Travel Analysis Report

WHITE RIVER NATIONAL FOREST

United States

Department of Agriculture

Forest Service

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Responsible Official:

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Abstract:

This Travel Analysis Report documents a route-by-route analysis of all National Forest System roads on the White River National Forest and recommends the minimum road system needed for public access and forest management.

Location:

White River National Forest
Garfield, Pitkin, Mesa, Summit, Gunnison, Eagle and Rio Blanco Counties, Colorado

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EXECUTIVE SUMMARY

The Travel Analysis Report for the White River National Forest (WRNF) documents a route-by-route analysis of National Forest System (NFS) roads on the WRNF and recommends the minimum road system needed for public access and forest management.

The outcome is a set of science-based recommendations for changes to the forest transportation system to meet current and future management objectives. These recommendations are based on an analysis of the physical, biological, social and economic risks and benefits of every system road.

On March 29, 2012, the US Forest Service, Washington Office directed Regional Foresters to complete a science-based analysis of all National Forest System roads by the end of FY15. This Travel Analysis must be documented in a travel analysis report, and is an important first step in meeting those sections of Subpart A of the 2005 Travel Management Rule that require each National Forest to:

- Identify the minimum road system needed for safe and efficient travel and for the protection, management, and use of NFS lands
- Identify roads that are no longer needed to meet forest resource management objectives and which therefore should be scheduled for decommissioning or considered for other uses

Travel analysis is intended to inform subsequent National Environmental Policy Act (NEPA) processes, allowing individual projects to be more site-specific and focused, while still addressing cumulative impacts. The travel analysis process neither produces decisions nor allocates National Forest System lands for specific purposes. It merely provides the analytical framework from which to make recommendations that may then be examined in the NEPA process. It describes current conditions, risks, benefits, opportunities (needs for change) and priorities for action. Future NEPA analyses that include public involvement may carry forward, reject or change the recommendations in this report and provide the basis for making specific transportation system related decisions.

Summary of Issues

Issues were identified using previous public involvement and internal Forest Service inputs and are as follows. Issues are discussed in more detail in Step 3.

- Insufficient resources for maintenance of the existing system of roads
- Access needs, including motorized recreation use, access and connectivity to a variety of recreational opportunities, access for forest management and emergency access
- Environmental impacts, including current condition and maintenance or repair costs, impacts to water resources, soil and geologic hazards, fragmentation and wildlife security, impacts to vegetation (particularly invasive species) and impacts to cultural resources
- Social impacts, including impacts to recreationists preferring to recreate in areas not directly under the influence of motorized use
- Inappropriate jurisdiction

Analysis Performed

The 2005 Travel Management Rule revised federal regulations in 36 CFR Part 212, Subpart A (Administration of the Forest Transportation System), Subpart B (Designation of Roads, Trails, and Areas for Motor Vehicle Use), and Subpart C (Use by Over-Snow Vehicles.)

The WRNF in 2011, completed the Final Environmental Impact Statement (FEIS) for the Travel Management Plan and filed a Record of Decision (ROD) for the FEIS. Implementation of that decision has met the requirements of Subpart B and Subpart C. The objectives of the FEIS were to:

- Bring summer and winter transportation systems into compliance with laws, regulations, agency or national direction, and the forest plan.
- Designate the forest road and trail system and eliminate through rehabilitating those that are not part of the system.
- Provide a travel plan that defines modes of travel across the forest by area and by route.
- Identify resource solutions to impacts due to the transportation system, including routes identified for rehabilitation.

With the ROD, the deciding official made the following decisions:

1. Designation of the summer road and trail system:
    - Defining the designated forest roads and trails
    - Defining what modes of travel are accepted on each road and trail
    - Deciding whether to incorporate or rehabilitate user-created routes
    - Determining if certain forest routes are no longer needed as part of the system and identifying those for rehabilitation
2. Designation of winter uses:
    - Designating open areas and routes for motorized use by vehicles made for over snow travel.

