White Mountain National Forest

United States Department of Agriculture

Forest Service

Eastern Region

# Eastside Road and Trail Repair Project

## Lincoln, Grafton County, NH

# Environmental Analysis

## Pemigewasset Ranger District

## December 2012

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*Cover photo: Culvert on Eastside Road/Trail washed out by Tropical Storm Irene. WMNF photo.*

# Contents

# Chapter 1 – Background and the Need for Action

The Eastside Road, which is also the Eastside Trail from Lincoln Woods to Franconia Brook tentsite, was heavily impacted by Tropical Storm Irene. The District is proposing to reroute a short segment of the existing road away from the East Branch of the Pemigewasset River, restore more natural hydrology in streams that cross the section of trail that will be abandoned, and repair the rest of the trail out to the tentsite.

This document presents the rationale for proposing the project, a description of the proposed action and other alternatives considered, and a summary of potential effects from each alternative that was analyzed in detail.

***Note***: Throughout this document the terms Eastside Road, Eastside Trail, the road, and the trail are used interchangeably to refer to the route that is both an administratively used Forest Service road and a year-round trail.

## Background

Tropical Storm Irene swept through New England on August 28, 2012. The storm brought several inches of rain to much of the White Mountain National Forest (WMNF) in just a couple of hours. The East Branch of the Pemigewasset River (East Branch) and its tributaries swelled, carrying wood and boulders downstream, scouring streambanks, and overwhelming culverts. In some places just the intensity of the rain caused extensive erosion of roads and trails, including the Eastside Road.

After Tropical Storm Irene, a variety of resource specialists walked the existing route and explored the surrounding area to assess the damage, determine where repairs were needed, evaluate where to locate the road between Lincoln Woods and Franconia Brook tentsite, and consider ways to improve conditions in the area and reduce the risk of future flood damage.

The Forest Service is partnering with Trout Unlimited on this project as part of on-going efforts to restore coldwater stream habitats in the White Mountains. Trout Unlimited is providing both funding and technical support to ensure the

proposed action will provide for natural stream flow and allow passage of fish and other aquatic species.

## Summary of the Proposed Action

Based on identified needs, input from resource specialists, guidance in the Forest Plan, and estimates of available funding, a proposed action was developed that would:

- relocate a section of the existing road farther away from the East Branch, which includes decommissioning a section of the existing route;
- remove culverts from the abandoned section of road and restore streams to more natural gradient and form;
- replace several undersized culverts;
- replace the culvert that was washed downstream with a bridge and remove the old culvert from the stream;
- repair the trail surface and restore appropriate drainage features to protect the route in the future.

## Purpose and Need for Action

Action is needed to repair recreation resources, address unacceptable erosion, protect water quality, provide aquatic passage, and restore administrative access to the tentsite.

### Recreation

The Eastside Road from Lincoln Woods to Franconia Brook tentsite is dual use with both non-motorized recreational use (hiking, biking, and skiing) and administrative vehicle access to assist in continued management of the tentsite.

Tropical Storm Irene resulted in damage that makes foot travel on the trail more challenging and vehicle travel impossible. The East Branch eroded a section of streambank adjacent to the trail, destabilizing the edge of the travelway and making vehicle travel unsafe (photo, left). Farther along, high water washed a large culvert downstream, leaving a gap in the trail that is impassable with a vehicle and requires hikers to

ford the stream (see cover photo). At several places along the road, heavy rains eroded the surface material, causing gullies to form in the trail and leaving loose rocks and holes that make footing unstable.

The Eastside Trail leaves from the very popular Lincoln Woods Visitor Center and is a fairly easy hike that accesses the Franconia Brook tentsite and Pemigewasset Wilderness, so it receives a lot of use throughout the year. Repairing the trail is important to maintaining recreation opportunities on the Pemigewasset District and ensuring those opportunities are safe for our visitors. Vehicle access on the Eastside Road is necessary to allow servicing of the vault toilet at the Franconia Brook Tentsite.

### Water and Aquatic Habitat Resources

The Eastside Road was established decades ago, when impacts to local hydrology and fish passage were not always thought of or well understood. As a result, several culverts along the existing route are not large enough to allow even normal high waters to flow properly. In addition, some culverts were poorly placed, requiring streams to be rerouted into them and making it difficult for fish and other aquatic species to move upstream.

Substantial work is needed to restore natural hydrology and species movement in the area. Undersized or poorly aligned culverts along the road should be either replaced in an appropriate location with structures (culvert, arch, bridge) that would span the bankfull width of each stream or removed entirely. In a couple instances, streams were diverted from their natural drainage route so they would flow through poorly placed culverts. These streams should be restored to more natural locations and stabilized.

In addition to the work needed to improve existing conditions, concern for these resources should influence efforts to repair the travelway for foot and vehicle traffic. Any new crossings need to be aligned and sized to allow proper stream flow and easy passage of aquatic species. Repairs to the road bed should include enough drainage structures to minimize the potential for erosion from future storm events.

