

Skykomish Evacuation Alternative Analysis Report

December 2023



King County

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II. Proviso Text

P1 PROVIDED THAT:

Of this appropriation, \$200,000 shall not be expended or encumbered until the executive transmits a Skykomish evacuation alternatives analysis report and a motion that should acknowledge receipt of the report, and a motion acknowledging receipt of the report is passed by the council. The motion should reference the subject matter, the proviso's ordinance number, ordinance section and proviso number in both the title and body of the motion.

The report shall use emergency management best practices and include, but not be limited to, the following:

- A. An evaluation of options to evacuate residents who live along the NE Old Cascade Highway between the town of Skykomish and the unincorporated community of Grotto in the event of an emergency or disaster, assuming the Miller River bridge #999W is not open to regular traffic; and
- B. Identification of:
 - 1. The costs associated with each option;
 - 2. Funding sources, including state and federal funding sources, that could be used to implement each option; and
 - 3. The preferred option or combination of options and the reasoning for the selection of the option or combination of options.

The executive should electronically file the report and motion required by this Proviso no later than December 29, 2023, with the clerk of the council, who shall retain an electronic copy and provide an electronic copy to all councilmembers, the council chief of staff and the lead staff for the local services and land use committee or its successor.

Ordinance 19546, Section 23, Office of Emergency Management, P1¹

¹ Ordinance 19546 ([Link](#))

III. Executive Summary

As called for by Ordinance 19546, Section 23, Proviso P1, this report details the potential options to evacuate residents living in the unincorporated Money Creek area west of the town of Skykomish.

In 2011, the NE Old Cascade Highway, formerly a through road, was permanently closed at the East Fork of the Miller River when a section of the roadway that led up to the Miller River Bridge was washed out and destroyed by a storm. This limited the entry and exit for this area to a single bridge over the Skykomish River with access to US Route 2. On September 10, 2022 the Bolt Creek fire erupted, impacting the communities of Baring, Grotto, and Skykomish. On November 29, 2022, the King County Council, authorized the Proviso through Ordinance 19546, to evaluate options to evacuate residents and visitors in this area if necessary.

Approximately six residents live year-round along the NE Old Cascade Highway between the town of Skykomish and the unincorporated community of Grotto. However, there are additional homes in the area that often serve as vacation or summer rentals. At its peak, the population could reach approximately 60 individuals. Primitive camping is also popular in the foothills and could represent additional people requiring evacuation. The recent Bolt Creek Fire highlighted the potential complications of providing service to such individuals. The fire spread along US Route 2, causing the roadway to be closed multiple times for days and weeks, forcing people in this area to shelter in place for extended periods of time.

This report is written from an emergency management perspective by the King County Office of Emergency Management (KCOEM). The report focuses on the bridge engineering and broader environmental matters from a high level. The funding estimates provided in the report were calculated in consultation with the King County Department of Natural Resources and Parks (DNRP), Department of Local Services (DLS), Road Services Division (Roads) and the Office of Performance, Strategy and Budget (PSB). Many private companies were reluctant to commit to estimates. KCOEM was unable to identify any state or federal funding sources to implement the options identified in the report. In particular, emergency responders, including search and rescue teams, are either already accounted for in existing budgets, or rely on volunteers for support. Any capital project would need to be funded from a yet-to-be-identified funding source. Most potential outside funding sources, such as federal transportation dollars, are outside the scope of emergency management. Given the costs and potential environmental impacts involved, the cursory findings would not support the approximately \$60 million needed for a new bridge. This is consistent Roads' 2022 review of the Old Cascade Highway washout at Miller River Bridge², which determined there were no additional funding sources and recommended a series of improvements to the existing infrastructure.³ Figure 1 below presents a summary of the potential evacuation options identified in response to the Proviso.

² Safety and resiliency in Skykomish Valley (Old Cascade Highway washout at Miller River Bridge) [\[Link\]](#)

³ NE Old Cascade Highway Roadway and Drainage Improvements [\[Link\]](#)

Figure 1 - Summary of Options, Cost, Feasibility, and Funding Options

Option	Cost	Feasibility	Funding Option
Skykomish River Bridge #999Z	Cost of responding to the emergency	This is currently the existing means of evacuation and costs associated are only that of response resources.	General Fund No identified state or federal sources.
Restore Access to Miller River Bridge #999W	\$62 million ⁴	Prohibitively expensive based on both funding as well as environmental concerns.	General Fund No identified state or federal sources
New Bridge at River Apex	>\$62 million (estimate provided by Roads)	Prohibitively expensive based on both funding as well as significant environmental concerns.	General Fund No identified state or federal sources
Pedestrian Bridge	\$33 million (estimate provided by DNRP and DLS)	Lower impact but of less general usability and also prohibitively expensive.	General Fund No identified state or federal sources
Temporary Bridge	\$40 million (estimate provided by Roads)	Prohibitively expensive with environmental concerns similar to other bridge construction options. Temporary bridges have a 5-year lifespan.	General Fund No identified state or federal sources

⁴ Miller River Bridge Draft Cost Estimate [[Link](#)]

Option	Cost	Feasibility	Funding Option
BNSF Rail Bridge (Skykomish River)	Cost of responding to the emergency	A potential option for pedestrians only, and dependent on emergency conditions. Could be problematic for individuals with access and functional needs.	General Fund No identified state or federal sources
BNSF Rail Bridge (Miller River)	Cost of responding to the emergency	A potential option for pedestrians only, and dependent on ambient conditions. Could be problematic for individuals with access and functional needs	General Fund No identified state or federal sources
Amtrak Rail	Cost of responding to the emergency	Expenses are dependent on response conditions. Two passenger rail passes are made in the area daily.	General Fund No identified state or federal sources
KCSO Helicopter Evacuation	Cost of responding to the emergency	Expenses are already factored into current budgeting. Feasibility is dependent on availability and weather conditions.	General Fund No identified state or federal sources
Search and Rescue	Cost of responding to the emergency	Expenses are already factored into current budgeting. Feasibility is dependent on availability, weather conditions, and the condition of the waterways.	General Fund No identified state or federal sources
Purchase Homes in Area	\$18 million (estimate from the King County Assessor’s website)	Prohibitively expensive and could have significant community concerns.	General Fund No identified state or federal sources

KCOEM finds that the most feasible and practical option for any evacuation is to utilize the existing bridge already in place. Based on subject matter expert input, from structural engineers with DLS, the existing bridge remains structurally sound with a projected low likelihood of future impacts structurally. Depending on the circumstances under which individuals may require evacuation, other options may be considered, including use of the BNSF railroad bridges, the use of search and rescue assets, and the use of Amtrak. Local first responders and KCOEM have educated and will continue to encourage residents of and visitors to the area to be prepared for emergencies and disasters; this will promote greater community resilience.

IV. Background

Department Overview: The Department of Executive Services (DES) provides internal services to King County government agencies and public services directly to King County residents. The divisions and offices that make up DES include the Business Resource Center, Finance and Business Operations Division, Office of Emergency Management, Facilities Management Division, Fleet Services Division, Inquest Program, King County International Airport-Boeing Field, Office of Risk Management Services, and the Records and Licensing Services Division.

Within DES, the King County Emergency Management (KCOEM) provides for the effective direction, control, and coordination of County government emergency services functional units; coordinates with other governments and the private, non-governmental sector; and serves as the coordinating entity for cities, County departments, and other appropriate agencies before, during, and after incidents and events of regional significance. This work is done in support of King County's True North and Values, the Executive's vision of making King County a welcoming community where every person can thrive.

Key Historical Context: The historic NE Old Cascade Highway is a low-traffic County road that stretches between Stevens Pass and the unincorporated community of Grotto in the Skykomish Valley. Formerly a through road, the NE Old Cascade Highway was permanently closed at the East Fork of the Miller River when, in 2011, a section of the roadway that led up to the Miller River Bridge was washed out and destroyed by a significant storm.⁵

Current Context: Nearby residents from the unincorporated community west of the Miller River currently have only one means of ingress and egress via the Skykomish River Bridge #999Z. In addition to the immediate area of concern, there are also residents east of the Miller River, in the area leading eastbound into the Town of Skykomish who also only have a single means of ingress and egress. Figures 2 and 3 show aerial views of the area taken by the King County GIS Center in 2009 and 2021, respectively. Figure 2 shows the Miller River Bridge and NE Old Cascade Highway intact, while Figure 3 Shows the Miller River Bridge and NE Old Cascade Highway after the 2011 washout.

Figure 2 – 2009 Aerial View with Inset of intact Miller River Bridge



⁵ FEMA Letter to Grantee, 1963-DR-WA King County Old Cascade Highway at Miller River, September 16, 2011

Figure 3 – 2021 Aerial View with Inset of Miller River Bridge and Washed-Out Approach



In September 2022, residents and visitors of the area between the town of Skykomish and the unincorporated community of Grotto were impacted by the Bolt Creek Fire, which burned nearly 15,000 acres north of U.S. Highway 2 and led to multiple road closures along the highway.⁶ While residents of this area were not subject to evacuation orders during the Bolt Creek Fire in September and October 2022, this event highlighted the need for evacuation alternatives, as the threat of wildfire on the west side of the Cascade Mountains is growing.⁷

Report Methodology: KCOEM conducted an options analysis to assess potential evacuation options in the event of an emergency or disaster. Each option was evaluated for feasibility and overall practicality. Extensive research and outreach were conducted by emergency management staff to a variety of parties with ties to the community. These efforts included speaking with representatives from the community through workshops hosted following the Bolt Creek Fire of 2022. The following subject matter experts were interviewed:

- The fire chief for King County Fire District #50 (KCFD 50)
- The King County Sheriff's Office (KCSO) deputy detailed to the area
- The KCSO lead deputy for Search & Rescue
- The KCSO Marine Unit
- The mayor of the town of Skykomish
- The incident response manager for Burlington Northern Santa Fe Railroad (BNSF)
- The area emergency manager for Amtrak
- Engineers from the Department of Local Services (primarily the Road Services Division)
- Engineers from the Department Natural Resources and Parks (primarily the lead for the Miller River Restoration Project)
- Representatives of the Bonneville Power Administration

⁶ Bolt Creek Fire Information | InciWeb (nwcg.gov) [\[Link\]](#)

⁷ Increasing number of western Washington wildfires a worrying trend amid stressed forests [\[Link\]](#)

- Representatives of the U.S. Forest Service
- Representatives of the Washington National Guard
- Representatives of Snohomish County Regional Fire & Rescue
- Representatives of Snohomish County Volunteer Search & Rescue
- Representatives of the Snohomish County Department of Emergency Management
- Staff members from KCOEM

Cost estimates for the options detailed below was primarily gleaned from direct interaction with engineers and from various reports and documents provided by the parties involved.⁸ One of the documents was The Case for Reopening the Old Cascade Highway, Grass Roots Fix the Miller River Washout, which is attached as Appendix A to this report. The study included multiple legislative resolutions passed by the municipalities in the area:

- The city of Skykomish (Resolution Number 250)
- The town of Index (Resolution 23-08)
- The city of Gold Bar (Resolution 23-02)
- The city of Sultan (Resolution No. 23-07)
- The Snohomish County Council (Resolution No. 23-028)

The study noted above also included statements provided by local residents detailing the impacts they have experienced since the loss of the Miller River Bridge access point.

