.

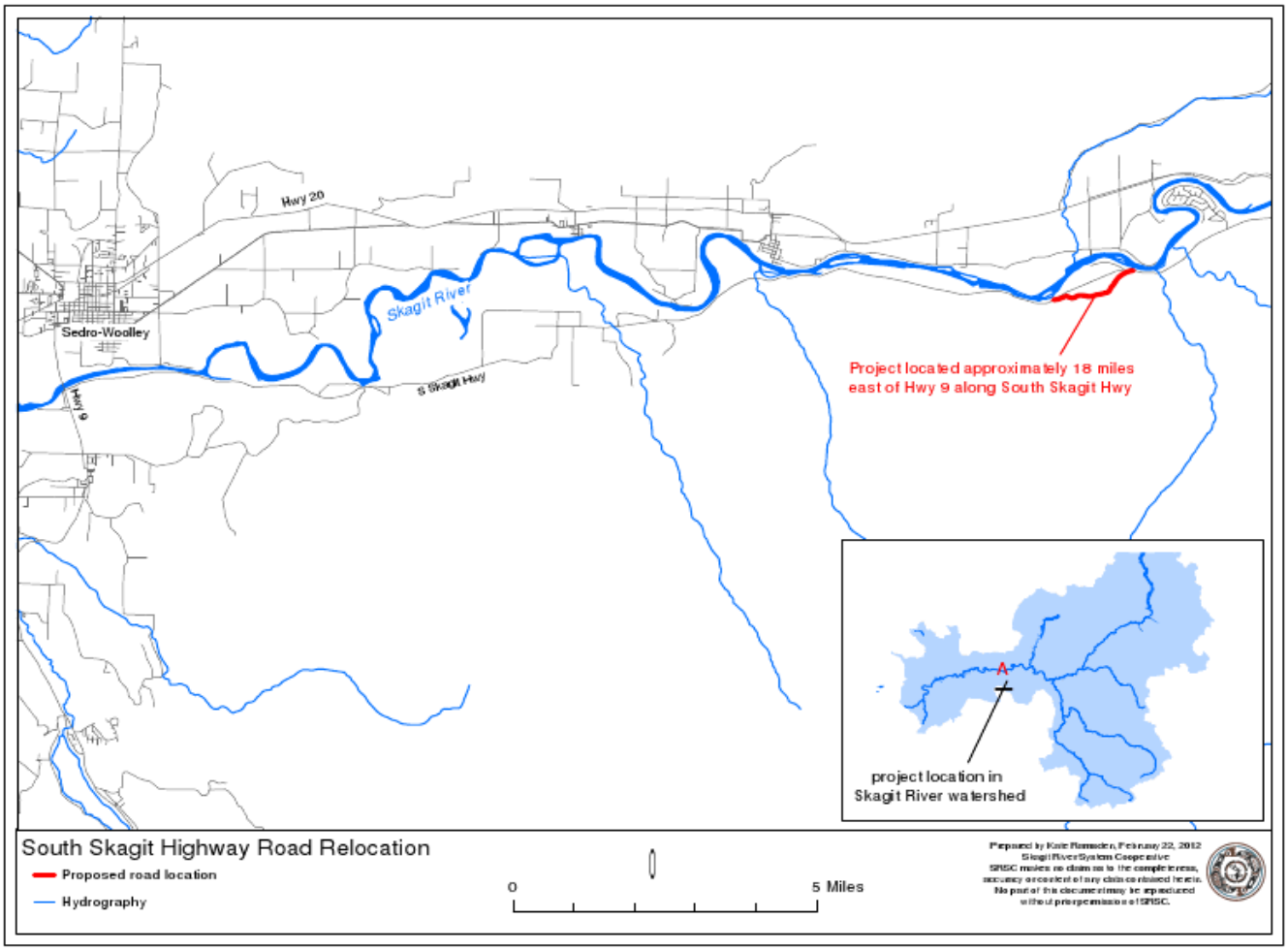

Figure 2: Milepost 17.8-19.4 proposed highway in red and existing highway in grey

The long term results of the South Skagit Highway realignment allows for the reducution of dredging and maintenance costs associated with the existing chronic migration zone in the alluvial fan (see fig.3) where the existing South Skagit Highway resides. WSDOT CEDs will not be a factor any longer with the proposed action and wetland habitat would be restored. There would be some maintenance requirements with the new bridges, but this would be very limited due to the design of the proposed bridge spanning nearly all of the channel migration zone of Mill Creek and Savage Creeks (Skagit Public Works). The short term effects during construction is the increase in erosion, noise and transportation usage. mitigation of these effects are addressed in the proceeding *mitigation* section.