The 2011 ROD was based on more than seven years of public input, resource analysis, and thoughtful decision-making and provides a pragmatic transportation system for the forest. The detailed and comprehensive analysis done then meets many of the requirements for Subpart A. 1400 miles of road were designated for use by motorized vehicles, of which 872 miles were designated for mixed use by licensed and unlicensed vehicles. A subsequent NEPA environmental assessment and decision notice were completed in 2014 for the Eagle - Holy Cross Ranger District that changed 133 miles from licensed vehicles only to mixed use and added an additional 10 miles of road for mixed use. The 2011 ROD included the addition of 225 miles of previously unauthorized routes (roads and trails) to the motorized system, decommissioning 692 miles of unauthorized routes, and decommissioning 519 miles of routes to be removed from the system.

In spring 2015 a review and analysis of existing information was conducted to begin identification of a minimum road system and roads likely not needed for future use. The 2015 Subpart A travel analysis process consisted of a risk-benefit assessment used to rank system roads on the WRNF based on risks (road condition/maintenance and repair costs, impacts on water resources, soil/geologic hazards, wildlife resources, invasive species, cultural resources, and jurisdiction) and benefits (motorized recreation use, recreation access/connectivity, forest management access and emergency access).

Key Results and Findings

Using route information compiled with the 2011 FEIS, roads were ranked based on their *risks* to natural, social, economic and cultural resources and their *benefits* to recreation use, forest management access and emergency access. Each road was then further evaluated to determine if it

was needed as part of the minimum road system. Opportunities for changes to roads were also identified. A summary of these findings:

- The percent of roads rated as high, medium, and low *risk* are 16%, 80%, and 4% respectively
- The percent of roads rated as high, medium, and low *benefit* are 23%, 25%, and 52% respectively
- Approximately 6 miles of system roads are recommended to be closed and retained on the system as maintenance level 1 roads (closed to motorized traffic except for less than annual, short term use for specific land management activities)
- Approximately 15 miles of system roads are recommended to be decommissioned
- Approximately 2 miles of system roads are recommended for conversion to non-motorized trails
- Approximately 23 miles of road previously determined to be decommissioned and 36 miles of road previously determined to be converted to non-motorized trails are recommended for inclusion in the system as maintenance level 1 roads

How the Report will be Used

This report for the WRNF is not a decision document. It will assist in addressing future issues related to the road systems. It will be used to inform future site specific analyses, decisions and specific actions. Travel analysis is an ongoing process and it is anticipated that this document will be updated on an ongoing basis.

INTRODUCTION

Travel Management Rule

In 2005, the U.S. Forest Service adopted the Travel Management Rule. The rule changed the way the Forest Service regulates motor vehicles on National Forests and Grasslands. The Travel Management Rule requires that National Forests identify their minimum road system and designate routes and areas for motor vehicle use. The public is able to operate motor vehicles only on the routes and areas that have been designated. The designations not only list what routes and areas can be used, but also what types of vehicles can be used and what time of year they can be used. The WRNF completed an FEIS and designated use with a Motorized Vehicle Use Map (MVUM) in 2011.

There are some exceptions to these designations, which include persons with a Forest Service permit specifically authorizing the otherwise prohibited act, any Federal, State or local law enforcement officer, or member of an organized rescue or firefighting force engaged in the performance of an official duty and Forest Service administrative use.

Prior to the 2011 FEIS and ROD, under the WRNF Land and Resources Management Plan - 2002 Revision, as Amended, no motorized vehicle use was allowed off designated routes or areas. The ROD did not change that status, which is consistent with the 2005 Travel Management Rule. There are no designated motorized use areas, only designated routes.

The objective of the Travel Management Rule is not to unnecessarily limit access to the Forest, but to protect the Forest from unmanaged use. The Forest Service must strike a balance in managing all types of activities. To this end, a designated system of roads and areas for motor vehicle use, established with public involvement, will enhance public enjoyment of the National Forests while maintaining other important values and uses on National Forest System lands. The Travel Management Rule works to manage current use so future generations can continue to enjoy access to our NFS lands.

The travel management regulations (36 CFR 212.5(b)) require that the Forest Service "identify the minimum road system needed for safe and efficient travel and for administration, utilization and protection of National Forest System lands"; and to identify the roads that "are no longer needed to meet forest resource management objectives and that, therefore, should be decommissioned or considered for other uses, such as for trails". This process is referred to as Subpart A of the Travel Management Rule.