⁸ *The Case for Reopening the Old Cascade Highway, Grass Roots Fix the Miller River Washout*

V. Report Requirements

- A. An evaluation of options to evacuate residents who live along the NE Old Cascade Highway between the town of Skykomish and the unincorporated community of Grotto in the event of an emergency or disaster, assuming the Miller River bridge #999W is not open to regular traffic;
- B. Identification of
 - 1. The costs associated with each option;
 - 2. Funding Sources, including state and federal funding sources, that could be used to implement each option; and

This section contains a comparison of evacuation options for the affected community in the event of an emergency or disaster, based on emergency management best practices, and the potential costs and funding sources associated with each option. Please note that Proviso requirement B3 – the preferred option or combination of options and the reasons for selecting the option(s) – is included as a separate section on page 18.

Many of the proposed evacuation options are prohibitively expensive and would require months to years of planning, preparation, and implementation. Less costly options would be provided on an as-needed basis, used at the discretion of local officials and emergency management, and depend on available resources at the time of the emergency or when conditions are appropriate (e.g., resources that are seasonally dependent). In addition to the evacuation options, residents of the area may also be requested to shelter in place for an extended period of time, until resources could arrive, or the emergency had ended. Emergency management authorities recommend residents be “two weeks ready” and have an emergency kit with supplies and resources, have a plan for when emergencies occur, and have a means to stay aware of the situation and be able to receive communications about the emergency.⁹

Option 1: Skykomish River Bridge (#999Z)	
Description	Utilize the existing bridge for access to US 2. The bridge could likely withstand an earthquake up to magnitude 6.5-7.5 on the Richter Scale without significant damage; the seismic performance will vary based on the earthquake depth, acceleration, epicenter location, and the sediment and soil factors at the bridge location. This bridge is not at significant risk from flooding and is unlikely to be impacted by channel migration. This is the current primary evacuation option that would be used by residents of the area.
Estimated Cost	Cost to deploy first responders and related assets (if needed) or any other assistance the community may need, which is situationally dependent.
Funding Source	General Fund. No identified state or federal sources.

⁹ King County OEM Preparedness [\[Link\]](#)

Option 2: Restore Access to the Miller River Bridge #999W (#999W)

Description	<p>Restoring access to this bridge would provide the community adjacent to the Miller River Campground with additional access to the town of Skykomish and US 2 in the eastbound direction.</p> <p>The existing bridge east of the washout was built in 1921 and consists of a 160-foot main span with 2-span timber trestle approaches at each end. The main span truss is the oldest steel Pratt truss in King County and is listed in the King County Landmark register.¹⁰ While the bridge was undamaged by the road washout, it is well past its design-life and has multiple structural and functional deficiencies as listed below:</p> <ul style="list-style-type: none">• The width of the bridge roadway, which is 16 feet 9 inches, is too narrow to accommodate two lanes of traffic.• The truss has inadequate overhead clearance of 13-feet 6 inches.• The bridge is posted for a load limit of 23 tons, with only one truck at a time on the bridge.• The spread footing foundations are scour critical due to the channel migration and it is mitigated by heavy riprap protection.• Some of the steel members exhibit minor corrosion as the bridge was encapsulated with paint in 1997.• Portals have truck impact damages noted.• Dirt accumulates on the 4"x12" deck planks and they are worn.• Timber rails and curbs need frequent maintenance.• The timber stringers in the truss span are the most critical members in the bridge for the load rating.• The sufficiency rating for this structure is 19.17 Structurally Deficient (SD). <p>Floods in November 2006, December 2008, January 2009, December 2010, and January 2011 have inundated the alluvial fan¹¹ from the east abutment of the Miller River Bridge #999W west to Spree Creek. The NE Old Cascade Highway is overtopped regularly west of the Miller River Bridge #999W.¹² The roadway overtopping necessitates regular closing of the roadway due to water over the road and subsequent sediment removal and damage repairs.</p> <p>The existing bridge and roadway alignment constrain the natural geomorphic function of the Miller River Fan. Reestablishing a transportation corridor across the alluvial fan would need to accommodate future channel migration processes</p>
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¹⁰ King County Landmarks: King County Bridges [\[Link\]](#)

¹¹ A fan-shaped mass of alluvium deposited as the flow of a river decreases in velocity.

¹² "South Fork Skykomish River Basin Restoration Feasibility Project", Herrera [\[Link\]](#)

	and flooding. This could result in longer, larger, and/or higher structures with greater hydraulic capacity and associated costs.
Estimated Cost	According to DLS, the estimated cost to utilize this option is \$62 million (in 2022 dollars). ¹³ According to DLS, this option is infeasible due to cost. Further study is needed to provide a comprehensive cost estimate.
Funding Source	General Fund. No identified state or federal sources.

Option 3: Install a New Bridge at the River Apex	
Description	<p>Construct a new modern bridge and road at the Miller River Fan apex to ensure seamless upstream alignment.¹⁴ This would block traffic flow by closing the NE Old Cascade Highway crossing of Miller River. Figure 4 below shows the existing geomorphic features of the Miller River Fan.</p> <p>This option consists of the following work items:</p> <ul style="list-style-type: none"> • build a new bridge that spans Miller River at its apex; • build a new segment of road (clearing, grading, and improving with asphalt and shoulders) that connects Miller River Road to the west abutment of the new bridge crossing; • build a new segment of road (clearing, grading, and improving with asphalt and shoulders) connecting the east abutment of the new bridge to the NE Old Cascade Highway; • close the portion of the NE Old Cascade Highway currently located west of the existing Miller River Bridge #999W (removing asphalt and revegetating); and • abandon or relocate the existing bridge per the Certificate of Acceptance (COA) requirements. <p>This option was eliminated for further review in a 2011 feasibility study due to the following reasons:¹⁵</p> <ul style="list-style-type: none"> • A new road right-of-way would be needed. • Unpredictable risks associated with engineering and environmental permitting. • Impacts to riparian¹⁶ areas from the required road improvements. • Time intensive and costly permitting needs due to the preparation of an Environmental Assessment (EA) / Environmental Impact Statement (EIS).
Estimated Cost	Initial analysis is prohibitively high, likely greater than option 2.
Funding Source	General Fund. No identified state or federal sources.

¹³ Miller River Bridge draft cost estimate [\[Link\]](#)

¹⁴ Herrera Environmental Consultants, Inc., "Restoration Opportunity Report South Fork Skykomish River Basin Restoration Feasibility Project [\[Link\]](#)

¹⁵ 2011 Draft Miller River Bridge feasibility report submittal to FEMA [\[Link\]](#)

¹⁶ Relating to or situated on the banks of a river.

Option 4: Build a Pedestrian Bridge	
Description	<p>A pedestrian bridge would require a reinforced support system and extra-deep foundations, similar to the permanent bridge option, to address the structural issues related to the bridge location in the channel migration zone.</p> <p>DLS anticipates that a bridge at the existing site would need to be 1,000 feet long and approximately 12-16 feet wide. DNRP is the County department that maintains pedestrian bridges, although for construction they often partner with DLS. DNRP is not an emergency response agency empowered to deploy emergency resources, therefore, building a pedestrian bridge is expected to take between eight and 15 years. Additionally, funding would need to be allocated by the King County Council, which may impact the timeline. In order to build a pedestrian bridge, the County would need to develop a trail plan, access routes, and a targeted list of priority property acquisitions.</p>
Estimated Cost	\$25-33 million (in 2023 dollars). Estimate provided by DLS in coordination with DNRP. These figures do not include the planning, land acquisition, or maintenance costs associated with the facility. Further study is needed to provide a full cost estimate.
Funding Source	General Fund. No identified state or federal sources.

Option 5: Install a Temporary Bridge	
Description	<p>Similar to the pedestrian bridge option, a temporary bridge would require a reinforced support system and extra-deep foundations to address the structural issues related to the bridge location in the channel migration zone. This option faces similar challenges as the pedestrian bridge, including project timing and funding.</p> <p>Additionally, because the BNSF Railroad is downstream, the design would need to be coordinated with them. The east approach is also within the railroad Right-Of-Way. Temporary bridges have a five-year lifespan.¹⁷</p>
Estimated Cost	\$40 Million (in 2022 dollars). Estimate provided by DLS. This cost estimate accounts for channel migration, scour, ¹⁸ and the cost of a substructure, which is similar for a temporary or permanent substructure.
Funding Source	General Fund. No identified state or federal sources.

Option 6: BNSF Railroad Bridge over the Skykomish River (BNSF Railroad Bridge 1735.3)	
Description	This bridge crosses the Skykomish River to the west of the Skykomish River Bridge #999Z. According to BNSF, railroad steel spans typically respond well to seismic events. BNSF has demonstrated that, based on their connection details

¹⁷ Design Requirements for Temporary Bridges, Washington State Department of Transportation [\[Link\]](#)

¹⁸ Of water or a watercourse make a channel or pool by flowing forcefully over something and removing soil or rock.

	<p>and overall “build,” bridges of this type meet the survivability limit state.¹⁹ The wood ties on the rail bridge are vulnerable to wildfire, and were sprayed with sprinklers during the Bolt Creek Fire in 2022. Figure 5 below shows the location of the BNSF railroad bridge over the Skykomish River.</p> <p>The bridge has a narrow pedestrian walkway used by BNSF personnel for bridge maintenance. In the case of an emergency, it may be possible to lay down temporary boards so pedestrians, including those in wheelchairs, could travel in the center of the bridge with no gaps.</p> <p>During the Bolt Creek Fire, BNSF offered the option of using a grapple truck to move people and their belongings across the bridge, if needed, upon request from fire responders and KCOEM. However, in the winter, it may not be possible to move the grapple truck to this site. In warmer months, it is estimated that the grapple truck could be at the site in one hour. Grapple trucks have a large truck bed with railings.</p> <p>Hi-rail trucks (pickup trucks with rail capability) could be at the Money Creek area in approximately 30 minutes, depending on conditions, according to BNSF representatives. These trucks have five seats and storage space in the truck bed.</p>
Estimated Cost	Cost to deploy first responders and related assets (if needed) or any other assistance the community may need.
Funding Source	General Fund. No identified state or federal sources.