## Connection to the Forest Plan

This project has its roots in the White Mountain National Forest's Land and Resource Management Plan, also known as the Forest Plan. Our Forest Plan was approved in 2005 after several years of extensive environmental analysis and

collaboration with the public. The Plan is a programmatic framework that documents the desired balance of multiple uses to meet society's needs while protecting, restoring, and enhancing our natural resources.

This EA is tiered (40 CFR 1508.28) to the Record of Decision (ROD) and Final Environmental Impact Statement (FEIS) for the Forest Plan (USDA Forest Service 2005a, 2005b, 2005c). Information and analysis in those programmatic documents that applies to this project-level analysis will be incorporated by reference into this EA, which can then remain focused on site-specific issues.

## Public Involvement

This project was listed on the quarterly White Mountain National Forest Schedule of Proposed Actions (SOPA) beginning in January 2012, and will remain on the SOPA until after a decision is made.

On July 30, 2012, a legal notice announcing the availability of the 30-Day Comment Report was published in the *New Hampshire Union Leader*. The report or notification of its availability online was sent to eight people who had asked to be on the project mailing list, state and local agencies, local partners, and others known to have an interest in this project. The 30-Day Comment Report was posted to the WMNF website at: http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=37899 on July 26, 2012. Flyers announcing the proposed project and inviting people to comment were posted at the Lincoln Woods Visitor Center and on the Eastside Trail to try to reach those who use the trail but are not likely to be reached by Forest Service mailings or the legal notice.

One member of the public asked for additional information but did not provide comments on the project. The only comment received was from the Town of Lincoln. The Town expressed support for the proposed action because it would improve the trail and maintain an important recreation opportunity in the town.

## Issues

An issue is a point of debate, dispute, or disagreement regarding anticipated effects of implementing the proposed action. Issues are usually identified by the interdisciplinary team based on comments from the public or other agencies. Occasionally issues arise within the interdisciplinary team if the concerns of all resources cannot be addressed in a proposal. For this project, the only public comment received was supportive of the proposal and all resource concerns were addressed in the proposed action. Therefore no issues were identified.

# Chapter 2 - Alternatives

This section describes the various ways of meeting some or all of the purpose and need that were considered by the interdisciplinary team and responsible official. Two of these alternatives (taking no action and implementing the proposed action) are analyzed in detail in Chapter 3.

## Alternative 1 – No Action

This alternative proposes no comprehensive repairs or improvements to the Eastside Road at this time. The road would remain impassable, preventing vehicle access to the tentsite. The trail would remain in its current location, closely following the river all the way to the start of the Pine Island Trail. Hikers would continue to use a rock-step ford where the culvert washed out. Ongoing maintenance of the existing trail would occur, which could include some repairs to the trail surface, but no trail repair would be part of this project. Culverts would remain undersized and poorly aligned, limiting aquatic species movement.

Analysis of "no action" provides a baseline from which to compare the effects of the action alternatives.

## Alternative 2 - Proposed Action

Based on identified needs, input from the specialists, guidance in the Forest Plan, and estimates of available funding, a proposed action was developed that would:

- relocate a section of the existing road/trail farther away from the East Branch, which includes decommissioning a section of the existing route;
- remove culverts from the abandoned section of road/trail and restore streams to more natural gradient and form;
- replace several undersized culverts;
- replace the culvert that was washed downstream with a bridge and remove the old culvert from the stream;
- repair the trail surface and restore appropriate drainage features to protect the route in the future.

The new segment of trail (see Figure 1) would begin on existing Forest Road (FR) 87B, follow an old skid trail north, and gradually return to the existing trail just north of the southern end of the Pine Island Trail.