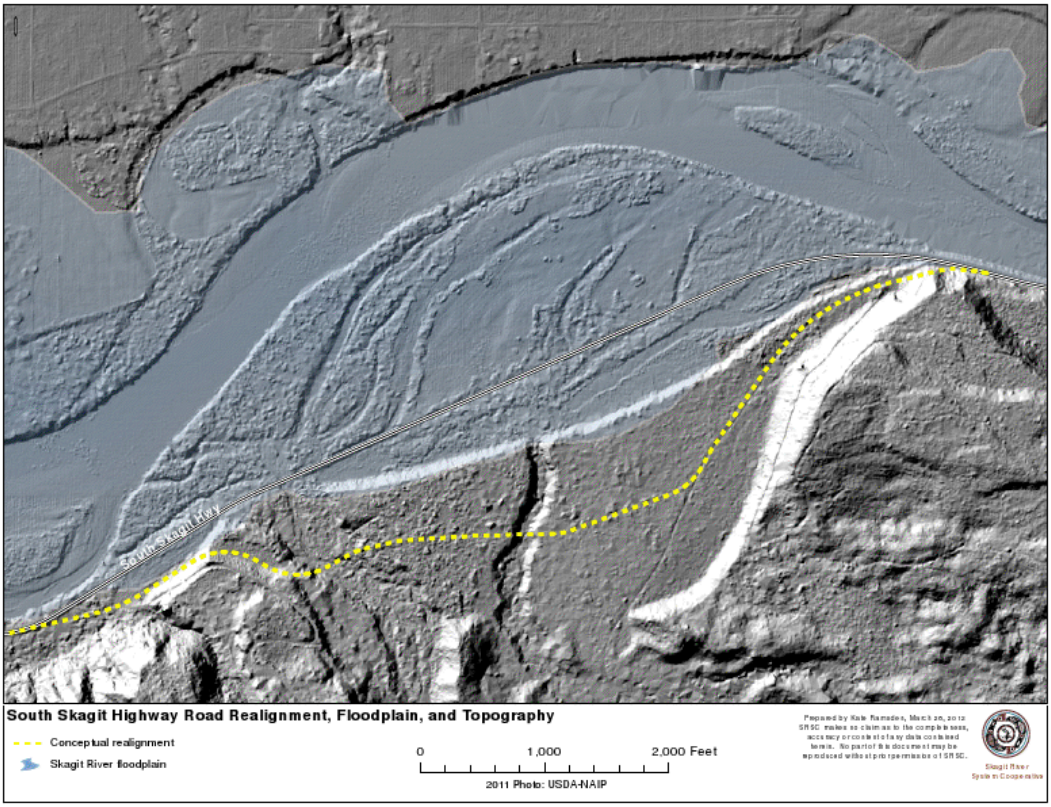

Figure 3: Lidar image showing the alluvial fan with the proposed realignment of South Skagit Highway upslope of the existing South Skagit Highway, Mill Creek CMZ and Savage Creek channelization.

Mitigation:

During this construction period the South Skagit Highway system will be affected by the temporary closure of the South Skagit Highway connectivity ends at milepost 17.8 and milepost 19.4. The temporary closure at these connectivity ends will allow construction personnel and equipment to travel upslope in the construction of the the proposed realignment highway and when the connectivity ends are under construction (Alan Schoisher, WSDOT, personal communication). Flaggers will be employed to ensure traffic safety concerns at milepost 17.8 and milepost 19.4 where the connection points will tie into the existing South Skagit highway. A DOT car may be used as a guide during the one lane closure process. Drivers and bicyclists will expect an approximate time closure of ten minute delays at most, and will be required to share the road with the increased traffic of construction machinery, dump trucks hauling debris and construction employees traveling to and from the work site (WSDOT) .

Skagit County adheres to Washington State noise regulations (WAC 173-60). The South Skagit Highway is a rural highway with an average daily traffic volume of 1,000 vehicles, approximately 9% of

which is truck traffic (KPFF Consulting Engineers 2012). Construction noise and air pollutants will increase during the road construction period, but will have no long term effects once construction is complete. Noise would be temporarily increased during bridge construction, but impacts would less than those for the proposed action. Temporary construction noise is exempt from noise regulations (WAC 173-60). Upon completion, noise would return to pre-project levels.

Erosion control will need to be mitigated and construction needs to occur outside of the salmon spawning period. The construction contractor will be required by the Washington State Department of Transportation to adhere to a Temporary Erosion and Sediment Control Plan (TESCP) that includes Best Management Practices (BMP) specific to the project. The TESCP is designed to protect water quality and reduce erosion-related costs. Erosion control fencing, hay bale collection will ensure erosion control measures. Parking spaces for construction crew and construction equipment will be gained through the use of Savage Road at milepost 19.2 and the forest road turn-off at milepost 17.8 during the construction period.

Mitigation of the bridges need to be considered for hydrological analysis for sizing of the bridges, geotechnical issues and topography of site (Torrey Nelson, Skagit County Public Works). These factors will be addressed and designs will be completed by one or a team of consulting firms that specialize in highway and bridge design.This work will be supervised by a licensed professional engineer and will be managed by a design team including Seattle City Light, Skagit County and the Skagit River System Cooperative. In addition, the proposed action needs to be compliance with the Washington Administrative Code (WAC) 468-12-660, substantive authority mitigation, the Manual 18 Salmon Recovery Grants Appendix D (design deliverables) Washington State Department of Transportation (WSDOT) Manual 41-10 *Standard Specifications for Road, Bridge and Municipal Construction*, 1-06.1(3) Aggregate Source Approval (ASA) Database, aggregate construction source must be in compliance and WSDOT sensitive areas criteria. Earthquake engineering standards are required for permitting (Alan Schoiser, WSDOT).

The existing South Skagit Highway removal of milepost 17.8 to milepost 19.6 will need to be in compliance with WSDOT road removal standards, *WSDOT regulation manual 41-10, section 1-04.11 Final Cleanup protocol*. In addition, the existing highway will need to be removed after the new road is built. Torrey Nelson a transportation programs representative of Skagit County Public Works says the removal of the road is done through the WSDOT protocol of pulverization, removal of material and excavated down to original grade.The road and fill material will be hauled off and stockpiled for future project use. This removal of the existing highway is necessary for the wetlands to function at capacity. The final outcome of the proposed project will ensure the structural integrity and safety of the road from further erosional damage (preventing further closures and repairs) and ensure

wetland productivity and fish habitat.