Option 7: BNSF Railroad Bridge over the Miller River	
Description	<p>The railroad bridge, trestle, and fill prism are all vulnerable to any increase in scour, channel migration or significant large wood accumulation.²⁰ Current risk to the railroad bridge is considered high in a geologist’s view of hazards. The wood ties on the rail bridge are vulnerable to wildfire, and were sprayed with sprinklers during the Bolt Creek Fire in 2022.</p> <p>This bridge also has a narrow pedestrian walkway used by BNSF personnel for bridge maintenance. In the case of an emergency, it may be possible to lay down temporary boards so pedestrians, including those in wheelchairs, could travel in the center of the bridge with no gaps. Figure 6, below, shows a BNSF hi-rail truck on the bridge spanning the Miller River.</p>
Estimated Cost	Cost to deploy first responders and related assets (if needed) or any other assistance the community may need.
Funding Source	General Fund. No identified state or federal sources.

¹⁹ Load and Resistance Factor Design [\[Link\]](#)

²⁰ Herrera Environmental Consultants, Inc., “Restoration Opportunity Report South Fork Skykomish River Basin Restoration Feasibility Project” (April 30, 2013) [\[Link\]](#)

Option 8: Amtrak Transportation	
Description	Depending on the emergency, Amtrak could pick up residents in rail passenger cars if available. Morning and late evening routes cross both rail bridges. ²¹ This option would require access to the tracks and logistical support to evacuate the area residents.
Estimated Cost	Cost to deploy first responders and related assets (if needed) or any other assistance the community may need.
Funding Source	General Fund. No identified state or federal sources.

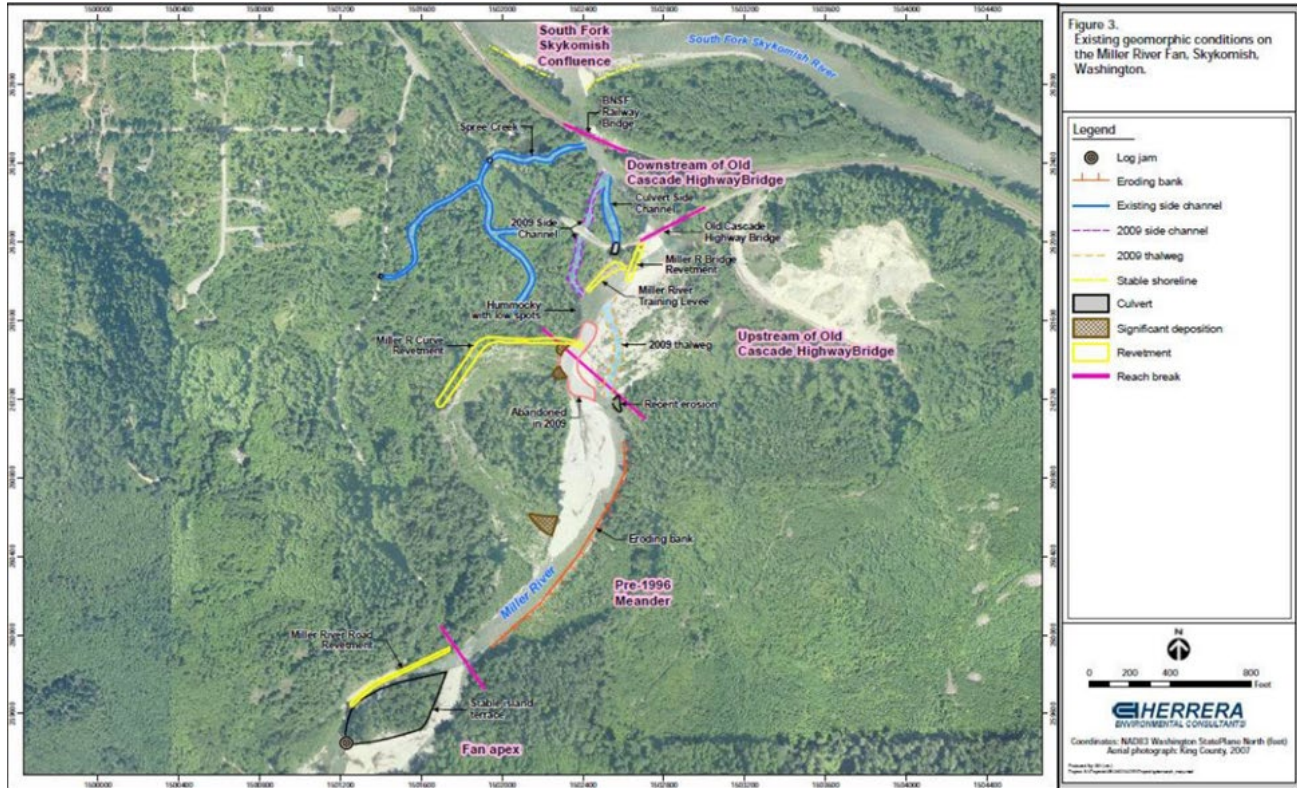
Option 9: King County Sheriff's Office Helicopter	
Description	There are places to land a helicopter in the area. However, access would be dependent on weather and pilot availability. During flooding and fire conditions, the ability to land may be limited as well as the number of people who could be moved at once.
Estimated Cost	Cost to deploy first responders and related assets (if needed) or any other assistance the community may need.
Funding Source	General Fund. No identified state or federal sources.

Option 10: Search and Rescue	
Description	<p>There are additional traditional search and rescue options.</p> <p>The King County Sheriff's Office Marine Unit may have water rescue capacity, depending on water levels in the Skykomish River. Washington State Fish and Wildlife also has swift water rafts. However, boats may have difficulty accessing certain areas due to the river and bank conditions. Snohomish County is nearby and has search and rescue capabilities, including three to four hovercraft in the area. Hovercraft are not as useful or effective in rocky areas.</p> <p>High water vehicles may be available from the Washington National Guard. Safely crossing the waterway depends on depth of the water; generally, the limit is 20 inches of depth, and the maximum depth that can be safely forded is 30 inches for a crossing duration of no more than 15 minutes. According to King County Search and Rescue, which has a 4x4 unit, a regular truck would not be able to ford the rivers at any time of year. The vehicles in this unit may be able to use alternate Forest Service roads when not snow-covered.</p>
Estimated Cost	Cost to deploy first responders and related assets (if needed) or any other assistance the community may need.
Funding Source	General Fund. No identified state or federal sources.

²¹ Amtrak Cascades Schedule [\[Link\]](#)

Option 11: Purchase All Homes in the Area	
Description	Purchase the 104 parcels that would be impacted if an emergency prevented ingress and egress.
Estimated Cost	\$18 million (in 2018 dollars and based on the parcel information with the King County Assessor). ²²
Funding Source	General Fund. No identified state or federal sources.

Figure 4 - Existing geomorphic conditions on the Miller River Fan Skykomish Washington



²² King County Department of Assessments: eReal Property [\[Link\]](#)

Figure 5 - BNSF Bridge across South Fork of Skykomish River



Figure 6 - Photo of BNSF Bridge Showing Hi-Rail Truck on Tracks



3. The preferred option or combination of options and the reasoning for the selection of the option or combination of options

A wide range of potential evacuation options were explored in this report. Potential costs or environmental impacts were captured but not used to disqualify a potential option. However, when identifying a preferred option, each are influential factors. Constructing a new bridge or replacing a bridge would be expensive and would not align with current environmental practices such as implementing innovative restoration practices (e.g., beaver introduction) where appropriate, to dampen the effects of shifting hydrology and work toward resilience by encouraging natural processes that may moderate expected shifts.²³ A pedestrian bridge would be less impactful to the environment, but also of less utility given it could not accommodate vehicle traffic, and still very expensive. For many of the emergency response options (e.g., BNSF hi-rail trucks), subject matter experts were reluctant to provide cost estimates.

Based on analysis performed by KCOEM staff, the most feasible and practical option is to utilize the current bridge already in place. Based on subject matter expert input from engineers with DLS, the current bridge remains structurally sound and has a low likelihood of future impacts from channel migration or flooding. Depending on the circumstances of the evacuation, other options may be considered, such as the BNSF railroad bridges, search and rescue assets, and Amtrak. Local first responders and KCOEM have educated and will continue to encourage residents of and visitors to the area to be prepared for emergencies and disasters; this will promote greater community resilience.

VI. Conclusion/Next Actions

As called for by the Proviso, this report provides an alternatives analysis for evacuation of areas surrounding the town of Skykomish.

This report was prompted, in part, by the events that transpired during the Bolt Creek Fire in the fall of 2022. Events causing potential evacuations in this area, such as wildfires or winter weather events, will remain a concern into the future. Thus, the evacuation options explored in this report help support safety for King County visitors and residents.

Community resilience is a pillar of emergency management and a duty owed to all the residents of not just King County but the many visitors that come to the area.

VII. Appendices

Appendix A: The Case for Reopening the Old Cascade Highway

²³ WRIA7 Climate Change Impacts on Salmon Issue Paper” March 2017 [\[Link\]](#)

THE CASE FOR REOPENING THE OLD CASCADE HIGHWAY



Grassroots Fix the Miller River Washout

THE CASE FOR REOPENING THE OLD CASCADE HIGHWAY

Executive Summary

The Cascade Highway served the entire Upper Skykomish Valley in Western Washington for over 100 years, connecting and protecting its people until it washed out in 2011. Our county has informed the people of the Upper Skykomish Valley that they have no intention of restoring this connection, and plan to terminate the Highway at the washout. This paper makes the case that this county action is ill advised, and that the washout of the Cascade Highway at Miller River should be repaired for the Safety and Protection of the people of the Upper Skykomish Valley with nothing less than adequate passage for a single lane, weight restricted, pedestrian, bicycle, emergency vehicle supporting bridge.

SECTION 1

About Section 1 of This Document

Town/City/County Resolutions and Statements of Support

To underscore that this is an issue impacting much more than one isolated community, the Town Councils of Skykomish, Index, and Goldbar, the City Council of Sultan, and the Snohomish County Council each ratified Resolutions in support. These are included in Section 1 of this document, along with community member statements that serve to represent the deep concern expressed in the many emails sent to legislators.

**The Town of Skykomish
Resolution Number 250**

A resolution regarding the repair of the washout on the Old Cascade Highway west of the Miller River bridge. In 2011, the Miller River washed out a portion of the Old Cascade Highway, destroying the only alternative access route for Highway 2 through Skykomish and dividing our community.