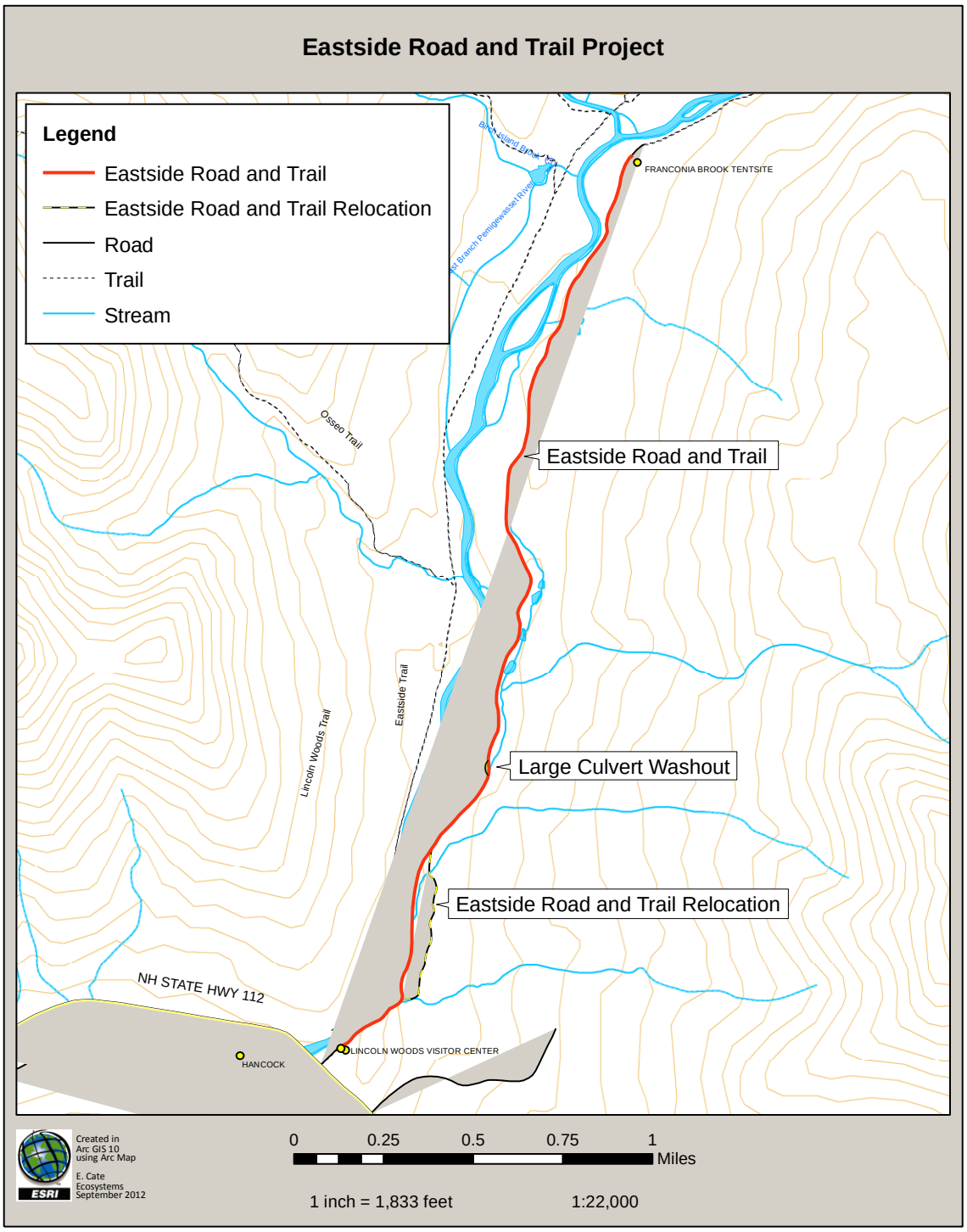


**Figure 1. Proposed Action Locations.**

This new road would be just under 0.5 miles long, slightly longer than the existing route (just over 0.4 miles). Road construction work would require removal of trees along part of the new route. Commercial-sized trees would be sold in a small timber sale.

The relocation would require two stream crossings, but would move a heavily damaged section of road out of the floodplain. Specifics on the stream crossings (culvert or bridge, precise location, size) would be determined based on on-going engineering surveys of the site. One crossing may require removing a large boulder, which might otherwise cause debris jams or undermine the crossing, through blasting or other means.

At the northern end of the section of road being bypassed, a 100-yard section of the existing route would be maintained as a trail (but not a road) to maintain the connection to the Pine Island Trail.

Undersized or poorly situated culverts between Lincoln Woods and FR87B would be replaced with either larger culverts or short bridges to restore proper hydrology and aquatic species passage in these streams. On-going survey and design work would determine the most appropriate structure and alignment for each location.

Decommissioning of the abandoned section of road would include removing culverts and restoring proper drainage for each stream. The trail tread would not be torn up or seeded in except through natural processes. Both ends of this segment of road would be blocked to prevent vehicle access and reduce foot traffic; signs would warn of the hazards associated with using the decommissioned trail. The new route would be signed to ensure the public knows how to follow the maintained trail. Decommissioning work would not occur until after the reroute is complete so the trail can remain open throughout most of the project.

As part of the decommissioning work, each of the streams that cross the abandoned segment of trail would be restored to a more natural form and location, if appropriate. This may require extensive effort. For example, the stream that currently runs through the culvert that hangs over the East Branch at

the eroded section of trail needs to be several feet lower by the time it reaches the East Branch to allow fish passage. All impacted banks and soil would be stabilized.

A bridge and abutments would be installed where the culvert was washed downstream. The exact siting of the bridge would be determined based on engineering surveys, but would be in the same basic location as the old culvert.

This work may involve blasting or otherwise demolishing a large boulder (photo, left) in the stream if the bridge cannot be located sufficiently far up or downstream to avoid debris jams in the future. The old culvert would be removed from the stream and either used elsewhere or discarded, depending on its condition.

An under-sized drainage culvert beyond the washed-out culvert site would be replaced with a larger culvert to minimize the potential for trail erosion during intense rains.

Repair of the road surface would include spreading new surface material to repair heavily eroded areas, clearing culverts, blading the road surface, and clearing/building waterbars and similar drainage structures.