4.1.2 Alternative 1:

The action of Alternative 1 relates the feasibility of maintaining the existing road location by constructing a new bridge trestle and increasing the size and amount of culverts.The upgraded stream and wetland crossing structure would reduce maintenance and improve habitat conditions. This alternative would maintain the existing road alignment while providing sufficient bridge and culvert crossings to restore connectivity with existing floodplain habitats and adequately span the Mill Creek alluvial fan. This would be a complex undertaking that would need more detailed design work to fully evaluate. But for scoping purposes and to compare to other alternatives, the project elements were assumed to be the following: construct a multi-span trestle type bridge with a total length of 800 feet where Mill and Savage Creeks currently cross the highway, install 3 culverts or small bridges to connect 5.2 acres of wetlands under the highway (total span length estimated at 140 feet), install at least one 60 foot bridge for the outlet channel from the large pond on the SE portion of the project area, ((see fig. 4) Skagit County public Works).

Alternative 1 would restore the functionality of the 5.2 acres of existing wetland habitat, but does not restore full connectivity between Skagit River and the floodplain, and would not restore full functionality even when Savage Road is removed due to the 62 acres of floodplain disconnected from the wetlands (Skagit County Public Works). Refer to the *natural environment section* of this document.

Constructing Alternative 1 would substantially reduce maintenance requirements compared to the existing Mill Creek Bridge as the large trestle crossing would allow Mill Creek and Savage Creek to migrate much more freely. However, large woody debris might rack up on the trestle structure, culverts will require annual dredging and maintenance and channels may still migrate to locations outside the culvert and bridge trestle zones due to the natural processes of the alluvial fan. Requiring annual and periodic event maintenance.

Mitigation

Short term construction mitigation would need to occur for erosion and safety concerns. A one lane closure would most likely occur during construction with a regulated wait time. Flaggers will be employed to ensure traffic safety concerns before milepost 17.8 and after milepost 19.4. A DOT car

may be used as a guide during the one lane closure process. Drivers and bicyclists will expect regulated wait time delay and will be required to share the road with the increased traffic of construction machinery, dump trucks hauling debris and construction employees traveling to and from the work site (WSDOT).

Parking spaces for construction crew and construction equipment will be gained through the use of Savage Road at milepost 19.2 and the forest road turn-off at milepost 17.8 during the construction period. Long term mitigation will require periodic dredging and maintenance to hold back CEDs.

Erosion control will need to be mitigated and construction needs to occur outside of the salmon spawning period. The construction contractor will be required by the Washington State Department of Transportation to adhere to a Temporary Erosion and Sediment Control Plan (TESCP) that includes Best Management Practices (BMP) specific to the project. The TESCP is designed to protect water quality and reduce erosion-related costs. Long term erosional mitigation of hay bale use alongside both sides of the highway will capture oil and grease run-off from vehicles, this will need to be changed out periodically to ensure the capture of pollutants (WSDOT).

Mitigation of the bridges need to be considered for hydrological analysis for sizing of the bridges, geotechnical issues and topography of site (Torrey Nelson, Skagit County Public Works). These factors will be addressed and designs will be completed by one or a team of consulting firms that specialize in highway and bridge design.This work will be supervised by a licensed professional engineer and will be managed by a design team including Seattle City Light, Skagit County and the Skagit River System Cooperative. In addition, the proposed action needs to be compliance with the Washington Administrative Code (WAC) 468-12-660, substantive authority mitigation, the Manual 18 Salmon Recovery Grants Appendix D (design deliverables) Washington State Department of Transportation (WSDOT) Manual 41-10 *Standard Specifications for Road, Bridge and Municipal Construction*, 1-06.1(3) Aggregate Source Approval (ASA) Database, aggregate construction source must be in compliance and WSDOT sensitive areas criteria. Earthquake engineering standards are required for permitting (Alan Schoiser, WSDOT).

4.1.3 No Action:

The impacts from the no-action alternative to transportation will be the inevitable erosional damage from upslope material brought down stream into the alluvial fan. Due the the South Skagit highway acting as a dam, trapping sediment behind it, Mill Creek and Savage Creek restrict essential

nutrients from depositional processes into the wetland habitat. Flooding event lead to the frequent closure the South Skagit Highway and the creation of extensive highway repairs after a flood event. The historical migration of Mill Creek on the alluvial fan accounts for the area to be deemed a chronic environmental deficiency site by WSDOT. Maintenance involved in keeping up with natural erosional processes will be continuous and costly (Skagit County Public Works). The maintenance and flood event closures will impact users, by delaying traffic or causing commuters to be rerouted to the other side of the river onto Highway 20, increasing time spent on the highway and impacting individuals who live beyond the project area. Repeated costly repairs and maintenance will be required to the road between milepost 17.8 and 19.4 due to the continuing erosional depositional processes in the chronic migration zone.

4.2 Housing

As of the date of this publication, no housing will be eliminated or added for this project. No proposed action, alternative action, or no action alternatives will affect housing.

Aesthetics

Existing conditions:

This section of the highway runs through a wetland. A view of the Skagit River can be seen from this section of the road in its current location.

