Draft Environmental Assessment

Tiger Mountain Trail Re-Route and Footbridge Relocation

King County, Washington

FEMA-1817-DR-WA (Public Assistance)

March 2011

U.S. Department of Homeland Security
FEMA Region X
130 228th Street SW
Bothell, WA 98021

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Prepared for:

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March 2011

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Acronyms and Abbreviations

BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
DAHP	Washington Department of Archaeology and Historic Preservation
dBA	A-weighted decibel
DNR	Washington Department of Natural Resources
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EMD	Washington Emergency Management Division (Military Department)
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GIS	geographic information system
HPA	Hydraulic Project Approval
HUC	Hydrologic Unit Code
I-90	Interstate 90
LF	Linear foot
MBTA	Migratory Bird Treaty Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCA	Natural Resource Conservation Area
NWI	National Wetlands Inventory
PA	Public Assistance
PHS	Priority Habitats and Species
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Office
SPCC	Spill Prevention Control and Countermeasures
TESC	Temporary Erosion and Sediment Control
TMT	Tiger Mountain Trail
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WAU	Watershed Analysis Unit
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area

1.0 Purpose and Need for Action

1.1 INTRODUCTION

Severe storms in January 2009 caused extensive flooding, landslides, and mudslides in western Washington. During the storms, heavy rains caused a large landslide that destroyed a trail footbridge and approximately 80 linear feet (LF) of hiking trail in the Tiger Mountain State Forest in King County, Washington (see the photo below). The flooding event was declared by the President as a major disaster (FEMA 1817-DR-WA) on January 30, 2009, making federal funding available for emergency work and repair or replacement of disaster-damaged facilities. The Washington State Department of Natural Resources (DNR) has applied through the Washington State Emergency Management Division (EMD) to the Federal Emergency Management Agency (FEMA) for funding to relocate the trail alignment and replace the footbridge.

This Draft Environmental Assessment (EA) has been prepared to assist FEMA in meeting its environmental review responsibilities under the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality's (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500 through 1508), and FEMA's implementing regulations (40 CFR Part 10). FEMA is also using the EA to document compliance with other applicable federal laws and executive orders, including the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the National Historic Preservation Act (NHPA), Executive Order (EO) 11988 (Floodplains), EO 11990 (Wetlands), and EO 12898 (Environmental Justice).

FEMA will use the findings in this draft EA and resulting public comments to determine whether to prepare an Environmental Impact Statement (EIS). If the action is determined not to significantly affect the quality of the human and natural environments, then FEMA will make a Finding of No Significant Impact (FONSI), and preparation of an EIS will not be warranted.

This document describes the purpose and need for the Proposed Action, the project alternatives, the affected environment and potential impacts on that environment resulting from the alternatives, cumulative effects, public involvement, and resources consulted.

1.2 BACKGROUND AND LOCATION

The project area is located approximately 1.5 miles southeast of Issaquah within the Tiger Mountain State Forest in King County, Washington (Figure 1.2-1, *Project Location*). The project area is part of the Tiger Mountain Trail system in the West Tiger Mountain Natural Resource Conservation Area (NRCA) (Figure 1.2-2, *Project Vicinity*), managed by the Washington DNR Parks and Recreation Department. The area is part of the Cascade Range foothills known locally as the "Issaquah Alps." The project area is located approximately 1.5 miles southwest of the High Point Trailhead, south of Interstate 90 (I-90) in the SW 1/4 of the NE 1/4 of Section 1 of Township 23 North, Range 6 East, Willamette Meridian. The project coordinates where the trail damage occurred are 47.51125 N (latitude)/ -121.97924 W (longitude) (FEMA 2009). The project coordinates of the proposed relocated trail footbridge are: 47.510238 N (latitude)/ -121.976992 W (longitude) (AECOM 2010).

The damaged trail section occurs on the Tiger Mountain Trail (TMT) approximately 3.6 miles south from the High Point Trailhead on I-90. This location is east of the TMT's intersection with the K-3 Trail, and between its west and east connections with the West Tiger Railroad Grade. The TMT and the West Tiger Railroad Grade are the same trail between these connections (Figure 1.2-3, *Project Site*). The TMT in this area is a heavily used single track foot trail, used for non-motorized recreation. The 2009 landslide destroyed a trail footbridge crossing one of the several headwater drainages to Upper High Point Creek in the project area, and about 6 feet of the TMT on either side (FEMA 2009). According to the geotechnical investigation conducted of the damage site in June of 2009 (FEMA 2009), the landslide was probably caused during heavy rainfall by upslope failure of an already saturated steep (greater than 50%) slope. There is an approximate 50-foot-wide gap where the trail crossed the footbridge (see the photo on the cover). The integral ground was lost on both ends of the bridge, and the site should be considered unstable as it appears to pose an immediate threat for additional mass movement. The landslide carried trees down slope of the destroyed bridge area, and several 50- to 70-foot trees within 50 feet of the destroyed bridge location will probably topple in the next heavy rain. There were no indications of prior slope movement at the site and the slope was probably stable prior to the 2009 storm. However, the 2009 slope failure stripped slope cover and the site may be subject to recurring flow events (FEMA 2009).

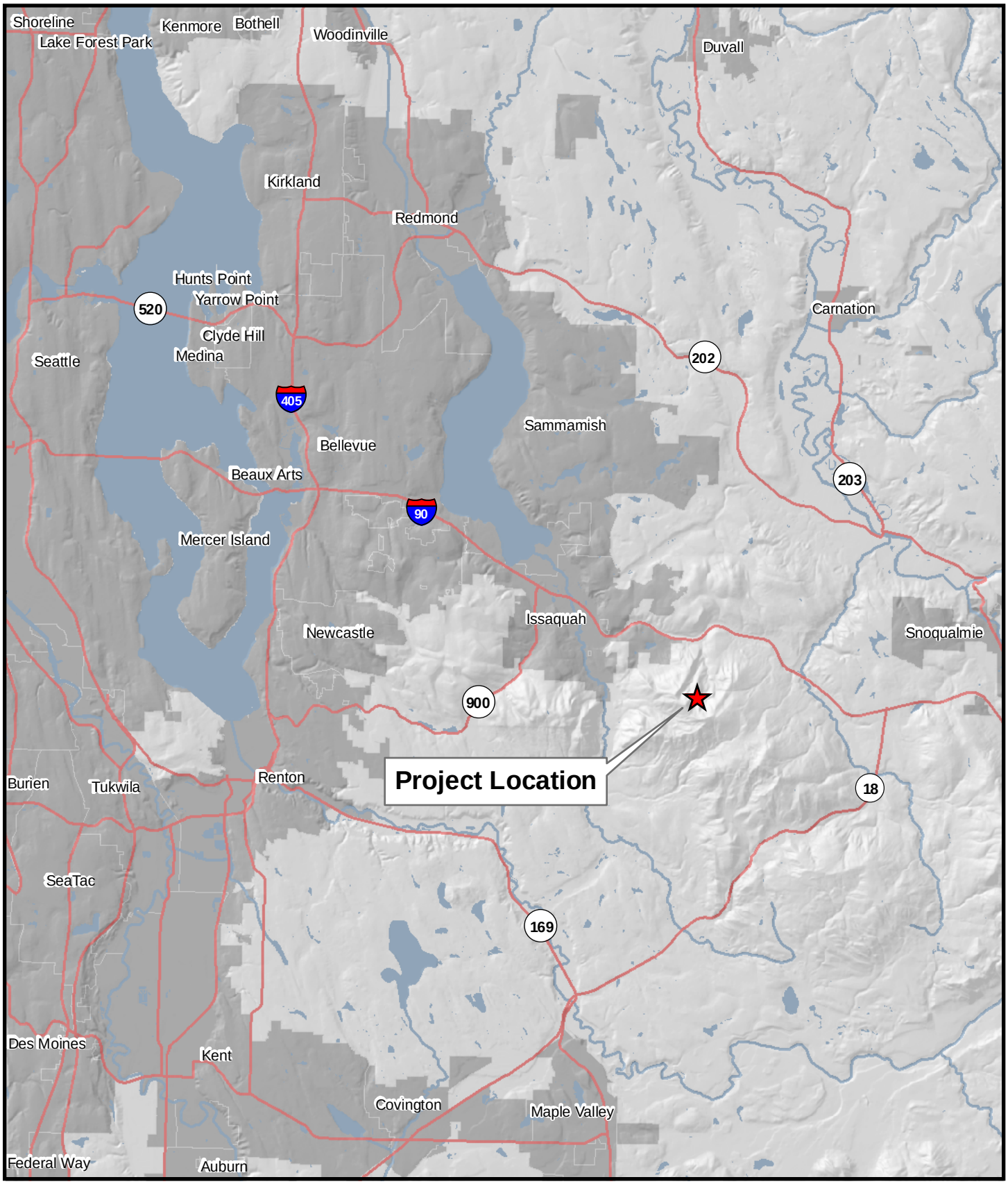
Because the damaged section of trail was considered unsafe, DNR officially closed it in January of 2009 (DNR 2009a); however, unauthorized use continues to occur (FEMA 2009; pers. comm., Jarrett 2010a). Hikers were scrambling directly across the wash created by the landslide, or scrambling up the steep slope to circumvent the area, trampling vegetation, creating numerous new unofficial footpaths, and causing erosion and sedimentation problems (FEMA 2009; pers. comm., Jarrett 2010a). DNR considered this activity to be a public safety issue and, with FEMA funding, constructed a temporary bypass trail across the lower portion of the wash in the March 2009 (pers. comm., Jarrett 2010b). The temporary bypass trail is narrow, steep, and traverses the drainage at grade (pers. obs., Howard 2010). It has experienced several minor washouts, causing erosion and sedimentation problems, and requiring repetitive maintenance (pers. comm., Jarrett 2010a, 2010b).

