

BRIDGE FORKS WEST ENVIRONMENTAL ASSESSMENT

Bend-Fort Rock Ranger District Deschutes National Forest Deschutes County, Oregon

Introduction

The Bridge Forks project is divided into two geographic areas, east and west. This Environmental Assessment (EA) analyses the trails in the west area. This area includes approximately 34 miles of trail to be reconstructed and 3 miles of new trail to be constructed.

The Bridge Forks West (BFW) project begins approximately nine (9) miles west of Bend, Oregon, bordered on the north by Skyliners Road (4601), and on the south by Cascade Lakes Highway. The eastern border is near private section 16 in T. 18 S, R 10 E. extending to the west approximately nine (9) miles to Forest Road 370 near Todd Lake. Refer to the general vicinity map ([Figure 1](#)). The project lies primarily within five 6th field watersheds; Tumalo, Bridge, Forks, Sparks and Bend. The entire project ([Figure 2](#)) is located within the boundaries of the Northwest Forest Plan (NFP). Included within the project area are a Key Elk Area and portions of an Inventoried Roadless Area and Lynx Analysis Unit ([Figure 3](#)).

Management Direction

The Deschutes National Forest Land and Resource Management Plan (Forest Plan), 1990, as amended by the Northwest Forest Plan (NWFP), 1994, established broad direction for the Forest. The analysis conducted for the BFW project tiers to the Forest Plan and its supporting documentation. The project includes Forest Plan Management Areas (MA):

- Scenic Views (MA-9) - To provide Forest visitors with high quality scenery that represents the natural character of Central Oregon.
- Bend Municipal Watershed (MA-10) - Provide water at a level of quantity and quality which will result in a satisfactory and safe domestic water supply. Manage the Bend Municipal Watershed for multiple uses by balancing present and future resource use with domestic water supply needs.
- Dispersed Recreation (MA-12) - Provide a range of quality recreation opportunities in an undeveloped forest environment.
- Winter Recreation (MA-13) - Provide quality winter recreation opportunities within a forest environment that can be modified for visitor use and satisfaction.
- Front Country (MA-18) - Provide and maintain a natural appearing forested landscape on the slopes

northeast of the Three Sisters and Tam MacArthur Rim while providing high and sustainable levels of timber production.

Documents Tiered To

The following documents were used in this analysis and are incorporated by reference. These documents are available for public review at the Bend-Ft. Rock Ranger District Office:

- 1990 Deschutes National Forest Land and Resource Management Plan (Forest Plan) - This plan was developed to guide all natural resource management activities and establish standards/guidelines on the Deschutes National Forest.
- 1990 Deschutes Land and Resource Management Plan (Forest Plan) as amended by the 1994 Northwest Forest Plan (NWFP).
- Inland Native Fish Strategy (INFISH), 1995.
- Bend Watershed Analysis, 1998.

Purpose And Need For Action

Increases in tourism and population between 1985 and 1995 increased recreation demands in Central Oregon, which is known for its year-round recreational opportunities and its consistently favorable weather. Present projections indicate an increase in population, visitation and recreation use. The popularity of mountain biking has grown over the past two decades. The project area has become a destination for mountain biking enthusiasts. The increase in use on Forest Service managed land has also indicated a tendency toward increased mountain bike user-created trails.

The Tumalo/Skyliner area in the Deschutes National Forest is approximately nine (9) miles west of Bend. It is a destination recreation area for varied motorized and non-motorized, year around recreation.

The Bridge Forks West project area has been a particularly popular area for multiple use trails, motorized and non-motorized. Some trails are designated as non-motorized, including hiking only, within the Bend Municipal Watershed and on Tumalo Mountain. The project area is close to town and provides a considerable amount of forested area with gentle, rolling terrain having a gradual increase in elevation east to west. One user-created trail in the project area crosses private land. Because managed timber stands are relatively open with few impediments on the surface, it can be expected that user-created mountain bike trails would continue to be developed unless a logical, connecting trail system can be created and maintained.

There is a need to: 1) Reconstruct trails to Forest Service standards where appropriate; 2) Relocate sections of trails to reduce soils and erosion concerns; 3) Respond to a private landowners desire to relocate a user-created trail from private to Forest Service land; 4) Construct trails to provide more effective management,

access and connection with existing trails; and 5) Provide trail signing in conspicuous and key locations.