Travel Analysis Process - Subpart A

Before the Forest Service adopted the Travel Management Rule, the Roads Analysis Process described in the Forest Service Manual (7712.1) and publication FS-643, *Roads Analysis: Informing Decisions about Managing the Transportation System,* was used. A Roads Analysis Report analyzing maintenance level 3, 4 and 5 roads across the WRNF was produced in 2006. This Travel Analysis Report revises and updates the 2006 Roads Analysis Report, including analysis of maintenance level 1 and 2 roads managed by the WRNF. It recognizes and builds off the 2011 FEIS and ROD that determined the current status of travel management on the WRNF.

The Travel Analysis Process consists of six steps which are as follows:

Step 1: Setting Up the Analysis
Step 2: Describing the Situation
Step 3: Identifying Issues
Step 4: Assessing Benefits, Problems and Risks
Step 5: Describing Opportunities and Setting Priorities
Step 6: Reporting

Travel analysis is an iterative process. When conditions change, additional analysis may point to the need for revisions to the recommendations. This analysis is not a decision process, but an analytical framework from which to make recommendations that may then be examined in the NEPA process, which provides the basis, including formal public involvement, for making decisions.

This analysis and report does not address motorized or non-motorized trail opportunities; it is focused on the road systems.

STEP 1: SETTING UP THE ANALYSIS

Purpose

The purpose of this step is to:

- Identify the analysis area
- State objectives
- Identify the roles of technical specialists
- Develop an analysis plan
- Identify information needs

Analysis Area

The analysis area is the WRNF which is approximately 2,482,493 acres in size. Approximately 1,506,084 acres of the analysis area (61%) are on National Forest System lands. There are 194,904 acres (8%) are inholding within the National Forest. The remaining 781,504 acres (31%) of the analysis area are in wilderness areas, which comprise of 192,891 acres on the Flat Tops, 16,093 acres on the Raggeds, 162,333 acres on the Maroon Bells/Snowmass, 35,404 on the Collegiate Peaks, 82,554 acres on the Hunter-Frying Pan, 111,253 acres on the Holy Cross, 135,272 on the Eagles Nest and 12,704 acres on the Ptarmigan Peak. Although the analysis area is limited to the WRNF, roads, resources and recreational opportunities on adjacent lands were considered in this analysis.

Objectives

The objective of this science-based analysis is to provide information for managing roads that are responsive to public needs and desires, conform to the Forest Plan, are determined to be needed to meet resource and other management objectives, minimize adverse environmental impacts and better reflect long-term funding expectations. All existing system roads within the analysis area were included in this analysis. Only non-system roads that were considered for addition to the transportation system were analyzed.

The Travel Analysis Process is intended to be a broad scale comprehensive look at the transportation network. The main objectives of the are:

- Balance the need for access while minimizing risks by examining important resource, social and economic issues related to roads;
- Furnish maps, tables and narratives that display transportation management opportunities and strategies that address future access needs and environmental concerns;
- Identify the need for change by comparing the current road system to the desired condition; and
- Make recommendations to inform decisions in subsequent NEPA documents.

Personnel

The analysis was led by Theresa Beard, SO engineering, working with numerous resource specialists on each of the four Ranger Districts.

Analysis Plan

The following steps were used in order to carry out the analysis:

- Reviewed and assembled existing data, including the 2006 WRNF Roads Analysis Report and 2011 Travel Management Plan FEIS and ROD.
- Verified accuracy of system road locations on maps.
- Identified discrepancies between on-the-ground conditions and the Forest's INFRA and GIS databases. Documented and corrected where possible these data discrepancies.
- Where possible, verified the current conditions of roads, including safety issues, surface type and environmental impacts.
- Identified preliminary access and resource issues, concerns and opportunities.
- Performed the analysis concurrently with other plans and projects ongoing on the forest.
- Recommended changes to the road systems based on the findings of this Travel Analysis in order to identify the minimum road system and improve the management of forest resources relying on the transportation system.