**Mitigation Measures**

- Any heavy equipment must be visibly free of seeds and plant parts prior to entering the project area. Cleaning should take place off-Forest unless an on-Forest cleaning site has been approved by a Forest Officer in advance.
- Gravel or fill must come from weed-free sources. The Forest Service will be available to work with owners of local gravel sources to identify weed-free borrow material in their pits. The entire pit or fill area need not be identified as weed-free; material may be used that is not likely to contain invasive plants or seeds.
- Minimize soil disturbance to no more than needed to meet project objectives.
- Where project disturbance creates bare ground, consistent with project objectives, reestablish vegetation to prevent conditions to establish weeds.

Use native seed where appropriate and feasible, and use certified weed-free or weed-seed free hay or stray where certified materials are reasonably available.

- Periodically monitor staging areas and access trails for dispersal or expansion of NNIS plants.
- Consider opening of view sheds at the old landing present at the end of FR87B. Views are possible of the ridgelines to the southwest through selective tree removal along the foreground of the clearing.

## Alternatives Considered but Eliminated from Further Study

In developing the proposed action, the interdisciplinary team and responsible official discussed the project and considered several options. For the reasons provided below, none of these were analyzed in detail in the environmental assessment.

**Establish a very short reroute that only avoids the stretch of trail currently being undermined by the river.**

Currently only a short section of road is being directly affected by the East Branch. It would be possible to move just a couple hundred feet of trail away from the river bank, making it safe for both foot and vehicle traffic. However the East Branch is undermining and eroding the river bank in both directions from the currently impacted piece of trail. This option would leave a substantial segment of road at risk of being undermined in the future. It also would not move any of the trail out of the floodplain. The Forest Plan indicates that roads and trails within 100' of a perennial stream should be moved when that relocation can be incorporated into regular project planning (Riparian and Aquatic Habitats G-7, p. 2-25). This option would miss an opportunity to implement this direction and protect the Eastside Road for the future.

**Reroute the trail onto a slight terrace between the existing route and the proposed route.**

The specialists involved in developing the proposed action identified a possible new road location that would move a section of the travelway slightly shorter than the proposed action away from the East Branch and would only require one new stream crossing. This alternative was considered to see if it would meet the resource needs identified earlier and be less expensive to construct. It was

determined that the ground along this route was less desirable for road construction because the ground is wetter and ensuring proper drainage would be more challenging. In addition, the river bank adjacent to the section of existing trail that would remain in use under this alternative but not in the proposed action is showing signs of instability. The proposed action would be farther from the river, drier, and require less new ground disturbance because it uses an existing road (FR 87B) for part of the reroute.

**Reroute the road outside the floodplain almost all the way to the tentsite.**

Moving as much of the road as possible out of the East Branch floodplain would reduce the potential for trail damage from future flood events and for impacts to adjacent resources. However it would be a large, expensive undertaking and would substantially alter the character of the trail. This option may be something to consider if future flood events cause damage to more of the trail, but it is not necessary to meet the purpose and need for the project, nor is it feasible with available funding.

# Chapter 3 – Effects Analysis

This section describes the direct, indirect, and cumulative effects on resources found in the Project Area resulting from Alternatives 1 and 2. Analysis of effects to resources is summarized from detailed Specialist Reports that are located in the project record.

## Affected Environment

The Eastside Trail is a highly used trail throughout the year. During the non-winter months, walkers, fisherman, mountain bikers, hikers, and backpackers use this trail. In foliage season, the amenities found in the large Lincoln Woods parking area make it a popular tour bus stop where visitors can briefly stroll up the trail. During the winter months, the trail transforms into a popular cross country skiing and snowshoeing trail. The trail passes by 18 no reservation or fee required campsites approximately 2.7 miles in at Franconia Brook Campsites.

The trail is used by a wide range of users seeking a variety of experiences and challenges. Its proximity to the river in several places makes it very appealing for visitors from a scenery standpoint. Since the trail also serves as a road, it is wider than a standard trail and allows for people walk, ski, or bike two abreast if there is no oncoming traffic, which is uncommon on forest trails. For those seeking more challenge, the Eastside Trail serves as a launching point for travel into the most remote areas of the Pemigewasset Wilderness.

The project area is approximately 2,500 acres, located in the Hancock Brook (of the Pemigewasset River) Watershed. Perennial streams in the project area include the East Branch of the Pemigewasset River (East Branch) and three unnamed tributaries to the East Branch. The East Branch is a large river draining heavily forested high mountains within the White Mountain National Forest. As a result, the river provides coldwater fish habitat even though the main stem river spans nearly 100’ in some places and is mostly un-shaded. There are no beaver flow areas or vernal pools in the Project Area.