WHEREAS, the Old Cascade Highway holds great historical significance to the Town, and is designated a King County Historic and Scenic Corridor as Cascade Scenic Highway (King County Road No. 999); **and**

WHEREAS, physical risks to the area resulting from lack of road repair are significant, costly, and potentially hazardous including (1) continued and further erosion of the east and west banks of the Miller River at that site; (2) potential structural compromise due to river current of the railroad bridge still in use a short distance downstream; (3) potential compromise to the power/communication lines that cross the washout to serve the residents in that area; **and**

WHEREAS, emergency closures of Highway 2 can result in (and have resulted in) denial of passage to residents and travelers for medical services, jobs, school, postal services including required medications, necessities, and being home; **and**

WHEREAS, the negative social, safety, and equity impacts due to the washout physically dividing our community;

**NOW, THEREFORE, the Town Council of the Town of Skykomish, do resolve as follows:
The Mayor and Town Council strongly support repairs to that critical washout infrastructure and restoration of road access across the Miller River.**

**PASSED by the Town Council of the Town of Skykomish, WA at the council meeting dated
Jan. 23, 2023**

**Virginia Eburn
Town**

**Henry Sladek
Mayor**

Town of Index
Resolution 23-08

A RESOLUTION IN SUPPORT OF REPAIRING THE OLD CASCADE
HIGHWAY WASHOUT AT MILLER RIVER

WHEREAS, a flood in 2011 washed out and closed the Old Cascade Highway at the Miller River bridge in King County, Washington, severing a travel route that had been uninterruptedly open for approximately 100 years; and

WHEREAS, the loss of this crossing interrupted a historically, culturally, and economically significant and necessary thoroughfare in the upper Skykomish Valley; and

WHEREAS, the loss of this thoroughfare creates a significant and harmful lack of necessary redundancy in the US2 highway corridor, negatively affecting:

- ingress and egress of residents and guests for both commonplace and emergency needs,
- emergency responder access to affected zones and emergency egress in the event of emergency or disaster,
- trade, commerce, and tourism
- travel alternatives to portions of US2 during closures; and

WHEREAS, the losses and barriers thus imposed upon the local community and travelers alike are of a nature and magnitude which would have been deemed unacceptable, and likely long since dealt with, had they affected the more populous regions in the Puget Sound basin; and

WHEREAS, loss of channel constraints imposed by the destroyed crossing potentially threatens the BNSF mainline crossing immediately downstream; and

WHEREAS, the Town of Index finds that neglect of the health and redundancy of the US2 corridor has wide ranging and negative impact on all communities in the Skykomish Valley; and

WHEREAS, the long term failure to maintain, repair and/or restore flood based interruptions to the continuity of alternatives to US Highway 2, specifically at Scenic, Miller River, and Lowe Creek have combined to essentially destroy what was in the recent past a near continuous transportation alternative between Baring and Stevens Pass; and

WHEREAS, the significant and adequate resources necessary to make an acceptable repair are believed to be held by or available to the government of King County, the question being instead one of priorities; and

WHEREAS, necessary repairs now being completed to similar damage to the nearby Index-Galena Road clearly demonstrate that such necessary projects are both environmentally and financially feasible; and

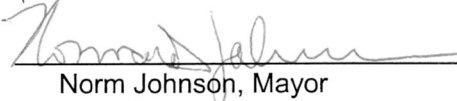
WHEREAS, in the intervening eleven-plus years since the flood event, zero progress has been made towards a solution acceptable to local communities; and

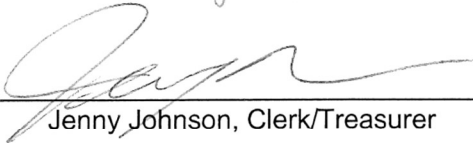
WHEREAS interminable delays in pursuing a repair will only result in unnecessary and avoidable increases in project costs,

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE TOWN OF INDEX THAT:

- 1. The Town of Index finds that restoration of the Miller River washout is an essential component of transportation infrastructure health in the Skykomish Valley.
- 2. The Town supports a repair alternative to Old Cascade Highway at the Miller River crossing nothing less than adequate to support pedestrian, bicycle, motor vehicle, and emergency traffic.
- 3. The Town calls upon King County government to assign a high priority to repairs and to work with State and Federal agencies to secure necessary funding and move forward with construction.

ADOPTED BY THE COUNCIL OF THE TOWN OF INDEX ON THIS 3rd Day of April, YEAR 2023

Signed: 
Norm Johnson, Mayor

Attest: 
Jenny Johnson, Clerk/Treasurer

**CITY OF GOLD BAR, WASHINGTON
RESOLUTION 23-02**

**A RESOLUTION OF THE CITY OF GOLD BAR, WASHINGTON IN SUPPORT OF
REPAIRING THE OLD CASCADE HIGHWAY WASHOUT AT MILLER RIVER**

WHEREAS, a flood in 2011 washed out and closed the Old Cascade Highway at the Miller River bridge in King County, Washington, severing a travel route that had been uninterruptedly open for approximately 100 years; and

WHEREAS, the loss of this crossing interrupted a historically, culturally, and economically significant and necessary thoroughfare in the upper Skykomish Valley; and

WHEREAS, the loss of this thoroughfare creates a significant and harmful lack of necessary redundancy in the US2 highway corridor, negatively affecting:

- ingress and egress of residents and guests for both commonplace and emergency needs,
- emergency responder access to affected zones and emergency egress in the event of emergency or disaster, as dramatically proven by the recent Bolt Creek fire,
- trade, commerce, and tourism
- travel alternatives to portions of US2 during closures; and

WHEREAS, the losses and barriers thus imposed upon the local community and travelers alike are of a nature and magnitude which would have been deemed unacceptable, and likely long since dealt with, had they affected the more populous regions in the Puget Sound basin; and

WHEREAS, loss of channel constraints imposed by the destroyed crossing potentially threatens the BNSF mainline crossing immediately downstream; and

WHEREAS, the City of Gold Bar finds that neglect of the health and redundancy of the US2 corridor has wide ranging and negative impact on all communities in the Skykomish Valley; and

WHEREAS, the City of Gold Bar and the Town of Skykomish have entered an interlocal agreement for the City of Gold Bar to provide management of the Skykomish Water System; and

WHEREAS, the long-term failure to maintain, repair and/or restore flood-based interruptions to the continuity of alternatives to US Highway 2, specifically at Scenic, Miller River, and Lowe Creek have combined to essentially destroy what was in the recent past a near continuous transportation alternative between Baring and Stevens Pass; and

WHEREAS, the significant and adequate resources necessary to make an acceptable repair are believed to be held by, or available to, the government of King County, the question being instead one of priorities; and

WHEREAS, necessary repairs now being completed to similar damage to the nearby Index-Galena Road clearly demonstrate that such necessary projects are both environmentally and financially feasible; and

WHEREAS, in the intervening eleven-plus years since the flood event, zero progress has been made towards a solution acceptable to local communities; and

WHEREAS, interminable delays in pursuing a repair will only result in unnecessary and avoidable increases in project costs,

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF GOLD BAR THAT:

- Section I Old Cascade Highway Washout**
- Section II Severability**
- Section III Effective Date**

Section I, Old Cascade Highway Washout

1. The City of Gold Bar finds that restoration of the Miller River washout is an essential component of transportation infrastructure health in the Skykomish Valley.
2. The City supports a repair alternative to Old Cascade Highway at the Miller River crossing nothing less than adequate to support pedestrian, bicycle, motor vehicle, and emergency traffic.
3. The City calls upon King County government to assign a high priority to repairs and to work with State and Federal agencies to secure necessary funding and move forward with construction.

Section II, Severability

This resolution is severable and if any portion of it shall be declared invalid or unconstitutional, the remaining portion shall remain valid and enforceable.

Section III, Effective Date

This Resolution shall take effect from, and after, its passage and approval, as provided by law.

Resolved this 2nd day of May, 2023.

**CITY OF SULTAN
WASHINGTON
RESOLUTION NO. 23-07**

A RESOLUTION OF THE CITY OF SULTAN, WASHINGTON, IN
SUPPORT OF REPAIRING THE OLD CASCADE HIGHWAY
WASHOUT AT MILLER RIVER

WHEREAS, a flood in 2011 washed out and closed the Old Cascade Highway at the Miller River bridge in King County, Washington, severing a travel route that had been uninterrupted open for approximately 100 years; and

WHEREAS, the loss of this crossing interrupted a historically, culturally, and economically significant and necessary thoroughfare in the upper Skykomish Valley; and

WHEREAS, the loss of this thoroughfare creates a significant and harmful lack of necessary redundancy in the US 2 highway corridor, negatively affecting:

- ingress and egress of residents and guests for both commonplace and emergency needs,
- emergency responder access to affected zones and emergency egress in the event of emergency or disaster,
- trade, commerce, and tourism
- travel alternatives to portions of US2 during closures; and

WHEREAS, the losses and barriers thus imposed upon the local community and travelers alike are of a nature and magnitude which would have been deemed unacceptable, and likely long since dealt with, had they affected the more populous regions in the Puget Sound basin; and

WHEREAS, loss of channel constraints imposed by the destroyed crossing potentially threatens the BNSF mainline crossing immediately downstream; and

WHEREAS, the City of Sultan finds that neglect of the health and redundancy of the US 2 corridor has wide ranging and negative impact on all communities in the Skykomish Valley; and

WHEREAS, the long term failure to maintain, repair and/or restore flood based interruptions to the continuity of alternatives to US Highway 2, specifically at Scenic, Miller River, and Lowe Creek have combined to essentially destroy what was in the recent past a near continuous transportation alternative between Baring and Stevens

Pass; and

WHEREAS, the significant and adequate resources necessary to make an acceptable repair are believed to be held by or available to the government of King County, the question being instead one of priorities; and

WHEREAS, necessary repairs now being completed to similar damage to the nearby Index-Galena Road clearly demonstrate that such necessary projects are both environmentally and financially feasible; and

WHEREAS, in the intervening eleven-plus years since the flood event, zero progress has been made towards a solution acceptable to local communities; and

WHEREAS interminable delays in pursuing a repair will only result in unnecessary and avoidable increases in project costs,

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SULTAN, WASHINGTON, DOES RESOLVE AS FOLLOWS:

1. The City of Sultan finds that restoration of the Miller River washout is an essential component of transportation infrastructure health in the Skykomish Valley.
Pass; and
2. The City supports a repair alternative to Old Cascade Highway at the Miller River crossing nothing less than adequate to support pedestrian, bicycle, motor vehicle, and emergency traffic.
3. The City calls upon King County government to assign a high priority to repairs and to work with State and Federal agencies to secure necessary funding and move forward with construction.