Information Needs

Information needs were identified and all available data was gathered about the following:

- Accurate location and condition of system roads within the analysis area. A complete inventory of non-system routes was not conducted.
- Maintenance responsibility.
- Assessment of previous and current opportunities, problems and risks for all roads in the analysis area.
- Soil, hydrology, vegetation, invasive species, wildlife and cultural resources and areas where they are being impacted by roads.
- Areas of special sensitivity, resource values, or both.
- Public access and recreational needs and desires in the area, including access for nearby landowners.
- Conflicts among uses, public access, user safety and accessibility.
- Anticipated future levels of motor vehicle use and changes in motor vehicle technology.
- Transportation needs for Forest management activities.
- Transportation investments necessary to meet land management plan objectives.
- Current observed road uses.
- Economic costs and benefits.
- Road management objectives.
- Best management practices.
- Forest Plan and other management direction.
- Agency objectives and priorities.
- Interrelationship with other governmental jurisdictions for roads.
- Applicable federal, state and local laws.
- Public and user group values and concerns.
- Forest-wide and project level road analyses.
- Previous administrative decisions regarding travel management.

STEP 2: DESCRIBING THE SITUATION

Purpose

The purpose of this step is to:

- Describe the existing management direction
- Describe the existing road systems

Road Management

The transportation system on the WRNF serves a variety of resource management and access needs. Most roads on the WRNF were originally constructed for commercial access purposes which included grazing, timber and mineral extraction. Other roads resulted from construction of gas pipelines, power transmission corridors and other activities. Over the past 100 years, an extensive road network was developed that continues to serve commercial, recreation and administrative purposes and provide access to private lands located within the forest.

NFS roads are managed in accordance with the Road Management Objectives (RMO's) established for specific roads. RMO's stipulate the uses for which the road was designed and currently managed, maintenance levels, target maintenance frequencies and tasks and other information, as well as future needs for the road.

NFS roads are assigned a specific maintenance level which defines the level of service provided by and maintenance required for, each specific road. Roads may be currently maintained at one level and planned to be maintained at a different level at some future date. The operational maintenance level is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints and environmental concerns; in other words, it defines the level to which the road is currently being maintained. The objective maintenance level is the maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints and environmental concerns. The objective maintenance level may be the same as, or higher or lower than, the operational maintenance level. Most roads are being maintained at their objective levels, i.e. the operational and objective maintenance levels are the same.

Discussions about roads in this report will use the Forest Service maintenance level (ML) terminology which includes ML's 1-5: ML 1 (closed roads); ML 2 (high clearance vehicles); ML 3 (suitable for passenger car travel); ML 4 (suitable for passenger car travel, provides comfort at moderate speeds); and ML 5 (paved, or chip sealed). ML 1 and 2 roads are usually native surface and ML 3 and 4 Roads are usually surfaced with material, such as gravel.

Maintenance levels 1-5 (operational and objective) are described in more detail in Forest Service Handbook (FSH) 7709.59, Section 62.32.

Geographic Information System and Corporate Database

Two of the tools used to catalog information about roads are 1) a geographic information system (GIS) and 2) a corporate database known as INFRA. Each of these computer-based tools contains slightly different information. The INFRA database lists all the system roads on the Forest and includes a variety of survey-based information about each route, such as route number, length, beginning and ending locations, ownership, ranger districts, surface type and other similar data. The database should also include features along the route, such as culvert pipes, switchbacks, signs,

waterbars, cattle guards and gates. The database also includes maintenance information. The geographic information system, or GIS, spatially displays the roads and other information across the landscape. Using GIS, transportation routes may be overlaid with streams, wildlife areas, land ownership and a host of other information.

The Forest Service has not always kept such detailed records of roads. Google Earth was used as an initial step to inventory all existing roads and most everything that looked like a road was identified as such. Routes that were identified as non-system routes and were not categorized as system roads. Engineering worked to ensure that the GIS and INFRA databases match what is actually on the ground. Level 1 and non-system roads have not all been field-verified and in some places across the forest, features that are not roads are still identified in the inventory as non-system roads. Some of these are fence lines, ditches, power lines, pipeline and other non-road features that looked like roads on Google Earth; others are unauthorized or user-created routes that were never intended as long-term Forest Service road assets to be kept on the system. There may be additional unauthorized routes that are not mapped.

Beginning in 2011, engineering employees have field-verified approximately 1,600 miles of ML2 roads across the White River National Forest comparing the data with INFRA and GIS. It was found that roughly 30% of the roads forest-wide either followed a different alignment, had incorrect lengths, or had the wrong maintenance level assigned to them. Minor discrepancies were corrected in the databases while the more significant changes were addressed on a case-by-case basis. In addition, all available RMO's were reviewed for Level 2-5 roads.