The State of New Hampshire designates these reaches as Class B. Class B is the second highest quality, considered acceptable for fishing, swimming and other recreational purposes and, after adequate treatment, for use as water supplies. Under New Hampshire antidegradation provisions, all waters of the National Forest are designated as “Outstanding Resource Waters” (ORW). Water quality shall be maintained and protected in surface waters that constitute ORW

(NHDES 1999). Some limited point and nonpoint source discharges may be allowed, provided that they are of limited activity that results in no more than temporary and short-term changes in water quality.

The size and velocity of the East Branch and the low nutrient levels in the water due to natural geology result in limited invertebrate populations and poor foraging opportunities for fish. Fish productivity in the river is considered below average in the White Mountains and fish species diversity is low with only populations of eastern brook trout, slimy sculpin, and dace species. Side channels and tributaries of the East Branch are more productive stream habitats. Lower stream power and water velocities allow stream invertebrate populations to establish and provide habitats more suitable for small fishes to access limited food supply. Fish passage into or along two of these tributaries currently is hampered by culverts under the Eastside Road. There is low potential for the fast flowing streams in this area to support mayflies on the Regional Forester's sensitive species list (RFSS).

The East Branch Pemigewasset River is part of the Merrimack River watershed, where efforts are ongoing to re-establish a self-sustaining population of Atlantic salmon *(Salmo salar)*. Since 1994, the East Branch Pemigewasset River was stocked with hatchery-reared Atlantic salmon fry. Adult salmon do not return to the E. B. Pemigewasset River to spawn due to impassable dams on the lower Merrimack River system (Multi-dated NHFG Atlantic salmon fish stocking records, Pemigewasset Office).

The project area is made up of softwood Ecological Land Types (ELTs). The majority of this area has outwash soils common to the rest of the White Mountain National Forest, well to excessively-drained loamy sands on average. Sections of the project area may have poor drainage due to the presence of a hard pan soil layer.

The Project Area contains predominately mixedwood forest habitat with spruce-fir and paper birch components. There is a permanent wildlife opening within the Project Area (located at the southern end of proposed road relocation). No active or dormant raptor nests or mammal dens were seen during site-specific field reviews. There are no documented deer yards or evidence of concentrated use by moose or deer in the Project Area. No non-native invasive species are documented in the Project Area.

There are no caves, mines, tunnels, or prominent rock outcrops exposed to sun

within the Project Area that would provide woodland bat roosting habitat or overwinter hibernacula. Based on woodland bat surveys (Krusic et al. 1996; Sasse 1995; Chenger 2002, 2004), there is a low probability that little brown bat, northern long eared bat, tri-colored, and Eastern small-footed myotis (Indiana bat does not occur on the WMNF) may roost or forage in portions of the Project Area. These bat species commonly roost in trees (snags and partially dead trees near foraging habitat) or buildings, except literature indicates that Eastern small-footed myotis roost in rock outcrops exposed to sun.

The Eastside Road is located in an area that has potential for Native American archaeological sites and was historically part of the East Branch & Lincoln Railroad logging operations of the late 19th-early 20th century. Logging Camp 4 of the J.E. Henry and Sons Co., in use between 1895 and 1896, was located along this spur line (Gove 2010a). A pedestrian survey was conducted along the spur line, but no signs of the logging camp were detected. In the 1940s, a truck road was constructed by the Parker-Young logging company on the east side of the East Branch, approximately in the location of the existing Eastside Road (Gove 2010b). Existing stone and concrete faced metal culverts along the Eastside Road are later constructions. The only known cultural site potentially eligible for the National Register of Historic Places located in the Project Area is the spur line of the East Branch & Lincoln logging railroad.

## Effects Analysis

Although the current conditions in this relatively small project area were described broadly, covering all resources of concern, effects will be discussed by resource. The interdisciplinary team for this project consisted of specialists in recreation, soil and water, fisheries, wildlife, and heritage resources. Those specialists reviewed the project on the ground and considered the best available information to evaluate potential impacts from the two alternatives on their resources. Each section below is a summary of a more detailed effects analysis, which is available in the project record. The rationale for identified analysis areas and timeframes, and all literature cited also are located in the project record.

Direct and indirect effects are those impacts that result from implementation of the project. Cumulative effects are the combined impacts of the direct or indirect effects with impacts from past, ongoing, and known future actions in the identified timeframe and analysis area. All past, ongoing, and future actions within the various analysis areas used by specialists are listed in the project

record.

## Recreation

**Direct and Indirect Effects**

The analysis area for direct and indirect effects is the Project Area. The temporal scope is the duration of the trail reroute construction and 20 years beyond.

*Alternative 1*

The road would remain impassable to a truck to pump the vault toilets. Most likely, the toilets would have to be closed. During periods of high use at the campsites, backcountry methods of dealing with human waste would be insufficient to handle the amount of human waste generated at the campsites; sanitation at the Franconia Brook Campsites would become a problem until other solutions for managing human waste could be implemented.

