



Spring 2013

Potter Road Bridge replacement

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POTTER ROAD BRIDGE REPLACEMENT



ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

ENVS 493 SPRING 2013

Jamie Halpin

Randal Bernhardt

Tyler Pedersen

Derek Vilar

Jessica Straight



Environmental Impact Assessment
Huxley College of the Environment

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 Derek Vilar

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 Jessica Straight

Signature: _____
 Jean Melious

Date: _____

Dear Concerned Citizens:

This document is an Environmental Impact Assessment (EIA), which assesses the potential impacts of the proposal to replace the Potter Road Bridge over the South Fork of the Nooksack River in Whatcom County, Washington. The project is approximated to be completed within two years. It will replace the structurally deficient existing 15-foot wide by 243-foot long bridge, with a 243-foot long 2-span bridge. The bridge serves as the sole access point for the residential, agricultural and tribal community west of the river.

This EIA document was produced to identify and analyze environmental impacts on both the natural and built environment. In addition, an alternative to the original proposal will be reviewed, as well as a no-action plan. The significant impacts that were identified by the Environmental Checklist are further discussed in this document. The impacts that were determined to be non-significant are identified but not discussed in detail.

This report was prepared by students of Western Washington University, in Huxley's College of the Environment's EIA Capstone course. Material was compiled in compliance with Washington's State Environmental Policy Act (SEPA). The information found in this document is from government entities and other credible sources.

A formal presentation of our findings will occur on Friday June 7th at 12:30 pm in Western's Arntzen Hall, Room 17.

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 Jamie Halpin

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Potter Road Bridge Replacement

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Disclaimer:

This report represents a class project that was carried out by students of Western Washington University, Huxley College of the Environment. It has not been undertaken at the request of any persons representing local governments or private individuals, nor does it necessarily represent the opinion or position of individuals from government or the private sector.

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Fact Sheet

Project Title

Potter Road Bridge Replacement

Description of Project

The proposed action is the replacement of the Potter Road Bridge over the South Fork of the Nooksack River in Whatcom County, Washington. The current one-lane bridge is structurally deficient and functionally obsolete. It will be replaced with a two-lane concrete girder bridge, and the construction will take an estimated two years. The bridge's National Bridge Inventory (NBI) number is 080743000000000.

Legal Description of Project Location

The Potter Road Bridge is located in sections 17 and 18 of Township 38 North, Range 5 East in Whatcom County, Washington State.

Project Proposer

Whatcom County Public Works
322 N. Commercial St.
Bellingham, WA 98225

Lead Agency

Whatcom County
5280 Northwest Drive
Bellingham, WA 98225

Permits

Shoreline Conditional Use permit
Shoreline SHC and SHR permit

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Acknowledgements

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Issue Date

June 7, 2013

Public Presentation Time and Date

June 7, 2013. 11:30-1:00pm

Glossary and Abbreviations

303(d) List: Under the Clean Water Act, states are required to return all waters to fishable and swimmable standards. This list is comprised of waters that are polluted for uses of drinking, recreation, aquatic habitat and industrial use.

Bank armoring: Reinforcement of banks using boulders and concrete slabs to prevent natural erosional processes.

Benzene photo ionization device: Detector used to measure the concentration of volatile organic compounds.

Bio-swales: Natural or constructed trenches in the soil containing native vegetation used to filter stormwater.

BMP: Best Management Practice. Used to describe the most efficient, effective and environmentally responsible method for conducting a project.

LWD: Large Woody Debris. Term is used to describe the woody structures that are habitat forming features in stream ecosystems.

Cobble: Rocks that range in size from approximately 2.5 inches to 10.1 inches. Found in stream beds and smaller cobbles are preferred for spawning gravel of Pacific salmon and steelhead.

Coffer dam: Water-tight construction device used to facilitate construction projects that are in water. Using pumps to remove water, the inside of the coffer dam allows work to be done in an otherwise submerged portion of the land.

DOE: Department of Ecology

DBH: Diameter at breast height. Standardized unit of measure used in forestry for cataloging the width of trees.

EPA: Environmental Protection Agency

Erosion: The breakdown of rock and soil using the forces of natural processes such as the energy from wind and moving water. Erosion may be chemical or physical.

ESCL: Erosion and Sediment Control Lead. A certification obtained through training conducted by the Department of Ecology.

Feeder bluffs: Bluffs/cliffs that provide sediment to beaches and shorelines.

Impervious: A surface that prevents liquids from passing through.

Macro-invertebrates: Small animals that reside in stream, lake and wetland ecosystems. They include insects, mollusks, crustaceans, arachnids and annelids.

NBI: The National Bridge Inventory is a database run by the US Department of Transportation under the Federal Highway Administration with the purpose of providing information on all bridges and tunnels.

Nonpoint source pollution: Unidentifiable source of pollution such as runoff from urban and agricultural land.

PGIS: Pollution Generating Impervious Surfaces. A surface considered to be a significant source of pollutants in stormwater runoff.

Point source pollution: Identifiable sources of pollution, such as sewage pipes, industrial effluent or an oil pipeline leak.

Riparian: The riparian zone is the land near stream bed.

Rip-rap: See bank armoring.

Salmonid: Term used to describe fish belonging to the family Salmonidae. This includes salmon, trout and whitefish.

Sediment: Particles present in the water column. Composed of gravel, cobbles, silts, clays and organic matter.

Sedimentation: The process where particles that are suspended in the water column settle out and are deposited.

SMP: Shoreline Master Programs are local land use regulations and policies in place to manage the shorelines. The programs are part of the Shoreline Management Act of 1972 and are monitored by the Department of Ecology.

Storm-event: Situation where precipitation and winds occur.

Stormwater: The water that is deposited as a result of a storm event.

TESC: Temporary Erosion and Sediment Control plans are implemented for construction projects to minimize erosion and sedimentation.

TSS: Total Suspended Solids in a water column.

TDA: Threshold Discharge Areas are on-site areas draining to a single natural discharge location or multiple natural discharge locations that combine within 0.25 miles.

TMDL: Total Maximum Daily Load is a calculated concentration of a certain pollutant that can be input into a water body on a daily basis and still meet federal water quality standards. Part of the Clean Water Act.

Total nitrogen: Represents the amount of nitrogen that is or can become nitrate ions. Includes nitrate, nitrite, ammonia and organic nitrogen (amino acids, DNA) and excludes nitrogen gas.

Turbidity: A measure of water cloudiness. Combination of total suspended solids and total dissolved solids.

USDA: United States Department of Agriculture

WCC: Whatcom County Code

WDFW: Washington Department of Fish and Wildlife

WQI: Water Quality Index is a parameter on a hundred-point scale used to score water quality and is maintained by the Washington Department of Ecology.

WSDOT: Washington State Department of Transportation

Executive Summary:

The purpose of this Environmental Impact Assessment (EIA) is to analyze and determine what effect the replacement of Potter Road Bridge will have on the environment. Potter Road Bridge is located in Whatcom County, Washington, and it crosses over the South Fork Nooksack River near the town of Van Zandt (Figures 1,2). Building on the Environmental Checklist that was prepared by Whatcom County, this EIA identifies significant impacts on both the natural and built environment. It also looks at a no-action alternative, as well as an alternative in which the bridge would be eliminated and Smith Road would be extended eastward.

Proposed Action:

The proposed action will build a 243-foot long 2-span reinforced concrete bridge next to the existing bridge on Potter Road, in Sections 17 & 18, T38N, R5E (Figure 3). The current bridge will remain active until the new bridge is in place, so that traffic to the other side remains open. When the new bridge is complete the old bridge will be demolished and removed from the site. Debris from the demolition of the existing bridge will be disposed of in compliance with the Department of Ecology and Northwest Air Pollution Authority.

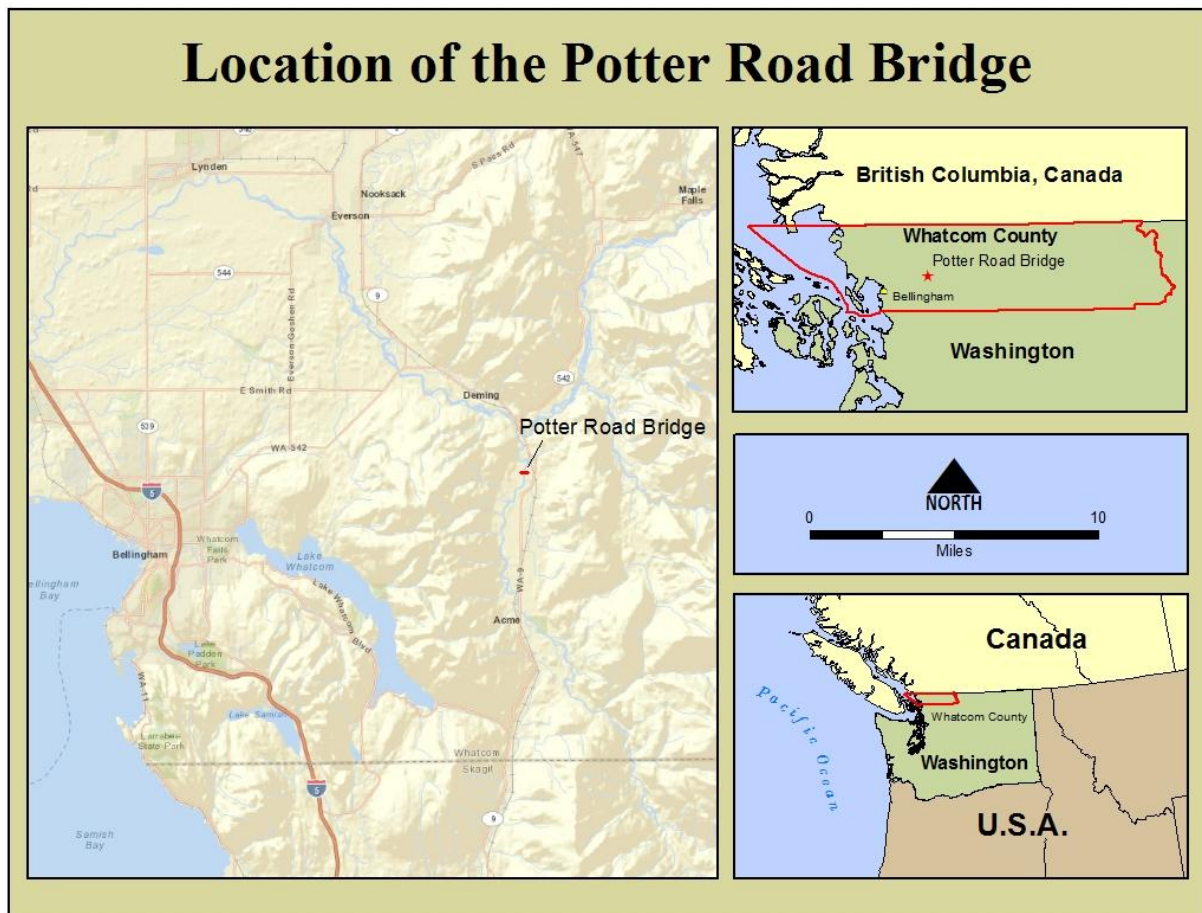


Figure 1: General project site location. Map courtesy of Tyler Pedersen.

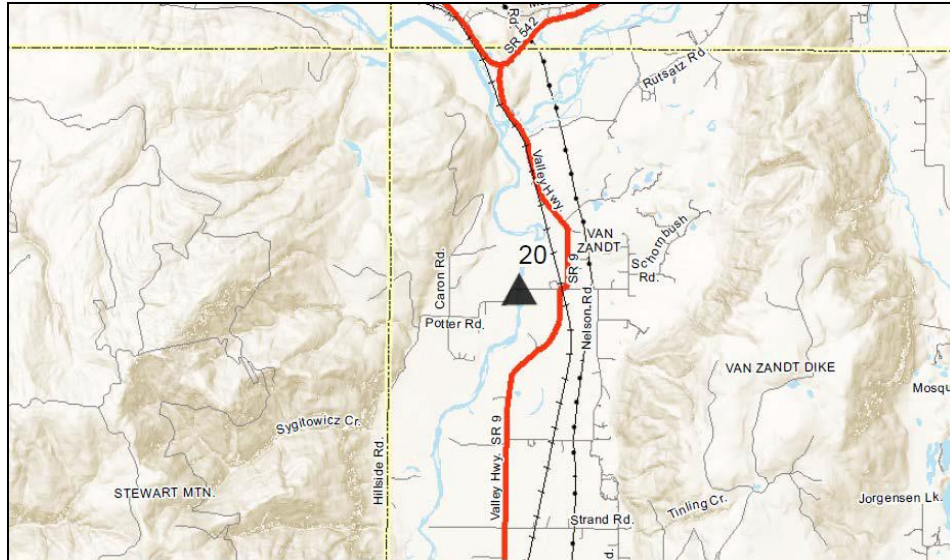


Figure 2: Close-up location of Potter Road Bridge (Whatcom County Public Works, n.d.).