Existing Direction

Travel analysis is focused on identifying needed changes to the forest transportation system. Identifying the existing direction is an important first step. In general terms, the existing direction includes how the National Forest System roads are currently managed for motor vehicle use. Restrictions, prohibitions and closures on motor vehicle use are also part of the existing direction.

The WRNF completed an Environmental Impact Statement and Decision Notice for travel management in March 2011 which covered the entire forest. This travel management decision was implemented in part by publishing a Motor Vehicle Use Map (MVUM) in May, 2011 and revisions in May, 2013, May, 2014 and May 2015 for the Flat Tops Area, Rifle, Aspen/Sopris, Eagle/Holy Cross and Dillon districts. These maps contain the existing direction for motor vehicle use on the districts. Motor vehicle use (excluding snowmobiles) is allowed on designated roads shown on the MVUM. There are no designated motorized areas. MVUMs for the White River National Forest are available on the web at: http://www.fs.usda.gov/detail/whiteriver/home/?cid=stelprdb5328680.

States, counties, other federal agencies and private entities may control roads that cross forest lands by obtaining easements from the Forest Service. Roads that have easements issued to other entities are generally not managed as National Forest System Roads.

Existing Condition

Table 1 lists the number of miles of system roads by operational maintenance level classification on the WRNF.

Table 1: System Roads on the White River National Forest

Roads	Miles
Maintenance Level 5	14
Maintenance Level 4	48
Maintenance Level 3	325
Maintenance Level 2	1,029
Maintenance Level 1	4
Total System Roads	1,420

In order to protect road surfaces and other resources, most roads on the WRNF are seasonally closed to all motor vehicles during the winter and spring seasons (except snowmobiles operating in designated areas).

STEP 3: IDENTIFYING ISSUES

Purpose

The purpose of this step is to:

- Identify key issues related to management of the existing road systems

Key Issues

The key issues were identified using public involvement and comments that addressed the WRNF Forest transportation system as well as input from Forest Service personnel. These issues are listed in random order and do not represent a hierarchy of importance.

1. **Insufficient resources for maintenance of the existing system roads**
   Inadequate maintenance reduces access for National Forest users and management, accelerates soil erosion by concentrating surface water flow and affects water quality and aquatic habitat by increasing sediment into water courses and intermittent drainages. Funding for road maintenance is not adequate to maintain the existing system and perform needed monitoring. (See Appendix A for more information on road maintenance costs.)
2. **Access Needs**
   Motorized vehicle access, of various types, is needed in order to provide recreational opportunities, efficiently manage the Forest and provide access for emergency response.
   a. **Motorized Recreation Use:** Roads are used for various types of motorized recreation including driving for pleasure, 4-wheel driving, ATV and motorcycle riding and snowmobile riding.
   b. **Recreation Access/Connectivity:** Roads provide motor vehicle access to recreational activities occurring off roads, such as hiking, camping, hunting, firewood gathering, rock collecting, etc. Roads are often more desirable if they provide connectivity to other roads.
   c. **Forest Management:** Roads provide access for forest management activities such as fuels reduction, timber harvest, grazing, mining, oil and gas development, noxious weed treatment, etc.

d. **Emergency Access:** Roads provide access to facilitate responding to emergencies such as fire suppression and search and rescue.

3. Environmental Impacts

There are concerns about damage from motor vehicle use, including:

a. **Impacts to water resources:** Erosion and sediment transport off roads in areas with perennial, intermittent and ephemeral stream channels or wetlands impair the ecological and hydrologic function of drainage channels;

b. **Soil and Geologic Hazards:** Much of the analysis area has soils that erode easily. These soils are extremely susceptible to compaction, rutting, gullying and development of mud holes. Some roads are susceptible to mass movement, such as landslides.

c. **Fragmentation and wildlife security:** Motorized routes may fragment wildlife habitat, create barriers to movement, reduce wildlife habitat capability to sustain populations and increase areas of disturbance.

d. **Impacts to vegetation:** Motor vehicle use may cause the spread of invasive species by dispersing seed sources.

e. **Impacts to cultural resources:** Motorized routes and use of these routes may impact cultural resources.