PASSED BY THE CITY COUNCIL AT A REGULAR MEETING THEREOF ON THE 8TH DAY OF JUNE, 2023.

CITY OF SULTAN

Russell Wiita, Mayor

ATTEST/AUTHENTICATED:

Tami Pevey, City Clerk



SNOHOMISH COUNTY COUNCIL
Snohomish County, Washington

RESOLUTION NO. 23-028

***A RESOLUTION OF THE SNOHOMISH COUNTY COUNCIL REGARDING THE
REPAIR OF THE WASHOUT ON THE OLD CASCADE HIGHWAY WEST OF THE
MILLER RIVER BRIDGE***

WHEREAS, in 2011, the Miller River washed out a portion of the Old Cascade Highway, destroying the only alternative access route for Highway 2 through Skykomish and dividing the community; and

WHEREAS, the Old Cascade Highway holds great historical significance and is designated a King County Historic and Scenic Corridor as Cascade Scenic Highway (King County Road No. 999); and

WHEREAS, physical risks to the area resulting from lack of road repair are significant, costly, and potentially hazardous including (1) continued and further erosion of the east and west banks of the Miller River at that site; (2) potential structural compromise due to river current of the railroad bridge still in use a short distance downstream; (3) potential compromise to the power/communication lines that cross the washout to serve the residents in that area; and

WHEREAS, emergency closures of Highway 2 can result in (and have resulted in) denial of passage to residents and travelers for medical services, jobs, school, postal services including required medications, necessities, and being home; and

WHEREAS, the negative social, safety, and equity impacts due to the washout physically divides our community; and

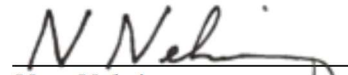
WHEREAS, 20 trains per day run the Burlington Northern Railroad mainline through the center of Skykomish causing planned and unplanned train stoppages which block both main exits from town. When both main exits are blocked Emergency First Responders and residents are trapped;

NOW, THEREFORE, BE IT RESOLVED, the Snohomish County Council strongly support repairs to that critical washout infrastructure and restoration of road access across the Miller River.

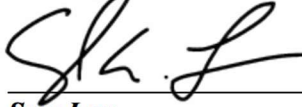
APPROVED this 21st day of June, 2023.



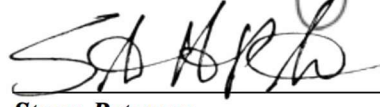
Jared Mead
Council Chair




Nate Nehring
Council Vice-Chair



Sam Low
Councilmember



Strom Peterson
Councilmember

ATTEST: 

Elena Lao, CMC
Deputy Clerk of the Council

Community Member Statements

My name is Bonnie Jones, I am the postal clerk for the Skykomish post office.

The United States postal service delivers important items such as medications, payments, bills, election mail, and cherished cards and gifts for loved ones. It is imperative that there is no disruption of the mail service. Please repair the wash out.

Thank you

On or about January 6 2020 my husband Ted became very very sick. I went into the bedroom to check on him and found him very pale and unresponsive. Our daughter was here at the time and we called Fire District 50. They were here immediately. It was decided he needed immediate medical attention, and needed to be transported to the hospital.

However there was a problem with Highway 2. Between Skykomish and the Tunnel. The highway was closed with a combination of snow, ice and fallen trees. Meaning that the highway crews had to remove downed trees before they could plow the snow and the ice, which made for slow clearing. The fire responder told us he had one chance to move Ted as there was going to be one small window of opportunity to get through, but it had to be decided upon immediately. SO they packed Ted out and got him in the ambulance along with our daughter. He spent four days in the hospital. It has been a very long recovery and was a very frightening experience for everyone.

The next experience was in the fall of 2022 during the Bolt Creek Fire. I have very serious Macular degeneration of the eyes. This requires regular shots in my eyes once a month. Once again the highway was blocked between Skykomish and the Tunnel. Once again it was Fire District 50 who saw that we were able to get the medical attention that was needed.

Skykomish is an isolated community on Highway 2. The last community before going over Stevens Pass. The highway is frequently closed in the winter because of snow ice and downed trees. Especially the area between Skykomish and the Tunnel. To have the bridge over the Miller River wash out and leave only one way out of town makes the feeling of isolation even worse. Skykomish residents go to Monroe, Everett, and Highway 522 for shopping and medical needs.

To go east from Skykomish for any needs means going over three mountain passes, Stevens, Blewett and Snoqualmie. A six hour drive, in ideal weather conditions.

The residents of Skykomish have a serious need to have a second route from our town to the outside world. We depend on Fire District 50 to come to our rescue for medical help. How can they do their job with only one way in and out of Skykomish Our school is suffering because of only one way in and out. A one lane bridge with a stop and go light would work well. How ever this is accomplished it needs to be done sooner rather than later, the need is great.

Sincerely Yours,
Nancy L. Cleveland
Resident of the Town of Skykomish

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The Case for Reopening Old Cascade Highway

I. Background - Historical Context of The Cascade Scenic Highway

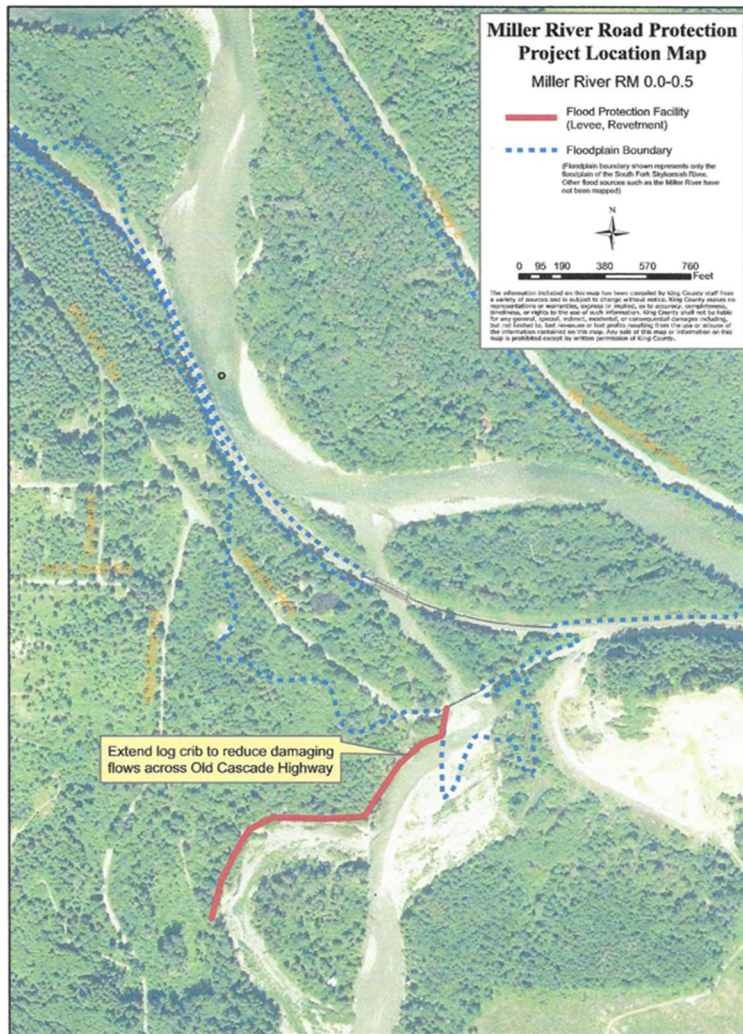
For over 100 years, the Cascade Scenic Highway served to **connect and protect**. It connected people to their homes, livelihood, USFS roads, the Wild Alpine Lakes area, and to Highway 2.

The Cascade Scenic Highway, aka the Old Cascade Highway, holds the designation of King County Historic Corridor, and since the late 1800s it **connected** the towns of Baring, Berlin, and Skykomish up to Stevens Pass. As recently as 1980, one could drive, bike, or walk from Baring to Stevens Pass via the Lowe Creek Road and Old Cascade Highway and only be on US 2 a very short distance. For those riding their horses, it had been a route highly favored over Highway 2. The Old Cascade Highway is a key access point to the Alpine Lakes Wilderness area. It is the **only** connection to Highway 2 in the Money Creek area; and had been relied on as an alternate ingress/egress route for those in the neighboring communities such as Skykomish, Timberlane, SkyLane.

The portion of the Old Cascade Highway at the Miller River, along with the supporting levee, gave critical **protection** to (1) people in the area by providing emergency ingress/egress and (2) the structural integrity of the railroad infrastructure a few feet downriver, thereby protecting the river, the river system, and major freight mobility.

Emergency ingress/egress - every home built to code is required to have a minimum of two exits for safety. So too communities are negatively impacted without safe exits. For this entire area that "exit for safety" had been provided by the Old Cascade Highway. The loss of that relied upon safety exit is very dangerous as was seen during the Bolt Creek Fire and the major snowstorms of the past three years. Each of those emergency occasions left people unable to leave for extended periods of time.

The Levee/Revetment



Pre-washout Map showing the 3 segments of the levee/revetment in red.

Adjacent to the Old Cascade Highway was a levee, parts of which can be seen today. Like other levees constructed in the 1950s-1960s on shifting gravel and more loosely constructed than today's standards, it required routine maintenance. Reports indicate the routine maintenance was not performed in 2010. Per the foreman at that time, the maintenance had been planned but was called off.

Per King County's recent description of maintenance in that area: *'The "Miller River Bridge Protection" training levee was constructed in 1970 to prevent flanking of the western roadway approach and bridge abutment by channel migration. Repairs to this levee were documented in 1981, 1987, and 1998. The levee was significantly damaged by rapid channel migration in the 1990s...*

The "Miller River Curve" training levee was constructed in 1968 to prevent channel migration toward Old Cascade Highway, west of the bridge, and to direct the Miller River under the bridge. The levee was damaged by flooding in 1995 and 1996. Repairs to this levee occurred in 1987 and 1998. The levee is generally in good condition, but no longer provides a training function to direct flows from the

Miller River under the bridge because the river channel rapidly moved away from the levee in the mid-1990s.

The “Miller River Road Protection” revetment is located approximately a half mile upstream of the Miller River Bridge and protects the Miller River Road from river erosion. A segment of levee at the downstream end of the revetment also directs the river channel toward the eastern half of the Miller River alluvial fan and may have been built to steer the river toward the Miller River Bridge. The date of construction for this revetment was not documented but likely occurred early in the mid-twentieth century when the Miller River Road was first developed. This revetment was repaired in 2017 due to flood damages.’