Proposed Action:

If a transportation project disturbs the roadside areas, WSDOT will restore the landscape according to the characteristics of the surrounding area. For example, in an urban setting, the road may be restored to have a park-like appearance, whereas in a forested area, we would plant vegetation to blend in with the natural growth. Using native plants in roadside restoration will over the long term reduce maintenance requirements and costs. Native plant communities, once established, reduce soil erosion and will out-compete many weeds and undesirable plants that would otherwise be mowed or sprayed. Views of the roadside, as seen by motorists, will go from mature wetland and wetland vegetation to a higher, dryer elevation running through mostly natural scenery. Since the project is realigning the road away from the river, river-viewing opportunities from the road will decrease. However, the position of the road will likely be much more preferable to motorists who will have fewer concerns regarding road flooding.

Alternative Action:

Roadside restoration.

No action:

Views of the river from the road would remain, if the road stayed in its current location.

However, the road would continue flooding and needing frequent repairs.

Mitigations:

The proposed action will need to limit all disturbances to only those areas needed for

construction.

4.3 Environmental Health

4.3.1 Noise

Description:

Skagit County adheres to Washington State noise regulations (WAC 173-60). The South Skagit Highway is a rural highway with an average daily traffic volume of 1,000 vehicles, approximately 9% of which is truck traffic (KPFF Consulting Engineers 2012).

Proposed action:

Noise would be temporarily increased during roadway and bridge construction and removal. The existing road will be pulverized and excavated down to original grade with heavy machinery, and road and fill material will be hauled off site. Temporary construction noise is exempt from noise regulations. Upon completion, noise would return to pre-project levels. In the long term, the proposed action would enhance river users' experience by reducing the proximity of vehicle noise on South Skagit Highway and increasing noise absorption by vegetation.

Alternative action:

Noise would be temporarily increased during bridge construction, but impacts would less than those for the proposed action. Temporary construction noise is exempt from noise regulations. Upon completion, noise would return to pre-project levels.

No action:

Noise levels would not change from current conditions.

4.3.2 Risk of explosion and release of toxic or hazardous substances

While environmental health hazards including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste are unlikely, the risk of an environmental incident is always present during any construction.

Proposed Action:

The only foreseeable risk of explosion or release of hazardous material would come from malfunctioning heavy machinery or a fuel spill during construction and removal of roadways, bridges and culverts.

Alternative Action:

Impacts would not differ from those of the Proposed Action.

Mitigation:

Contractors are required to prepare a project specific Spill Prevention Control and Countermeasure (SPCC) Plan prior to any construction activity. In the unlikely event of an environmental incident, the contractor would be responsible for iimmediately implementing the SPCC plan, notifying the project engineer, and evaluating the incident. If fuel was spilled into a waterway, the National Response Center, Washington State Division of Emergency Management, and Department of Ecology office in Bellevue would be immediately notified. In the event of a spill on land, the Department of Ecology office in Bellevue would be immediately notified.

No Action:

There is no known preexisting risk of explosion or toxic substances.

4.2 Land and Shoreline Use

Existing Conditions:

The Savage Creek Reach has been identified as the second most largest area of potentially available juvenile Chinook salmon habitat per unit of mainstream channel length (Reach Level Analysis for the Middle Skagit River Assessment, 2011). However, the floodplain has been identified as having some of the greatest impairment through anthropogenic disturbance and forest removal. Impaired floodplains are less likely to regain natural function and may not support natural habitat without restoration. The Savage Creek reach has had a total of 783.2 meters of hydromodified banks which highly disrupts the natural morphology of a river (Assessment and Inventory of Hydromodified Bank Structures in Skagit River and Floodplain, 2010). The geomorphological potential of a reach is defined by its ability to create complex links between a multitude of habitats through natural channel movement. The highly altered banks of the Savage Reach greatly reduce the potential for future chinook habitat. The reduction in geomorphological potential decreases the viability of habitat creation in the floodplain.

South Skagit Highway has been identified as a rural highway with a traffic volume of approximately 1000 vehicles per day. The highway is the main route to and from Concrete, WA. as well as other small cities. South Skagit Highway is also the only detour route if Highway 20 were to close west of Concrete, WA.

The land in the project site is mostly owned by Seattle City Light. It has been left in its natural state with the intent donating it to the proposed project. There are two family owned homesteads with a small amount of property in the vicinity. The houses were bought from the families and will be demolished if the project progresses.

Proposed Action:

The proposed action will not affect the land or shoreline use in the project area. The realignment, bridge, and culvert construction will allow greater connectivity between waterbodies but there are no plans to change the hydromodified banks. A similar portion of land will be covered by roadway and traffic would not increase because of the project. The surrounding land would remain in its natural state.

No Action:

There would be no change to the land or shoreline use.

5. Conclusion

The proposed action meets all of the goals of the project in an environmentally sound manner. Realigning the highway will improve transportation safety, decrease maintenance costs of the existing highway, and benefit an ecosystem that supports several species. The removal of the existing road or the installation of a new bridge and culvert system will allow for fish passage that was previously blocked. The proposed action will confine construction impacts to the immediate roadway and cleared area, employing mitigation measures that protect the surrounding aquatic and terrestrial environments. Any native vegetation that is disturbed during the construction process will be replanted, providing terrestrial habitat and ecological services, such as a filtration buffer. After the initial construction period, the proposed action will not cause a noticeable inconvenience for those who use the existing road. The no action alternative will continue to have detrimental effects upon the ecology of the area while the erosion-repair cycle of the existing road would continue, leading to costly and unsafe conditions.