Reason for Proposal:

Although the Potter Road Bridge is used by less than 1,000 cars per day (Holth, 2011), it is the sole access point for the residential, agricultural and tribal community west of the river. The bridge also scores lowest of all the bridges in Whatcom County based on its structural integrity. According to the National Bridge Inventory (NBI) the Potter Road Bridge is “Structurally Deficient,” which means the bridge's structural components received a score of 4 out of 9 or fewer points according to NBI standards. As a result the existing bridge has a low weight limit. The NBI also classifies the Potter Road Bridge as “Functionally Obsolete,” meaning the design of the bridge is not suitable for its current use (Svirsky, 2013).

Summary of Impacts

Although this project site is designated as a Critical Area for certain species of wildlife, and thus must be impacted to the minimum extent possible, adverse impacts are not completely avoidable. Because the Potter Road Bridge spans the South Fork Nooksack River, the impacts of primary concern are those that will affect the aquatic and riparian (land near the river) environment. Removal of the current bridge may cause destabilization of river banks and increased sediment load to the river, while construction of the replacement bridge will require removal of riparian vegetation, extension of roads and other impervious surfaces, potential sediment destabilization, decreased stream shading, noise production and fuel use. All of these impacts could affect the native salmonid species in this location.

Mitigation will decrease some of these impacts, and mitigation strategies may include but are not limited to: bank stabilization and erosion control, re-vegetation of riparian zones, installment of woody debris for wildlife habitat, temporary installment of coffer dams to minimize sediment influx to the river, construction only during an approved period to minimize wildlife impacts and creation of bio-swales or other stormwater treatment measures to control runoff from impervious

surfaces. The Whatcom County Code (WCC) 16.16 is the primary enforcement body behind these mitigation measures.

Despite mitigation, some significant adverse impacts will remain. For example, salmonid species will be directly and indirectly affected from the proposed action, as even the mitigation measures (such as installment of the coffer dams) will reduce or change habitat. Both water quality and vegetation health will likely decline during and directly after the proposed action, as many of the mitigation measures (like re-vegetation and construction of bio-swales) take time to fully reverse the damage brought on by the removal and construction of the bridges. However, in the long term the mitigation strategies may improve ecosystem health overall by diversifying the vegetation and aquatic habitat, and by treating stormwater runoff.

Several elements identified in the Environmental Checklist do not have significant impacts and thus will not be discussed in detail in this document. These elements include: housing, lights and glare, public services and utilities. A brief description of recreation, historic/cultural preservation and transport will be provided, although these categories were determined to be non-significant.

Alternatives

Reasonable Alternative:

The primary concern regarding this project is its effects on the Nooksack River. The South Fork is a spawning ground for salmonids and habitat for many other species. With that in mind, the primary alternative to replacing the Potter Road Bridge is to eliminate the bridge entirely. Access to the properties currently serviced by the bridge would then be accomplished by building a new road extending eastward from Smith Road, passing around the north side of Stewart Mountain and connecting to Potter Road from the other side (Figure 4). This road would be 5.3 miles long, and would pass through current forest land. With the new road built the existing bridge could be demolished and not replaced, allowing the river to return to its completely natural state.

Constructing the new road has the drawback of costing significantly more than building the new bridge. Over five miles of new road would need to be constructed through forested area with an estimated cost of between \$15-35 million, while the new bridge proposal is estimated to cost only \$10 million.

Another drawback of this alternative is its potential environmental impacts. Even though the new road would reduce the impacts on the Nooksack River, it would come with its own host of issues related to building a road through a forested area such as hazards to wildlife due to habitat encroachment and vehicle strikes, runoff of oil and other pollutants into soils and streams, and slope instability issues caused by undercutting hillsides to build the road.

Some of these adverse effects can be mitigated through stormwater control and re-vegetation, but the impacts from cost and the need to remove a long but narrow stretch of forest cannot be fully alleviated.

No-Action Alternative:

The no-action alternative would leave the existing bridge as it is with no replacement. The area surrounding the bridge would remain the same. Potential impacts from implementing the proposed bridge, such as soil erosion, would be avoided. However, under the National Bridge Inventory’s standards, the Potter Road Bridge is “Structurally Deficient.” As a result the existing bridge has a low weight limit, as previously mentioned. The NBI also classifies the Potter Road Bridge as “Functionally Obsolete,” meaning the design of the bridge is not suitable for its current use and is not up to modern standards. The bridge has a twelve percent sufficiency rating as well. All of these classifications show that the bridge is quickly degrading. Without replacing the bridge, the residents that rely on the bridge will not have any way to cross the Nooksack River. There is also a liability concern. If the bridge is not replaced and it continues to deteriorate in condition there is a possibility that it could collapse, potentially harming or killing someone. Needless to say, if the bridge collapsed it could also cause intense physical damage to the streambed directly below.

Mitigation can be partially achieved by continued maintenance of the bridge, but small, incremental repairs are not long term solutions.



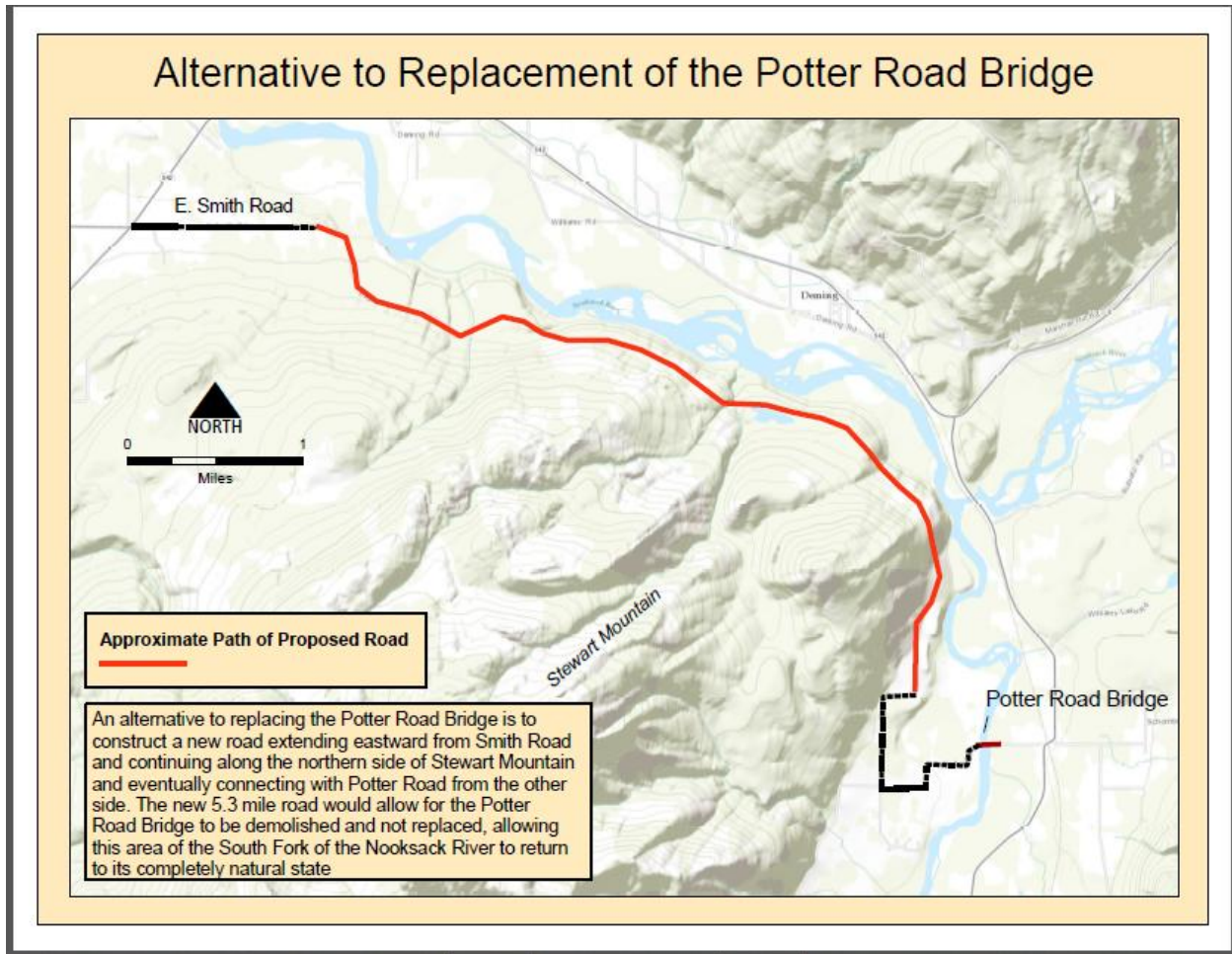


Figure 4: Extension of Smith Road is a reasonable alternative to the proposed action. Map courtesy of Tyler Pedersen.

1. Natural Environment

1.1 Earth

1.1.1 Existing Conditions

The project site is located in flat, low grade, low elevation agricultural and pasture land with farms and housing on both sides of the channel. Due to the levees that are in place, there are banks that are 90% in grade. The bank is composed of silt, sand and gravel and the channel is composed of small and medium sized cobbles (Whatcom County Public Works, 2012).

Currently there are riparian buffers that serve to stabilize the soil and prevent erosion, and historically there has been no issue of unstable soils along the banks. Due to the use of the stream by Chinook, coho, sockeye, chum, steelhead and bull trout (all of which are federally threatened), the stream is classified as a Critical Area. Therefore, any activity that could be harmful to the stream and the species that utilize it as habitat is not allowed.

1.1. 2 Significant Impacts

The removal of the riparian buffer will increase the probability that sedimentation, or the settling of sediment into the stream bed, will occur. Since the surrounding land is flat pastureland, the risk of a large landslide is minimal. However, if the re-vegetation fails or the soils are exposed for too long during the construction process, the bank may erode into the stream due to the 90% grade in some areas. Erosion may also occur in the case of a storm or high water event. The excess erosion will adversely affect salmonid spawning gravel by filling in the gaps between the small and medium sized cobble, which salmon prefer over silty conditions for spawning. It will also increase the overall turbidity (water cloudiness) and as a result the average temperature, because the suspended soil particles absorb sunlight then re-emit infra-red energy around the water column, increasing the energy's residence time and thereby warming the water. Both cloudy and warm water have adverse effects on vegetation, fish and macro-invertebrates (Homann, 2012).

It is important to note that the stream is currently listed on the Washington State 303(d) list for total nitrogen and turbidity. The 303(d) list is a state mandate in place under the Federal Clean Water Act, and it requires all state waters to be returned to fishable and swimmable conditions. The 303(d) list thus includes all waters that are polluted at a certain capacity and quantifies the amount of a substance that can enter the water body on a daily basis, which is called the Total Maximum Daily Load, or TMDL (Washington State Department of Ecology, 2013). The TMDL for the South Fork requires a reduction in thermal heat loading (see Table 1 temperature criteria), which is directly associated with turbidity. As a result, an increase in bank erosion would increase the turbidity levels and violate the TMDL that is in place as a result of the listing.

Table 1: Washington State temperature criteria for impaired parameters in the South Fork Nooksack River watershed (Washington State Department of Ecology, 2012b)

Use Classification	Criteria
Core summer salmonid habitat, spawning, rearing, and migration	<16°C 7-DADMax ^{1,2}
Char spawning and rearing	<12°C 7-DADMax ^{1,2}
Supplemental salmonid spawning and incubation	<13°C 7-DADMax ^{1,2} (Sept 1 – Jul 1)

¹ 7-DADMax means the highest annual running 7-day average of daily maximum temperatures.

² A human-caused variation within the above range of less than 0.3°C for temperature is acceptable.

1.1. 3 Alternatives

Extension of Smith Road

The best reasonable alternative calls for the extension of the existing Smith Road that is on the west bank of the stream. This action would decrease the likelihood of sedimentation occurring directly at the Potter Road Bridge, because riparian vegetation will not have to be cleared for the installation of the replacement bridge. However, this alternative would require the removal of forests that serve to stabilize the soils that are above the South Fork. Additionally, in some locations depending on the slope grade, cutting into the hillside may be necessary to establish a

roadway. The removal of a stretch of forested area to pave for a road would increase the probability of a land slide that would damage the bank and vegetation along the stream, thereby impacting the water quality.