Failure to address the trailside bank erosion and washed out water crossings would degrade the experience for the majority of users. Foot traffic would continue around the slump and hikers would continue to use a rock-step ford where the large culvert washed out. Public safety could be affected as more trail is gradually eroded, and user created trails would emerge to bypass around washed out sections of trail. Ongoing maintenance of the existing trail would occur, which could include repairs to the trail surface. No changes to the length of trail within sight distance of the East Branch or to the slope of the trail would occur under this alternative.

*Alternative 2*

The proposed reroute would be constructed as a road and therefore be similar in form and function to the existing trail; however the relocation would change the user's experience. The relocation would move the trail away from the bank of the river, which it hugged for approximately 0.3 miles previously. For many people, this would remove the sights and sounds of the river and be a less scenic experience. Replacing the washed-out culvert with a bridge would make it more evident to users that they are passing over a manmade structure. The rest of the surface repairs and culvert replacements would provide a more continuous and smoother surface, and improve the long term sustainability of the trail.

The reroute would be about 0.1 mile longer. The reroute would add a short hill along the existing FR 87B, but would eliminate an existing short steep grade between the slump and where the reroute will connect with the existing trail.

Those who use the trail to access fishing spots or to enjoy views of the river

would continue to use the trail until it grows in, despite signage directing them to the reroute. There would be dips in the trail and wet crossings where culverts are removed and natural channels restored, increasing the challenge to users. Those with less ability might turn back when faced with a more challenging trail along the river or reroute with a hill near its start. Some users might opt for the Lincoln Woods Trail instead, if it is repaired. Public perception of the Forest Service's ability to provide enjoyable and relatively easy walking and hiking opportunities would be degraded.

The project would restore vehicle access to the Franconia Brook tentsite and its vault toilets, allowing for continued maintenance of sanitation in the area. The reroute would remove one steeper section of road where vehicle traction was an occasional issue in the past.

**Cumulative Effects**

The cumulative effects analysis area is the Hancock watershed. The analysis timeframe is ten years past and twenty years in the future (2002 to 2032).

The vault toilets installed at Franconia Brook Campsites in 2006 were established to handle the human waste issues associated with concentrating use at a site. Under Alternative 1, failing to restore the administrative access would limit the usefulness of the toilets to the past six years, negating the long-term effectiveness of this past action. Alternative 2 would complement the previous management actions to relocate campsites and toilets from the west side of the river to Franconia Brook tentsite. This combination of past and proposed actions would demonstrate a commitment by the Forest Service to continue to provide these opportunities on this highly visited and used trail.

The removal of the Pemigewasset Suspension Bridge in 2009 limited some trail network options and placed more importance on the Eastside Trail as a gateway to the central region of the Pemigewasset Wilderness. The long term sustainability of the Eastside Trail under Alternative 1 would be questionable due to continued erosion. Alternative 2 would demonstrate a commitment to providing this access and not changing the character or challenge associated with people seeking access to the Wilderness.

## Soil and Water Resources

**Direct and Indirect Effects**

The analysis area for direct and indirect effects on soil and water resources includes the 2,530-acre project area. The time frame for analysis of direct and

indirect effects is five years.

*Alternative 1*

The existing Eastside Road route was heavily impacted by Tropical Storm Irene, making the road impassable due to washouts and extensive and ongoing erosion. Under Alternative 1, erosion of exposed crossings and river banks would be expected to continue. Localized erosion and sedimentation around undersized stream crossings and disturbed stream banks would continue, and may affect water quality in short stream reaches. Sediment loads and turbidity may be higher than in recent years due to Tropical Storm Irene impacts, but would gradually return to pre-storm levels as disturbed areas naturally stabilize or revegetate. Stream reaches that are currently unstable due to historic activity or Tropical Storm Irene would gradually shift to a more stable condition that may differ from the channel's historic morphology.

Without vehicle access to the tentsite, the vault toilet would eventually need to be closed. As a result, fecal waste from campers likely would be deposited in close proximity to water, which could lead to water quality impacts well as changes in the proper functioning of the riparian area (USDA-Forest Service 2005b, p. 3-50).

With continued use of the project area, there would be additional impacts to soil and water quality as users sought out alternate routes around the affected sections of the road bed. This would likely lead to a decrease in soil cover, and increase in soil compaction, soil erosion and stream sedimentation from unmanaged user created trails.

*Alternative 2*

Road construction would expose previously protected soil to rainfall, and the top, organic-rich layer of soil could more easily erode, decreasing soil productivity. Soil under the new road would be detrimentally impacted by compaction, resulting in a long-term loss of soil productivity in the approximately 20-foot wide road corridor. By contrast, soils along the slightly shorter decommissioned section of road would be put back into productivity as natural revegetation would be allowed to take place. Therefore the net loss of productive soils would be negligible.

Alternative 2 would increase the maintained impervious area in the analysis area by approximately 0.06 acres. Adding this to the known impervious areas in roads, trails, and the Lincoln Woods Visitor Center would still result in less than 10% impervious cover. Therefore no increase in runoff is expected.