II. The 2011 Flood

Despite the levee not being repaired since 1998 per the County’s records, the Cascade Highway continued to be a viable and critical part of the area’s transportation infrastructure.

In 2011 a storm resulted in high water levels, raising the log crib that had been placed adjacent to the road. The rise of the log crib obliterated the section of the Cascade Highway that crossed the Miller River, leaving the road impassable. Part of the levee still exists, but the portion that channeled the river under the bridge, providing safety and a buffer for the road and for the railroad trestle is damaged.

At the time when needed maintenance was not performed and when King County decided to ignore rather than repair flood damage, the Cascade Highway was **not** a decommissioned forest service road. It was a valuable and viable segment of the transportation infrastructure for the upper Sky Valley. When it was announced that King County had decided **without apparent public input** to not repair it, frustration and anger among many residents ran higher than the flood waters, leaving taxpayers with a distrust that still exists today.

III. Effects of the Washout on the Area Communities

The washout had a profound immediate and damaging impact on the community and set into motion a very dangerous longer term risk for the area and the entire river system which continues to this day.

Locally, it severed and isolated neighboring communities, destroyed a necessary travel route that had been open and relied on for approximately 100 years. The washout impacts trade, commerce, tourism, pedestrians, bicyclists, residents, visitors, recreationalist, and travelers. It negatively impacts students riding the school bus and the school bus drivers by not providing an alternative route to the 60 mile per hour Highway 2.

The unrepaired washout heightens serious concerns about the vitality and survival of the community itself. As the area community continues to be divided into smaller unconnected and isolated sections, the economic health becomes more fragile. Residents from neighboring towns to the west are less likely now to do business in the Skykomish area.

The “Economic Analysis of Outdoor Recreation in Washington State” 2020 report describes the vast economic and health benefits of outdoor recreation, and that Washington’s outdoor recreation is a driving force for the state’s economy creating jobs and building rural business.(1) The economic engine of the Sky Valley relies on outdoor recreation here and this section of road does make a difference to homeowners and business owners throughout the upper Sky Valley. As a resident and business owner states, “We are the rural communities that rely on access. Please help!”

- **Loss of emergency ingress and egress:**

Background: In the Upper Skykomish Valley area, if your access to Highway 2 is blocked or inaccessible, you are not going anywhere, certainly not in a vehicle. There is no doctor or medical clinic; the nearest hospital is about 35 miles to the west, a full-service hospital is further. There is no pharmacy, no veterinarian. There was one alternate exit route which is now washed out.

The elevation of this area is approximately 900 feet, with a 3,000-foot elevation gain in 20 minutes when driving east to the pass. The nearest grocery store is a 40-minute round trip by car if going west, or if going east, it is over an hour drive one-way across the 4,000-foot mountain pass, with a treacherously breathtaking curve that is typically icy in winters.

While this is a remote location, the portion of Highway 2 that runs through this area is packed with vehicles on weekends. 180,000 vehicles/month typically travel in and through this area. Approximately 8,000 skiers enjoy the ski resort on a typical day. The Great Northern and Cascade Railway train rides and local festivals will bring an additional 200 to 300 people/day into town. The Skykomish Fire and EMT First Responders are responsible for all calls coming from Highway 2 up to and including Vail’s ski and downhill biking resort at Stevens Pass, as well as calls from the forest service roads, campsites, hiking trails, and the area residents and guests.

The remoteness of this location, the high-volume swings of people, and the critical need for quick and immediate access to Highway 2 especially in emergencies underscores the invaluable nature of what was once a viable alternate emergency route to Highway 2 and is now washed out and inaccessible, the Old Cascade Highway. Medical emergencies in which delays of even minutes result in profound impacts make accessible exits even more paramount, and the unrepaired washout at Miller River unconscionable.

In order to provide an acceptable level of service of emergency response to all people within King County's prime recreational area, including Vail/Stevens Pass ski and downhill mountain biking resort, to all travelers on Highway 2, and to our area residents and guests, safe ingress/egress is absolutely critical.

A Burlington Northern Railroad mainline runs in an east-west direction through the center of Skykomish. There are 20 trains per day, 2 Amtrak, the rest carrying freight for international, national and King County based companies such as Boeing, Amazon, UPS, FedEx, etc.; as well as oil tankers, volatile and typically one to two miles long. Planned and emergency unplanned stoppages of the train do block one or both main exits from town. Repairing the washout to restore the town's alternate exit is imperative.

- The washout destroyed the alternate exit/access route between Skykomish and Highway 2, a route relied upon and used by the Upper Sky Valley.
- During several recent area-wide emergencies residents living in the Money Creek area (west of the wash-out) were trapped with no access out (or in), cut off from all essential services, the alternate exit that had been provided by the Old Cascade Highway no longer available to them.
- For weeks, residents could not leave the area to escape the fire and smoke of the Bolt Creek Fire, and after the flames were out, still could not leave to go to their jobs, schools, get medical services, US postal mail, for several weeks.
- The Food Bank in Skykomish was unable during that time to bring in needed supplies.
- After the fires were out and the smoke cleared, planned and unplanned closures of Highway 2 at the Money Creek Tunnel continued due to fallen debris and associated clean-up activities, blocking vehicle access for area residents who would have taken the Old Cascade Highway if the washout were repaired.



After shopping for essentials once conditions appeared to be stable enough to open Highway 2, some residents were faced with a closed highway on their return to town as conditions required immediate unplanned highway closure for safety. They were able to ford the river at the washout, carrying essentials on their backs, and leaving their vehicle on the west side. This couple, in their 60's, had to then hitch a ride home beyond Skykomish, then repeat the journey days later to retrieve their car.



Similar conditions for this resident, over 70 years old. He forded the washout 5 times to get all his groceries from his car to his home.

- Fire/EMT 1st Responders are unable to use this as a route to respond to emergency calls. As described above, the Emergency First Responders are responsible for all emergency calls from the following:
 - Highway 2 between Index and Stevens Pass, with 180,000 vehicles/month,
 - Vail Ski Resort, with 8,000 typical skiers on a given day,
 - Recreationalists in the area at campsites, trails
 - All people in Skykomish and the area communities including Baring, Grotto, Money Creek, Berlin, Mill Town, Skykomish, Timberlane, Sky Lane, Foss River and Vail/Stevens Pass

- **Residents frequently partially or fully trapped by rail crossings:**

A Burlington Northern Railroad mainline runs in an east-west direction through the center of Skykomish. There are 20 trains per day, 2 Amtrak, the rest carrying freight for international, national and King County based companies such as Boeing, Amazon, UPS, FedEx, etc.; as well as oil tankers, volatile and typically one to two miles long. Planned and emergency unplanned stoppages of the train do block one or both exits from town. Repairing the washout to restore the town's alternate exit is imperative.



Twenty trains per day travel through Skykomish and over the train trestle by the washout. Two Amtrak, the rest are oil tankers and freight, carrying products for international, national, and King County based companies, i.e. Amazon, Boeing, FedEx, UPS. Typically, the trains are one to two miles long, which can block both the town's exits. With no road access due to the washout, no alternate routes are available.

When a train blocks both Skykomish main exits, and with the only alternate emergency exit now washed out and unavailable, the Emergency First Responders and residents are trapped. In February, 2023 an emergency stoppage of a train with a hydraulic brake issue blocked both Skykomish exits for five hours from 2:08 am to 7:37 am, with no alternate exit. The lack of The Alternate exit is a serious impact to the entire upper Skykomish Valley. In addition to the Emergency First Responders, residents were delayed in getting to the airport for their scheduled departure time and other residents were delayed in going to work, several returning home till the issue was corrected hours later. The Alternate exit would have allowed the required passage.

- **Going East in Order to Go West - Increase Time and Fuel Consumption**

- The Money Creek Tunnel on Highway 2, just east of the turn off for the Old Cascade Highway, is often the location where Highway 2 is closed during emergencies. Prime recent examples of this are during the Bolt Creek Fire, and the snowstorms of the past three years. For everyone who was on the east side of the tunnel during these closures that meant driving 5 hours east to make the loop over Stevens Pass and then Blewett Pass to drive what would have otherwise been a 45 minute drive if the washout were repaired. As this was the case for an extended period of time, that represents a lot of fuel consumption and pollution. For those who needed that route to get to work, both they and their employers were out of luck for those long durations. A five hour one-way trip is also not feasible for doctor, dentist, and other medical appointments, many of which had to be canceled. Those medical appointments could have been kept if the washout were repaired. The five hour loop was also not a viable option for those people with electric vehicles. Both the Bolt Creek Fire and the snowstorms brought with them power outages, making it impossible to charge vehicles at the start of the trip, nor would there be enough functioning charging stations along the 5 hour route to make it.
- For Mill Town residents wishing to drive west from their homes, prior to the washout, they would simply drive west on the Old Cascade to arrive at Highway 2, then continue west on Hwy 2. Since the washout, they must drive east, through Skykomish, then loop back on Highway 2 in order to go west.

IV. Effects of the washout on Structures including Railroad Infrastructure, Utility Poles, Private Property

The levee/road provided critical protection, acted as a buffer for the road and for the railroad infrastructure a few feet downstream - the railroad infrastructure that supports the passage of 20 trains per day, two Amtrak, the rest freight for international, national, and King County based companies such as Amazon, Boeing, FedEx, UPS, and oil tankers, volatile and typically one to two miles in length over a sensitive river.

Per the environmental engineering assessment report, “data suggest that there is a debris flow or debris flood (the collapse of debris jam further upstream) hazard on the fan itself, which **could destroy the remainder of the highway prism and the railway during a single event.**”

Now that conveyance is no longer as restricted as it once was at the Old Cascade Highway, these events could more directly affect conditions at the railway.” (2) Damage to the Miller River from such a railway event would be felt throughout the entire river basin system.

As noted in the reports, the washout puts at “high risk” the railroad infrastructure that is a few feet downstream of the washout. (3) It lists risks due to the washout including the “Railroad Bridge, Trestle and Fill Prism all vulnerable to any increase in scour, channel migration or significant large wood accumulation. Overhead Utilities -Power/Communication, Underground Utilities, Miller River Road Private Properties in the “Town of Berlin” Private Quarry and Railroad spur Recreational Users” (4) The levee/road provided critical protection for the structures in that area.