Desired Future Condition

The desired future condition for this trail system is to have a planned, manageable, and maintainable trail system that connects to city trails rather than creating additional destination trailheads. Trails would be located in areas that minimize impacts to other resources. Trails would be a mix of non-motorized uses, with primary use designation, and be of various lengths with logical connections with other National Forest trails. There would be a variety of difficulties providing opportunities for a range of user skill levels. Trails would be clearly signed in conspicuous and key locations to provide destinations and distances.

Proposed Action

The proposed action would: 1) Reconstruct approximately 34 miles of existing trail; 2) Relocate approximately two (2.0) trail miles that are located in areas of soil and erosion concern; 3) Construct approximately three (3) miles of new trail, primarily mountain bike trail that would be closed to horses and motorized use; and 4) Provide signs that are semi-primitive in style and placed in conspicuous and key locations.

Decision To Be Made

The purpose of this document is to display the effects of the revised proposed action and any alternative methods of addressing the purpose and need for the Bridge Forks West EA. It documents an environmental analysis of the alternatives including the no-action alternative. Based upon this analysis and public comments, the Bend/Fort Rock District Ranger will determine which alternative will be implemented in the project area and if so, where and under what conditions.

Availability Of The Planning Record

Specialist reports used in the preparation of this Environmental Assessment are on file and available on request at the Bend-Fort Rock Ranger District office.

Public Involvement/Scoping Process Used

A letter requesting public involvement was mailed to approximately 70 individuals, businesses, and organizations that have an interest in the process on September 27, 2001. Included in the mailing was The Bulletin, the local newspaper that reported on the proposed project area. Announcement of the proposed action was included in the Central Oregon Schedule of Projects (Deschutes National Forest publication) starting in the winter of 2000 issue. This notification reaches approximately 3,200 individuals and groups.

Scoping Issues

The public scoping process for the Bridge Forks West EA identified no key issues related to the proposed action in the project area. One response was received and that response expressed concerns that were considered in the development of mitigations. The key concerns are:

- Over-improving of the trails.
- The amount and type of signing.

Alternatives

This section provides discussion of a no action alternative and one action alternative. A site-specific environmental analysis was conducted.

Alternatives Considered in Detail

This section presents a detailed description of the alternatives responding to the "Purpose and Need" that are considered to be reasonable and viable by the Decision Maker (the Bend-Fort Rock District Ranger). The Proposed Action Alternative is designed to move toward the desired condition consistent with the standards and guidelines of the Forest Plan.

Alternative A (No Action)

The No Action alternative would allow the existing trail system to remain as is. No reconstruction, relocation, or signing of trails would be implemented. Erosion problems that currently exist would likely continue or worsen, some areas being adjacent to riparian areas. Trails would likely continue to be cleared of fallen trees and users would complete minor drainage work each season. One portion of a user-created trail would remain on private land.

Alternative B (Proposed Action)

The project consists of reconstructing approximately 34 miles of existing trails and relocation and/or constructing approximately 3 miles of new primary mountain bike trail (Refer to Table 1).

Table 1: Proposed Action Trail Activities

Trail Name	Reconstruction Miles	Relocation Miles	Obliteration Miles	New Construction Miles	Total Trail Miles	Primary User	Restrictions *
Skyliner				2.0	2.0	Bike	No domestic ungulates
Tumalo Mountain	1.7	.4	.3		1.7	Hiker	Hiker Only
North Fork	3.5	.3	.3		3.5	Hiker	Bikes uphill only
South Fork / Swampy	9.5	.5	.4		9.5	Bike	NA
Swede Ridge	2.5	.3	.2		2.5	Bike	NA
Flagline	10.4	.3	.3		10.4	Bike	NA
Section 16			.1	1.0	1.0	Bike	No domestic ungulates
Bridge Creek	6.3	.2	.1		6.3	Hiker	Hiker Only
Total	33.9	2.0	1.7	3.0	36.9		

* All trails closed to motorized summer use.

Activities Associated with Reconstruction:

- Redefining trailheads.

- Relocating minor sections of trail where drainage structures fail to adequately drain water from the trail.
- Removing excess soil, and fill, where necessary, for improved trail definement.
- Obliterating existing, abandoned trail.
- Clearing brush from either side of the trail.
- Installing drainage structures.
- Removing fallen trees.