DNR's proposed project (described in Section 2.4. *Proposed Action*) was partially constructed in April and May of 2010 (pers. obs., Howard 2010; pers. comm., Jarrett 2010b). The work completed included construction of most of the trail re-route, except for approximately 25–50 feet on both ends that would connect it to the existing TMT trail and construction of the trail footbridge.

FEMA has prepared a separate Draft EA (FEMA 2010b) for another DNR project to replace a Tiger Mountain Trail footbridge over High Point Creek (*Tiger Mountain Trail Footbridge Project*) located approximately 0.8 mile downstream in the same watershed; that project is similar in nature and scale to the proposed project in this Draft EA (Figure 1.2-3, *Project Site*).

1.3 PURPOSE AND NEED

The purpose of FEMA's Public Assistance (PA) program is to provide financial assistance (grants) to local, state, and certain private non-profit entities with the response to and recovery from presidentially declared disasters. The need for the FEMA action is to provide funds to DNR to restore the function that was lost with the damage to the TMT. The January 2009 landslide rendered the TMT between its west and east connections with the West Tiger Railroad Grade unusable by hikers and other recreational users, disrupting the east/west trail system connection.



Map Location

LEGEND

- Project Location
- City Limits
- Major Roads
- Rivers & Streams
- Water Bodies

Sources: Project Coordinates - FEMA 2009; 2010

DISCLAIMER: All GIS data, information, and maps are provided "as is" without warranty or any representation of accuracy, and are not guaranteed to be accurate, correct or complete.

Datum: NAD83 State Plane
Washington South FIPS 4602 Feet
Projection: Lambert Conformal Conic

1 in = 3 miles when printed on 8.5x11

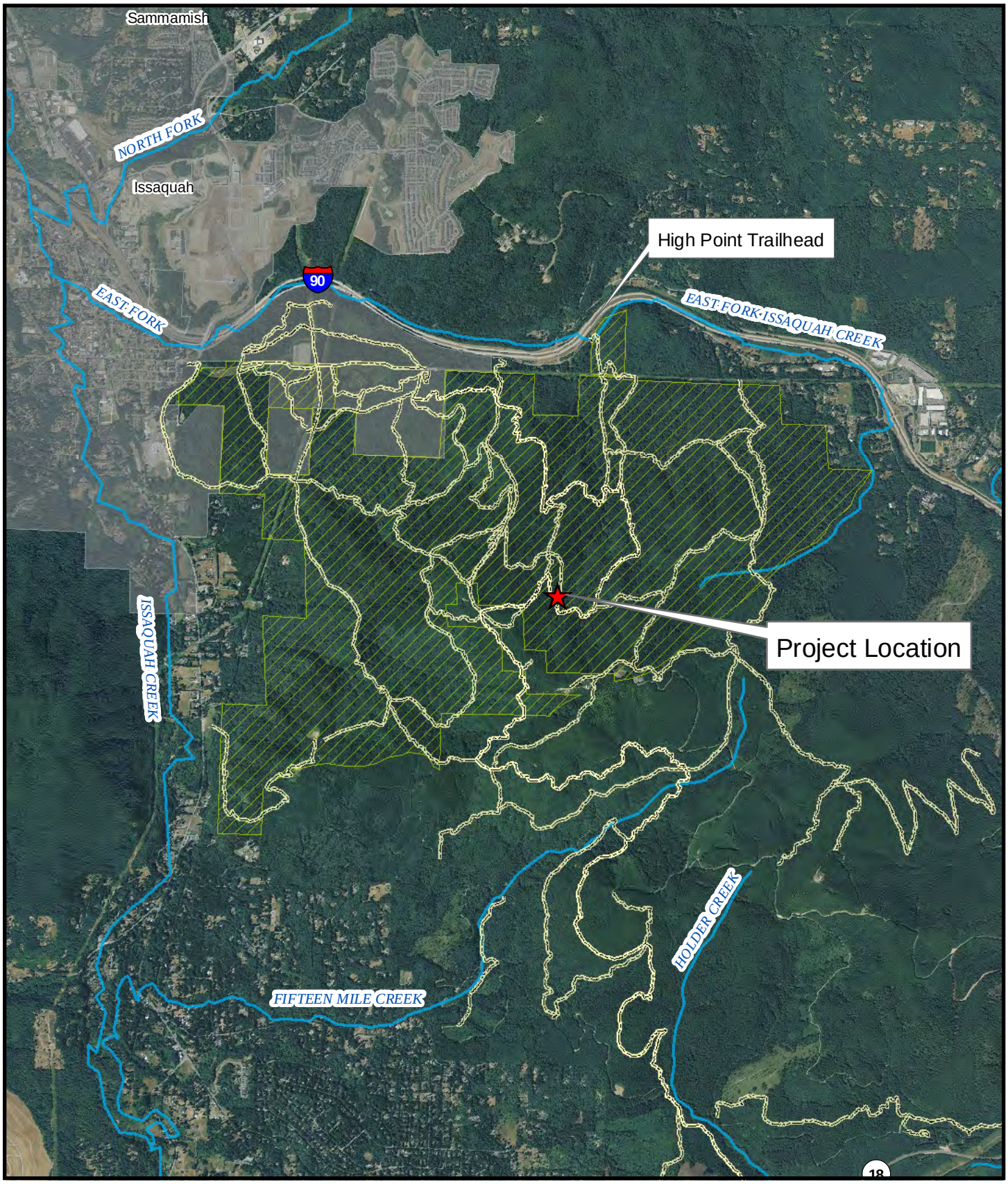
N

0 3 6 Miles

Figure 1.2-1
Project Location

FEMA DR-1817 PW-1283(1)
DNR Tiger Mountain Trail Re-Route
and Bridge Relocation at
Upper High Point Creek

Filename: P:\2010\10100401_03TigerMt2\06GIS\6.3Layout\Figure_1-2-1_ProjetLocation *HowardL, August 25, 2010*



LEGEND

- Project Location
- West Tiger Mountain NRCA
- Trails
- Rivers & Streams

Sources: Project coordinates - FEMA 2009; 2010
Parks, Trails - DNR 2009e, Aerial Photography - NAIP 2009

DISCLAIMER: All GIS data, information, and maps are provided "as is" without warranty or any representation of accuracy, and are not guaranteed to be accurate, correct or complete.

Datum: NAD83 State Plane
Washington South FIPS 4602 Feet
Projection: Lambert Conformal Conic

N

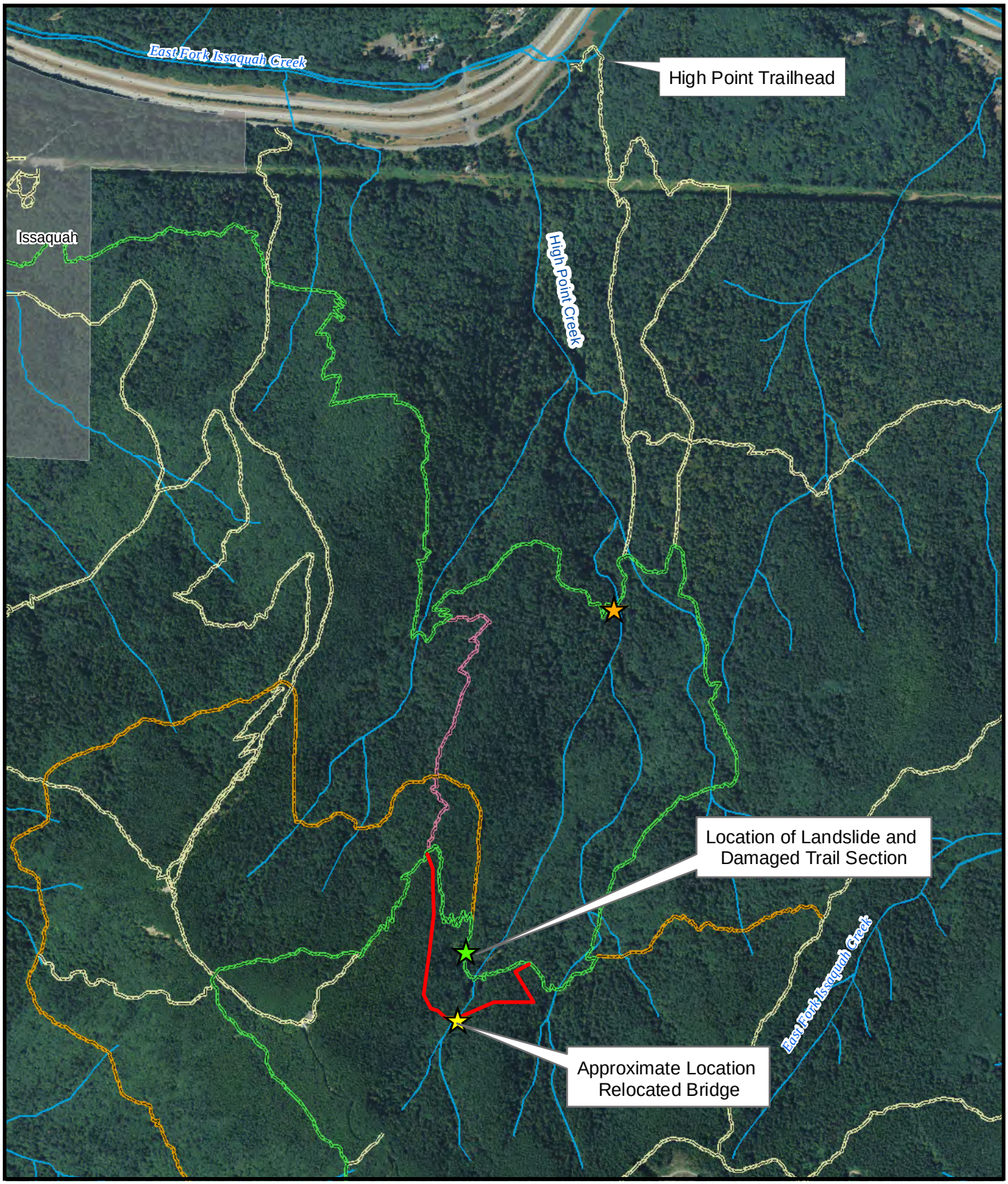
1 in = 1 miles when printed on 8.5x11

0 0.5 1 Miles

Figure 1.2-2
Project Vicinity

FEMA DR-1817 PW-1283(1)
DNR Tiger Mountain Trail Re-Route
and Bridge Relocation at
Upper High Point Creek