Miller River Restoration Preliminary Feasibility/Uncertainty and Risk	Existing Conditions/Risks			Uncertainty of Project Effects			Preliminary Project Related Increase in Risk or Habitat			Future Projected Condition/Risk with Road and Facility Removal Only			Required to reduce uncertainty and inform design	
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Technical Information and analysis	Outreach and Coordination
Geologist's preliminary view of Hazards. Red is bad in this section.														
Flood Hazard Code Compliance	NA					x			x		NA		x	
Risk to LB Railroad Fill Prism		x				x			x		x		x	x
Risk to Right Bank Trestle		x				x			x				x	x
Risk to RR Bridge			x			x			x				x	x
Risk to Miller River Road	x					x			x		x		x	x
Risk to "Berlin" Properties		x					x		x				x	
Risk to Quarry	x					x		x			x		x	x
Risk to Recreational Users	x					x		x			x		x	x
Risk to Utilities			x		x			x					x	x
Geologist's preliminary view of Habitat. Red is good in this section.														
Sustainable Floodplain Connection		x				x			x				x	
Off-Channel Habitat Complexity		x				x			x				x	
Large Wood Recruitment	x				x			x			x		x	
Large Wood Trapping	x				x			x			x		x	
Edge habitat		x			x			x					x	

Preliminary Feasibility: Habitat, Risk and Uncertainty

(5) Herrera Environmental Engineering

V. Effects of the washout on the highway corridor

- **Loss of alternative route to US 2 between the tunnel and Skykomish:**
US 2 between the tunnel and Skykomish is frequently blocked by fallen trees in high wind or heavy snow conditions. King County has warned travelers that risks of debris fall in this area will remain likely for the next few years in the aftermath of the Bolt Creek Fire.

As seen during the Bolt Creek Fire and during the snowstorms of the past three years, Highway 2 was closed right at the Money Creek Tunnel, just east of the turnoff for the Old Cascade Highway. During these times, all residents and travelers east of the tunnel are told to take a detour route if they wish to go west, that is to head east for a 4 1/2 to 5 hour loop, for a trip that would otherwise take minutes. Repairing the Miller River washout would provide an emergency alternate route saving several hours for each vehicle. It would provide an alternate route for employees to get to work. Driving 5 hours one way is not feasible for workday attendance.

- **Pedestrians and bicyclists forced to use a very unsafe section of US 2:**

In 2005, the Skykomish Mayor and Town Council passed a resolution detouring all bicyclists off Highway 2 and onto the Old Cascade Highway as a safer route of passage. Due to the washout, that safer route is no longer an option. Progressing through the Tunnel is challenging and adrenaline raising, as the light differential hampers the drivers' visibility of the bicyclists.

- **Increase risky turns:**
- Many local residents indicate a concern that due to the washout, they are forced when heading west bound to making a hazardous left turn across Highway 2 with cars going the full 60 mph behind them as well as toward them. Before the washout, they were able to approach the Money Creek area at a reduced speed. Now, they must contribute to the mixed speed traffic on Highway 2.

VI. Effects of the washout on the river corridor:

- Without the levee and road providing channel direction, the alluvial fan of the river has expanded and continues to expand. As a result, the seasonal water flow levels are very low in the summer. The previous channel and portions of the alluvial fan have been observed to be completely dry during the summer with islands of rock and debris isolating stream areas from the rest of the river system. Additionally, there is an observable loss of tree canopy. As erosion of the river banks is allowed to continue, there is far less shading from large trees that had previously shaded and cooled the water. Instead, the large trees are being eroded, toppled at their roots, destroying the tree canopy.
- Per the “Impacts on Salmon Issue Paper”, written in conjunction with the Tulalip Tribes Natural Resource Department and King County Natural Resources Department, low level flows raise the temperature of the water. Warm temperature waters are lethal for salmon. A prime example is in 2015 the high temperatures in the Skykomish River caused Chinook to take refuge in the cooler Sultan River. As higher temperature water flows into the rest of the river system, it has a warming effect on the **entire** river system. (6)
- In addition to being lethal for the fish, warm temperature waters degrade the habitat, cause egg abnormality, and delay migration. Seasonal undulation, building up of sediment, rocks, debris is also now visible in the area of the washout. This has detrimental consequences for the habitat and for the fish – building “islands” that trap and isolate the fish, concentrate the fish into fewer areas, increase spread of disease, competition for food, predation. (7) [Climate Change Impacts on Salmon Issue Paper 2017]
- It appears this situation at the washout may be destroying the very environment we are wishing to protect!
- Rather, a **single thread channel approach** instead of an unrestricted span of the alluvial fan would help alleviate this problem immediately, and provide better protection for the conditions anticipated to intensify with climate change.

VII. Possible Solutions

As an engineer responsible for bridge borings all across the United States stated, “If there’s one way to solve an issue, then there are multiple possible approaches to explore and assess.” In determining an appropriate option, balance is critical. We must strive, as stated by the Army Corps of Engineers, “to balance and integrate society’s needs for economic growth, public safety and environmental quality.” (8) Also, it is important not to build way beyond what is necessary, as it becomes too expensive and undoable.

Here are a few possible approaches:

A. **No action:** This option is a **high danger risk**. As described in the environmental engineering assessment reports “Within the area of study, maximum [flow] depths are persistently found on the steep and confined left bank at the upstream extent of the project area, near the Miller River Road, in the vicinity of the recently eroded Old Cascade Highway and at the BNSF railroad bridge.” (9) Continued erosion and no protective buffer would continue the high level of erosion currently underway and keeps at high risk “the railroad infrastructure, the power/communication poles, road, private properties, private quarry, railroad spur, recreational users.” (10) Also, the No Action option leaves the Fire/EMT 1st responders and the area residents with no emergency exit. It keeps at risk all people in this area, the community, and the entire river system.



Potential Impacts and Risks

- ▶ Railroad Bridge, Trestle and Fill Prism all vulnerable to any increase in scour, channel migration or significant large wood accumulation.
- ▶ Overhead Utilities -Power and Phone?
- ▶ Underground Utilities (likely unaffected if present?)
- ▶ Miller River Road
- ▶ Private Properties in the “Town of Berlin”
- ▶ Private Quarry and Railroad spur
- ▶ Recreational Users

(11) Herrera Environmental Engineering

The report further states “The road has, and will continue to protect the railway so long it is in place, though there is clear evidence that it has been and will continue to be gradually lost due to natural processes. The railway prism west of the existing Miller River main channel crossing is not armored. Hydraulic modeling results indicate high velocities (in excess of 10 feet per second: Appendix E) in this area, which was corroborated by significant geomorphic changes observed following recent high flows in the vicinity of the left bank railway bridge abutment. (12)

B. **Realign channel, reconstruct levee, reuse existing bridge:** Utilize the adjacent quarry and existing rock to reconstruct the levee; realign the channel under the bridge. The existing bridge was rated in “fair condition” in the 2014 bridge inspection. (13) Benefits: restores buffer for road, railroad infrastructure, and the other “at risk” issues including the river; provides critical emergency access, supports bicycling, pedestrian use, and restores the alternate safety route that had been relied on for 100 years, and returns a sense of safety to the residents and other people in the area.

C. **Full span new bridge at existing location:** There are several low cost/quick install options in this category. For example, Bailey Bridges are used around the world and throughout the U.S. as dependable bridges. The longest Bailey Bridge span is 2,585 feet. (14) They are prefabricated and install quickly.

Another option is the rapid build, prestressed lightweight concrete girders as was used for the Skagit River Bridge and completed in months.

The community of Mt. Index River Sites (MRIS) was subjected to mountain slides a few years ago, devastating the entire community and splitting MRIS in two. A one lane emergency bridge was installed and is still in operation today.

Yet another option to consider for this category is what was used at the Foothills Trail Bridge. Per King County Executive Dow Constantine’s Newsletter “It will offer an alternative emergency route for pedestrians and vehicles if State Route 410 is impassible.” Cost in 2024 dollars is \$16 million. (15)

Green infrastructure practices and technologies could be incorporated such as infiltration chambers, and subsurface infiltration galleries.

Per King County assessments, this approach would require one hundred (100) foot deep footings and a one-thousand (1,000) foot span. Without the levee or a single thread channel, it might not provide the necessary buffer for the railroad infrastructure or road, so it is probable that this option would need to include reconstruction of a levee or some other method to help ensure structural stability for nearby structures.

D. **Build a second bridge - Single Thread Channel Design for Crossings:** This involves leaving the first bridge where it is and building a second one-lane bridge to join the first bridge on one end and to span the flow on the other side.

Determine the appropriate level of service (LOS) needed for the span - if 1,000 ft span is for the worst eventuality, it is likely a 60 to 80 percent level would be more appropriate. Determine what is needed for a 200 yr flood. As recently stated by a Hydrologist familiar with the area, “With the appropriate use of culverts and a couple end-to-end bridges, some very significant flow levels could be handled. This should be a single thread channel; with another opening for the water when it is needed. Otherwise the river must pinch back to fit under the trestle.”

However wide the alluvial flow is allowed to expand, the river must still narrow before going under the trestle. Because there is still the pinch of the railroad bridge to consider for the

safety of the railroad bridge, freight mobility, and therefore of the entire river system, it must be a single thread channel. Terraces along the river bank with natural vegetation could be included. Because the river will still need an additional outlet during large events, the west side of the road will be overrun during such events, that is acknowledged, and the road during these events could be closed. This level of service would return the sense of safety to the community.

E. Full span bridge at new upstream location: Another option is to construct a full span bridge at a new location further upstream.

F. Dismantle the road and the bridge: This is the most immediately dangerous of all the options. As described in the Herrera feasibility report “The road has, and will continue to protect the railway so long it is in place, though there is clear evidence that it has been and will continue to be gradually lost due to natural processes. The railway prism west of the existing Miller River main channel crossing is not armored. Hydraulic modeling results indicate high velocities (in excess of 10 feet per second: Appendix E) in this area, which was corroborated by significant geomorphic changes observed following recent high flows in the vicinity of the left bank railway bridge abutment. There is a greater potential for encountering hazardous or culturally significant materials than any of the other high priority projects. The road has been in place, in some form, for nearly 100 years, and it may have been located at a historical Native American crossing point. The bridge is relatively newer than the road itself, so there may be old creosote-treated wooden abutments from the original bridge buried in the road prism. The bridge itself is also potentially a historic resource and the extent to which the abutments would be included in that determination is unknown. “ (16)

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VIII. King County Proposals and Response to date

- a. KC has stated they will do nothing on the basis of an inflated cost estimate
- b. KC has not presented a ranked list of studied alternatives to the community
- c. KC has neglected maintenance of a serviceable bridge because of their choices

IX. Preferred choice/minimum alternative acceptable to the community.

The preferred choice is one that would restore the critical alternative safety route, a single lane road across the Miller River to support vehicles, emergency vehicles, pedestrians, and bicycles; and restore the buffer for the railroad infrastructure and the other “at risk” issues. It appears at this point that Option B - “Realign channel, reconstruct levee, reuse existing bridge” and Option D - “Build a second bridge - Single Thread Channel Design for Crossings” meet the requirements.