Activities Associated with New Construction:

- Relocate approximately one (1) mile of trail, currently located on private land.

Mitigation Measures

Forest Plan Standards and Guidelines would be applied in the design of the alternatives and are not listed here. The following measures would be applied to reduce potential adverse impacts of Alternative 2 (Proposed Action). If implementation problems or concerns are encountered, the appropriate specialist would be consulted.

Recreation

1. Trail Signing would be semi-primitive in style, and be placed in conspicuous and key locations to provide adequate directional signing to provide for user safety.
2. Improvements would be limited to retain the trail in a condition that incorporates safety and resource protection while providing challenges for bike riders.
3. Designated trails would be closed to motorized uses and be open for other non-motorized uses except where restrictions apply.

Wildlife

4. Trail reconstruction, relocation, and new trail construction would not take place in nesting, roosting, and foraging (NRF) habitat during spotted owl-nesting March 1 - September 30 (Portions of North Fork, South Fork/Swampy, Skyliner and Bridge Creek trails). Work needing to be conducted within this habitat during this timeframe, without using Project Design Criteria (PDCs), would need consultation with USFWS prior to activity initiation.
5. To be consistent with this closure, trail maintenance should not occur until August 15. By not maintaining this trail until this time would also discourage use prior to this date. Work needing to be conducted within the key elk area prior to this date would need to be approved by the project wildlife biologist.
6. Discourage user created trails from forming off of the main trail to the creek by placement of signs along select portions of the trail.
7. Rehabilitation efforts to areas immediately adjacent to existing trail beds located in riparian areas,

such as decompaction of soils, would not be implemented. This would substantially reduce negative impact risks to *Pristiloma arcticum crateris*. Rehabilitation efforts would either occur within the defined portion of trail compaction or these portions of trail would be covered with slash to disguise the trail. Slash would be imported from outside the riparian areas.

Fisheries/Hydrology

8. Trail reconstruction and re-route activities would occur at a time of the year when the possibility of overland flow of sediments into watercourses is reduced.

Cultural Resources

9. If previously unknown cultural resources are found during construction, the USFS Archaeologist would be notified and construction would terminate until the importance of the site is determined.

Environmental Consequences

This section describes the beneficial and adverse impacts to the environment that would occur if the alternatives were implemented. Estimated effects are discussed in terms of environmental changes from the current situation and include qualitative as well as quantitative assessments of direct, indirect, and cumulative effects.

Recreation

Existing Condition: Recreation in the Bend area is rapidly growing as a result of increases in: 1) mountain biking; 2) the population of Bend; and 3) the popularity of the Bend area as a recreation destination. Existing trails within the project are of varying ages, some of which are historic and prehistoric. Access between existing trails within the project area is complicated in particular areas. Some of these areas, as a result of relatively flat, unimpeded terrain, increase the opportunity for user-created trails that could impact forest resources.

Many trails on the Forest are open for use by mountain bikes in conjunction with other dispersed, non-motorized recreation uses. Approximately 95% of trails in the project area (Figure 2, page 3) are in acceptable locations and constructed to an acceptable standard. One (1) of the existing trails was developed by bike users and is partially located on private land.

- Tumalo Mountain trail originally accessed a fire lookout and was not built to present standards. The last portion of the trail, to the top of the mountain, is steep and on cinder material that is loose and easily displaceable. Through use, there is a tendency for trench development to occur.
- North Fork trail was constructed within the past 10 years between the Middle and North Forks of Tumalo Creeks. The trail upstream of the bridge crossing the Middle Fork of Tumalo Creek (T18S,

R10E, Section9) was constructed to a high standard. Skidding, as a result of downhill mountain bike use, has contributed to the loosening of soils, within the trail width, with subsequent erosion. This has occurred primarily on switchbacks and sweeping turns.

- Swede Ridge trail is also utilized as a Nordic trail. A portion of the trail is in the bottom of a shallow draw, which channels snowmelt and rainwater. Natural process in conjunction with recreation use is causing a trench to be developed.
- Swampy Lakes trail is a traditional route with numerous switchbacks. Erosion is occurring at the switchbacks due to their location and steep inclines.
- South Fork trail has areas that are located immediately adjacent to or are within a riparian area.
- Bridge Creek trail, a hiking only trail, has areas that are adjacent to riparian areas.
- Flagline trail is also a Nordic trail. Trail areas, bordering springs or consistent snowmelt areas, are muddy during the spring months.
- Section 16, a user created trail, currently traverses the southeast quarter section of private land.