No-Action

The no-action alternative would keep the current bridge in place with no additional measures. This would have minimal effects on the surrounding land.

1.1. 4 Mitigation Measures

To minimize the amount of erosion and sedimentation into the South Fork Nooksack, the project will follow the Washington State Department of Transport's (WSDOT) Best Management Practices (BMP). The sediment retention device that will be used in this project is a filter fence, which will be installed at the base of the sloping banks to catch materials that otherwise would slide into the stream (Whatcom County Public Works, 2012). The construction crew will be trained in Temporary Erosion and Sediment Control (TESC) measures, and the contractor will have a certified Erosion and Sediment Control Lead (ESCL) to ensure that the impacts of bank stabilization and erosion are minimized. To verify both of these stipulations are being followed, Whatcom County will have a trained construction inspector on-site to monitor the process (Whatcom County Public Works, 2012).

According to the Washington Department of Fish and Wildlife (WDFW), the stream bank condition is not functioning properly in its ability to retain sediment and promote natural meandering. This is due to historic logging practices that have destabilized banks and increased landslide occurrence and armored banks that prevent meandering. The project will remove and replace rip-rap: the boulders that are installed along the sides of the bank to minimize natural erosion. Due to the current use of rip-rap to prevent bank erosion, the proposed plan does not further impact the stream bank and maintains the baseline condition (Whatcom County Public Works, 2012).

For the reasonable alternative, re-vegetation and sediment control plans (particularly along steep portions of the new route) can reduce the adverse impacts associated with the extension of Smith Road. Because the scale of this alternative is larger than the proposed action, there will have to be more mitigation measures in place overall. The potential for a catastrophic landslide by removing trees and cutting a road into Stewart Mountain cannot be completely ruled out.

Significance after Mitigation

To prevent excess erosion into the stream, and violating the TMDL in place, the proposed action will include a re-vegetation plan that will replace the lost riparian habitat, which was composed primarily of small shrubs, invasive blackberry and native trees. The replanted trees, once rooted, will serve to provide natural bank stabilization. This however will take a long time for the results to fully take effect. As a result, it will take years for the project's restoration to be complete and certain impacts and risks of bank destabilization will be unavoidable. If the sediment control plan remains in place until natural bank stabilization is achieved, though, the project's overall effects on the earth will not be of lasting significance.

The significance after mitigation for the extension of Smith Road is very similar to the remaining significances of the proposed action; however, due to the large size of this alternative and the fact that a great deal more vegetation will be removed and soil destabilized or disturbed means that there will still likely be significant impacts even after mitigation.

1.2 Water

1.2.1 Existing Conditions

The South Fork of the Nooksack River is approximately 50 miles long, beginning east of the Twin Sisters mountain range in the North Cascades, wrapping around the southern portion of the mountains and flowing to junction at the main stem just east of Deming. This portion of the river flows through forested as well as agricultural landscapes.

The South Fork is considered a Critical Area because it supports threatened salmonid species. It is an impaired water body as well and as a result of this there is a Total Maximum Daily Load plan set in place. A TMDL plan, as previously mentioned, is created when a water body has been deemed impaired and it dictates the maximum parameter levels within a stream. The goal of the TMDL is to identify key water quality parameters that are impeding ecological function within an aquatic system. The Water Quality Index (WQI) scores streams based on how well they meet the TMDL standards, with scores that are greater than 80 correlating to water quality indicators that meet expectations, 79 to 40 indicating the water moderately meets expectations, and less than 40 indicating poor water quality that does not meet expectations. The South Fork Nooksack in 2012 received a rating of 39, with the lowest scores being total suspended solids, total nitrogen and turbidity: 27, 21, and 32 respectively (Washington State Department of Ecology, 2012a). However, since 1997 all of these scores have risen, indicating the water quality is improving. Nonetheless, the water body is still impaired and does not meet expectations.

There are 15 streams above the proposed site that feed into the South Fork that have been 303(d) listed for elevated temperatures; much of the South Fork itself both above and below the project site is also listed (Figure 5). The issue of poor water quality is compounded by the low WQI scores for total nitrogen and turbidity levels, impairing juvenile salmonids' survival. Because these streams drain into the South Fork above the project site, and since the project site is itself located in an impaired water body, the severity of the impacts from elevated turbidity and nitrogen have the potential to be greater (Washington State Department of Ecology, 2012b).

The channel has been armored by installing levees in order to protect land owners from the impacts of seasonal flooding. As a result of the levees, the river will not meander at the rate and in the manner it would without them at this site. With minimal potential for lateral movement, the construction of the bridge does little to dictate the hydrological flow regime of the stream.

1.2.2 Significant Impacts

This project can result in an increase in sediment input to the water. The construction of the bridge will disturb compact stable-soils and will create an initial shock of matter into the stream. Because of the 90% slope on some portions of the bank, there is a greater possibility that a large

quantity of sediment will enter the stream. The risk of a large sediment influx into the stream during the removal of the existing bridge, particularly during the removal of rip-rap and existing piers that are embedded in the soil, will also increase.

The increase in sediment loading will increase the average temperature in the stream because, as previously mentioned, the particulates will absorb the energy, thus warming the water (Homann, 2012). Another negative side effect is the infill of spawning gravel, reducing the overall area that salmonids can spawn in. Furthermore, highly turbid waters reduce the ability of aquatic vegetation to photosynthesize because it blocks out sunlight, and as a result turbidity decreases the productivity of the stream, which will impact the species that feed on the vegetation as well as those that use it for habitat (Homann, 2012).

The project is also located within the region's 100-year flood plain. As a result, the destabilization of the bank could lead to a larger flood with a high water event. The levee is in place to prevent such an event, but if the levee becomes unstable and eroded due to the project, high water events could spill over onto the adjacent land.

Furthermore, the proposed action calls for channel expansion from 240 feet to 360 feet, which has the potential to make the channel shallower and thus warm the water due to increased surface area and reduced depth. Without an increased buffer region to compensate for the lost bank vegetation, there is the potential for agricultural runoff to have a greater effect on the stream than it does under existing conditions. The loss of the riparian vegetation will remove stream shading and can potentially elevate the mean water temperature. While shading in a large stream such as the South Fork does not contribute significantly to lowering mean water temperatures, it does provide shaded areas where macro-invertebrates and the fish that feed on them can hide.

Finally, there will be an increase in impervious surfaces from 0.67 acres to 0.97 acres. Impervious surfaces alter the drainage regime of the surrounding land because water cannot infiltrate them. Due to the lack of natural pollution filtration, soil, petrols and metals from passing cars can drain into the stream.

1.2.3 Alternatives

Extension of Smith Road

The alternative to the proposed bridge replacement will reduce the effects on the Nooksack River. By extending Smith Road so that it passes around the north side of Stewart Mountain and connects to Potter Road from the other side, potential impacts from construction of the new bridge are completely avoided. This is essential because the South Fork is a spawning ground for salmon and habitat for many other species. However, the reasonable alternative's road would remove existing forest and run along the west side of the river for 5.3 miles. The removal of forest could destabilize the soil and increase the sediment input into the stream unless a significant buffer was retained. Also, there will be an increase of impervious surfaces which will reduce the land's ability to naturally filter stormwater, increasing surface runoff. This could make the South Fork's peak flows higher and occur sooner as well as more suddenly during large-scale rain events if the road is not located a sufficient distance from the river.

No-Action

The no-action alternative would leave the existing bridge in place without changing anything in the landscape. One of the risks associated with this plan is if the bridge becomes damaged in any manner, the creosote pilings can end up into water. Creosote is a chemical used to treat the wood to prevent decomposition. The compounds present in this substance are toxic and will degrade the aquatic habitat, killing fish, vegetation, macro-invertebrates and damaging water and substrate quality. Also, there is currently no stormwater treatment for impervious surface runoff other than the immature forest along the river's banks.

1.2.4 Mitigation Measures

As alluded to in previous sections, the South Fork of the Nooksack is a Critical Area and more specifically, a Habitat Conservation Area because it is the rearing grounds of many threatened salmonid species. As a result it is protected under the Critical Areas Ordinance which safeguards environmentally sensitive natural resources that have been designated for protection and management under the Growth Management Act. Because of this, any proposed project must comply with its regulations.

Following these regulations, any project in these sensitive areas must not have any adverse impacts that create a net loss of habitat functions in accordance with WCC 16.16.760. It states in section B that there must be compensatory mitigation for alterations to habitat areas and that these mitigations shall achieve equivalent or greater biologic functions, and shall provide similar functions to those that are lost or altered. This stipulation is being met in the proposed action with the addition of large woody debris (LWD), which serves as a habitat-forming feature, upstream as well as downstream. To elaborate, the LWD creates locations in a stream where fish and other aquatic organisms can hide and birds can perch.

According to WCC 16.16.720 H, the project must have no net loss of riparian habitat. There will be a re-vegetation project that entails planting native trees and shrubs. Success will be measured in part by the lack of invasive exotic species, a common problem in this location. Part of the re-vegetation will function as the stormwater treatment grounds that are located off of the main channel in the adjacent sloughs. These stormwater treatment units are strongly associated with water quality, because riparian vegetation stabilizes the banks and decreases erosion and thus turbidity, as well as acts as a natural filtration system, stopping pollutants from flowing directly into the stream.

The channel expansion must ensure that it will not diminish the flow capacity of the stream or other natural processes, as stated by WCC 16.16.720 B. The new bridge must also allow for the natural process of channel migration to go unhindered as well as the downstream movement of habitat-forming features such as LWD as stated in WCC 16.16.720 C. The channel expansion will allow for stream migration to a degree, thus satisfying this requirement.

Additionally, there will be construction of bio-swales at the northeast and southwest sides of the new roadway. Bio-swales are typically depressions in the soil, filled with native vegetation and material that will slow and filter pollutants before they can reach the stream. In the case of the

South Fork, the bio-swales will provide a mechanism for pollutants and sediments in road runoff to settle out before they make it into the channel. Once the project is completed, the stormwater will be directed to three discharge areas: directly into the South Fork, into the slough to the east of the main channel or to a slough west of the main channel (Whatcom County Public Works, 2012). The threshold discharge areas, (TDAs) describe the segments of the project that require stormwater management and are organized as follows (Whatcom County Public Works, 2012):

TDA-1: Treatment for 0.47 acres of pollution generating impervious surfaces (PGIS). Discharge into western slough. New Potter Road surface west of the bridge and the western half of the bridge deck storm water will be directed into a bio-swale and Filterra vault on the south side of the road.

TDA-2: Treatment for 0.09 acres of PGIS. Drain into the surrounding sandy soils.

TDA-3: Treatment for 0.26 and 0.13 acres of PGIS, draining into the western bio-swale and eastern bios-wale respectively. Water collection will be from the eastern half of the bridge and the eastern portion of Potter Road in the project area (Table 2).

Finally, to reduce the likelihood of construction materials entering the stream from the proposed action, two gravel staging areas will be installed in the southwest and southeast quadrants of the site and away from the stream (Figure 6).

For the reasonable alternative, electing to build the road further into the forest rather than on the banks of the river can decrease potential damage to the South Fork; the larger a forested buffer, the better vegetation can slow and filter polluted runoff from the road before it reaches the water. Stormwater collection and treatment via bio-swales could further decrease runoff impacts.

Under the no-action alternative, continued maintenance of the bridge such as small repairs to damaged portions of the structure may decrease the likelihood of structural failure, which in turn would cause physical and chemical damage to the South Fork, but small repairs are a temporary solution at best.

Level of Significance After Mitigation

The habitat-forming features that are being added will provide greater habitat for salmonids, insects and birds than the existing conditions. A 2007 case study by the Nooksack Tribe has deemed LWD in the South Fork to be not properly functioning; thus, the eight additions of LWD structures up and downstream will serve to improve the baseline (Whatcom County Public Works, 2012). Due to WCC stipulations, the riparian vegetation must be replanted. This will take many years for the permanent establishment to take place. As a result, initially the riparian habitat will be at an elevated risk for takeover by invasive species such as Japanese knotweed, Himalayan blackberry and reed canary grass. Continued maintenance of the native vegetation can prevent this from happening, however; assuming this, there should not be any long term adverse impacts on the riparian vegetation and thus, the water quality and aquatic habitat. In fact, the replanting of the bank will be advantageous in the long run due to increased shade and debris input which contributes to habitat-forming features and food for macro-invertebrates.