6.Appendix

Maps:

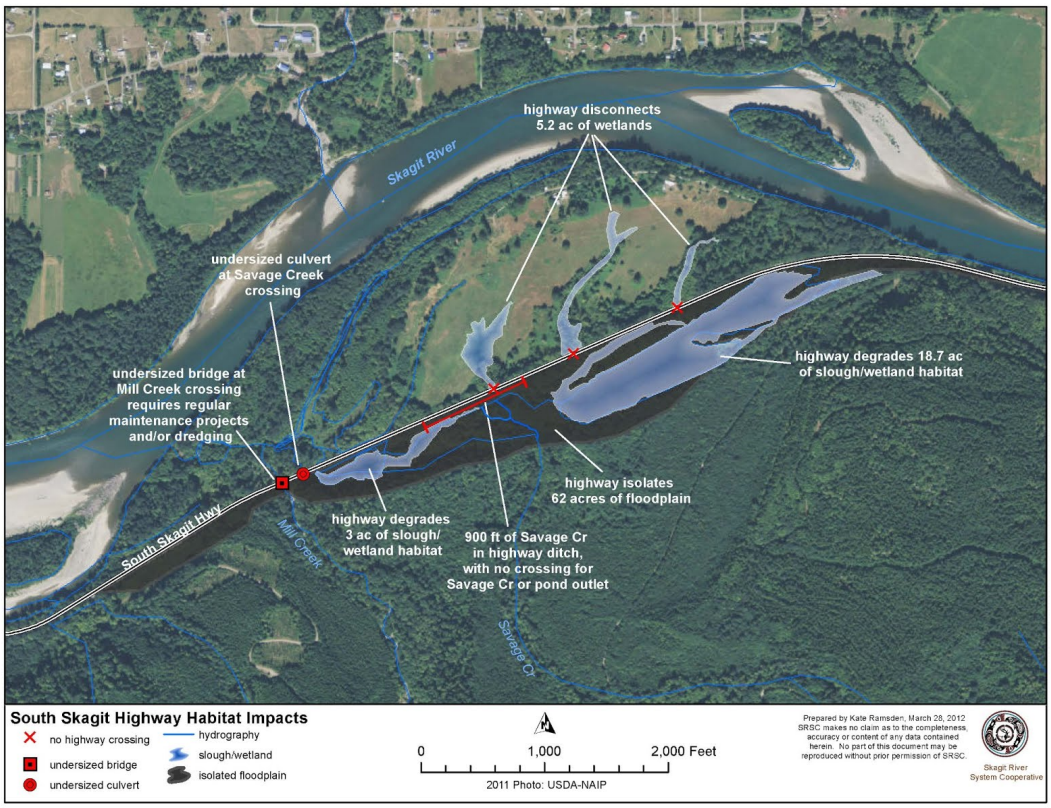

Fig. 1

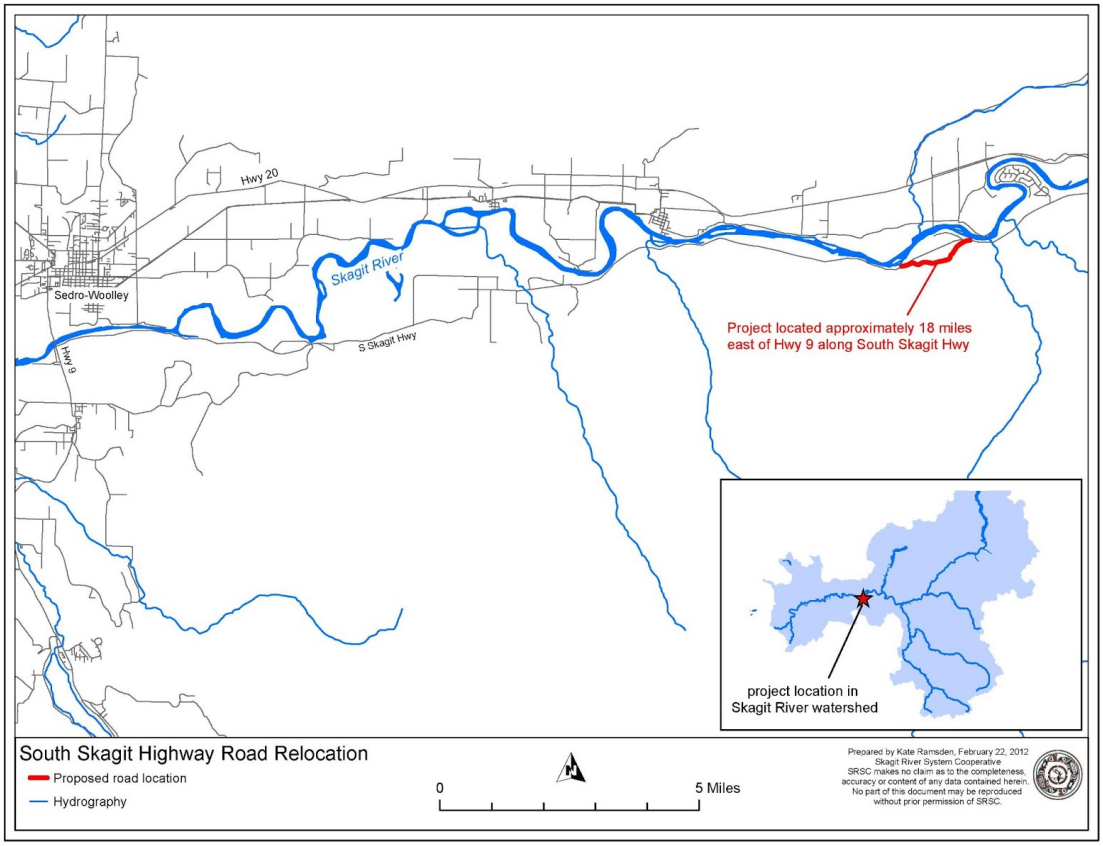
Hwy 20
Skagit River
Sedro-Woolley
S Skagit Hwy
Hwy 9
Project located approximately 18 miles
east of Hwy 9 along South Skagit Hwy
project location in
Skagit River watershed
South Skagit Highway Road Relocation
Proposed road location
Hydrography
0
5 Miles
Prepared by Kate Ramsden, February 22, 2012