The primary trailhead is Phil's trailhead, accessed from the Skyliner Road. Phil's Trailhead, Swampy Lakes, Vista Butte, Dutchman Flat, and Tumalo Falls are developed sites/trailheads within the project area. Most of these developed sites provide bulletin boards with directional signing, toilets, and graveled or paved parking areas.

The project area is primarily unroaded and primarily day use. Dispersed camping areas in this project area are few. Restrictions within the Bend Municipal Watershed do not allow for dispersed activities such as campfires, camping, biking, horseback riding, or the presence of dogs.

Alternative A (No Action): Use on existing trails would create an increased need for dispersion of use. Existing trails would continue to have use and location related concerns that contribute to loosening of soils and trenching within the cleared trail, erosion, and potentially increased sedimentation into streams. Regular maintenance alone, without reconstruction, would allow these trails to continue to degrade. Potential for user-created access between trails would continue as present. An interlinking, defined trail that would reduce impacts to forest resources would not be constructed. Section 16 trail would continue to be used across private land.

Alternative B (Proposed Action): Existing trails would be reconstructed to a standard that would provide for proper drainage and reduced erosion concerns. Trail Signing would be to a semi-primitive standard, and be placed in conspicuous and key locations to provide adequate directional signing (destinations, distances, uses) to provide for user safety. A trail system would be created which would:

- Define trailheads
- Provide the basis for long term maintenance
- Create a manageable trail system, entirely on USFS land.
- Create multiple use opportunities
- Create logical loop opportunities
- Further existing partnerships with user groups

Primary access to the project area would be from Bend via either Skyliner Road or Cascade Lakes Highway

and defined trailheads such as Phil's Trailhead, Swampy Lakes, Dutchman Flat, and Tumalo Falls. A designated trail system would be recognized in future management actions. Trail integrity would be maintained longer, and existing and future use would have fewer adverse impacts on other resources. No new trailheads (fee areas) would be developed within the framework of this project.

Wildlife

Species and Habitats List: The following wildlife and habitats have been reviewed ("x" = within or adjacent to project area, na = not applicable) to determine if the project/activity will have any negative impacts on Forest Plan Management Indicator Species (MIS), NWFP Survey and Manage (S&M) species, and special habitats (see note 1). Only those species or habitats with an "x" could be potentially impacted by the project/activity.

Forest Plan MIS Species/Habitats:

Deer	Transition Range - na	Raptors (see note 2) - na
	Summer Range - x	Woodpeckers - na
	Winter Range - na	Great Blue Heron - na
	Fawning Habitat - na	Waterfowl - na
Elk	Transitions Range - x	California Wolverine - na (See BE)
	Summer Range - na	American Marten - na
	Winter Range - na	Western Big-Eared Bat - na
	Calving Habitat - x	Logs/Down Wood spp. - na
	Key Elk Habitat - x	Special Habitats - na

Note 1 - Special habitats include: caves, cliffs, old-growth forest, riparian, wetlands, and snags.

Note 2 - Note: northern spotted owl, peregrine falcon and bald eagle are addressed by the Biological Evaluation (BE). Includes golden eagle, northern goshawk (Species of Concern (SOC)), red-tailed hawk, Cooper's hawk, sharp-shinned hawk, great gray owl (S&M spp.), and osprey.

Species of Concern (USFWS)	Northwest Forest Plan: na
Northern Goshawk - na	S&M Mollusks - x
Black Tern - na	Great Gray Owl - na (S&M)
Harlequin Duck - na (see BE)	Snags - na (matrix)
Olive-Sided Flycatcher - na	Coarse Woody Debris - na (matrix)
Tri-Colored Blackbird - na (see BE)	Riparian Reserves - x
Western Sage Grouse - na (see BE)	Late Successional Reserves - na
Ferruginous Hawk - na	Green Tree Retention - na (matrix)
Pygmy Rabbit - na (see BE)	Late and Old Structure Retention - na (matrix)