Filename: P:\2010\10100401_03TigerMt2\06GIS\6.3Layout\Figure_1-2-2_ProjetLocation *HowardL, August 25, 2010*



LEGEND

- Damage Site
- Relocated Bridge Site
- Generalized Trail Re-Route
- Tiger Mountain Trail Footbridge Project Location
- Streams
- Trails
- Tiger Mountain Trail
- West Tiger RR Grade
- K-3 Trail

Sources: Damage Site, Trail Re-Reroute and Relocated Bridge - AECOM 2010
Parks, Trails, Streams - DNR 2009e, Aerial Photography - NAIP 2009

DISCLAIMER: All GIS data, information, and maps are provided "as is" without warranty or any representation of accuracy, and are not guaranteed to be accurate, correct or complete.

Datum: NAD83 State Plane
Washington South FIPS 4602 Feet
Projection: Lambert Conformal Conic

N

1 in = 1,200 feet when printed on 8.5x11

0 1,200 2,400 Feet

Figure 1.2-3
Project Site

FEMA DR-1817 PW-1283(1)
DNR Tiger Mountain Trail Re-Route and Bridge Relocation at Upper High Point Creek

Filename: P:\2010\10100401_03TigerMt2\06GIS\6.3Layout\Figure_1-2-3_ProjetSite *HowardL, August 25, 2010*

2.0 Alternatives, Including the Proposed Action

The following section describes the alternatives that are being considered for the Tiger Mountain Trail Re-Route and Footbridge Relocation Project, and the process that was used to develop these alternatives. This EA presents an analysis of two alternatives for the project: Alternative A (No Action Alternative) and Alternative B (Proposed Action: Trail Re-Route and Footbridge Relocation, above the failed slope).

2.1 ALTERNATIVES DEVELOPMENT

NEPA requires federal agencies to consider a reasonable range of alternatives that meet the purpose and need of a proposed action in their NEPA review. Because of the site conditions and constraints, there are limited options to restoring the function of the trail. Section 2.2 provides a brief summary of these considerations.

2.2 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Restoration of the trail in its original configuration was considered as an alternative but not carried forward for further evaluation in this EA. It does not meet the purpose and need for the project, which is to provide safe and sustainable non-motorized trail access in the project area. Restoring the trail to its original configuration would present a high risk to public safety and would not be sustainable because of the high risk of additional mass movement on the steep slope due to the loss of natural ground and future runoff concentrations (FEMA 2009).

Conversion of the temporary bypass trail to a permanent trail was determined not to be a viable alternative for this project. The temporary bypass trail was never intended by DNR as a permanent solution as it crosses the landslide damage area at grade and is a wet crossing of the drainage in this area (pers. comm., Jarrett 2010b). The trail is subject to repetitive washouts, making it difficult and unsafe to cross. Long-term use of the temporary bypass trail would result in excessive damage to the surrounding ground surfaces and vegetation, and continued erosion and sedimentation problems in Upper High Point Creek. The temporary bypass trail would also be subject to additional mass movement of the steep slope above due to the loss of natural ground and future runoff concentrations. Additionally, the Washington Department of Fish and Wildlife (WDFW) would not allow DNR to retain a wet crossing through the drainage as it comprises part of the headwaters to High Point Creek (pers. comm., Jarrett 2010b).

2.3 ALTERNATIVE A – NO ACTION

Under the No Action Alternative, FEMA would not provide funding to DNR to support construction of the trail re-route and bridge relocation. DNR could choose to move forward with completion of the trail re-route, bridge relocation, and trail decommissioning using non-FEMA funding. However, given DNR's budget limitations and lack of alternative funding sources, it is probable that no further trail or bridge construction, regular maintenance of existing trails, or trail decommissioning would take place (pers. comm., Jarrett 2010b). According to DNR (pers. comm., Jarrett 2010b), without FEMA funding, the damaged section of TMT, the temporary bypass trail, and the partially constructed trail re-route would all remain in their current condition as described below.

The damaged section of the TMT and West Tiger Railroad Grade would remain unusable, and access east and west along the Tiger Mountain Trail system would officially terminate at this location (pers. comm., Jarrett 2010b). The temporary bypass trail would remain in place, and with a wet crossing, but due to DNR budget limitations, would not be maintained on a regular basis (pers. comm., Jarrett 2010b). Hikers would likely continue to use the temporary bypass trail to travel east and west along the TMT.

The partially constructed trail re-route would also remain in place in its current condition, with a wet crossing of Upper High Point Creek (pers. comm., Jarrett 2010b). The partially constructed trail re-route is not connected to the TMT. Approximately 25–50 feet of additional trail construction is necessary on both ends to connect the two. No maintenance of the partially constructed trail re-route would take place.

2.4 ALTERNATIVE B – PROPOSED ACTION

Under the Proposed Action, FEMA would provide funding to DNR for construction of the Tiger Mountain Trail Re-Route and Footbridge Relocation Project. The Proposed Action includes the design and construction of a 2,880 LF trail re-route above the slide and a new trail footbridge, and the decommissioning of approximately 6,500 LF of existing trail, including the temporary bypass trail, and disassembly of an existing footbridge along the trail section to be decommissioned. The total estimated cost is $232,452 (FEMA 2010a). The estimate includes engineering and design, materials, fabrication, and installation. Elements of the project, construction activities, and best management practices (BMPs) identified as part the project and/or permit requirements are described in detail below. Most of the re-routed trail was constructed in April and May of 2010 (pers. obs. Howard 2010; pers. comm., Jarrett 2010b) Project work still to be completed includes construction of the trail footbridge and completion of the re-routed trail connections to the existing TMT at either end.

Project Elements

Proposed project elements include the following:

- Construct approximately 2,880 LF of new trail.
- Disassemble an existing 50-foot long wood glue-laminate footbridge located several feet to the east of the damage site.
- Clear the area around the location of the relocated footbridge and trail approach.
- Install concrete abutments and stringers for a new wooden footbridge.
- Construct an approximate 50-foot long wooden footbridge.
- Decommission approximately 6,500 LF of the TMT east and west of the damage site.

Trail Design and Construction

Trail design and construction would be done in accordance with DNR's Recreation Trail Maintenance book (Clift and Graham 1983). The trail would be designed to the same classification as the damaged trail section – a single track trail, highly developed for heavy hiker use. The trail re-route would be approximately 2,880 LF, with a 5–10% grade and approximately two switchbacks when completed, and would include the construction of one trail footbridge (described below). Trail

construction involves travelway clearing, trail tread and drainage feature construction, and bridge construction. The travelway would be cleared by removing hazardous trees and windfalls, small trees, shrubs and other vegetation, and would average approximately 6 feet in width. Cleared materials would be disposed of outside of the travelway and scattered on the forest floor to lie flush with the natural surface. Construction of the trail tread involves grading, grubbing (removal of protruding roots), filling ruts and holes, installing retaining walls and turnpikes where appropriate, and installing drainage features. The trail tread would average approximately 2–4 feet in width. Drainage features would include ditches, reverse grades (a.k.a. drain dips), water bars, and stream fords where appropriate. Trail structures and features would be constructed using native materials to the extent feasible (e.g., native soil, gravel, rock, and downed logs). Trail construction would be accomplished primarily with the use of non-motorized hand tools (i.e., axes, pulaski, shovels, hoes). However, power tools such as small chain saws and motorized brush cutters may be needed for heavy cutting (e.g., hazard and other small tree removal, large brush) (DNR 2009b, 2009c; FEMA 2010a; Mountains to Sound Greenway Trust 2010; pers. comm., Jarrett 2010a, 2010b).

Bridge Relocation and Construction

The relocated trail footbridge would be a 4-foot wide by 50-foot long wood glue-laminate footbridge with safety railings and pre-cast concrete abutments. The footbridge abutments would be located outside of the stream channel, and the bridge deck would have at least 9 feet of freeboard, well above potential 100-year debris flows. Construction of the footbridge would involve disassembly of the existing bridge, transport of re-usable and new bridge materials to the new bridge location, excavation for and placement of the abutments, and installation of the new bridge stringers, deck, and hand rails. Equipment and tools used during construction of the footbridge are anticipated to include a helicopter and hand tools. The contractor would evaluate materials from the existing footbridge for use in the new footbridge. It is anticipated that the stringers from the disassembled footbridge would be re-used, but that the existing bridge decking would not be recyclable. The safety railing material would depend on the materials the contractor chooses to meet the engineered specifications of the design. Any non-native materials from disassembly of the existing footbridge that cannot be re-used would be removed from the site and disposed of at an approved location (DNR 2009b, 2009c; FEMA 2010a; Mountains to Sound Greenway Trust 2010; pers. comm., Jarrett 2010a, 2010b).