Skagit River System Cooperative
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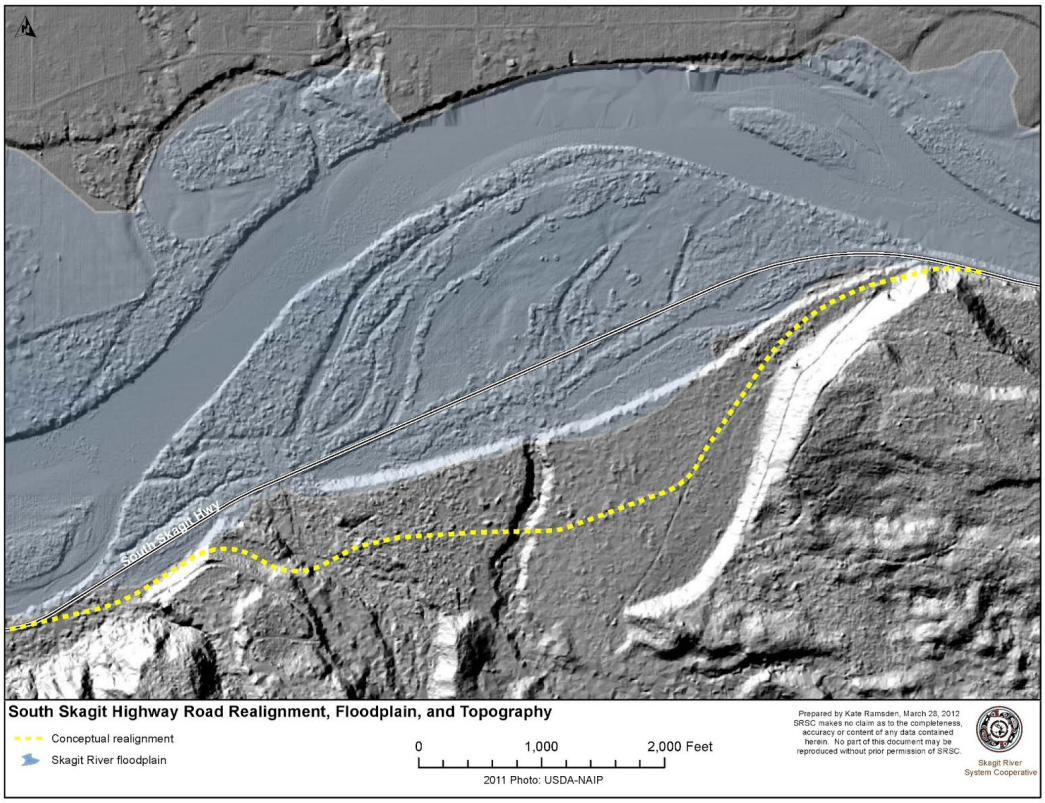
Fig. 2


South Skagit Hwy
South Skagit Highway Road Realignment, Floodplain, and Topography
Conceptual realignment
Skagit River floodplain
0
1,000
2,000 Feet
2011 Photo: USDA-NAIP
Prepared by Kate Ramsden, March 28, 2012
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Skagit River System Cooperative