Pacific Western Big-Eared
 Bat - na
 Small-Footed Myotis - na
 Long-Eared Myotis - na
 Long-Legged Myotis -na
 Yuma Myotis - na
 Fringed Myotis - na
 California Wolverine- na
 (see BE)
 Pacific Fisher (see BE)
 Preble's Shrew - na
 Tailed Frog - na
 Northern Sagebrush Lizard -
 na
 Cascades Frog - na

Bats - na (matrix)
 Woodpeckers - na (protection buffers)
 Flammulated Owl - na (protection buffers)
 Canada Lynx - x (see BE)

Threatened and Endangered Species List: The following wildlife/habitats have been reviewed ("x"= occur within or adjacent to the project area, na = not applicable) to determine if the project/activity will have any negative effects on listed, proposed, candidate or sensitive species in order to meet the requirements for a biological evaluation. Only those species or habitats with an "x" could potentially be impacted by the project/activity.

Northern Spotted Owl (NSO) - na	Canada Lynx LAU* - x	Oregon Spotted Frog - na
NSO/Critical Habitat - na	Canada Lynx KLA**- na	Northern Bald Eagle - na
NSO/Nesting, Roosting, Foraging habitat - x		

* LAU=Lynx Analysis Unit; ** KLA=Key Lynx Area

Region 6 Sensitive Species List:

American peregrine falcon - na	Horned grebe - na	Western sage grouse - na
Red-necked grebe - na	Bufflehead - na	Yellow rail - na
Tri-colored blackbird - na	Harlequin duck - na	California wolverine - na
Pygmy rabbit - na	Pacific fisher - x	

Alternative A (No Action): With or without implementation of this project, recreational use is expected to occur and increase within and adjacent to the project area. User created trails would most likely be created in areas without reconstruction and construction of new trails, in some cases in areas sensitive to wildlife or vegetation. The trail along Bridge Creek would remain within riparian habitat, maintaining decreased habitat effectiveness for riparian dependent species. Existing wildlife use patterns would continue to be modified as

human use in the area grows.

Alternative B (Proposed Action):

Big Game: This project would occur within deer summer range, elk summer and transition range, key elk habitat, and elk calving habitat. The project would be subject to the standards and guidelines described in the Deschutes National Forest Land and Resource Management Plan (Forest Plan 1990). The Oregon Department of Fish and Wildlife and Forest Service cooperate in determining the level of habitat effectiveness needed to meet elk management objectives.

Approximately 1 1/2 miles of the Flagline Trail traverses the Tumalo Mountain Key Elk Area (Figure 3, page 4). This trail has a summer closure until August 15, reducing the possibility of disturbance to elk and their calves in this key area. August 15 reflects elk use that may extend later into the summer following heavy snow years. Trail activities occurring prior to this may impact elk and their calves (Mitigation measure 5, page 8).

Areas adjacent to Tumalo Creek, South Fork Tumalo Creek, and Bridge Creek provide elk calving habitat. Elk use is dispersed and most likely sporadic throughout these areas and specific areas of use within these drainages are unknown. It is possible that proposed activities would occur during the elk calving period (May through July). It would be expected that with the estimated low level of disturbance from the trail work (mostly hand tools with some chainsaw work) that the project would not adversely affect adult elk or their calves. The proposed activities would remove some existing vegetation, mainly seedling, sapling, and pole size trees. The current availability of cover and forage would not be adversely affected. Moving portions of trails away from riparian areas would benefit elk and deer that utilize the area by increasing the value and quality of riparian habitat and reducing possible human/big game interactions.

Three (3) miles of new trail construction (2 trails) would occur within two non-riparian areas. The non-riparian areas are elk transition and deer summer range. Construction of these two (2) new trails would not adversely effect local deer and elk populations or their respective habitats.

Mollusks: Pre-field surveys for the Survey and Manage Species *Pristiloma arcticum crateris* were conducted along proposed trail relocation areas along the South Fork Tumalo Creek and Bridge Creek. None of the proposed trail relocations contained key features that would indicate the presence of *Pristiloma arcticum crateris*.

Key features, adjacent to portions of existing trail near South Fork Tumalo Creek that would be closed and/or rehabilitated, indicate the possible presence of *Pristiloma arcticum crateris*. Proposed trail rehabilitation activities would not adversely affect *Pristiloma arcticum crateris* species that may occur adjacent to the existing trail bed along South Fork Tumalo Creek. All proposed activities would occur only within the defined compacted portion of the trail tread (Mitigation Measure 7, page 8).