There will be an unavoidable increase in PGIS, but there is a net gain of stormwater treatment in the form of the TDAs: currently there is no stormwater filtration system in place. The

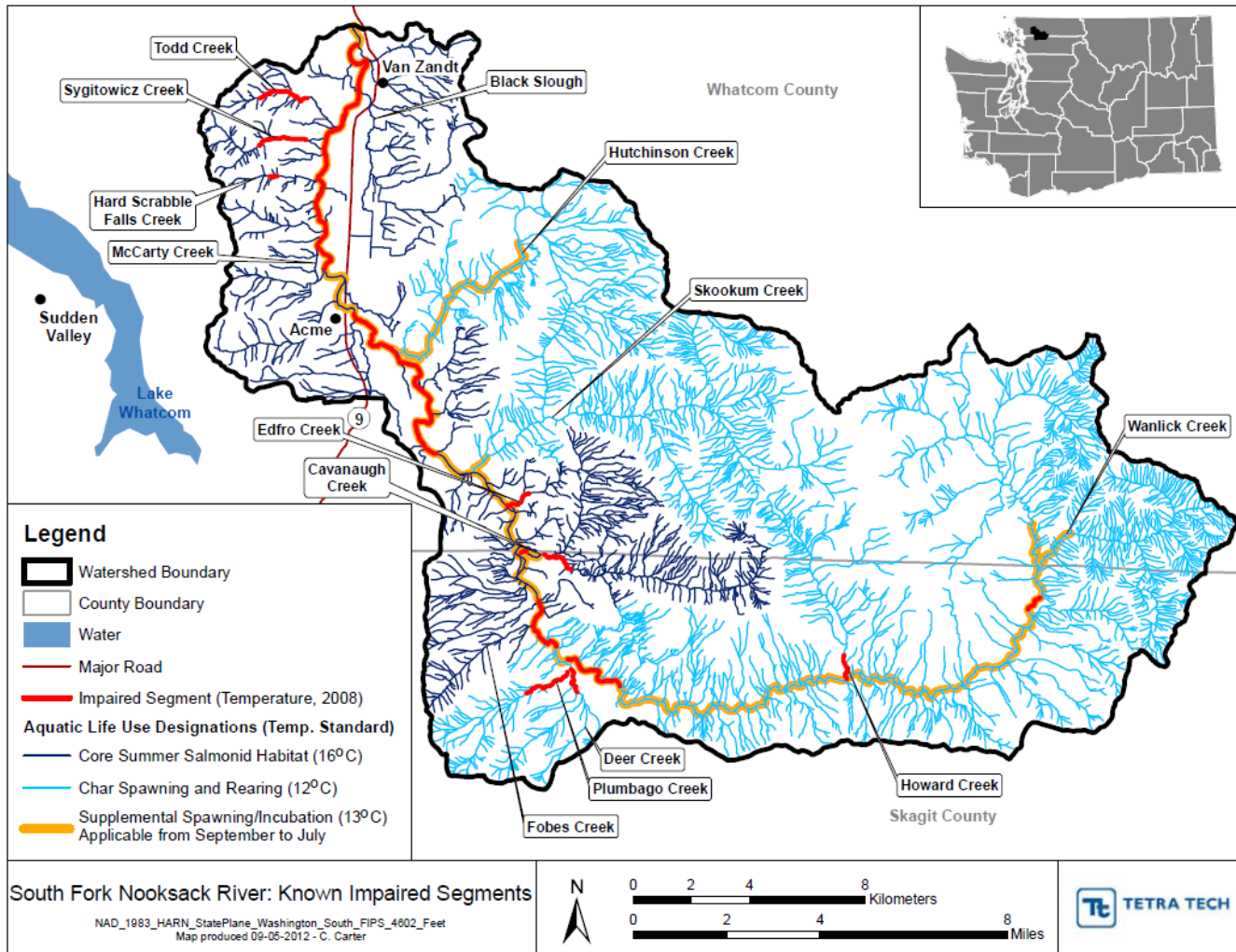


Figure 5: This figure represents the impaired streams on the South Fork Nooksack River that are above the temperature standards set forth by the Washington Department of Ecology (2012b.)

Table 2: This table represents the current and future impervious surfaces and drainage plans for the Potter Road Bridge. (Whatcom County Public Works, 2012).

Parameter	DISCHARGE AREA				TOTAL (acres)
	1	2	3	4	
Pre-Project Existing Impervious Surface					
Existing treated impervious surface with discharge to water body	0	0	0	0	0
Existing impervious surface infiltrated	0	0	0	0	0
Existing untreated impervious surface	0.23	0.15	0.16	0.13	0.67
Total existing impervious surface	0.23	0.15	0.16	0.13	0.67
Post Project Impervious Surface					
Treated impervious surface with discharge to water body	0.47	0	0.39	0	0.86
Impervious surface infiltrated (acres)	0	0.09	0	0	0
Untreated impervious surface	0	0	0.01	0.01	0.11
Total impervious surface	0.47	0.09	0.4	0.01	0.97

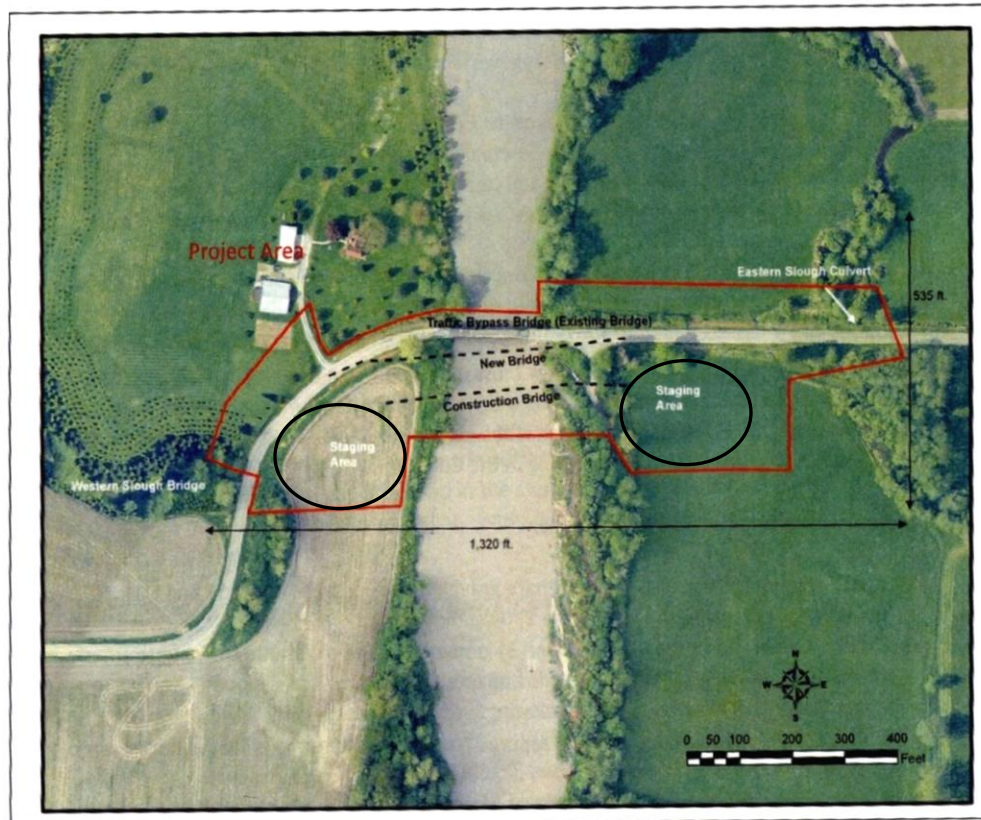


Figure 6: Diagram showing staging areas (circled in black for clarity) within the project area (Whatcom County Public Works, 2012).

1.3 Plants

1.3.1 Existing Conditions

The project site is a mixture of riparian vegetation and pastureland. Primary species identified via site visit included Himalayan blackberry, reed-canary grass and red alder (Figure 7); of these dominant plants, only red alder is native. According to the project's *Biological Assessment*, black cottonwood and willow are also riparian components (2012). There are no threatened or endangered plants present in this area. The riparian zone along the South Fork Nooksack River serves to stabilize the banks, prevent erosion, filter runoff from pastureland and shade the sides of the river. There was no old growth and little to no LWD at the project site. Riparian vegetation of a similar composition also exists along sloughs running through the pastureland near the site (Figure 8).

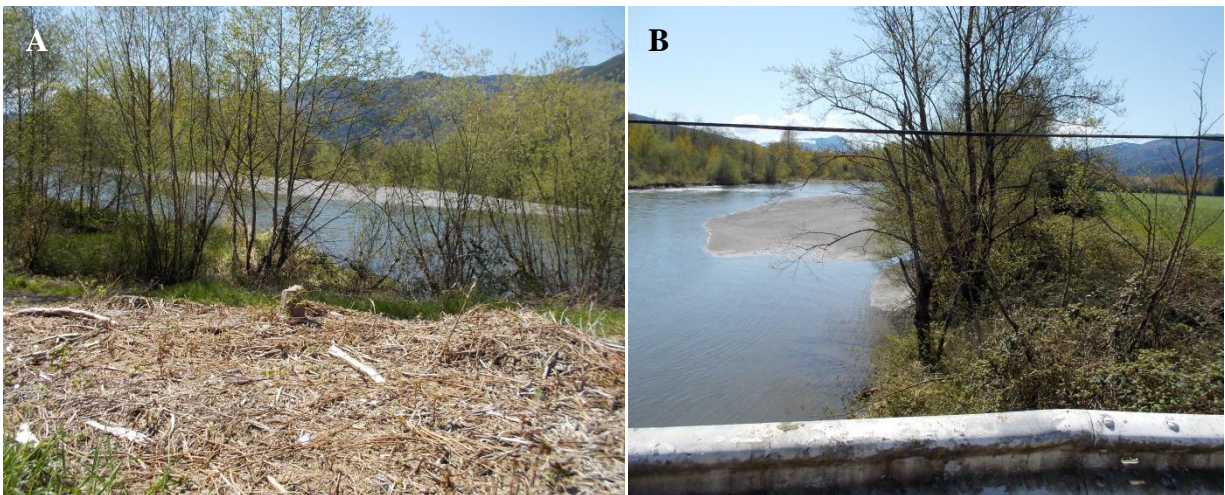


Figure 7: **A.** Riparian vegetation at the project site on the South Fork Nooksack River. Red alder line the water along with emerging reed-canary grass; the swath of dead vegetation is a cutback patch of Himalayan blackberry. No such cutbacks exist elsewhere on the site. The existing bridge is just to the right of this image. **B.** Directly across from A, looking upstream. Himalayan blackberry and surrounding pastureland is evident.

1.3.2 Significant Impacts

Approximately 0.4 acres of riparian vegetation around the existing bridge will be removed during the construction and installment of the new bridge (Whatcom County Hearing Examiner, 2013). Plant species removed will include Nootka rose, red twig dogwood, snowberry, Himalayan blackberry, 21 red alders and 33 black cottonwoods over 8 inches in DBH (Whatcom County Public Works, 2012). Additionally, widening and shifting of the road on both sides of the bridge will result in further riparian and pasture loss and increased impervious surfaces. This combination of effects will likely result in increased runoff (from both automobiles and surrounding cattle land) into the river, decreased bank stabilization and decreased stream

shading. Also of concern is the potential for the introduction or disturbance of invasive plants, such as knotweed (*Polygonum* spp.): an escaped ornamental that colonizes areas around rivers in vast monocultures, crowding out native plant species and destabilizing banks (Figure 9).



Figure 8: Western slough looking upstream and downstream from bridge, respectively (Whatcom County Public Works, 2012). Species composition around slough is similar to species bordering the South Fork Nooksack River.

Knotweed is prevalent on the Nooksack River (Figure 10), including the South Fork which contains 18 acres surveyed thus far (*Knotweed Project Summary*, 2007). Although it was not spotted at the project site, invasive knotweed is both upstream and downstream from the Potter Road Bridge and thus could be present but unseen in the construction zone. This plant has the ability to re-sprout from small stem fragments; therefore, riparian clearing via "bushwhacking" could actually spread and help propagate any knotweed that may be present there. Furthermore, removing upper canopy plants such as the red alder may allow knotweed to have an easier time colonizing this site should it spread from nearby patches.