Prior to construction of the bridge abutments, sediment fencing would be placed between the abutments and the stream channel to capture any potential sediment delivery generated during construction. Small brush in the immediate vicinity of the bridge abutments would be removed. Approximately 1 to 1.67 cubic yards (30 to 45 cubic feet) of soil would be excavated by hand to prepare holes for the bridge abutments. Each hole would be approximately 3 x 5 foot in area and 2 to 3 feet deep. The excavated soil material would be hauled away from the stream and spread onto the new trail tread or scattered in the forest understory. The pre-cast concrete abutments would then be transported to the site and placed using a helicopter. Once the abutments are placed, the helicopter would be used to transport and place the bridge stringers onto the new concrete abutments. The bridge decking and any other materials needed may be transported to the site by helicopter or carried in by external frame backpack via hiking the existing trail. It is anticipated that two alder trees (one on either side of the stream) would need to be removed to provide clearance for helicopter transport of the bridge abutments and other materials. Construction of the abutments and bridge is estimated to

take approximately two weeks (Jarrett 2010b; DNR 2009b, 2009c; FEMA 2010a; Mountains to Sound Greenway Trust 2010; pers. comm., Jarrett 2010a, 2010b).

Trail Decommissioning

Decommissioning of the existing trail, including the temporary bypass trail, would involve returning the slope back to a natural grade, accomplished by pulling sidecast materials back onto the bench and smoothing out the backslope; scattering native windfall and other debris onto the restored slope; and planting native vegetation along the restored slope, primarily swordfern *(Polystichum munitum)*. Trail decommissioning would be accomplished solely with the use of handtools. No culverts or other non-native materials are present along the trail section to be decommissioned (pers. comm., Jarrett 2010a, 2010b).

Best Management Practices

Construction of the relocated bridge would occur during the WDFW in-water work window of July 1 to October 31 (WDFW 2010a). DNR would adhere to state and federal regulations and permit conditions for construction and operation of the proposed project. In addition, the following BMPs would be implemented during construction-related activities:

- **Trail Design and Construction:** The West Tiger Mountain NRCA Management Plan (DNR 1997) provides BMPs for trail design and construction**.**

- **Erosion and Sediment Control**: These specifications require the contractor to implement a Temporary Erosion and Sediment Control (TESC) Plan to comply with federal, state, and local laws, rules and regulations, and the National Pollutant Discharge Elimination System (NPDES) General Construction Permit regarding erosion prevention and sediment control for on-site construction activities. Erosion and sediment control specifications typically focus on soil and slope protection and stabilization measures, followed by site restoration methods (including planting materials). Additional erosion and sediment control BMPs are required in the provisions of the Hydraulic Project Approval (HPA) (WDFW 2010a).

- **Riparian Area Revegetation:** The HPA (WDFW 2010b) requires the revegetation of disturbed riparian areas with native or other approved woody species. Riparian vegetation must be replaced in-kind and maintained as necessary for 3 years to ensure 80% survival.

- **Environmental Protection**: These specifications direct the contractor to implement measures and comply with laws and regulations designed to protect sensitive environmental resources. To ensure that all construction-related pollutants are controlled and contained, a project-specific Spill Prevention, Control, and Countermeasures (SPCC) plan would be developed and implemented. This specification section addresses hazardous waste and hazardous substances management, pollution control, protection of plant and animal species, protection of wetlands, and protection of cultural resources, as well as other applicable safety, health, and human resource issues. Additional environmental protection BMPs are required in the provisions of the HPA (WDFW 2010a).

- **Clearing and Grubbing:** These specifications direct the contractor regarding clearing operations, including removing, preserving, and trimming of trees and other vegetation. This specification section also addresses grubbing operations, and provides limits on the contractor's area of approved activity and scope of actions. These specifications protect vegetation both inside and outside of approved work areas. Additional clearing and grubbing BMPs are required in the provisions of the HPA (WDFW 2010a).

2.5 SUMMARY OF EFFECTS

Table 2.5-1 summarizes the effects described and analyzed in Chapter 3 (*Affected Environment and Environmental Consequences)*. Levels of potential effect are defined as follows:

- **None/Negligible**: The resource area would not be affected, or changes would be either non-detectable or if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable.

- **Minor**: Changes to the resource would be measurable, although the changes would be small and localized. Impacts would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects.

- **Moderate**: Changes to the resource would be measurable and have both localized and regional scale impacts. Impacts would be within or below regulatory standards, but historical conditions are being altered on a short-term basis. Mitigation measures would be necessary and the measures would reduce any potential adverse effects.

- **Major**: Changes would be readily measurable and would have substantial consequences on a local and regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, although long-term changes to the resource would be expected.

The criteria and thresholds of significance used in the analysis are defined by resource in Chapter 3.

Table 2.5-1. Summary of Effects of the Project Alternatives.

Resource Area	Alternative A – No Action Alternative	Alternative B – Proposed Action
Geology and Soils	Potentially substantial risk to hikers from future landslides and falling trees due to unauthorized crossing of the closed damaged site and use of the temporary bypass trail after high precipitation events. Negligible soil erosion and sediment contribution to Upper High Point Creek from unauthorized crossing of the closed damage site, unauthorized use of the partially constructed re-routed trail, and long-term use of the temporary bypass trail without periodic maintenance.	Negligible soil erosion and sediment contributions to streams during construction. Negligible long-term soil erosion.
Hydrology, water quality, floodplains, and wetlands	Negligible effects on hydrology and water quality in the unnamed tributary to High Point Creek near the unstable landslide area.	No effect.
Vegetation	Minor long-term effects on vegetation from use of temporary bypass trail.	Minor short-term effect from clearing 0.26 acre of understory vegetation in hemlock forest to construct 2,880 LF of new trail and the bridge abutments. Minor, long-term, beneficial effect from decommissioning 6,500 LF of trail. The decommissioned trail would restore 0.6 acre of native understory vegetation in hemlock forest, resulting in a net increase of 0.34 acre.
Fish and Wildlife	No effect.	No effect on fish. Minor, short-term effect resulting in wildlife avoidance of the project area during construction. Minor, short-term effect from 0.26 acre of wildlife habitat loss from clearing of understory vegetation in hemlock forest. Minor, long-term beneficial effect from planting 0.6 acre of native understory vegetation in hemlock forest, resulting in a net increase of 0.34 acre of restored wildlife habitat.
Recreation and Visual Quality	Moderate adverse effect on recreation due to lack of trail access. Minor adverse visual effect due to damaged trail section and existing bridge.	Moderate beneficial effect on recreation due to restored east/west trail access. Minor temporary adverse visual effect from bridge disassembly, trail construction, and trail decommissioning.
Cultural Resources[1]	No effect.	No effect.
Environmental Justice[1]	No effect.	No effect.
Noise	No effect.	Minor, temporary noise effect during construction.
Climate Change[1]	No effect.	No effect.
Cumulative Effects	No effect.	Negligible effect.

[1] *Based on analysis presented in FEMA (2010b); incorporated here by reference.*

3.0 Affected Environment and Environmental Consequences

The following sections describe the affected environment (including regulatory considerations) and environmental consequences of the project alternatives on physical, biological, cultural, and social resources in the project area. The level of detail is commensurate with the scale of the project and potential impacts of the project alternatives.

As noted in Chapter 1, FEMA has prepared a separate Draft EA (FEMA 2010b) for another DNR trail and footbridge replacement project (*Tiger Mountain Trail Footbridge Project*) located in the same watershed, which is similar in nature and scale to the proposed project in this Draft EA. For these two projects, the affected environment and environmental consequences are essentially the same for the following resources: Cultural Resources, Environmental Justice, and Climate Change and Greenhouse Gases. Therefore, the affected environment and environmental consequences of the proposed project on these resources are incorporated into this Draft EA by reference. Additionally, regulatory considerations for the proposed project in this Draft EA are the same as described in the Tiger Mountain Trail Footbridge Project EA (FEMA 2010b) and are also incorporated into this Draft EA by reference.

3.1 GEOLOGY AND SOILS

This section describes the existing condition of the physical landscape in the project area, including geology and soils, with additional information on topography and landforms as applicable, and describes the potential effects of the project alternatives on these resources.

3.1.1 AFFECTED ENVIRONMENT

The damaged trail section and proposed trail re-route are located in an area of high gradient hills (40% and greater), and cross the upper edge of an old landslide and a small mountain inner gorge (or ravine) (Sarikhan and Walsh 2007). Several small headwater drainage channels in the area form Upper High Point Creek, part of the drainage network flowing to Issaquah Creek (Figure 3.1-1, *Topography*). Inner gorges within the Tiger Watershed Analysis Unit (WAU) are steep walled (70% and greater) gullies that have formed by a combination of stream action and landslides (Sarikhan and Walsh 2007). These small mountain inner gorges have discontinuous 70% gradient slopes, often ranging from 67 to 68% to just above 70%; slopes are convergent or “spoon shaped” (Sarikhan and Walsh 2007). This landform is naturally unstable and prone to shallow landslides, debris flows, and debris avalanches (Sarikhan and Walsh 2007). Landslide potential is considered to be very high (Sarikhan and Walsh 2007). The upper edges of old landslides have a very high hazard for future landslides, and because deep-seated landslides and earth flows, on average, fail on slopes between 40% and 50% within the watershed, high gradient hills within the Tiger WAU have been identified as a potential threat to public safety (Sarikhan and Walsh 2007). Deep-seated landslides within the watershed are generally associated with areas where water concentrates (Sarikhan and Walsh 2007).