4. Inappropriate Jurisdiction

Roads that access private property where the majority of traffic on the road is related to the private property are better suited as county roads. The use of forest roads for the purposes of accessing private property, while not necessarily prohibited, cannot be said to be contributing to the protection, administration and utilization of the forest. In fact, the considerable maintenance and administrative costs associated with the private use of Forest Service roads, especially as relates to winter use and snowplowing, detracts from the agency's ability to manage roads for the purposes for which they were intended. The Forest Service cannot provide adequate maintenance or management to meet to needs for this access.

Public Involvement

The Subpart A travel management process utilized the great amount of information and knowledge gained with public involvement during past planning. The WRNF has been engaged with travel planning since an effort was initiated in response to a demonstrated need outlined in a 1997 analysis of the management situation, and public interest during the forest planning process. The draft forest plan, released for public comment in August 1999, contained a detailed travel management plan. The decision-maker decided to separate the two decisions and analysis processes in response to public comment about the difficulty in reviewing both the travel management and forest plan decisions simultaneously, and the public's desire for more time to review travel management proposals. Planning information from the initial effort, site specific comments received during the comment period on the draft forest plan, and extensive public engagement and comments from the process culminating in the 2011 FEIS all informed the Subpart A travel management process.

STEP 4: ASSESSING RISKS AND BENEFITS

Purpose

The purpose of this step is to:

- Describe the analysis process
- Describe the criteria and rankings used in the risk and benefit analysis
- Summarize the results of the risk and benefit analysis

The Analysis Process

The risk and benefit criteria categories (Table 2) were developed by considering the issues from Step 3, the assessment of risks and benefits contained in the 2006 Roads Analysis Report and additional knowledge and information from the districts staff. The questions and answers for assessing the risks and benefits of the existing and potential road system contained in Step 4 of the 2006 Roads Analysis Report were reviewed and found to be applicable to this analysis and are not repeated in this document. Each road was then evaluated against the identified risks and benefits.

Criteria and Rankings Used in the Risk and Benefit Analysis

Roads on the WRNF provide access for many uses and users; they also provide the infrastructure to facilitate motorized recreation and forest management. However, their presence has possible negative effects on the natural and cultural resources of the forest, maintenance and repair costs in excess of recent budgetary allocations. The analysis team identified the following risks and benefits of roads as the most important resource issues for managing the transportation system on the WRNF.

Table 2: Road Risks and Benefits

Risks	Benefits
• Condition/Maintenance and Repair Costs • Surface Water Resources • Soil/Geologic Hazards • Wildlife Resources • Invasive Species • Cultural Resources • Jurisdiction	• Motorized Recreation Use • Recreation Access/Connectivity • Forest Management Access • Emergency Access

Each road was evaluated for these risks and benefits and assigned a numerical value for each category. This was based on field knowledge of the routes, data contained in GIS layers, maintenance and repair cost data contained in INFRA, and professional knowledge of the routes, their resource impacts and benefits for various uses. High risks and benefits were assigned a numerical value of three (3), medium risks and benefits were assigned a numerical value of two (2) and low risks and benefits were assigned a numerical value of one (1). Where resource risk was rated as “unknown”, the category was not assigned a numerical value. Assignment of a High (3), Medium (2), or Low (1) rating for each risk and benefit category generally followed the guidelines presented below.