Riparian Habitat: Several sections of trail are located within riparian habitat along the South Fork Trail. Creating a trail further up the slope, within upland vegetation, would move recreation activity out of the riparian habitat. Vegetation would be able to regenerate within and adjacent to the old trail bed to provide quality riparian habitat for various species of wildlife. Relocation of trail to outside of the immediate riparian

area would not be expected to negatively impact riparian habitat or associated riparian species. Trail rehabilitation efforts within the riparian area would be limited to the defined portion of trail tread (Mitigation Measure 7, page 8).

Northern Spotted Owl: Approximately 1 1/2 miles of trail reconstruction, 1 mile of trail relocation, and 1/4 mile of new trail construction would occur within suitable nesting, roosting, and foraging (NRF) habitat (Figure 3, page 4). Activities associated with this alternative would remove some existing vegetation, mainly seedling, sapling, and pole size trees. This would not affect existing habitat quality for the northern spotted owl within the project area. The nearest spotted owl sighting was approximately 1 mile south of the proposed Section 16 new trail construction. To meet applicable Project Design Criteria (PDCs), the project would not take place within areas of suitable NRF habitat during the spotted owl nesting season from March 1 - September 30 (mitigation measure 4, page 8).

Activities associated with the Bridge/Forks West Project would have NO EFFECT on northern spotted owl individuals or habitat.

Canada Lynx: The west half of the project area is located within areas of denning, foraging, and travel habitat of the Bachelor Lynx Analysis Unit (LAU) (Figure 3, page 4). Approximately 1/4 mile of trail relocation would occur within lynx denning and foraging habitat. Much of the trail reconstruction activity also occurs within this habitat.

The proposed project would not affect existing habitat quality for lynx within the project area, nor would it affect the potential of the area to provide future lynx habitat. Trail reconstruction would be in areas previously impacted and trail relocation would remove some existing vegetation including seedling, sapling, and pole-size trees and possibly cutting trail through down woody material.

Activities associated with the Bridge/Forks West Project would have NO EFFECT on Canada lynx individuals or habitat.

Pacific Fisher: A majority of the Bridge Creek drainage provides habitat for the Pacific fisher. Several sightings have occurred in the area. Approximately three quarters (3/4) of a mile of trail along Bridge Creek is proposed for trail relocation away from riparian habitat. This would benefit the species by reducing potential disturbance and increasing habitat effectiveness for the fisher.

Activities associated with the Bridge Forks West project would have NO IMPACT to Pacific fisher individuals or habitat, and may benefit the species by moving the trail away from the creek.

Fisheries/Hydrology

Existing Condition: The project area includes Riparian Reserves, which are portions of the watershed where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply

(page B-12, Record of Decision for NWFP). The Riparian Reserve designation for streams within the project area (Bridge Creek, South and North Forks of Tumalo Creek) is fish-bearing. The recommended guideline for this Riparian Reserve designation consists of whichever is greatest:

- The stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge
- Or to the outer edges of the 100 year floodplain
- Or to the outer edges of riparian vegetation
- Or to a distance equal to the height of two site-potential trees
- Or 300 feet slope distance (600 feet total, including both sides of the stream channel)

Alternative A (No Action): Trails and associated areas of soil compaction near water would continue to contribute to potential overland flow of fine sediments into Bridge Creek and the South and North Forks of Tumalo Creek. Fine sediment within streambed substrates can reduce fish embryo survival, and reduce aquatic invertebrate habitat (Meehan, 1991). The volume of fine sediments added as a result of overland flow from the trail system would be immeasurable in the stream, and would be a small fraction of what is added from other natural or human caused erosion processes within the watershed.

Alternative B (Proposed Action): The majority of the present and proposed trail system and associated maintenance activities would be located away from surface water. Reconstructing or relocating existing trails would occur near South Fork Tumalo Creek, North Fork Tumalo Creek, and Bridge Creek. Trail relocation away from each of these three streams would be 100' or less. Trail relocation in these areas would remain within the riparian buffer (150') although relocation would be within dry, upland vegetation. Reconstruction activities would include installing or replacing water bars and drainage dips, brushing, and trail definement. Relocations would occur to reduce trail slope or move the trail farther away from surface water.