As summarized in Section 1.2, the geotechnical report describing the investigation of the damage site concluded that the loss of natural ground and vegetation has created a steep slope with the potential for additional mass movement and danger of falling trees (FEMA 2009).

3.1.2 Methodology and Thresholds of Significance

The analysis of environmental effects is based on an assessment of available data and literature sources, combined with best scientific and professional judgment where quantitative data were unavailable.

Based on the location of the project in a headwaters area of steep slopes with landslide and erosion hazards, a project alternative was determined to result in a significant effect on geology or soil resources if it would:

- Present a substantial risk to people or property due to geologic hazards such as landslides.
- Cause substantial long-term erosion of soils.
- Result in a substantial accumulation of sediment in aquatic habitats.
- Conflict with applicable regulations.

3.1.3 Environmental Consequences

This section describes the potential effects of the project alternatives on geology and soil resources in the project area. Measures to avoid, reduce, or mitigate for identified impacts to geology or soils are also identified.

Alternative A: No Action

Under the No Action Alternative, FEMA would not provide funds to support the restoration of the TMT in the project area. Given DNR's budget limitations and lack of alternative funding sources, it is probable that no further trail or bridge construction, or regular maintenance of the existing trails would take place. Existing trails include the damaged section of the TMT, the temporary bypass, and the partially constructed re-routed trail section. Potential effects of the No Action Alternative include risks to hikers from future landslides, erosion of soils, and sedimentation in aquatic habitats. These are described below.

The existing damaged section of the TMT would remain in its current condition. Although DNR closed the trail 20 to 50 feet back on either side of the damage site, unauthorized use, including hikers scrambling directly across the wash or climbing up the steep slope above it, continues to occur. This presents a substantial risk to hikers from future landslides or falling trees, especially during and after high precipitation events. Hikers crossing the damage site would contribute to soil erosion on the steep slope and the accumulation of sediment to Upper High Point Creek.

The temporary bypass trail would remain in place, and it is anticipated that hikers would continue to use this trail even if it is officially closed by the DNR. The temporary bypass trail is located below the damage site and presents a moderate risk to hikers from future landslides or falling trees during and after high precipitation events. Long-term use of the temporary bypass trail without periodic maintenance would cause soil erosion along the trail and at the wet stream crossing that would contribute small amounts of sediment to Upper High Point Creek.

Under the No Action Alternative, DNR would not connect the partially constructed re-routed trail to the existing TMT or construct the proposed trail footbridge, which would leave one wet stream crossing. However, it is anticipated that some hikers would find and use the partially constructed trail. Unauthorized use of this trail without periodic maintenance, primarily at the wet stream crossing, would cause some erosion of soils on the stream banks and would contribute small amounts of sediment to Upper High Point Creek.

The soil erosion and sediment contribution from hikers crossing the existing damaged section of the TMT, or using the temporary bypass trail or partially constructed re-routed trail without periodic maintenance, is anticipated to be negligible.

Alternative B: Proposed Action

Under the Proposed Action, trail construction activities, including vegetation removal and construction of the trail bench and tread, would disturb up to approximately 0.26 acre of soil and alter the natural slope along the length of the re-routed trail section. The natural slope would be permanently altered, and bench construction could contribute to runoff resulting in long-term soil erosion problems. Proper trail design, installation of drainage features, and regular maintenance in accordance with DNR's Recreation Trail Maintenance book (Clift and Graham 1983) would minimize these effects to a negligible level.

The new bridge and trail approaches would be located approximately 140 feet higher in elevation than the damaged trail section, in terrain with a lower risk of landslides. The Proposed Action is not anticipated to contribute to or be at high risk from future landslides in the project area. The excavation of holes for the bridge abutments would remove up to approximately 50 cubic feet of soil on both sides of the stream channel, and a small amount of temporary erosion on the stream banks is probable. The installation of BMPs as described in Section 2.4 will reduce soil erosion in this area and potential sediment contributions to the stream to negligible levels.

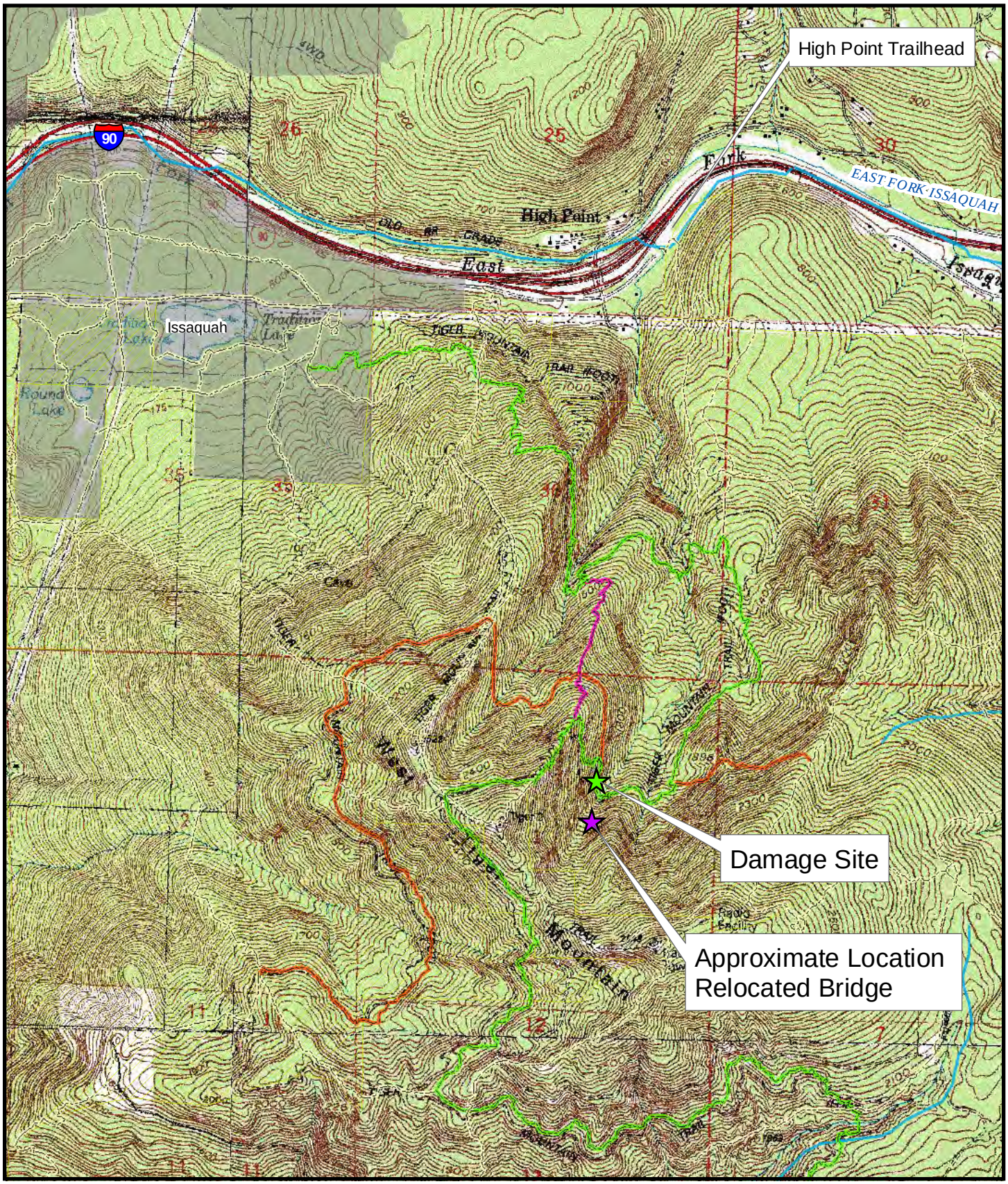
Decommissioning of the damaged trail section and the temporary bypass trail as described in Section 2.4 would restore approximately 6,500 LF of natural slope in the project area. Replanting the restored slope with native vegetation, primarily swordfern, would help stabilize the steep slope and soils over the long term, providing a long-term benefit to these resources.

Mitigation Measures

The installation and use of temporary construction BMPs, and the design, construction, and maintenance of the trail and bridge in accordance with DNR's Recreation Trail Maintenance book (Clift and Graham 1983) will reduce potential temporary and long-term soil erosion and sedimentation in the project area to negligible levels. Therefore, no mitigation measures are necessary.

Significant and Unavoidable Adverse Effects

The Proposed Action would have no significant and unavoidable adverse effects on geology or soils.



LEGEND

- Damage Site
- Relocated Bridge Site
- Trails
- Tiger Mountain Trail
- West Tiger RR Grade
- K-3 Trail

Sources: Project coordinates - FEMA 2009; 2010
Parks, Trails - DNR 2009e, Aerial Photography - NAIP 2009

DISCLAIMER: All GIS data, information, and maps are provided "as is" without warranty or any representation of accuracy, and are not guaranteed to be accurate, correct or complete.