Table 3: Road Risk and Benefit Guidelines

Risks		
Issue	**Rating**	**Criteria Guidelines**
Condition/Maintenance and Repair Costs	High	High levels of deferred maintenance and repair needs as based on the presence of three or more of the following conditions: washboarding; surface deterioration; landslides; roadbed slumping; slope raveling; drainage problems; rutting or gullying; mud holes; poor condition of drainage structures or culverts; and design deficiencies.
	Medium	Moderate levels of deferred maintenance and repair needs as based on the presence of two or more of the above conditions.
	Low	Little or no deferred maintenance and repair needs; no existing damage or one of the above conditions present and condition fair or better.
Surface Water Resources	High	Close proximity to surface water, history of drainage problems or sediment being transported off road with direct impact to surface water resources.
	Medium	Some buffer between route and surface water, some history of drainage problems or sediment being transported off route.
	Low	Distant from surface water, minimal history of drainage problems or sediment being transported off route.
Soil/Geologic Hazards	High	Forest Service knowledge of road damage from landslides, slumps, mudflows, rockfall, retaining wall failure, gullying, soils that are unstable or extremely susceptible to erosion.
	Medium	Knowledge of minor road damage from soil or geologic hazards.
	Low	No knowledge of damage from soil or geologic hazards.
Wildlife Resources	High	High levels of motorized and non-motorized use on roads in highly roaded area.
	Medium	Moderate levels of motorized and non-motorized use on roads in moderately roaded area.
	Low	Low levels of motorized and non-motorized use on roads in minimally roaded area.
Invasive Species	High	Numerous known populations of noxious weeds in vicinity of route corridor.
	Medium	Some known populations of noxious weeds in vicinity of route corridor.
	Low	No or few known populations of noxious weeds in vicinity of route corridor.
Cultural Resources	High	Known historic properties within road prism or in vicinity of corridor.
	Unknown	Area of unknown archaeological potential, little or no archaeological survey and/or the presence of "needs data" sites.
	Low	No known or located historic properties within prism or in vicinity of corridor where archaeological potential has been largely assessed (through Class III archaeological inventory) or Level 3 or higher road where cultural resources are likely to be affected or compromised.
Jurisdiction	High	Access to multiple private parcels or large private development(s).
	Medium	Access to few private parcels.
	Low	No private access.

Benefits		
Issue	**Rating**	**Criteria Guidelines**
Motorized Recreation Use	High	Roads that are frequently used for motorized recreation activities (includes driving for pleasure, 4X4, ATV, motorcycle, or snowmobile use).
	Medium	Roads that are occasionally used for motorized recreation activities.
	Low	Roads that are rarely or never (ML1 roads) used for motorized recreation activities.
Recreation Access/Connectivity	High	Roads that provide access to numerous or high value recreation opportunities and/or connectivity to many other motorized routes.
	Medium	Roads that provide access to some recreation opportunities and/or connectivity to some other motorized routes.
	Low	Roads that provide access to limited recreation opportunities and do not provide connectivity to other motorized routes.
Forest Management Access	High	Roads that provide access to areas that periodically undergo management in multiple resource program areas (e.g. timber, range, fuels, fire, minerals, law enforcement etc.).
	Medium	Roads that provide access to areas that infrequently have active management in more than one resource program area.
	Low	Roads that provide access to areas that rarely have active management and serve only one resource program area.
Emergency Access	High	Roads that are frequently used or will likely be needed for emergencies (such as fire suppression, search and rescue, etc.).
	Medium	Roads that are infrequently used or needed for emergencies.
	Low	Roads that are rarely used and will likely not be needed for emergency access.

The same risk and benefit categories were used for all roads, regardless of maintenance level. This was done for simplicity and consistency. This risk and benefit analysis was based on GIS layers available at the time this analysis was being conducted. A matrix was created displaying each road and each risk and benefit category. Once a numerical value was assigned to each matrix category, an average was calculated for each road that is represented by the "overall risk (or benefit) ranking". Those rankings with a value of 2.34 or greater were assessed as "High", those rankings between 1.67 and 2.33 were assessed as "Medium" and those rankings less than 1.67 were assessed as "Low". These categories were calculated mathematically and did not consider the severity of the impact beyond the guidelines listed above. Recommendations were made as to whether each road should be part of the minimum road system. Opportunities were identified for suggested changes to a road.

The Watershed Condition Framework (WCF) was used to the maximum extent possible to estimate the watershed risk ratings. The WCF "Road and Trail Condition Rating Rule Set", specifically the overall "Road and Trail Condition Indicator" and the "Open Road Density" and a modification of the "Proximity to Water", attributes were used to develop rating criteria. Site-specific road information and professional judgment were used to adjust the rating when appropriate.

Some roads that were thoroughly assessed and analyzed in the 2011 FEIS, mostly ML 3, 4 and 5 roads, were not included in this risk and benefit analysis, but were reviewed and assessed for inclusion in the minimum road system and opportunities for suggested changes. A total of 1141 miles were included in the current risk/benefit analysis.

For additional information on the rationale and methodology employed by specialists in the evaluation process, see Appendix B.