Under Alternative 2, road improvement and maintenance activities would cause ground disturbance and short-term erosion. However road resurfacing and improving drainage features would help maintain the road and protect the road from future damage due to high rain events, thereby helping to prevent future soil erosion problems (Moll et al. 1997).

Disturbance of soil during road maintenance and reconstruction could lead to temporary sedimentation, which should be localized to areas near stream crossings and the area adjacent to the road relocation. Due to the gentle slopes in the activity area, the potential for soil erosion and sedimentation would be low. Forest Plan direction, BMPs, and soil and water conservation practices would further reduce the potential for soil erosion and sedimentation. Road improvements would be expected to reduce sedimentation relative to Alternative 1 within the analysis period.

The proposed relocation would remove the road from the floodplain and onto a terrace that is approximately 200 feet farther inland. This would be consistent with the Forest Plan direction for protecting riparian and aquatic habitats (USDA-Forest Service 2005a, p. 2-25). New stream crossings along the reroute would be properly sized and constructed to allow channel-forming (bankfull) flows and flood flows to pass unimpeded, thereby preventing continuous scouring and changes in channel shape (UNH 2009).

The total number of stream crossings would remain the same, though two crossings would be relocated onto the rerouted road section. Several undersized and misaligned culverts on perennial streams crossing the Eastside Road would be either removed or replaced in an appropriate location with structures (e.g. culvert, arch, bridge) that would span the bankfull width of each stream. This work would improve channel function by increasing the capacity of the crossings to accommodate high flows, restore proper hydrology, and allow for aquatic organism passage. All affected banks would be stabilized to minimize short-term sedimentation.

Restablishing vehicle access to the tentsite would reduce impacts from human waste at this concentrated use site.

In summary, this alternative would have less detrimental impacts to soil and water resources than the Alternative 1 and a net watershed benefit. A road would be moved out of a floodplain, streams would be restored to a more natural form and location, sources of ongoing erosion and sedimentation would be stabilized,

and vehicular access to the vault toilets at the Franconia Brook tentsite would be reestablished. Water quality will be maintained in Outstanding Resource Waters.

**Cumulative Effects**

The area for the Cumulative Effects Analysis (CEA) includes the East Branch watershed and five tributaries to the East Branch, four unnamed and Birch Island Brook, comprising a 6,060 acre analysis area. The time frame for analysis of cumulative effects is ten years in the past and ten years beyond the proposed action.

Past actions, including the installation of the double vault toilet, the creation of tent pads, and the relocation of six camping sites away from the river, reduced waste, erosion, and compaction impacts within the floodplain. The No Action alternative would end the benefits of the vault toilet and result in unmanaged waste disposal and increased erosion and compaction within the floodplain. The Proposed Action alternative would maintain the benefits of the vault toilet; use would likely remain concentrated and the potential for negative effects from unmanaged waste would be minimized.

The very slight net increase in road mileage under Alternative 2, combined with other road construction decisions across the Forest, would be well within the level of road construction analyzed for in the Forest Plan FEIS (USDA-Forest Service 2005b, p. 3-29 to 3-36).

On-going activities in the analysis area such as trail and road maintenance may temporarily disturb soil, but have been found to reduce sedimentation over the long term (NCASI 2000). Therefore, these activities would not result in any additional adverse impacts to water quality under either alternative.

## Aquatic Species and Habitats

**Direct and Indirect Effects**

The analysis area for direct and indirect effects is the East Branch of the Pemigewasset River from the mouth of the Franconia Brook to the mouth of Hancock Brook, including all perennial streams that enter the river between these two points. The timeframe for direct and indirect effects will be five years into the future.

*Alternative 1*

There would be minor direct effects to fish, other aquatic species, and aquatic habitats in the "no-action" alternative. Erosion would continue at the washed out

culvert crossing and the brook would continue to erode the unstable fill slopes, causing some minor sedimentation to a quarter mile of stream habitat. Indirectly, stream connectivity would continue to be fragmented because culverts would remain undersized, which would limit the ability of fish and other aquatic species to access suitable habitat in the tributaries.

The Biological Evaluation (BE; see project record) determined that this alternative would have no impact on aquatic RFSS.

*Alternative 2*

Proposed activities could cause some minor negative direct effects to aquatic life due to the minor sedimentation and turbidity into tributaries and the East Branch that could occur during construction (see previous section). Following Forest Plan direction and New Hampshire wetland permit conditions would minimize these effects. A net reduction in sedimentation should occur in the tributary with the washed-out culvert as the eroding fill slopes are stabilized with the installation of a bridge. While overall in the project area sedimentation may occur and cause disturbance to fish and aquatic life in the short term, this effect would not have any measureable impact on the sustainability of local populations and should improve in the long-term (see Soil and Water discussion).

Aquatic organism passage would be restored in two tributaries, and maintained in the stream with the washed-out culvert. This would maximize the availability of all fish bearing stream habitats to fish species of the East Branch within the analysis area and increase available habitat for other aquatic species. Replacement of undersized culverts with structures that span more than bankfull width also would improve passage of sediment and wood in two tributaries. Indirectly brook trout habitat would improve and result in the free movement of individuals into spawning and nursery habitat.