The proposed trail reconstruction and re-route activities would benefit water, fisheries, and riparian resources. Trampling of vegetation and compaction of soils near water would be decreased, reducing the likelihood of overland flow of sediments into surface water. The benefits of fine sediment reduction in the streambed would be immeasurable due to the small volume and the difficulty in distinguishing between sources. Relocating portions of trail further from streams would improve or maintain Aquatic Conservation Strategy Objectives.

The following is an evaluation of each alternative for compliance with the Aquatic Conservation Strategy Objectives (ACS) (Record of Decision, Northwest Forest Plan, page B-11).

ACS Objective 1: *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.*

Alternatives A or B would not retard or prevent the attainment of this objective. The existing trail system has very little contact or influence on the aquatic systems in the watershed.

ACS Objective 2: *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include flood plains, wetlands, upsweep areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

Alternatives A and B would not retard or prevent the attainment of this objective. Drainage networks on a watershed scale are not affected by either alternative. Physical and chemical routes for aquatic and riparian-dependent species are maintained. Alternative B does however have benefits to drainage networks on a localized scale.

ACS Objective 3: *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

Alternatives A and B would not retard or prevent the attainment of this objective. Neither alternative affects the physical integrity of the aquatic system on a large scale. The physical integrity of the aquatic system in the watershed has been altered from other activities in the watershed (i.e., water withdrawals). Alternative B activities would have benefits to the physical integrity of the aquatic system on a small scale.

ACS Objective 4: *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

Alternatives A and B would not retard or prevent the attainment of this objective. Water quality would remain within the range to protect the integrity of the system. Alternative B proposed actions would benefit water quality by reducing overland flow of sediments, but the benefits to water quality would be immeasurable in the stream.

ACS Objective 5: *Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

Alternatives A and B would not retard or prevent the attainment of this objective for the aquatic system on a large scale. Alternative B proposes activities that would reduce the sediment input slightly on a localized scale, but the volume would be immeasurable in the streambed, and would be but a small fraction of sediment input from other natural or man-made causes in the watershed.

ACS Objective 6: *Maintain and restore in-stream flows sufficient to create and restore riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration and spatial distribution of peak, high, and low flows must be protected.*

Alternatives A and B would not retard or prevent the attainment of this objective. Instream flows are not affected by either alternative.

ACS Objective 7: *Maintain and restore timing, variability, and duration of flood plain inundation and water table elevation in meadows and wetlands.*

Alternatives A and B would not retard or prevent attainment of this objective. Floodplain inundation and water tables would not be affected by either alternative.

ACS Objective 8: *Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distribution of coarse woody debris sufficient to sustain physical complexity and stability.*

Alternatives A and B would not retard or prevent attainment of this objective. The plant communities would be maintained to provide structural complexity and stability to the aquatic systems. Alternative B would benefit riparian plant communities by relocating trails at a few localized areas.

ACS Objective 9: *Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

Alternatives A and B would not retard or prevent attainment of this objective. The distribution of populations of plant and animal species across the watershed would not be affected by either alternative.

Cultural

Government to government consultation with tribes occurred in the format of a scoping letter describing the proposed activities within the Bridge Forks West analysis area. No special concerns regarding Tribal resources were identified. Implementation of the activities is anticipated to have benign effects to most elements of the ecosystem. It is acknowledged that the Tribes may have lost the verbal history and may not know the location of desired plant species and resources. This affects their ability to provide Federal agencies with information and location of Tribal trust resources on Federal lands.

An appropriate inventory has been conducted for this undertaking to determine properties eligible for the National Register for Historic Places (NHRP). All evaluated and unevaluated sites would be avoided; therefore, the undertaking meets the criteria given in Stipulation III.B.1 of the Programmatic Agreement among the USDA Forest Service, the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer. There would be no known direct, indirect, or cumulative effects to these resources.

Soils

Existing Condition: Soils, in general, are typically volcanic ash with moderate to high porosity. Sites may vary depending on soil particle size. As particle size increases, porosity increases.

Alternative A (No Action): There would be no change to the soil resource. The potential for soil displacement and overland flow would continue with the current conditions. Riparian areas, with associated trails, would have continued soil and sediment concerns. Trails located on steep slopes and with switchbacks would continue to have soil displacement and erosion concerns.