1.3. 3 Alternatives

Extension of Smith Road

This alternative will affect the area immediately adjacent to the bridge much less than the proposed action. Riparian vegetation loss will be less, because additional land will not have to be cleared for the new bridge; however, some of the bank and its flora could still be damaged during removal of the current structure. The main concern at the bridge site is that decreased stabilization will still occur. Thus, prompt restoration of the affected area will still be required by way of replanting native trees and shrubs.

Construction of the 5.3 mile road would impact the forested Stewart Mountain and probably have more of an impact on vegetation as a whole than the proposed action because it would require the clearing and paving of a portion of woodland.

No-Action

If the Potter Road Bridge is not replaced, riparian vegetation will not be removed and there is little potential for destabilization of the bank or decreased shading. Based on current site



Figure 9: **A.** Invasive knotweed in the foreground on the North Fork of the Nooksack River (Project, 2007). **B.** Image showing the dense growth habits of this plant.

conditions, it is evident that in one location the invasive Himalayan blackberry is being actively managed (Figure 8, above). However, the blackberry is unmanaged throughout the rest of the riparian zone; on the northeast side of the bridge, in particular, the plant is growing over shrubs and other native plants. Without any intervention or active management for the entire area, the site may become increasingly overwhelmed with Himalayan blackberry. Colonization from nearby stands of knotweed is also a possibility without oversight.

1.3. 4 Mitigation Measures

Adverse effects are to be minimized and compensated for pursuant to the WCC 16.16.260. More specifically, the disturbed areas must be re-vegetated with native species following construction in accordance with Critical Area standards under WCC 16.16.360 and 16.16.740. The re-vegetation in this Critical Area must provide the same ecological functions and processes as the unaltered habitat did (SMP 23.90.03). The *Biological Assessment* (2012) suggests adding compost and mulch to disturbed areas and then planting western hemlock, Douglas fir, black twinberry, red osier dogwood, common snowberry and Pacific ninebark. Additional and ongoing measures may be required to prevent erosion and noxious weed incursions during and after immediate construction (SMP 23.90.06).

The site location is designated as a Resource and Conservancy Shoreline (Figure 11) and thus requires a standard buffer that extends 150 feet from either side of the river's high water mark, in accordance with WCC 16.16.740 B.

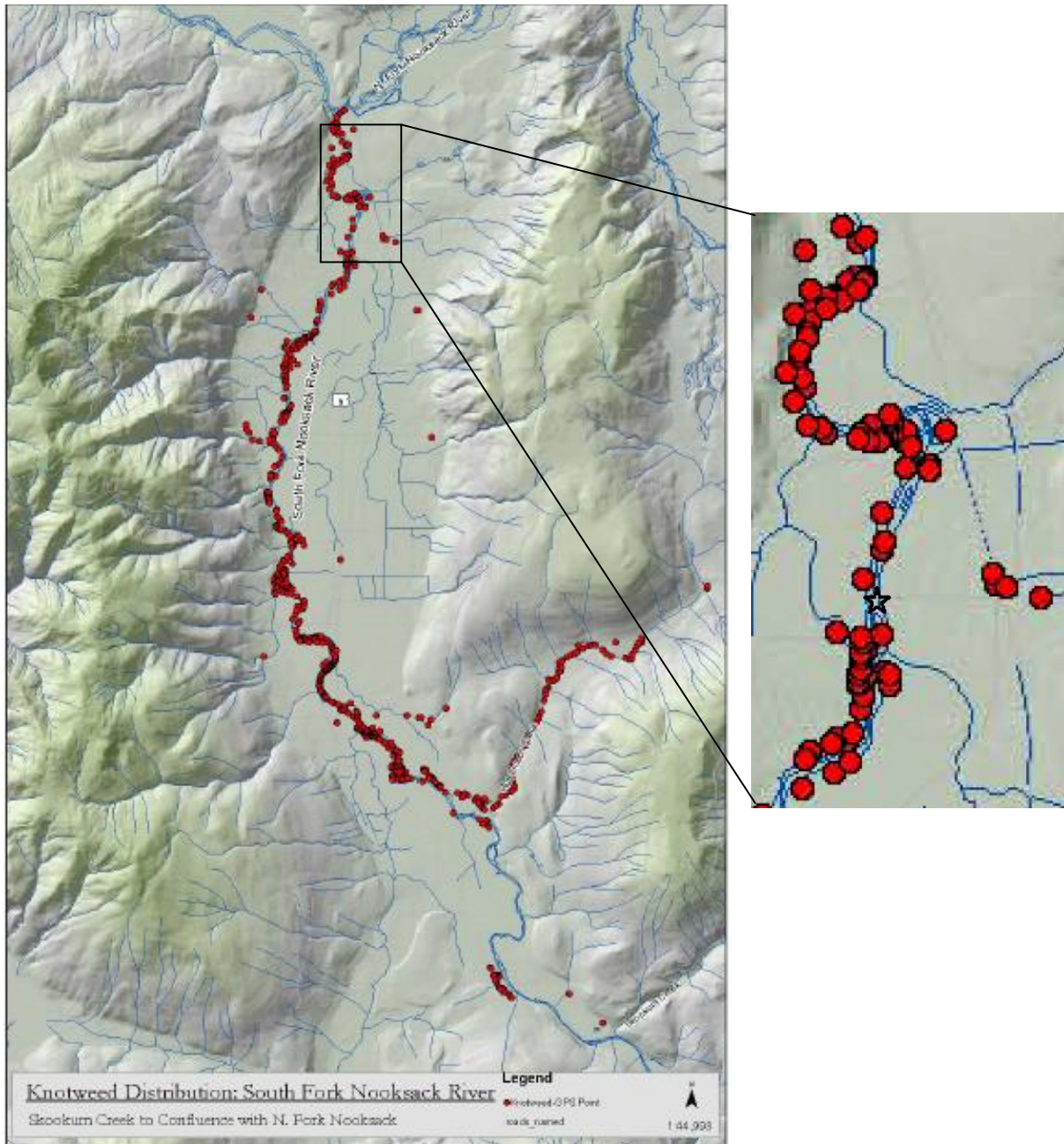


Figure 10: Knotweed distribution along South Fork Nooksack River (*Knotweed Distribution Maps, 2007*). Inset: close-up of project region, with a star marking the site.

It is further recommended that native vegetation be planted near newly constructed roadsides or in bio-swales to treat water runoff from impervious surfaces.

For the extension of Smith Road, stormwater mitigation measures must be in place, perhaps in the form of ditches draining to bio-swales. There must also be a significant riparian buffer between the roadway and the Nooksack River. (The size of this buffer is discussed in the following section.)

The no-action alternative may need mitigation in the form of removal and/or control of invasive species in and around the project site. Removed species should be replaced with native ones, and this alternative requires continued maintenance of the area.

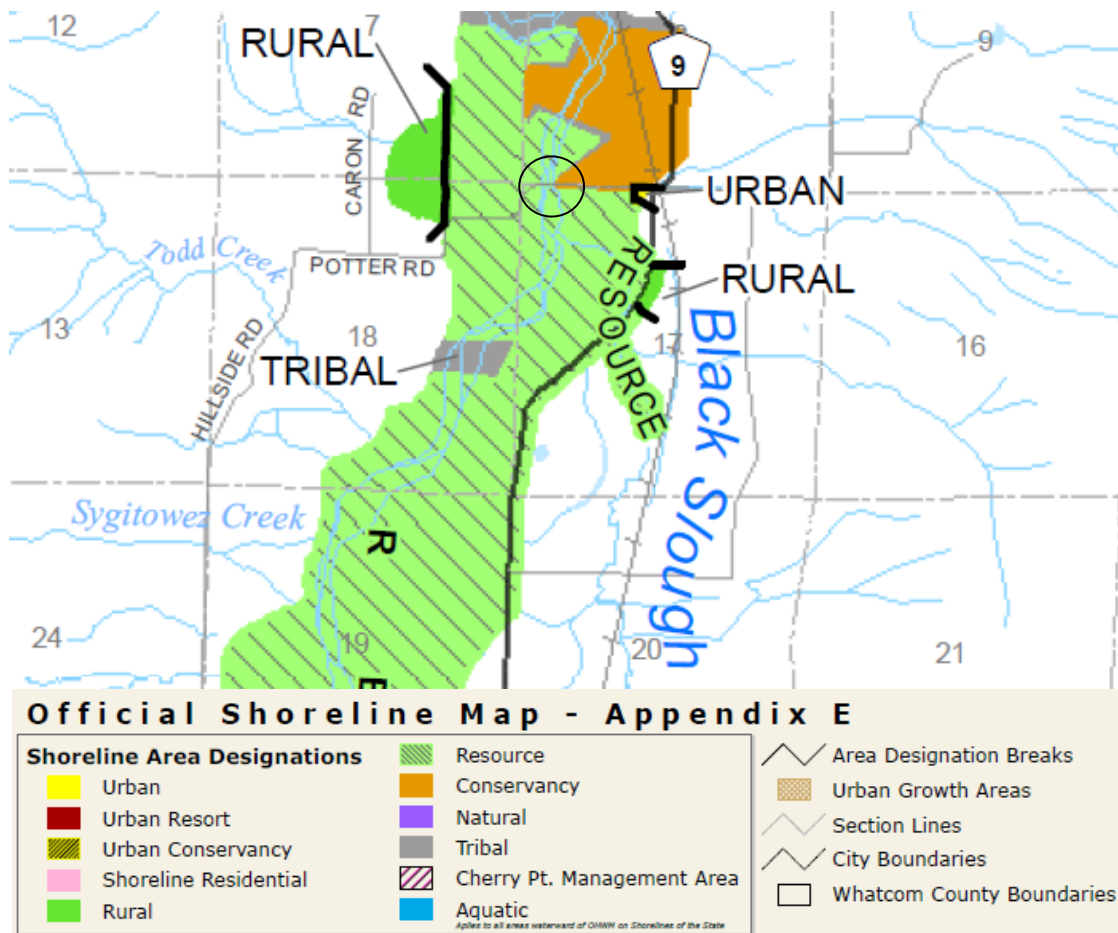


Figure 11: Close-up of shoreline designation at the Potter Road Bridge location (circled). The site is a Resource/Conservancy Shoreline. (Whatcom County Shoreline Area Designation [Map], 2008).

Level of Significance After Mitigation

For this project to be completed, approximately 0.4 acres of "immature forest" and riparian vegetation must be disturbed (Whatcom County Hearing Examiner, 2013). Although mitigation requires restoration, it will take years for the vegetation, especially the trees, to return to a pre-project state. Thus, there will still be an unavoidable significant impact on the site's vegetation immediately after completion. However, several years after construction, impacts will dwindle to non-significance assuming the required and recommended mitigation efforts are successful (i.e., replanted riparian vegetation is not overgrown by invasive species). This will result in a positive lasting impact, as the replanting will diversify the riparian zone.

For the reasonable alternative, the loss of forest will be more difficult to mitigate and lasting vegetation impacts will remain even after re-planting because the forest structure has been altered; for example, removal of trees will let light into the forest understory, altering the

composition of understory vegetation. There will also be significantly more trees lost under this alternative as compared to the proposed action.

1.4 Animals

1.4.1 Existing Conditions

The site is primarily a mixture of riverine and wetland habitat. As discussed in the Executive Summary and Water sections, the South Fork of the Nooksack serves as habitat for a variety of salmonids, some of which are threatened. Based on data from the Washington Department of Fish and Wildlife, the *Priority Habitat and Species Report* (PHSR) of the project site indicates the South Fork is a migration route for chum salmon, steelhead and cutthroat trout, as well as a breeding area for Chinook, coho, pink and sockeye salmon, steelhead and bull trout (*PHS on the Web*, 2013). In fact, the South Fork Nooksack is considered critical habitat for Chinook salmon (Lentz, 2006 ; *Biological Assessment* 2012) and bull trout (Whatcom County Public Works, 2012). Black Slough, just upstream from the project site, is also a migration corridor for bull trout, Chinook, chum, coho and cutthroat trout (*PHS on the Web*, 2013; Table 2).

Additional animals noted at the site by the applicant include: hawk, eagle, heron, songbirds, deer and beaver. Species were not specifically identified, and thus it is difficult to assess their state and federal designations. However, the bald eagle is listed as State Sensitive and a Federal Species of Concern while the golden eagle is a State Candidate, and several types of hawks are considered Federal Species of Concern (Conservation, 2013). Thus, it is likely that some of these additional, unidentified animals are of interest to the State or federal government. Further, the site is within the Pacific Flyway, which is a major north-to-south migration corridor for a variety of birds, including the marbled murrelet. The marbled murrelet is Federally Threatened, and a mature coniferous forest a few miles away from the project site includes past nesting locations (Whatcom County Public Works, 2012). Of primary concern for this species is potential use of the river corridor for migratory pathways at dawn and dusk (Whatcom County Public Works, 2012).