Fig. 3

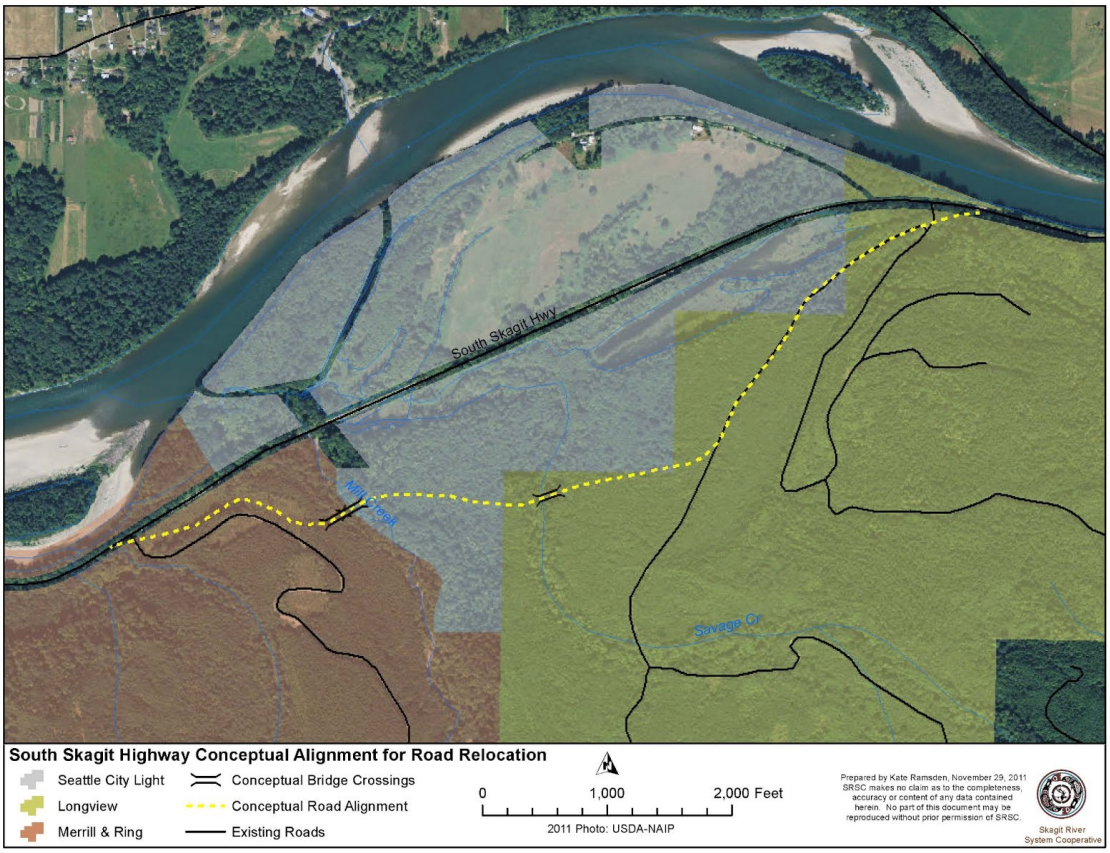

Figure 4 not used in document

7. Sources

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Helpful Links:

Maps from skagit county:
http://www.skagitcounty.net/Common/ASP/Default.asp?d=gis&c=General&p=gallery/main.htm

Maps and project description:
https://secure.rco.wa.gov/prism/search/projectsnapshot.aspx?ProjectNumber=12-1209

DOT regulations: http://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS2012.pdf

Hydrology Report: http://www.ci.burlington.wa.us/imageuploads/Media-2021.pdf

Habitat Protection Plan:
http://skagitwatershed.org/uploads/middle-skagit-initiative/MiddleSkagitRiverRestorationPlan-Final.pdf

Chinook Recovery Plan: http://www.skagitcoop.org/documents/SkagitChinookPlan13.pdf

Salmon Recovery Law: http://apps.leg.wa.gov/RCW/default.aspx?cite=77.85

Reach Level Analysis:
http://skagitwatershed.org/uploads/middle-skagit-initiative/MiddleSkagit_Reach_Analysis_Final_Report_and_Appendices.pdf

Hydromodicication
http://skagitwatershed.org/uploads/middle-skagit-initiative/assessment-and-inventory-hydromodified-bank-structures-in-skagit-river-and-floodplain.pdf

Other Links:

Washington State Department of Fish and Wildlife
Habitat Restoration Guidelines:(2004)
http://wdfw.wa.gov/publications/pub.php?id=00043
The Watershed Planning Act, RCW 90.82, was passed in 1998, providing a framework for developing local solutions to meet the water supply needs, including instream flows, for each watershed. It primarily addresses water quantity, but the watershed plans may also address water quality and habitat issues. Watershed Planning is being implemented in 42 of Washington's 62 water resource inventory areas (WRIAs). The Growth Management Act (GMA), RCW 36.70A, and Shoreline Management Act (SMA), RCW 90.58, also specifically address protecting fish and wildlife habitat through analyzing and regulating land use with locally developed and implemented programs. Under the Watershed Planning Act, instream flows are established. Under the GMA and SMA, fish and wildlife habitat areas are to be protected and managed with appropriate buffers and regulations. The SMA guidelines for developing and adopting new Shoreline Master Programs (WAC 173-26) require inventory and analysis of