Datum: NAD83 State Plane
Washington South FIPS 4602 Feet
Projection: Lambert Conformal Conic

N

1 in = 2,000 feet when printed on 8.5x11

0 2,000 4,000 Feet

Figure 3.1-1
Topography

FEMA DR-1817 PW-1283(1)
DNR Tiger Mountain Trail Re-Route
and Bridge Relocation at
Upper High Point Creek

Filename: P:\2010\10100401_03TigerMtl\06GIS\6.3Layout\Figure_3-1-1_Topography *HowardL, August 25, 2010*

3.2 HYDROLOGY, WATER QUALITY, FLOODPLAINS, AND WETLANDS

This section describes the hydrology, water quality, floodplains, and wetlands in the project area, and the potential effects of the project alternatives on these resources.

3.2.1 AFFECTED ENVIRONMENT

Watershed Characteristics and Project Area Hydrology

The project area is in the Cedar–Sammamish Watershed (Water Resource Inventory Area [WRIA] 8) and the U.S. Geological Survey (USGS) Lake Washington watershed, Headwaters Sammamish River subwatershed (5th field Hydrologic Unit Code [HUC] 171100120201), and the 61 square mile Issaquah Creek basin (King County 1996). The Issaquah Creek basin is a steep, narrow basin with hydrology that is groundwater fed and influenced by storm events. The project area is located in the headwaters of High Point Creek and includes Upper High Point Creek and an unnamed tributary to Upper High Point Creek (described below). The stream network and the densely forested character of the project area are depicted in Figure 1.2-3 (*Project Site*).

Upper High Point Creek

Upper High Point Creek is a steep, forested ravine with gradients that range from 12 to 20% (WDFW 2011). The steep, single channel, narrow V-shaped valley is constrained by a hillslope with stable densely vegetated banks and stream substrate dominated by cobble and boulder. The project area includes two distinctly different portions of Upper High Point Creek: existing footbridge location and proposed footbridge location. The existing footbridge location of the creek is similar to the overall character of Upper High Point Creek. The 50-foot long footbridge is approximately 20 feet above the creek (pers. obs., Mejia 2010) and the bankfull width there is 15 feet. The proposed footbridge location of the creek is a relatively flat, single, open channel with stable sparsely vegetated banks and stream substrate dominated by fine sediment. The bankfull width at the new location is 6 feet (Figure 3.2-1, *Photos of Streams and Vegetation*). This segment of Upper High Point Creek is seasonally intermittent and mapped by DNR as Type ‘N’, a non-fish bearing stream (DNR 2011).

Unnamed Tributary to Upper High Point Creek

The damaged TMT trail crosses one of several unnamed tributaries to Upper High Point Creek. The unnamed tributary is a steep, single channel creek with sparsely vegetated banks. The bankfull width is 12 to 18 inches. Hydrology concentrates in this tributary, but also appears to sheetflow across the entire landslide area (Figure 3.2-1, *Photos of Streams and Vegetation*). The area was stripped of ground vegetation, including trees, and is vulnerable to additional mass movement from recurring rain storms (FEMA 2009). The temporary bypass trail crosses over the lower portions of the landslide and in the same unnamed tributary. This unnamed tributary is seasonally intermittent, and mapped by DNR as Type ‘N’, a non-fish bearing stream (DNR 2011).

Upper High Point Creek and Proposed Bridge Location

Unnamed Tributary to Upper High Point Creek

Hemlock Forest

Disturbed Uplands and Bypass Trail

Mixed Conifer-Hardwood Forest

Riparian Areas

Figure 3.2-1. Photos of Streams and Vegetation.

Water Quality

Based on surrounding land use, intact riparian habitat with a contiguous forested landscape, and field observations, water quality in the project area is determined to be unimpaired. No other water quality data are available for High Point Creek (Ecology 2009). The NRCA Management Plan (DNR 1997) provides a framework to maintain and protect water quality in the project area and includes objectives such as the conservation of aquatic systems.

Floodplains

The project area is mapped as Zone X on Flood Insurance Rate Map [FIRM] Panel No. 53033C0715F and therefore is not in a floodplain (FEMA 1995). A floodplain denotes the area that is subject to a 1% or greater chance of flooding in any given year (40 CFR 9.4). Approximately 1.2 miles downstream of the project area is a FEMA Zone A, a designated floodplain (FEMA 1995). According to FEMA, damage to the TMT trail appears to represent a random failure within this setting, impacted by localized rainfall and runoff concentrations (FEMA 2009). The slope failure collapsed on the unnamed tributary to Upper High Point Creek. The damaged slope is considered unstable and is stripped of ground vegetation and trees. The existing and proposed footbridge locations are outside of the active channel of Upper High Point Creek.

Wetlands

In its 1979 publication, *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979), the U.S. Fish and Wildlife Service (USFWS) defined wetlands by plants (hydrophytes), soils (hydric soils), and frequency of flooding. The definition stated that wetlands must have one or more of the following attributes: (1) at least periodically, the land supports predominantly hydrophytes (water-loving plants); (2) the substrate is predominantly un-drained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year. 44 CFR 9.4 defines wetlands as those areas inundated or saturated by surface water or groundwater with a frequency sufficient to support, or that under normal hydrologic conditions do or would support, a prevalence of vegetation or aquatic life typically adapted for life in saturated or seasonally saturated soil conditions. This definition is intended to be consistent with the definition of wetlands in Cowardin et al. (1979) (44 CFR 9.4).

The USFWS National Wetlands Inventory (NWI) (USFWS 2010b) shows no wetlands mapped in the Upper High Point Creek drainage. AECOM ecologists conducted a field investigation of the proposed new trail alignment (the project site) on July 19, 2010 to collect information on site conditions, including assessing whether wetlands occur within or adjacent to the project construction footprint. No evidence of wetland attributes was observed, and it was determined that there are no wetlands present in the affected environment.

3.2.2 Methodology and Thresholds of Significance

Potential environmental consequences of each alternative on hydrology, water quality, wetlands, and floodplains were considered from both regulatory and ecological perspectives. To conduct the analysis, two AECOM ecologists assessed the affected environment through a site visit conducted on July 19, 2010, documenting watershed characteristics through field notes and photographs of notable features. A field visit was also conducted by a FEMA Geotechnical Specialist on June 9, 2009. Existing information was gathered from DNR, the Washington State Department of Ecology

(Ecology), and King County, and applicable scientific literature pertaining to hydrology, water quality, floodplains, and wetlands within the affected area was reviewed. A project alternative was determined to result in a significant effect on hydrology, water quality, floodplains, or wetlands if it would:

- Violate currently monitored water quality standards; or discharge regulations; or contribute runoff that would affect water quality standards, would require another permit, or otherwise measurably degrade water quality from current conditions.
- Alter the existing drainage pattern of streams or wetlands in a manner that would violate the standards outlined in the NRCA management plan or exceed the standards of required permits.
- Violate local, state, or federal regulations concerning hydrology, water quality, wetlands, or floodplains.

3.2.3 Environmental Consequences

This section describes the potential effects of the project alternatives on water quality, hydrology, wetlands, and floodplains within the project area. Mitigation measures to offset any identified adverse effects are provided as applicable.

Alternative A: No Action

Under the No Action Alternative, there would be ongoing negligible effects on hydrology and water quality in the unnamed tributary to High Point Creek near the unstable landslide area. Hikers would continue to use the bypass trail that would resulted in minimal turbidity and erosion in the creek.

Alternative B: Proposed Action

Under the Proposed Action, the new footbridge would be sited and constructed to avoid and minimize impact on project area hydrology, and BMPs and the TESC plan would ensure that no stormwater runoff would be discharged to any water body during construction. The footbridge would be built outside the active channel of Upper High Point Creek and natural hydrologic and sedimentation processes of Upper High Point Creek would be maintained.

The Proposed Action would have no effects, either temporary or permanent, on hydrology and floodplains. In addition, this footbridge design would restore trail access across the creek, reducing the erosion caused by foot traffic on the bypass trail across the unnamed tributary to Upper High Point Creek in the unstable landslide area. Water quality would not be affected by the Proposed Action through use of BMPs in the TESC, SPCC Plan, and the HPA.

Mitigation Measures

No mitigation measures for hydrology, water quality, floodplains, or wetlands are proposed under either of the alternatives considered.

Significant and Unavoidable Adverse Impacts

The Proposed Action would have no significant and unavoidable adverse effects on hydrology, water quality, floodplains, or wetlands.

3.3 VEGETATION

This section describes vegetation communities and special status plant species in the project area, and the potential effects of the project alternatives on these resources.

3.3.1 AFFECTED ENVIRONMENT

Plant Communities

The West Tiger Mountain NRCA consists of a mosaic of lowland, high elevation, dry-site and wetland vegetations types (DNR 1997). Prior management activities that affected the vegetation in the project vicinity included extensive logging in the early 20th century, railroad lines across Tiger Mountain, small sawmills, and waterwheel electricity generation facilities on many of the perennial streams (DNR 1997). The DNR has managed the forest surrounding the project area as an NRCA since 1995, with the conservation of native forests and understory vegetation as a primary management goal (DNR 1997). Dominant plant communities in project area vicinity include mixed western hemlock *(Tsuga heterophylla)* forest, disturbed uplands, mixed conifer-hardwood forest, and riparian areas.

Hemlock Forest

Hemlock forest is located in the higher elevation portions of the project area and in the surrounding areas near the top of the Tiger Mountain ridge line and includes a closed canopy of western hemlock and Douglas-fir (*Pseudotsuga menziesii*) (Figure 3.2-1, *Photos of Streams and Vegetation*). The understory is open with sparsely scattered low shrub species that include salal *(Gaultheria shallon),* Oregon grape (*Mahonia nervosa*), and bunchberry (*Cornus canadensis*). Herbaceous species are dominated by sword fern (*Polystichum munitum*).