1.4.2 Significant Impacts

Removal of the existing bridge, including the onshore creosote pilings and concrete columns presently in the river, will churn up a significant amount of bank and riverbed sediment (Figure 12). Depending on the amount of sediment that influxes into the Nooksack, the effects could be potentially deleterious on aquatic organisms, especially salmonids. The increased sediment load may settle onto the gravel bottom of the stream, degrading the spawning habitat essential to the salmonids listed as breeding in the South Fork (Table 3). To re-iterate, increased sediment will also increase water temperature as the dark particles will absorb sunlight more strongly than clear water. According to Washington's Dept. of Ecology, the highest seven-day maximum temperature for char (bull trout) spawning is 12°C, while the temperatures for core summer salmonid habitat and salmonid spawning, rearing and migration are 16°C and 17.5°C, respectively (*Supplemental Aquatic Life Temperature Criteria Information*, 2008). The cold, clear water necessary for these species' survival may be compromised if care is not taken to reduce sediment load to the river during removal of the old bridge and installation of the new structure.

Table 3: Possible important species located within the project area*

Species	Location	Habitat Type	Designation
Bull trout**	Black Slough	Migration	FT, SC
	South Fork Nooksack	Breeding	
Chinook salmon**	Black Slough	Migration	FT, SC
	South Fork Nooksack	Breeding	
Chum salmon	Black Slough	Migration	FT, SC
	South Fork Nooksack	Migration	
Coast resident cutthroat trout	Black Slough	Migration	NL
	South Fork Nooksack	Migration	
Coho salmon	Black Slough	Migration	FT
	South Fork Nooksack	Breeding	
Marbled murrelet**	1-2 miles east of site	Nesting, migration	FT
Pink salmon	South Fork Nooksack	Breeding	NL
Sockeye salmon	South Fork Nooksack	Breeding	FT, SC
Steelhead trout**	Black Slough	Migration	FT, SC
	South Fork Nooksack	Breeding	

* This list is not an exhaustive account of all species in the area, but represents the species of most concern that may be affected by the proposed action.

FT- Federally threatened: a species "likely to become an endangered species within the foreseeable future throughout a significant portion of its range... without cooperative management or removal of threats." **SC**- State candidate: under review for possible listing as State Endangered, Threatened or Sensitive. **NL**- Not listed. Definitions and designations from Washington Department of Fish and Wildlife, 2013 . Species marked with a double asterisk (**) are those specifically addressed by Whatcom County's 2012 *Biological Assessment*.

Dismantling the old bridge must be done with caution. According to the applicant, the bridge contains lead paint and the wood pilings are coated in creosote; the latter was confirmed by a site visit. Creosote is derived from distillation of coal tar; it protects wood from fungus, insects and other organisms that break down wood (U.S. Environmental Protection Agency, 2007). While clinical studies of creosote as a human carcinogen are limited, there is sufficient evidence to indicate the chemical mixture is linked to cancer in animals (U.S. Environmental Protection Agency, 2002). Lead, meanwhile, is a toxic chemical that is actively monitored and regulated. Lead concentrations as low as 1.0-5.1 ug/L can have harmful effects on aquatic organisms, including "reduced survival, impaired reproduction, reduced growth and high bio-concentration" (Eisler, 1988).

As discussed in Section 1.3, construction will require removal of some riparian vegetation at the immediate project site. In addition to a decrease in bank stabilization, removal of riparian trees, in particular, may reduce river edge shading, decreasing habitat for aquatic organisms and increasing water temperatures somewhat. Onshore species, particularly birds, may suffer from reduced habitat with removal of trees and brush.

Expansion of the roadway leading to the bridge will also reduce habitat, as well as increase impervious surfaces. Under current site conditions, 0.67 acres within the project area are

impervious, and with construction and new bridge installation, there will be a net gain of 0.3 acres for this land cover type. Any increase in impervious surfaces is concerning because when precipitation strikes these surfaces, water cannot infiltrate into the soil where its flow is slowed significantly. Without infiltration, the various mechanisms that naturally filter groundwater by removing or trapping potentially harmful chemicals will not cleanse this water. Precipitation falling on the roadways can thus serve as a carrier to the Nooksack for chemicals like copper and oil that originate from vehicles.

Additionally, precipitation landing on impervious surfaces heats up because it is not soaking into the soil. Roadways allow this warmer, chemical-laced water to run quickly into surrounding aquatic areas.

Lastly, construction -in particular, pile driving- will cause noise in the terrestrial environment for up to 3.85 miles away (Whatcom County Public Works, 2012). While the sound declines to a non-significant level by the time it reaches the marbled murrelet nesting grounds, if the birds are using the river as a flyway at dusk and dawn then they are likely to be adversely impacted.



Figure 12: A. Concrete columns in the South Fork and B. creosote pilings on the east side of the river. Removal of these structures could increase sediment flux to the river if not dismantled carefully.

1.4. 3 Alternatives

Extension of Smith Road

According to the PHSR of the alternative route and surrounding forest, the only additional species of concern that may be impacted is the bald eagle (*PHS on the Web*, 2013). Other common species such as deer may also be impacted by vehicle strikes, although probably not to a significant degree. Building the road through forested land so close to the South Fork could still adversely affect salmonids migrating and spawning in the river, through additional runoff and turbidity increases via construction and land erosion. These effects are likely to impact the Nooksack to a lesser degree, though, depending on the forested buffer between the road and river. Removal of the existing bridge at the site will cause some of the same problems as described for the proposed action, but this alternative will prevent riparian clearing for a new

bridge installation. However, construction of the road will also decrease forest habitat and may increase peak flow to the South Fork during storm events, resulting in a bolus of water and sediment influxing into the river. While the effects to Black Slough will be non-existent, all salmonids that rely on the slough also rely on the South Fork (Table 3) and will therefore not be completely excluded from the alternative's effects.

No-Action

If the project is not undertaken, the majority of the impacts described above will not occur. However, due to the age and structural deficiency of the bridge, it is possible that pieces of lead paint may flake off into the water without maintenance. The creosote pilings are also of concern, due to the harmful nature of the material; however, if not submerged, contact with the water is unlikely. Additionally, runoff from the bridge may still get into the river, although the riparian vegetation will prevent runoff from the road from going directly into the Nooksack. If the bridge were to collapse due to its structural deficiency, there could also be significant physical damage to the streambed from bridge debris.

1.4. 4 Mitigation Measures

Because the project site is a Habitat Conservation Area (HCA), WCC 16.16.710 requires the replacement bridge to be designed to preserve the natural substrate and gradient and allow for both vertical and horizontal high water marks (WCC 16.16.720 C2). Pursuant to WCC 16.16.760, mitigation must be sufficient so that there is no net loss of habitat function. For this project, because there is a permanent alteration to the landscape, habitat restoration or enhancement is required by law; replanting and managing riparian vegetation may fulfill this requirement (16.16.760 B2), but a sediment control plan will also be necessary in the interim or during construction. The project applicant will follow WSDOT's Best Management Practices as outlined in the 2010 Highway Runoff Manual (Whatcom County Public Works, 2012). These BMPs will be followed until the bank is either stabilized by coir cloth mulch or re-vegetation (Whatcom County Public Works, 2012). Installation of woody debris for salmon refuge will also serve to enhance the habitat. The replanted vegetation must be of sufficient buffer size for a shoreline stream (150 feet) in accordance with 16.16.760 B5. The bridge replacement should be timed to minimize impact on fish and other wildlife (16.16.760 B3); the applicant will thus permit construction only within the WDFW's designated work window, which extends from July 15 to October 15.

It is also suggested by the project's *Biological Assessment* that, to minimize turbidity increases, coffer dams be installed on both sides of current bridge (Figure 13). Removal of fish and then water inside these dams will prevent sediment from getting into the main part of the South Fork. The water that is pumped out of these dams should be filtered (either through natural or artificial means) before it is allowed to flow back into the main channel.

Because the current riparian zones are narrow around both the nearby sloughs and the river and construction will remove mature vegetation near the South Fork, additional treatment of surface runoff from the road is recommended. The bio-swales have the capacity to absorb and subsequently treat stormwater pulses through infiltration. It is therefore suggested that bio-swales with fast-growing native vegetation be constructed around new road and the parking spaces the applicant is planning to install.

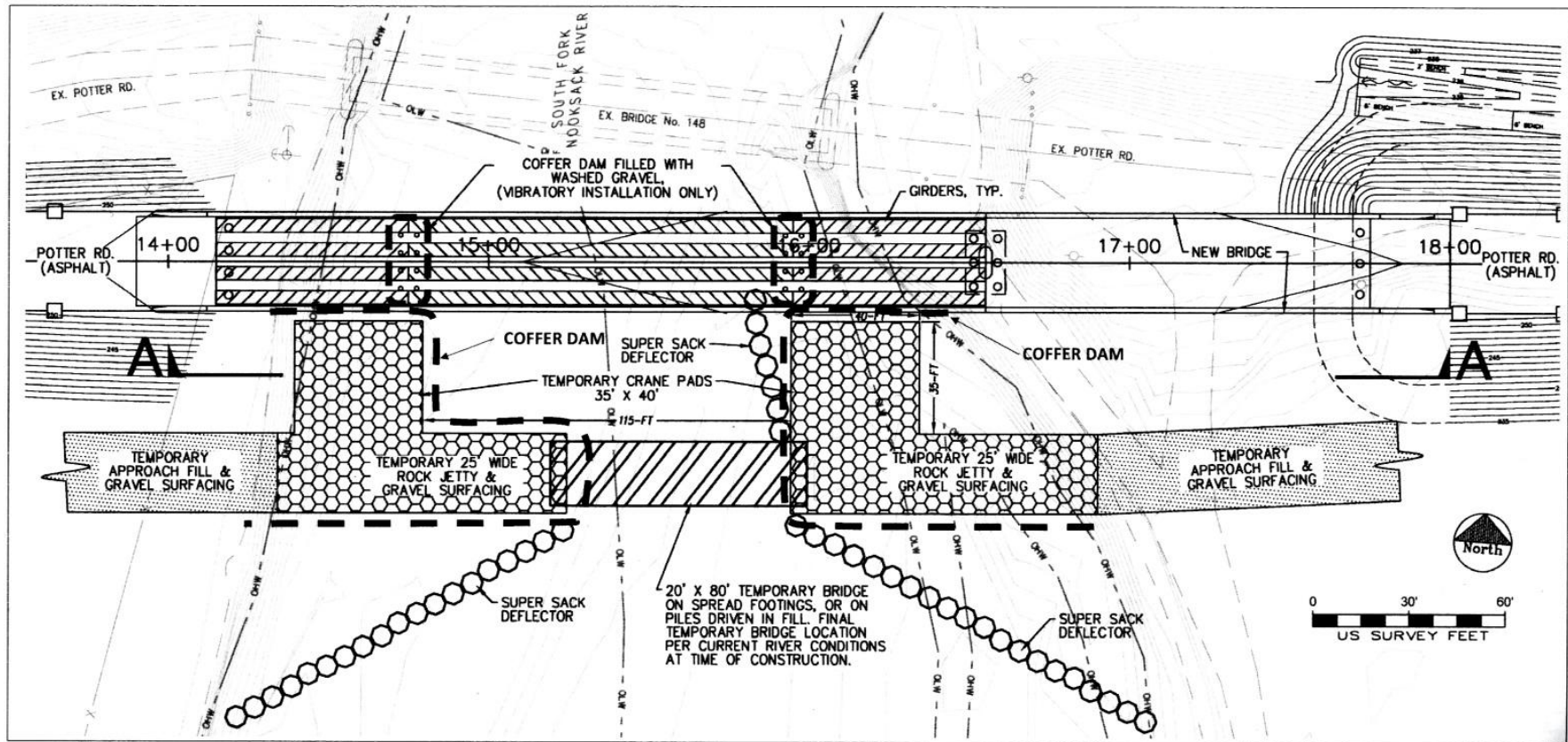


Figure 13: Diagram showing positioning of coffer dams and associated structures to minimize salmonid impact (Whatcom County Public Works, 2012).

If the reasonable alternative (extension of Smith Road) is undertaken, in addition to stormwater treatment, a forested buffer must be in place. The width of this buffer will vary depending on shoreline designation; however, because the South Fork Nooksack is a fish-bearing stream, the minimum buffer size is 100 feet (WCC 16.16.740 B).