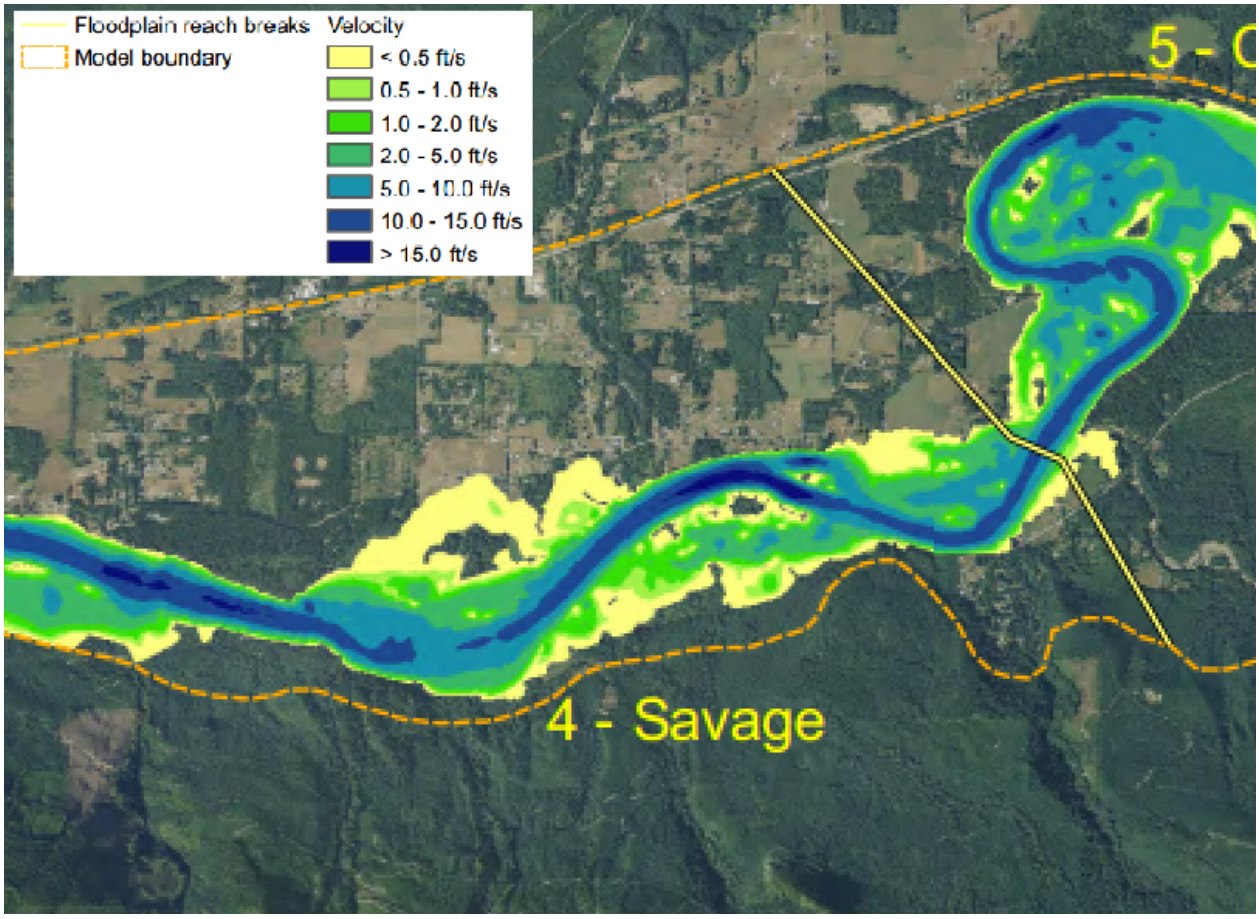
landscape scale ecological, hydrologic and geomorphic processes which determine shoreline ecological function. They also require that updated Shoreline Master Programs contain a shoreline restoration plan, which may include regulatory and nonregulatory measures, and must also include benchmarks and other measures for assuring that the restoration plan is achieved over time (copied and pasted from WSDFW 1.1).

Washington State Department of Transportation(WSDOT) Manual 41-10
Standard Specifications for Road, Bridge and Municipal Construction
1-06.1(3) Aggregate Source Approval (ASA) Database:
The ASA is a database containing the results of WSDOT preliminary testing of aggregate sources. This database is used by the Contracting Agency to indicate the approval status of these aggregate sources for applications that require preliminary testing as defined in the Contract. The ASA 'Aggregate Source Approval Report' identifies the currently approved applications for each aggregate source listed. The acceptance and use of these aggregates is contingent upon additional job sampling and/or documentation. The ASA database can be accessed online at the agency website.
Aggregates approved for applications on the ASA 'Aggregate Source Approval Report' not conforming to the Specifications, not fulfilling the acceptance requirements, or improperly handled or installed, shall be replaced at the Contractor's expense.
Aggregate materials that are not approved for use in the ASA data base may be sampled

and tested by the Agency, for a specified use on a project, from the source or from a processed.

WSDOT regulation manual 41-10, section 1-04.11 Final Cleanup protocol.
http://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS2012.pdf
The Contractor shall perform final cleanup as provided in this Section to the Engineer's satisfaction. The Engineer will not establish the Physical Completion Date until this is done. The Highway Right of Way, material sites, and all ground the Contractor occupied to do the Work shall be left neat and presentable. The Contractor shall:
1. Remove all rubbish, surplus materials, discarded materials, falsework, camp buildings, temporary structures, equipment, and debris; and
2. Deposit in embankments, or remove from the project, all unneeded, oversized rock left from grading, surfacing, or paving.
The Contractor shall not remove warning, regulatory, or guide signs unless the Engineer approves.

https://www.google.com/search?hl=en&q=stream+bank+stabilization&bav=on.2,or.r_cp.r_qf.&biw=1920&bih=979&um=1&ie=UTF-8&tbm=isch&source=og&sa=N&tab=wi&ei=TC86UbiDMIKhqgH9voCQDQ#imgrc=MaM2tI-d5sJvSM%3A%3BwjoC4zt-AS_7iM%3Bhttp%253A%252F%252Fwww.hendersondesign-build.com%252Fwp-content%252Fuploads%252F2012%252F02%252Fmerrill-creek-design.jpg%3Bhttp%253A%252F%252Fwww.hendersondesign-build.com%252Fprojects%252Fmerrill-creek-design-build-stream-bank-stabilization-and-salmon-habitat-enhancement%3B800%3B600


Floodplain reach breaks
Model boundary
Velocity
< 0.5 ft/s
0.5 - 1.0 ft/s
1.0 - 2.0 ft/s
2.0 - 5.0 ft/s
5.0 - 10.0 ft/s
10.0 - 15.0 ft/s
> 15.0 ft/s
5 - C
4 - Savage