The BE determined that this alternative would have no impact on aquatic RFSS.

**Cumulative Effects**

The analysis area for cumulative effects is the same as for direct and indirect effects. The time frame for looking at cumulative effects in the project area is ten years past and 25 years forward.

None of the past or ongoing management activities would impact fish or fish habitat. Therefore there would not be any cumulative effects from these actions under either alternative.

Climatic or weather events, such as extreme drought, could cause cumulative

effects if they occur within the analysis timeframe. Under Alternative 1, local extinction of aquatic populations could occur in two tributaries to the East Branch. Aquatic passage is currently blocked and would not be restored under this alternative. If local populations in these tributaries experience total mortality, they would not be replaced by mobile individuals from the East Branch.

Under Alternative 2, connectivity of brook trout populations in all five tributaries and the East Branch would be realized within the analysis timeframe. It is difficult to predict how this could affect the size or health of the population but if extreme events such as drought or floods occur, maximum stream connectivity would maximize the probability that population patches would find refuge and thereby buffer the population from extreme mortality.

## Terrestrial Wildlife, Plants, and Habitats

**Direct and Indirect Effects**

The analysis area for direct and indirect effects is the Project Area. The temporal scope is the duration of the project.

*Alternative 1*

There would be no direct or indirect effects to MIS or common wildlife because the amount and quality of terrestrial habitat would not change. There would be lost opportunities to improve watershed and floodplain function and maintain a riparian wildlife travel corridor.

As disclosed in the Biological Evaluation, Alternative 1 would have no impact on any federally endangered, threatened, or Regional Forester's Sensitive plant or animal species.

Alternative 1 would not affect non-native invasive species populations because there would not be any ground disturbance or use of heavy machinery.

*Alternative 2*

Implementation activities would cause relatively minor and localized noise, disturbance, alteration of travel patterns, and possibly displacement of wildlife from the affected area. There is a low risk of mortality for some less mobile wildlife, such as amphibians, reptiles, and invertebrates. Alternative 2 would not cause any permanent travel or migration barriers (paved roads or impassible ditches, berms, or culverts).

Tree and other vegetation removal for the road reroute would result in a slight decrease in the amount of nesting, roosting, and denning habitat for wildlife, and

a minor reduction in large woody material recruitment onto the forest floor used by birds, small mammals, amphibians, reptiles, and insects. These effects would be localized and minor in magnitude so would not negatively alter populations or wildlife use of the area in the long term. The proposed action would not adversely affect WMNF MIS population trends or viability.

Year-round use of the reroute would move human presence to a slightly new area, affecting some individuals through noise, vegetation trampling, and compaction or snow or soil. However the existing road would be more favorable to foraging woodland bats and other wildlife due to reduced human presence in a riparian corridor.

As disclosed in the Biological Evaluation, Alternative 2 would have no impact on any Regional Forester's Sensitive plant or animal species. Alternative 2 "may affect, but is not likely to adversely affect" individual Canada lynx and is consistent with direction in the WMNF Plan for protecting Canada lynx habitat.

Implementation of Forest Plan direction and identified mitigation measures (see alternative description) for non-native invasive species would minimize the potential for the proposed action to introduce new infestations.

**Cumulative Effects**

The cumulative effects analysis area is the Hancock watershed. The analysis timeframe is ten years past and ten years in the future (2002 to 2022).

There would not be any cumulative effects from Alternative 1 because there would be no direct or indirect effects to terrestrial wildlife and plants. Due to the application of Forest Plan standards and guidelines and other best management practices, effects from past and future actions are so minimal that the addition of minor impacts from the proposed action would not result in adverse cumulative effects to any terrestrial wildlife or plant species, including MIS, bats, and RFSS.

## Heritage Resources

**Direct and Indirect Effects**

The analysis area for direct and indirect effects is the Project Area. The temporal scope is two years beyond project implementation.

*Alternative 1*

The No Action alternative would not affect cultural resources because no ground disturbance would occur.

*Alternative 2*

The only known cultural site potentially eligible for the National Register of Historic Places located in the Project Area is the spur line of the East Branch & Lincoln logging railroad. Under the proposed action, the relocated road would cross over this spur line along FR 87B where it currently crosses the spur line. Therefore, no new route would cross the spur line and there would be minimal additional impact on the spur line.

Two existing stone and concrete faced metal culverts may be removed or impacted as part of decommissioning the existing trail. These culverts are not considered historically significant and have seen multiple episodes of repair over the years.

No other cultural resources are known in the area that would be disturbed by the project. If a new site were found during project implementation, all activity in the area would stop, and the Forest Archaeologist would be informed so the site could be assessed and protected. Therefore, no effect from project activity would be anticipated.

**Cumulative Effects**

Since there would be no direct or indirect effects to heritage resources from either alternative, there would be no cumulative effects.

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