X. Supporting information

The lower Miller River is seasonally a dynamic river. The river did what it needed to do when the water couldn't get through fast enough; it needed breathing room and took it. It also took away what people in the community critically need, the safety that comes by having an alternate exit route in an area that often has no exits.

The current approach of allowing the river's alluvial fan to expand in an unconstrained manner is detrimental in two regards:

- (1) There are necessary physical constraints in this area that are not going away. This includes the railroad infrastructure and the power/communication poles (responsible for data transfer for T-Mobile between Seattle and Chicago.)
- (2) The seasonal low flow that warms the water temperature and, in some areas entirely dries up, may be creating havoc for fish habitation and migration. This condition is anticipated to worsen with climate change.

It must be noted, that due to geographical constraints, there are no naturally occurring salmon in this area - any salmon seen here have been transported up past Sunset Falls. Per the feasibility report, there are no guarantees this will change even with the change to an unrestricted alluvial fan approach. Assumptions of habitat growth are "assuming that all reasonable infrastructure was removed...i.e., demolition of existing infrastructure....However, it is impossible to predict the rate of increase of these features in advance." (17) It is unlikely the existing relied upon infrastructure such as the railroad trestle, the power and communication poles will be removed in the near future.

During the Bolt Creek Fire, a King County Councilmember was quoted as saying "What is the price of doing something now versus doing something later." To deny a safety route for the people of this area, to put at "high risk" the railroad infrastructure, freight mobility, power/communication system, and to worsen rather than enhance the conditions for fish habitation/migration - in essence, to hold this entire area hostage without safe ingress/egress - is a high-stake gamble.

XI. Conclusion

The repair of the Miller River washout and restoration of road access across the Miller River is an essential component of transportation health in the Skykomish Valley. The repair of the Miller River washout and restoration of road access is critical for the safety of the people in the area, the structures adjacent to the washout including the railroad infrastructure, and ultimately of the entire river system. The repair of the Miller River washout will restore the critical emergency alternative route to Old Cascade Highway at the Miller River crossing in a manner adequate to support pedestrian, bicycle, motor vehicle, and emergency traffic.

The Vision Statement in the Snoqualmie/NE King County Subarea Plan states:

"Snoqualmie Valley/Northeast King County are characterized by strong rural communities with distinct cultures and histories, where people and businesses are thriving, the natural environment and agricultural

lands are conserved and protected, farms are preserved, the community is resilient to climate change, and services and programs are accessible to residents in a way that preserves the unique rural character.”

“The purpose of the Subarea Plan is to make real, equitable improvements to the quality of life for everyone who lives, works, and plays in Snoqualmie Valley/NE King County. Guided by the community vision, equitable improvements can encompass thoughtful development that builds individual and collective wealth and supports the health and well-being of current and future community members while protecting and enhancing the rural aesthetic and natural amenities of the area.” (18)

The failure to repair the washout and restore road access across the Miller River fails to meet these vision objectives.

XII. Author information

Grassroots Fix the Miller River

Events over the past several years have heightened the already critical need to reopen the Old Cascade Highway and restore road access across the Miller River. Snowstorms, fire, emergency train stoppages – all blocking ingress/egress for one or multiple area communities resulted in a deluge of letters from concerned citizens to their legislators to restore road access across the Miller River on the Old Cascade Highway in the Skykomish area. As the letter writers became aware that there were others writing letters for this purpose as well, the Grassroots was formed.

This document is a collaborative effort by the Grassroots Executive Committee. It included interviews with subject matter experts, residents, and those who lived through the events and conditions both before and after the washout. It also included extensive research as noted in the footnotes and references. Primary documents from which At Risk elements of the washout are identified and described are the Herrera Reports, “body only” and “appendix E”. Another major resource for this document is the “Climate Change Impact on Salmon Issue Paper” written in conjunction with Tulalip and King County Departments of Natural Resources. The descriptions of what climate change will bring are the conditions that are viewable **today** due to the extremely low flow seasonal water level permitted by the alluvial fan in that particular location.

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Footnotes

1. J. Mohica, A. Fletcher; “Economic Analysis of Outdoor Recreation, 2020 Update”
https://static1.squarespace.com/static/561dc6e4b039470e9afc00/t/5f249326f05167773ab0774d/1596232557974/EconomicAnalysis-OutdoorRecreationWA_EarthEconomics_w0720-0.pdf

2. Herrera Environmental Consultants, Inc., “Appendix E Restoration Feasibility Report Lower Miller River” (April 17, 2013), page 16.
https://www.govlink.org/watersheds/7/pdf/skykomish_pdfs/Restoration_Opportunity_Report_SF_Skykomish_April_2013_Appx_E.pdf
3. Denise DiSanto, Todd Hurley, “Lower Miller River Floodplain Restoration Project”, page 14. https://snohomishcountywa.gov/DocumentCenter/View/87890/Lower-Miller-River-Floodplain-Restoration-Project---Tech_Comm-V2_020122
4. DiSanto, Hurley, “Lower Miller River Floodplain Restoration Project”, page 13.
5. DiSanto, Hurley, “Lower Miller River Floodplain Restoration Project:”, page 14.
6. Beth leDoux, Snoqualmie Watershed Forum; Jessica Engel, King County Department of Natural Resources and Parks; Morgan Ruff, Tulalip Tribes Natural Resources Department; Colin Wahl, Tulalip Tribes Natural Resources Department, “WRIA7 Climate Change Impacts on Salmon Issue Paper” March 2017; page 10.
<https://www.govlink.org/watersheds/7/pdf/SnohomishClimatePaper/ClimatePaper2017.pdf>
7. leDoux, “WRIA7 Climate Change Impacts on Salmon Issue Paper,” page 7.
8. US Army Corps of Engineers, “Flood Risk Management Value to the Nation”; (US Army Corps of Engineer Institute for Water Resources, 2009), page 4.
<https://www.mvk.usace.army.mil/Portals/58/docs/PP/ValueToTheNation/VTNFloodRiskMgmt.pdf>
9. Herrera Environmental Consultants, Inc., “Appendix E Restoration Feasibility Report Lower Miller River” (April 17, 2013), page 34.
https://www.govlink.org/watersheds/7/pdf/skykomish_pdfs/Restoration_Opportunity_Report_SF_Skykomish_April_2013_Appx_E.pdf
10. Herrera Environmental Consultants, Inc., “Lower Miller River Floodplain Restoration Project Presentation” (Including Risks); page 13
https://snohomishcountywa.gov/DocumentCenter/View/87890/Lower-Miller-River-Floodplain-Restoration-Project---Tech_Comm-V2_020122
11. Herrera Environmental Consultants, Inc., “Lower Miller River Floodplain Restoration Project Presentation” (Including Risks); page 13
https://snohomishcountywa.gov/DocumentCenter/View/87890/Lower-Miller-River-Floodplain-Restoration-Project---Tech_Comm-V2_020122
12. Herrera Environmental Consultants, Inc., “Appendix E Restoration Feasibility Report Lower Miller River” (April 17, 2013), page 51.
https://www.govlink.org/watersheds/7/pdf/skykomish_pdfs/Restoration_Opportunity_Report_SF_Skykomish_April_2013_Appx_E.pdf
13. Bridgehunters, “Bridge Inspection Report
<https://bridgehunter.com/wa/king/83784000000000/>
14. Bailey Bridge - Wikipedia https://en.wikipedia.org/wiki/Bailey_bridge
Bailey Bridges Inc. <https://www.baileybridge.com/>

15. King County Executive Dow Constantine News, “Foothills Trail Bridge” (January 20, 2023) <https://kingcounty.gov/elected/executive/constantine/news/release/2023/January/20-Foothills-Trail-Bridge.aspx>
16. Herrera Environmental Consultants, Inc., “Appendix E Restoration Feasibility Report Lower Miller River” (April 17, 2013), page 51. [https://www.govlink.org/watersheds/7/pdf/skykomish_pdfs/Restoration Opportunity Report SF Skykomish April 2013 Appx E.pdf](https://www.govlink.org/watersheds/7/pdf/skykomish_pdfs/Restoration_Opportunity_Report_SF_Skykomish_April_2013_Appx_E.pdf)
17. Herrera Environmental Consultants, Inc., “Restoration Opportunity Report South Fork Skykomish River Basin Restoration Feasibility Project” (April 30, 2013), page 18. https://www.govlink.org/watersheds/7/skykomish_report/default.aspx

References

- “South Fork Skykomish River Basin Restoration Feasibility Project”, Herrera: [https://www.govlink.org/watersheds/7/pdf/skykomish_pdfs/Restoration Opportunity Report SF Skykomish April 2013 Report Body Only.pdf](https://www.govlink.org/watersheds/7/pdf/skykomish_pdfs/Restoration_Opportunity_Report_SF_Skykomish_April_2013_Report_Body_Only.pdf)
- “Lower Miller River Restoration Feasibility Report”, Herrera [https://www.govlink.org/watersheds/7/pdf/skykomish_pdfs/Restoration Opportunity Report SF Skykomish April 2013 Appx E.pdf](https://www.govlink.org/watersheds/7/pdf/skykomish_pdfs/Restoration_Opportunity_Report_SF_Skykomish_April_2013_Appx_E.pdf)
- “Climate Change Impacts on Salmon” <https://www.govlink.org/watersheds/7/pdf/SnohomishClimatePaper/ClimatePaper2017.pdf>
- The Legacy Roads and Trails Remediation Program: [1210009.pdf \(wa.gov\)](#)
- Economic Analysis of Outdoor Recreation, 2020 Update: [Economic Analysis of Outdoor Recreation in Washington State](#)
- Green Roads for Watershed Management: [Roads for Watershed Management – Green Roads for Water](#)
- Lower Miller River Floodplain Restoration Project Presentation, Including Risks: https://snohomishcountywa.gov/DocumentCenter/View/87890/Lower-Miller-River-Floodplain-Restoration-Project---Tech_Comm-V2_020122
- “Court News State Cannot Enforce Law Against Trains Blocking Railroad Crossings” [State Cannot Enforce Law Against Trains Blocking Railroad Crossings \(courtnewsOhio.gov\)](#)

- Army Corps of Engineers, “Flood Risk Management”, <https://www.mvk.usace.army.mil/Portals/58/docs/PP/ValueToTheNation/VTNFloodRiskMgmt.pdf>
- King County Landmarks: King County Bridges; <https://www.historylink.org/File/2401>