Disturbed Uplands

Disturbed uplands are limited to the landslide area in the damaged portion of the TMT and constructed bypass trail (Figure 3.2-1, *Photos of Streams and Vegetation*). This area has 50% bare ground with patches of herbaceous species that are dominated by foxglove (*Digitalis purpurea*), oxeye daisy (*Leucanthemum vulgare*), and bedstraw (*Galium aparine*).

Mixed Conifer-Hardwood Forest

Mixed conifer-hardwood forest is located in the lower elevation portions of the project area (Figure 3.2-1, *Photos of Streams and Vegetation*). These areas include a closed canopy of Douglas-fir, red alder (*Alnus rubra*), and western hemlock with big-leaf maple (*Acer macrophyllum*) along the steeper switchback portions of the TMT. The understory consists of moderately open tall shrubs that include vine maple (*Acer circinatum*) and red elderberry (*Sambucus racemosa*) and low shrubs that include salal and Oregon grape. The herbaceous layer is comprised of sword fern and redwood sorrel (*Oxalis oregana*).

Riparian Areas

The riparian area is limited to vegetation adjacent to Upper High Point Creek near the existing footbridge (Figure 3.2-1, *Photos of Streams and Vegetation*). Plant species include devil's club

(*Oplopanax horridus*) and salmonberry (*Rubus spectabilis*) with an understory of youth-on-age (*Tolmeia menziesii*) and various mosses growing on the soil surface.

Special Status Plant Species

For the purposes of this EA, special-status plant species are defined as plants that are listed as either federally threatened or endangered under the Endangered Species Act (ESA), or that are otherwise considered sensitive by Washington State resource conservation agencies. No ESA-listed plant species are located in or near the project area. Tall bugbane (*Cimcifugia elata* var. *elata*), a non-ESA special status plant species, has been documented within 5 miles of the project site (DNR 2009d). No species-specific surveys for this plant have been conducted for this project. Two AECOM ecologists conducted a site visit on July 19, 2010, to collect information on general site conditions, special habitat features, and vegetation communities. Tall bugbane or other sensitive plant species were not encountered.

3.3.2 Methodology and Thresholds of Significance

Field notes and measurements were taken to assess species and relative abundances of vegetation, and photos were taken to represent specific features and characteristics of the project area. Where quantitative measurements could not be taken, scientific literature was consulted based on qualitative characteristics of the project area.

An alternative would result in a significant effect on vegetation if it would:

- Substantially disturb or degrade sensitive natural communities such as riparian habitats.
- Directly or indirectly significantly alter the habitat or populations of sensitive, threatened, or endangered plant species.
- Conflict with applicable state and federal regulations.

3.3.3 Environmental Consequences

This section describes the potential effects of the project alternatives on vegetation resources in the project area. Mitigation measures to offset any identified impacts are also provided.

Alternative A: No Action

Under the No Action Alternative, hikers would use the temporary bypass trail that crosses the unstable landslide area. Minor long-term effects from trampling on disturbed uplands would continue along the temporary bypass trail. No special status plants would be affected.

Alternative B: Proposed Action

Minor, short-term effects are anticipated on vegetation due to the Proposed Action. Trail building activities (clearing and brushing, grubbing and grading) would permanently clear approximately 0.26 acre of understory vegetation in hemlock forest to construct approximately 2,880 LF of new trail and the bridge abutments. A detailed vegetation clearing avoidance plan would be developed by DNR and the construction contractor during the final design and construction phase of the project as part of the BMPs described in Section 2.4 to limit vegetation clearing to that necessary for the project. The project also includes decommissioning approximately 0.6 acre and 6,500 LF of trail.

The decommissioned trail would be restored to native mixed conifer-hardwood forest and planted with sword fern. This restoration would be a minor, long-term, beneficial effect.

The current plan is to transport materials via a helicopter, which would require the clearing of two trees to safely accommodate lowering of these parts. The locations of these trees would be identified by the contractor, for DNR concurrence, following detailed plans and specification for the project. Tree removal would be carefully considered by DNR, and the agency would seek approval and follow WDFW requirements, which may include that the felled trees to be placed in Upper High Point Creek to supplement existing large woody debris. Potential vegetation removal would be a negligible, long-term effect.

Mitigation Measures

No mitigation measures are proposed under either alternative. DNR will implement its standard trail design and construction BMPs in accordance with its standard practices and the Management Plan (DNR 1997).

Significant and Unavoidable Adverse Impacts

The Proposed Action would have no significant and unavoidable adverse effects on vegetation.

3.4 FISH AND WILDLIFE

This section describes fish and wildlife resources in the project area and the potential effects of the project alternatives on these resources.

3.4.1 AFFECTED ENVIRONMENT

Terrestrial Wildlife

Wildlife that occurs in the project area is similar to that described for the nearby Tiger Mountain Trail Footbridge Project (FEMA 2010b). No sensitive, threatened, or endangered wildlife species were encountered during a field reconnaissance and no unique habitats were observed.

Fish

The project area portions of Upper High Point Creek and the unnamed tributary to Upper High Point Creek do not have suitable habitat to support fish species. A search of WDFW Priority Habitats and Species (PHS) database for the project area resulted in no fish occurrence data. This segment of Upper High Point Creek is mapped by DNR as Type 'N', a non-fish bearing stream (DNR 2011).

Threatened or Endangered Species

No fish or wildlife species listed as threatened or endangered under the ESA are documented as occurring in the project vicinity (WDFW 2010b; StreamNet 2010; USFWS 2010a; NMFS 2010; FEMA 2010b). This includes no documented occurrence of the northern spotted owl (*Strix occidentalis caurina*) or marbled murrelet (*Brachyramphus marmoratus*) in the project vicinity. No threatened or endangered species, nor suitable habitat, were observed during the site reconnaissance.

3.4.2 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

A field reconnaissance, review of existing information, and professional judgment were used to evaluate project effects. An alternative would result in a significant effect on fish or wildlife if it would:

- Interfere substantially with the breeding, feeding, or movement of native resident or migratory fish, bird, amphibian, or mammal species.
- Substantially conflict with state or local regulations protecting fish, wildlife, or habitat.
- Substantially conflict with the provisions of an applicable species or habitat management plan.
- Result in the long-term degradation of streams or riparian forested habitat in the project area or vicinity.

3.4.3 ENVIRONMENTAL CONSEQUENCES

Potential effects of the No Action and the Proposed Action alternatives on fish and wildlife within the project area are described below.

Alternative A: No Action

Under the No Action Alternative, FEMA would not provide funding for the replacement of the footbridge. Terrestrial and aquatic habitat elements important to fish and wildlife would remain unaltered from their current condition. There would be no effects on fish and wildlife related to the No Action Alternative.

Alternative B: Proposed Action

Because there is no suitable fish habitat in the project area, implementation of the Proposed Action would not result in short- or long-term effect on fish.

Noise and other disturbances caused by construction crews may cause wildlife to move away from the construction area. Since the habitat areas found in the project area are connected to other similar habitats, many species would temporarily relocate in these nearby areas during construction. In the long term, wildlife species would return to the area (see Section 3.6, *Noise*, for more information).

All construction would take place during the dry season and in the upland forest habitat, minimizing run-off and sedimentation during construction. BMPs and a TESC plan would be applied as part of the project to prevent run-off, and sedimentation from reaching streams and aquatic habitats, if it were to occur. Heavy equipment would be kept to the minimum necessary for transporting materials to and from the project area. The use of a helicopter to deliver some large bridge components would cause additional short-term disturbance to wildlife in the area.

The permanent clearing of approximately 0.26 acre of understory vegetation in hemlock forest to construct approximately 2,880 LF of new trail and bridge abutments would have a minor, short-term effect on wildlife through the loss of habitat. A detailed vegetation clearing avoidance plan would be developed by DNR and the construction contractor during the final design and construction phase of the project as part of the BMPs described in Section 2.4 to minimize this effect. The project would decommission approximately 6,500 LF of trail and restore approximately 0.6 acre of understory vegetation, resulting in a net long-term increase of 0.34 acre of wildlife habitat in the project area This net increase in native understory vegetation in hemlock forest would have a minor, long-term beneficial effect on wildlife and habitat in the project area.

Mitigation Measures

The Proposed Action would have only minor, temporary adverse effects on wildlife from vegetation clearing, construction activities. and noise; these effects would be minimized through the implementation of BMPs and no mitigation measures are proposed. Over the long term, the Proposed Action would have a beneficial effect on wildlife and habitat.

Significant and Unavoidable Adverse Impacts

The Proposed Action would have no significant and unavoidable adverse effects on fish or wildlife.

3.5 RECREATION AND VISUAL RESOURCES

This section describes existing recreation and visual resources in the project area, and the potential effects of the project alternatives on these resources.

3.5.1 AFFECTED ENVIRONMENT

Recreational Resources

Recreational resources in the project area that could be affected by the project alternatives include the TMT and the West Tiger Railroad Grade in the Upper High Point Creek area. The TMT in the project area is a heavily used single track foot trail, used for non-motorized recreation (as described earlier).

Visual Resources

The damaged trail section, temporary bypass trail, and remaining bridge next to the damage site are located within a densely forested riparian ravine. Because of the topography and extensive forest, views of the damage site from long distances are hidden behind landforms and vegetation, with the only clear views available immediately above and below it, or immediately from the east and west.

The proposed re-routed trail and location of the relocated bridge are in more open forest, with sparse, low-growing understory. However, due to topography, views of the new trail route and bridge location are also hidden behind landforms from long distances.