Level of Significance After Mitigation

Despite mitigation and restoration plans, the *Biological Assessment* for this project noted that the construction process "will likely adversely affect bull trout, steelhead trout, Chinook salmon, Chinook critical habitat and bull trout critical habitat," if only temporarily (Whatcom County Hearing Examiner, 2013). Further information on the health of the local salmonid populations is required to assess the immediate and lasting significance of these adverse impacts, but it is very likely that fish populations will be negatively affected initially, primarily through water quality and associated habitat changes. However, addition of LWD would significantly improve habitat over the long-run. Marbled murrelets will not be affected.

1.5 Air

1.5.1 Existing Conditions:

The bridge replacement proposal is located within the Frasier air shed, which is a combination of the Georgia Basin and the Puget Sound Basin (*B.C.'s Airsheds*; Figure 14). Although there are large pollution sources within this region, the smaller sub-region that this project is located in does not face pollution issues. There are no big air pollution sources within many miles of the bridge replacement.

1.5.2 Significant Impacts

The proposal will increase air pollution mainly during the construction phase of the plan. Dust development will be a direct impact of increased construction. Chain saws, two cranes, a crane-mounted impact pile driver, excavators, dump trucks, vibratory rollers, eight-inch diesel pumps, three-inch gas powered pumps and associated support vehicles will be used for this project. Heavy machinery has been identified as a main source of air pollution, due to its large amount of diesel exhaust. Washington State's Department of Ecology has also named diesel exhaust as being a public health threat (Washington State Department of Ecology, n.d.). In general, construction will cause temporary increases in local air pollution.

The number of trips made across the bridge is not expected to increase with the replacement of the old bridge. This means that pollution from motor vehicles will not increase after the project is completed. The impacts of construction-related dust development and air pollution will be short-term and local.

1.5.3 Alternatives

Extension of Smith Road

The extension of Smith Road will have a bigger impact on air quality than the proposed action. The area that the road is to pass through is currently forested land. To build the road it would require deforestation of a five mile swath of land. Deforestation is listed as one of the main

contributors to greenhouse gases by the EPA. These gases trap heat within our atmosphere and add to the overall global temperature increase (United States Environmental Protection Agency, 2012). To clear this land heavy machinery would be brought in, and the fumes from these machines would also contribute to air pollution.



Figure 14: The Fraser air shed, outlined (B.C.'s Airsheds n.d.).

No-Action

There are no air quality related concerns that were found if the no-action alternative was taken. The eventual disrepair of the bridge may even reduce the amount of vehicle-contributed pollutants the atmosphere.

1.5. 4 Mitigation Measures

To mitigate the possible effects of diesel exhaust the heavy machinery needs for this project, workers can use water-diesel emulsion in coordination with low sulfur diesel, the use of which can reduce emissions by forty percent (Genesis Engineering Inc., 2003).

Level of Significance After Mitigation

Overall, for the proposed action there should not be a lasting significant adverse impact to the air quality.

For the reasonable alternative, the same mitigation measures discussed above to reduce pollution can be in place, but the carbon storage loss from deforestation cannot be as easily offset unless the site is returned completely to pre-existing conditions; with the road passing through the forest, this area can never completely restored.

1.6 Energy and Natural Resources

1.6.1 Existing Conditions

The Potter Road Bridge does not have major infrastructure that will be affected during the process of construction. The bridge itself is the only piece of infrastructure that will be impacted, but it will remain in place until construction is finalized on the new bridge. This will allow residents to travel across the river during the construction period. There is a stream gauge on the existing bridge which will be removed during the construction. The gauge is for observation only and won't impede services, like electricity or natural gas. All existing resource delivery lines (power and gas lines) are independent of the bridge and will be left intact during the construction process.

1.6.2 Significant Impacts

Proposed Energy and Resource Use

All of the energy use will be directly involved with the de-construction and the construction of the new bridge. The equipment that will be used during the removal of the Potter Road Bridge, to install the new road, and to construct the new bridge will consist of: chain saws, two cranes, a crane-mounted impact pile driver and crane-mounted vibratory pile driver, excavators, dump trucks, vibratory rollers, pavers, eight-inch diesel pumps, three-inch gas powered pumps and associated support vehicles (Biological Assessment, 2012). All of these vehicles are powered by powered by gasoline or diesel engines.

Effects on Solar Power

There will not be any effects on the use of solar power by any of the adjacent landowners due to the rural nature of the project site. Also the project site is so small that even if it were a more developed area the impact of the construction would be so minimal that there still wouldn't be any effect on solar energy use. There is a stream gauge attached to the current bridge and if it is solar powered then it will be affected because with the dismantling of the old bridge it will have to be removed until the new bridge can be constructed.

Energy Conservation Features

Due to the sensitive nature of the fish species in the South Fork of the Nooksack River, there is an allotted work window by the WDFW for all of the in-water work that involves taking down the old bridge and constructing the new bridge (Table 4). During the in-water work window (July 15 to October 15), construction will occur seven days a week with double shifts because of the estimated three months that it will take to put up the new bridge (Whatcom County Public Works, 2012). Timing is a larger factor than conservation of the resources needed to complete the project because of time-sensitive factors such as salmonid migration and breeding.

1.6. B Alternatives

Extension of Smith Road

There is an alternative in place that would involve removing the current bridge and creating a new road extending east from Smith Road and traveling around the north side of Stewart

Mountain, eventually connecting up with Potter Road. This project would still require the resources to remove the old bridge and the massive amount of resources need to construct the new road.

No-Action

If the current bridge was left as it is there wouldn't be the use of any resources. But the bridge has been declared structurally deficient and eventually it will have to be replaced. If a structural failure were to occur it could result in the loss of life and the efforts to create a new bridge would have to be doubled. The urgency to build a new bridge would be so great because the current bridge is the only access across the river to Highway 9 for the people living on the west side of the South Fork. This would probably result in more resources used than the current proposed project as well as costing more than the current project which is budgeted at \$10 million.

2. Built Environment

2.1 Environmental Health

2.1.1 Existing Conditions

Exposure to Nonpoint Source Pollutants

Nonpoint sources of pollutants (which are defined as sources that cannot be traced to a single input) that are of concern for this proposal are pollutants from vehicles and construction machinery. Some of these pollutants include sediment, oils and metals. The current bridge and surrounding road area are made of concrete and asphalt, respectively. Pollutants may accumulate on these surfaces and then be transported into the river by wind or water. Once they are in the river system, they can degrade water quality and harm aquatic life.

Diesel exhaust from the construction equipment also poses a threat to public health. Diesel exhaust contains forty different toxic air contaminants. These include many known or suspected cancer-causing substances, such as benzene, arsenic and formaldehyde. It also contains other harmful pollutants, including nitrogen oxides (Washington State Department of Ecology, n.d.). The location of this project is not within an urban environment so the pollutants from the exhaust will not compound with other pollutants, therefore reducing the risk that they will be harmful to the public.

Environmental Hazards

The area surrounding the bridge is a popular recreation spot. In the summer months tubers float the river and often use the bank south of the bridge to pull their tubes out. There are two concerns surrounding this use. If the proposed bridge does not provide an area for floaters to exit the river, floaters might choose an area that is ecologically valuable and decrease its stability. Secondly, the nonpoint source pollutants that will occur during and after construction must be below hazardous levels so as not to harm those recreating in the South Fork.

Table 4: Proposed Construction Timetable by the Biological Assessment Report created for the project. The red sections are the designated times of in-water construction set by the WDFW.

Table 2. Project Construction Schedule

Task	Mar 2013	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan 2014	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan 2015	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct
Utility Relocate / BMP Install	█																															
Clear/ Grub/ Staging	█	█	█																													
Pier Construction		█	█	█																												
Bridge Approach Work																█	█															
<i>In Water Work</i>																																
Place Coffer Dams (FE)						█																										
Phase 1 Rip-Rap E. and W. banks (FE)						█	█	█																								
Install Crane Platform (VPD and IPD)																		█														
Install Temporary Bents (VPD and IPD)																		█	█													
Install Span 1 Girders and Deck																																
Remove Crane Platform (VPD)																																
Place Coffer Dams (FE)																																
Remove Old Bridge																																
Remove Temp Bents (FE)																																
Phase 2 Rip-Rap E. and W. banks (FE)																																
Remove Coffer Dams																																
East Floodplain Expansion, phase 1																																
Construct Span 1																																
Construct Span 2																																
Construct Roadway/ Driveways																																
Pave / Stripe / Guardrail																																
East Floodplain Expansion, Phase 2																																
Place Log jams, Boles, and LWD																																
Install Stormwater facilities																																
Hydro seed/Plant																																

IPD = Impact Pile Driving **in Fill**; VPD = Vibratory Pile Driving; FE = Fish Exclusion

2.1.2 Significant Impacts

Impacts on the environmental health of the area as discussed in this section will be minimal. The main impacts that will need to be addressed are oils and metals, both of which will stem from the construction stage of the proposal. Diesel and gasoline are the biggest threat to water quality during this project.

The potential for diesel or gas spills into the river also needs to be addressed. If either is spilled on the ground surrounding the construction site it could then pose issues with benzene contamination. Benzene is a carcinogen and is also deadly to aquatic life in extremely small doses. The available data for benzene indicates that acute toxicity to freshwater aquatic life occurs at concentrations as low as 5,300 µg/l and would occur at lower concentrations among species that are more sensitive than those tested (United States Environmental Protection Agency, 1980).

2.1.3 Alternatives

Extension of Smith Road

The extension of Smith Road poses more of a threat on environmental health than the current proposal. The combined factors of deforestation and increased levels of traffic through a previously un-impacted area will both be harmful to the surrounding environment.

No-Action

The no-action plan will have limited impacts on environmental health. The continual degradation of the bridge's support beams will eventually lead to the disrepair of the bridge.

2.1.4 Mitigation Measures

To reduce the impacts of potential spills, the contractor will prepare a Spill Prevention Control and Countermeasures Plan. This plan will be prepared according to WSDOT Highway Runoff Manual Guidelines (Washington State Department of Transportation, 2012). By the time of construction the plan will be approved and the provisions of the plan will be monitored and enforced by a Whatcom County construction inspector. If any diesel or gasoline is spilled at the contaminated area, it will need to be removed. When all suspected contaminants have been removed the area will then need to be screened for remaining hot spots using a photo ionization device. After mitigation, impacts to environmental health should be insignificant.

For the reasonable alternative, mitigation measures include the same strategies mentioned in previous sections such as replanting of vegetation to reduce impacts on the surrounding forest. The larger scope of this project may make mitigation of spills and other hazards more difficult, however, resulting in a greater likelihood of remaining impacts after mitigation.

2.2 Land and Shoreline Use

2.2.1 Existing Conditions

The land that surrounds the proposed project is comprised of small privately owned farmland and is zoned by Whatcom County as agricultural land. On both sides of the river there is a small buffer of vegetation (Figure 15). Upstream there are two unnamed sloughs on the right bank of the stream.

There is also a stream gage that is present on the left bank of the downstream portion of the existing bridge that is used by the Washington Department of Ecology to assess the groundwater contribution to the South Fork and to measure the fluctuations of flow.



Figure 15: This is a current photo taken from the right bank of the upstream portion of the South Fork Nooksack River at the Potter Road Bridge.

The shoreline currently is armored by riprap comprised of large boulders to protect the soil that the bridge is built in from eroding and thus destroying the bridge. This riprap will be removed so the expanded channel may have natural substrate features, but the new channel will be armored as well, reusing much of the old riprap and bringing in new boulders as needed.

2.2.2 Significant Impacts

As a result of the road widening and the new bridge merging with the existing road (Figure 16), there will be a small portion of the agricultural land that will be lost. There will also be an initial loss of 0.4 acres of immature forest that serves as the riparian buffer; both native shrubs and immature trees will be removed.

There will be a net gain of impervious surfaces, from 0.67 to 0.97 acres, for a total gain of 0.30 acres of impervious surfaces. This alters the landscape that is currently agricultural or riparian.

The impacts of the lost land are being mitigated, however via bio-swales and re-vegetation that will occur in the remaining area.

In order to comply with WDFW regulations, the channel will be expanded from 240 feet to 360 feet. The expansion of the channel poses risks for increased flooding, if the levees were to become compromised, as well as invasive species habitation; the disturbed soils could allow for succession by rapidly growing invasive exotic species and thus a loss of the natural riparian habitat. Species such as Himalayan blackberry, Japanese knotweed, or reed canary grass are present along the Nooksack River and could potentially show up if the re-vegetation is not successful. These noxious weeds could further encroach on the surrounding farmland as well.