Alternative B (Proposed Action): There would be shallow disturbance of the upper layers of soil with trail construction. On side slopes, the depth of disturbance would be up to two (2) feet. On flat ground the disturbance would be approximately 1-2 inches. Trail width would be less than 18 inches wide. Excess soil would generally be sidecast and scattered. Replacement and installation of water bars and water dips will improve water dispersion and potential sediment containment.

Botany

No Threatened, Endangered, and Sensitive (TES) plant species, noxious weeds, or Survey and Manage sites were located within the areas of proposed activities. The alternatives would have no adverse effects upon TES plants.

There is low risk of weed spread with the No Action or Proposed Action alternatives. All proposed work would be accomplished using hand methods. No heavy equipment would be involved. Control of noxious weeds within the project area would not be affected by either alternative.

There are no expected direct, indirect, or cumulative effects to Survey and Manage species from either alternative.

Noise

Existing noise is presently associated with people using the area for recreation. Noise impacts from trail construction activities would be of short-term duration, two (2) hours to two (2) days, and low to moderate intensity.

Wetlands and Floodplains

Both alternatives are consistent with Executive Orders 11988 and 11990, in that there would be no adverse effects to wetlands and floodplains.

Effects Common To All Alternatives

Compliance With State and Local Laws

Implementation of either Alternative 1 or 2 would be consistent with State and local laws, land use, and environmental policies.

Alternative B follows State of Oregon requirements in accordance with the Clean Water Act for protection of waters. Application of Best Management Practices (BMPs) are selected and designed on site-specific conditions for waters potentially impacted in the Bridge Forks West area. While not always referenced as "BMPs" in the environmental analysis, the interdisciplinary team has reviewed and incorporated applicable BMP water quality objectives in the design of Alternatives B and associated mitigation measures. Standards and Guidelines for the Northwest Forest Plan (Aquatic Conservation Strategy) and the Inland Native Fish Strategy were developed (in part) to maintain and restore aquatic ecosystems for dependent species. These standards and guidelines afford the same or greater protection of stream courses as direction found in the 1988 USDA publication "General Water Quality - Best Management Practices".

Public Access

Access to existing trailheads is primarily via Cascades Lake Highway and Skyliner Road. Access also exists through use of trails from outside the project area that connect with those located within the project area. Motorized and non-motorized access to and within the project area would remain as present.

Inventoried Roadless and Unroaded Areas

Approximately 75% of the project area is within an "Inventoried Roadless Area" (IRA) as identified by the Forest Plan (Figure 3, page 4). No activities such as commercial harvest or road building are planned within the IRA. This project would not close or decommission roads. Vehicle access to established trailheads would continue as present. Implementation of the action alternative would not affect wildlife movement or change unique ecological values associated with the IRA.

Within the area planned for activities, there are no unroaded, roadless, or wilderness areas as defined by Forest Service Manual 7712.16a "Contiguous Unroaded Areas". Therefore, the action alternative would not change attributes associated with unroaded characteristics, such as road density and long term development of late and old structured stands outside of the IRA.

Prime Lands

There are no lands within the planning area that are classified as prime farm or rangelands. There would be no direct, indirect, or cumulative adverse effects to these resources and thus are in compliance with the Farmland Protection Act and Departmental Regulation 9500-3, "Land Use Policy".

Irreversible and Irretrievable Resource Commitments

The existing commitment of resources would continue under both alternatives, there are no additional irreversible or irretrievable resources committed in this alternative.

Civil Rights and Environmental Justice

Civil Rights legislation and Executive Order 12898 (Environmental Justice) direct an analysis of the proposed alternatives as they relate to specific subsets of the American population. The subsets of the general population include ethnic minorities, disabled people, and low-income groups. The purpose of the analysis is to determine whether adverse civil rights impacts are anticipated on an underrepresented population. The analysis is to determine also whether disparate or disproportionate impacts associated with the alternatives are anticipated. The alternatives do not discriminate between subsets of the general population.

List of Planning Participants

This section identifies the Forest Service personnel who participated in the analysis and the preparation of the Bridge Forks West EA. For a list of organizations and individuals contacted during the scoping process, as well as persons and organizations responding to the proposed action and copies of their comments, refer to the project file located at the Bend-Ft. Rock Ranger District.

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[Deschutes and Ochoco National Forests Website](http://www.fs.fed.us/centraloregon/manageinfo/nepa/documents/bendfort/bridgeforkswest/ea.html)

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