3.5.2 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

Recreational and visual resources were evaluated based on the July 2010 site visit and the management documents produced by the DNR for the West Tiger Mountain NRCA (DNR 1997).

An alternative would result in a significant effect on recreation or visual resources if it would:

- Increase the use of or exceed the capacity of the existing recreational resources such that substantial physical deterioration would occur or be accelerated.
- Have a substantial effect on the quantity or quality of recreational activities in the vicinity.
- Substantially alter views or the natural visual character of the area.

3.5.3 ENVIRONMENTAL CONSEQUENCES

This section describes the potential effects of the project alternatives on recreational and visual resources in the project area. Measures to avoid, reduce, or mitigate for any identified impacts on recreational and visual resources are also identified.

Alternative A: No Action

Implementing the No Action Alternative would represent a moderate adverse effect on recreation resources due to a lack of trail access. Under the No Action Alternative, the truncated trail sections on either side of the damage site, including the existing bridge, would not be decommissioned and would be a minor, long-term visual intrusion on the landscape.

Alternative B: Proposed Action

The Proposed Action would have no temporary impacts on recreational resources during construction because the temporary bypass trail would remain in place until the proposed trail re-route and bridge relocation is completed, and east/west access through the project area would not be disrupted. The Proposed Action would have a moderate, long-term beneficial effect on recreational resources in the project area by restoring sustainable east/west trail and bridge access across Upper High Point Creek in the project area.

The Proposed Action would have a minor, temporary impact on visual resources during construction because disassembly of the existing bridge adjacent to the damage site and trail construction to connect the re-routed trail to existing trails would be a temporary, minor visual intrusion to hikers passing nearby. The Proposed Action would have no long-term adverse effect on visual resources in the project area since the relocated bridge would be constructed with wood components and would cause no glare or light reflection, maintaining the natural visual character of the project area. Decommissioning of the damaged trail section (including bridge removal) and the temporary bypass trail would restore the landscape in that area back to its original character, removing long-term visual intrusion from nearby trails and providing a long-term beneficial effect.

Mitigation Measures

Adverse impacts on visual resources from the Proposed Action are temporary and minor, and would not require mitigation.

Significant and Unavoidable Adverse Effects

The Proposed Action would have no significant and unavoidable adverse effects on recreational or visual resources in the project area.

3.6 NOISE

This section describes existing noise conditions in the project area and the potential effects of the project alternatives on noise-sensitive receivers. Noise-sensitive land uses are those where exposure would result in adverse effects on users or occupants and where quiet is an essential element of the intended purpose of the land use. Noise-sensitive land uses include residences, parks, hospitals, churches, libraries, and similar uses where low noise levels are essential. Noise-sensitive receivers are the users or occupants of these types of land uses and may include both humans and wildlife.

3.6.1 Affected Environment

The project area is located in unincorporated King County on state lands managed primarily for conservation purposes and secondarily for low-impact recreational use (DNR 1997). The affected environment for the proposed project is the same as the affected environment for the nearby Tiger Mountain Footbridge Project (FEMA 2010b), including ambient noise conditions, noise-sensitive land uses and receivers, and applicable noise regulations.

3.6.2 Methodology and Thresholds of Significance

The methodology and thresholds of significance used to evaluate noise effects from the proposed project are the same as those used for the nearby Tiger Mountain Footbridge Project (FEMA 2010b).

A project alternative would reach the significance threshold for noise if it would:

- Cause substantial increases in noise levels on a permanent basis or for a prolonged period of time.

3.6.3 Environmental Consequences

The potential noise effects of the project alternatives are described below. Measures to avoid, reduce, or mitigate for any identified noise effects are also identified.

Alternative A: No Action

Under the No Action Alternative, FEMA would not fund the project, and there would be no repair or related construction activities, and thus no temporary noise effects related to construction or long-term noise effects related to operation of the project.

Alternative B: Proposed Action

Potential noise-related effects associated with the Proposed Action are primarily related to short-term construction noise in the project area. There would be no long-term noise effects from operation of the project.

Construction activities would occur between 8 a.m. and 5 p.m. during the construction phase, and would likely occur outside of the nesting season for migratory bird species. If migratory birds are identified as nesting in the project area, DNR will coordinate with the USFWS and WDFW to identify appropriate avoidance measures and ensure compliance with the Migratory Bird Treaty Act (MBTA). Trail construction activities would primarily involve the use of hand tools. However,

noise-generating power equipment such as small chainsaws and/or motorized brush cutters could potentially be used. It is anticipated that a helicopter would be used to place the bridge abutments and stringers, and may also be used to transport other bridge materials to the project site.

A typical chainsaw generates a sound emission level of around 84 A-weighted decibels (dBA) at 50 feet from the source (FHWA 2006). A brush cutter is assumed to generate similar sound emission levels for the purpose of this analysis. Noise emissions from the use of chainsaws or brush cutters would exceed the King County regulatory threshold for construction within about 100 feet from the point of use and attenuated to ambient sound levels within about 400 feet. Persons using trails within about 400 feet of the project site could experience increased noise levels (over ambient sound levels) during use of these equipment. However, the use of this equipment would occur over a very short period of time, and while nearby hikers could experience a substantial increase in noise levels, the noise impact would be temporary. This is considered to be minor impact.

Noise effects from helicopter use would be similar to that for the nearby Tiger Mountain Footbridge Project (FEMA 2010b). Helicopter noise during construction would be substantial in the project area, but would be of very short duration and would fall within regulatory standards. This is considered a minor temporary noise impact.

Noise effects on wildlife would be similar to that for the nearby Tiger Mountain Footbridge Project (FEMA 2010b) and are considered minor and temporary.

Mitigation Measures

Due to the anticipated short duration of noise impacts related to construction of the project, no mitigation measures are proposed.

Significant and Unavoidable Effects

Sound levels generated during construction would result in temporary, minor noise impacts under the Proposed Action. These noise effects are unavoidable but are expected to be of short duration and are not considered significant.

3.7 CUMULATIVE EFFECTS

Cumulative effects are those that result from the incremental effect of a proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other action (40 CFR 1508.7). Effects of the Proposed Action that may have an incremental effect when added to other activities in the area include negligible to minor adverse effects from vegetation clearing and soil disturbance, and minor beneficial effects on recreational resources, as described below.

- **Vegetation Clearing and Soil Disturbance –** Vegetation clearing and soil disturbance could have minor cumulative effects on the ecological resources (e.g., soils, hydrology, vegetation, and fish and wildlife) of the NRCA. Under the Proposed Action, vegetation clearing would be less than 0.26 acre. This is less than 0.01% of the total land in the NRCA. This incremental loss would be minor even when added to other activities in the area, and cumulative effects over the long term would be negligible.
- **Improvements to the Trail System** – In addition to the proposed project, DNR is planning three other footbridge projects in the general vicinity. Each footbridge would be installed on DNR lands where existing trails over streams and small drainages are too difficult to safely cross. These improvements to the trail system could increase hiker use. DNR would continue to maintain this trail system in accordance with West Tiger Mountain NRCA Management Plan (DNR 1997). The cumulative effects of the Proposed Action added to these other footbridge projects would have an additive beneficial use on recreation use, as well as ecological resources, including minor increases in hydrologic capacity and stream bank protection.

4.0 Consultation & Coordination

4.1 PUBLIC INVOLVEMENT

FEMA determined that a separate NEPA scoping process for the Proposed Action in this EA was not necessary based on the responses received during the NEPA scoping process for a similar DNR trail and bridge replacement project located on the TMT nearby, referred to as the Tiger Mountain Footbridge Project (FEMA 2010b).

4.1.1 COMMENTS ON THE DRAFT EA

The Draft EA will be released for public review. Copies will be sent directly to those federal agencies, tribes, state and local jurisdictions, and stakeholders that participated in scoping for the Tiger Mountain Footbridge Project EA (FEMA 2010b) and are listed in Chapter 6, *Distribution*. A Public Notice will announce the availability of the Draft EA to the general public for comment and will be posted at the High Point Creek trailhead. The Draft EA will be available for viewing at the Issaquah branch of the King County Public Library. The Draft EA will be posted to the FEMA website, the web address of which will be included in the Public Notice.

There will be a 30-day comment period. Comments resulting from this public review will be reviewed and analyzed, and the document revised as appropriate. A Final EA, and a decision as to whether a FONSI or an EIS notice of intent is required, will be provided at the FEMA website.

4.2 AGENCY AND TRIBAL CONSULTATION AND COORDINATION

As part of the NEPA scoping process for the Tiger Mountain Footbridge Project (FEMA 2010b), FEMA consulted with several federal and local agencies throughout the EA process to gather valuable input and to meet regulatory requirements. This coordination was integrated with the analysis of project effects and the public involvement process. For additional information on this process, see FEMA (2010b).

Because there were no federally threatened or endangered species present under the Endangered Species Act, no consultation with USFWS and the National Marine Fisheries Service (NMFS) is required. Because FEMA made a “no adverse effect” determination regarding Essential Fish Habitat (EFH) under the MSA, no consultation with NMFS is required.

FEMA is consulting with the State Historic Preservation Office (SHPO) and with the Snohomish, Tulalip, Muckleshoot, and Puyallup tribes requesting help in identifying cultural or religious properties that may be affected by the project.

5.0 Preparers

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LIBRARIES

King County Public Library, Issaquah Branch

VOLUNTEER ORGANIZATIONS

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PERSONAL COMMUNICATIONS

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