2.2.3 Alternatives

Extension of Smith Road:

The land between the terminus of E. Smith Road and Potter Road is forested: zoned for commercial and rural forestry (*Whatcom County Title 20 Zoning Designations [Map]*, 2012). If Smith Road was extended, more trees would be cut down than those under the proposed action. Forests serve to protect the soils from eroding into the streams and prevent landslides from occurring. The removal of forest could destabilize the soil and increase the probability of a landslide. The road is 5.3 miles long, thus there would be a 5.3 mile stretch of land that will have an elevated risk of landslides. If this were to occur, such an impact could be far greater than the effects of construction on the banks near the bridge. It should be noted that these impacts mainly pertain to the environment; compared to the surrounding forest that is also zoned for commercial and rural forestry, the road will only take up a small area and thus will not result in any significant economic impacts.

No-Action

If the current bridge were to remain at the site, there would be little change to the land and shoreline. The rip-rap installed in the banks will prevent the stream from meandering, and thus continue to preserve the surrounding agricultural land. The vegetation in place is stabilizing the soil and without removing the vegetation, it is unlikely that a slide will occur.

2.2.4 Mitigation Measures

Whatcom County Code 16.16.720 H states that natural shoreline processes will be maintained to the maximum extent practicable. The activity must not alter the size or distribution of shoreline or stream substrate, or eliminate or reduce sediment supply from feeder bluffs. In accordance with WCC 16.16.720 H, the disturbed riparian buffer will be re-vegetated, and each plant will be covered with six inches of mulch to increase success (*Whatcom County Public Works*, 2012). The species that will be planted are native riparian vegetation that are common in the region.

Filter fences will be placed at the bottoms of the banks while work is being done to ensure that any land does not get washed away downstream. The purpose is to maintain the stability of the shoreline during and after the project and minimize erosion into the stream.

By law the channel and shoreline composition must be either improved or maintained, and as a result substrate disturbances must be minimized as much as possible. Restoration of the adjacent riparian vegetation will be sufficient to comply with these regulations.

If the reasonable alternative is undertaken, replanting of native vegetation must also occur, but at a larger scale. Because the area impacted is greater, this alternative is likely to have more of a lasting impact despite mitigation than the proposed action.

Level of Significance after Mitigation

For the proposed action, bank stabilization will result from the addition of rip-rap along the shores of the project site. Re-vegetation of the shoreline will provide stable soils; however, it will take many years for succession to occur so it is likely associated impacts will occur in the interim. Due to historic practices of bank armoring and the plan to add new rip-rap, it is likely that the shoreline will prevent meandering of the stream and erode minimally (Whatcom County Public Works, 2012). The LWD placed on the bank will also diversify the shoreline, increasing habitat capabilities.

2.3 Noise

2.3.1 Existing Conditions

The current noise conditions of the Potter Road Bridge are minimal. The area is rural and the bridge is not heavily travelled.

2.3.2 Significant Impacts

Some construction activities will generate high decibel noise such as pile driving, loading and unloading rock, back-up alarms and the use of jackhammers.

2.3.3 Alternatives

Extension of Smith Road

Extending a new road from the west would involve building over 5 miles of road through a forested area, which would also generate high decibel noise, including the use of chainsaws and heavy equipment.

No Action

Taking no action would eliminate the noise concerns for both humans and migrating birds, but the issue would arise again in the future. The Potter Road Bridge will have to be replaced eventually and the noise will have to be mitigated at that time.

2.3.4 Mitigation Measures

All construction noises for both the proposed action and alternative will be limited to the period starting one hour after sunrise and ending one hour before sunset. Aside from limiting the noise

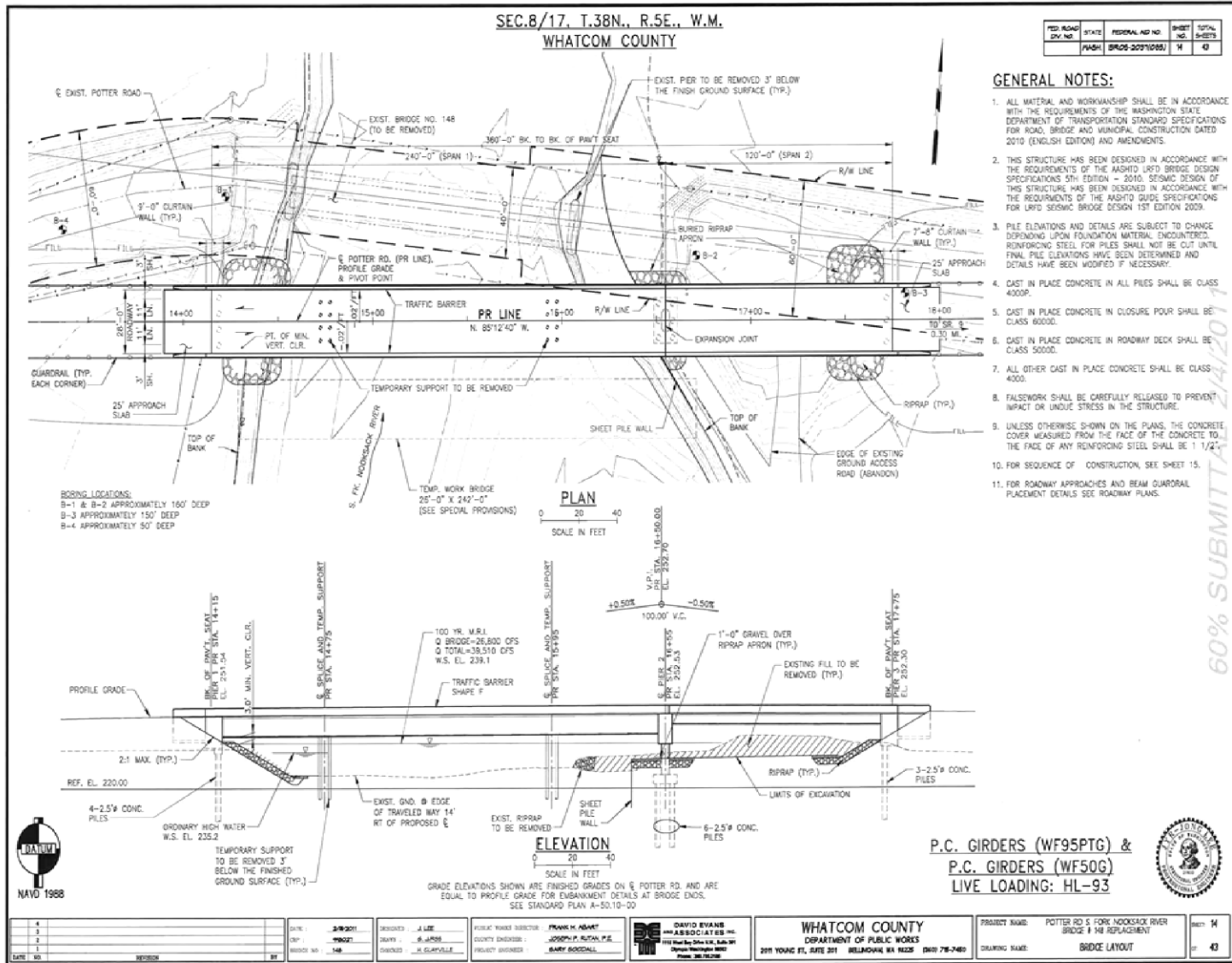


Figure 16: This figure represents the planned location of the new bridge, running slightly parallel to the existing bridge and merging with the road.

disturbances to local residents, the primary reason for noise mitigation is the potential for the disturbance of marbled murrelets, a threatened species of seabird.

Significance After Mitigation

There should not be any lasting adverse impacts after mitigation.

2.4 Recreation

2.4.1. Existing Conditions and Impacts

The South Fork of the Nooksack is popular for groups of people to float in during the summer and the Potter Road Bridge is a highly used stopping point for groups coming from the town of Acme up river. Currently, there is a small pull-off area on the east shore of the river on the south side of the road. Building the new bridge will eliminate this area, but there is a plan in place to add two parking spaces for recreational users as well as a 6-foot wide pedestrian path on the north side of the bridge. The proposed parking spots would be approximately 750 feet east of the bridge.

During the construction process over the next three summers for both the proposed action and for the reasonable alternative, there may be interruption of recreational use of the site due to the construction crew building coffer dams and rerouting the river as well as doing excavation work in the current parking area. These impacts are not expected to be significant. Under the no-action alternative, there would be no change in recreation use assuming continued bridge structural maintenance.

2.5 Aesthetics

2.5.1 Existing Conditions

The vegetation in the riparian zone and the broad river are the most scenic components of the project area, although the Himalayan blackberry growth detracts from this somewhat. The large, cutback patch of blackberry is visually distracting. The bridge itself has several visually unattractive aspects, with a tattered underside, a bent guardrail and graffiti on the supporting columns (Figure 17).

2.5.2 Significant Impacts

The installation of a new bridge may improve the aesthetics of the structure itself by the removal of the damaged bridge. The new bridge will be composed of pre-stressed concrete and will be two lanes instead of one. Unfortunately, a projected image of the new bridge for this site does not exist for comparison. Also, removal of riparian vegetation in the immediate area will decrease the aesthetics of the natural landscape. Consistent management of replanted riparian vegetation should result in riparian visual improvement.

2.5.3 Alternatives

Extension of Smith Road

Removal of the bridge would restore the project site to its natural state, thereby making the surrounding area more scenic. However, installation of the new road through a wooded landscape would decrease the natural aesthetics of the surrounding forest for hikers, but may expose more travelers to the interior of the forest.



Figure 17: **A.** Scenic view of the South Fork Nooksack River, looking downstream from the Potter Road Bridge. Note the peeling paint on the cross-beam in the foreground. **B.** Underside of the bridge's eastern side, with creosote pilings and tattered plastic.

No-Action

If the project is not undertaken, the bridge will become increasingly decrepit without maintenance. The vegetation will not be affected, and thus the immediate area will remain lightly forested but will continue to be encroached on by Himalayan blackberry.

2.5.4 Mitigation Measures

Control of invasive species and encouraging the growth of replacement riparian vegetation will be most effective in combating negative aesthetic impacts for both the proposed action and reasonable alternative. If the no-action option is selected, painting the bridge and replacing the damaged portions (such as the guardrail) will greatly improve aesthetics.

Level of Significance After Mitigation

The aesthetic changes will not be significantly adverse after mitigation; replanting the banks should improve the landscape's appearance.

2.6 Historic & Cultural Preservation

2.6.1 Existing Conditions and Impacts

The bridge is over 75 years old, which makes it eligible for the National Register of Historic Places (Fox, 2011). There is no confirmation that this label is official, however. Thus, although an old landmark will be lost if the bridge replacement is carried out under either the proposed action or reasonable alternative, this impact is not significant especially in comparison to other environmental factors.

2.7 Transportation

2.7.1 Existing Conditions and Impacts

Traffic over the bridge currently averages about 700 cars per day (Holth, 2011). The construction phase of the proposed action should not significantly impact transportation because the current bridge will remain open while construction is ongoing. After construction, expansion of the bridge from one lane to two will improve traffic flow but should not increase it due to the rural nature of this site. (In other words, replacing the bridge will not result in a significant influx in vehicles because it will not increase the population residing across the bridge.) The extension of Smith Road as a reasonable alternative should not change the overall traffic average nor impact transport significantly. The no-action alternative will also not impact traffic, assuming the bridge is maintained so that it does not fail physically.

Decision Matrix

The decision matrix presents a comparison of the environmental impacts imposed by the proposal and alternatives. The symbol (-) represents negative impacts, (+) represents positive impacts and (0) represents no significant impacts. Both the reasonable alternative and no-action alternative include their respective mitigation components, but it should be noted for the reasonable alternative that impacts will vary depending on specific details (such as distance from the river).

SEPA Elements	Proposal	After Mitigation	Reasonable Alternative	No-Action
Earth	-	0	-	0
Water	-	+	-	-
Plants	-	+	-	0
Animals	-	+	0	0
Air	-	0	-	0
Energy and Natural Resources	0	0	-	-
Environmental Health	-	0	-	0
Land and Shoreline Use	-	0	-	0
Noise	-	0	-	0
Recreation	-	+	0	0
Aesthetics	-	+	0	0
Historic/Cultural Preservation	-	-	-	0
Transportation	0	+	0	0

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