Results of the Risk and Benefit Analysis

The analysis resulted in nine possible risk/benefit pair categories: High Risk/High Benefit; High Risk/Medium Benefit; High Risk/Low Benefit; Medium Risk/High Benefit; Medium Risk/Medium Benefit; Medium Risk/Low Benefit; Low Risk/High Benefit; Low Risk/Medium Benefit; and Low Risk/Low Benefit.

One-percent or less of the roads analyzed fall in each of the four categories where high and low rankings are paired. Fifty-percent of the road mileage falls in the category of medium risk and low benefit.

Table 4: System Roads in Each Risk/Benefit Category

Risk / Benefit Summary		Benefit						Risk Totals	
		H		M		L			
		miles	%	miles	%	miles	%	miles	%
Risk	H	8	<1%	170	15%	6	<1%	184	16%
	M	258	23%	86	8%	572	50%	916	80%
	L	2	<1%	24	2%	15	1%	41	4%
Benefit Totals		268	23%	280	25%	593	52%	1141	100%

STEP 5: DESCRIBING OPPORTUNITIES AND SETTING PRIORITIES

Purpose

The purpose of this step is to:

- Describe opportunities for roads
- List recommendations for roads
- Determine the minimum road system
- Describe future actions

Opportunities and Recommendations for Roads

Opportunities for changing the transportation system include the following options:

Change Jurisdiction

Opportunities may exist to convert some roads under Forest Service jurisdiction to another jurisdiction, such as a County or other government agency, thus shifting the maintenance responsibility to them. This could, however, require an initial investment to bring the road up to a designated standard prior to transfer of jurisdiction. No specific recommendations for jurisdictional changes are identified. In general, it is recommended that roads that primarily serve private access needs be assessed when

substantial maintenance or repair needs arise. Engagement with landowners and associated counties is important to ensure responsibilities with easements and maintenance agreements are satisfactorily met.

Close to Motorized Use

Opportunities may exist to convert some roads currently open to public motorized use to ML1 roads, if they are deemed needed for forest management. This could effectively reduce the cost of maintaining the roads. There may be initial costs to ensure that these roads are made to be self-maintaining hydraulically before converting them to ML1 roads. Three segments of ML2 road totaling six miles are recommended to convert to ML1:

- 105.3S - Sellar Park, 0.4 miles (at end)
- 1351.1A - Slate Creek, 0.7 miles
- 2950.5A - Williams Peak, 5.3 miles

Convert to Another Use

Opportunities exist to convert some roads to another use, such as a motorized or non-motorized trail, thus eliminating the need to use resources to maintain it as a road. This option, however, shifts the cost of maintaining the converted road to another program area. Two road segments totaling 4.3 miles are recommended for conversion to non-motorized trails:

- 221.1 – Upper West Miller, 1.0 miles
- 702.1 – Resolution, 1.4 miles (segment north of the 751.1 – Ptarmigan road intersection that ties into road 747.1 – Wearyman and trail 75.1 – Wilder Gulch)

Decommission

Opportunities exist to decommission some roads. This would eliminate the need to plan for expenditure of resources to maintain the road in the future; however, there may be one-time costs to decommission roads. Twelve road segments totaling 15.1 miles are recommended for decommissioning:

- 105.4S - Little Deadman, 1.0 miles
- 232.1 - Hill Creek, 0.9 miles
- 270.1H, 1.6 miles
- 270.1K, 0.3 miles
- 2851.1 - Green Mountain Overlook, 0.1 miles
- 293.1 - Lost Park, 0.9 miles
- 301.P - Pipeline, 2.9 miles (segment west of 320.1 - Park Creek intersection)
- 461.1 - Fire Box, 0.7 miles (segment inside NF boundary)
- 747.1 - Wearyman, 4.0 miles (from McCallister Gulch - 708.1 west to Resolution 702.1 and trail 75.1 - Wilder Gulch)
- 804.1 - Trail Gulch, 0.4 miles (northernmost end segment)
- 835.1 - Complex, 1.2 miles
- 835.1B, 0.2 miles

Remove from System

Opportunities may exist to remove some roads from the system. Some system roads exist on private property to which the Forest Service has not legal access. This is not the same as decommissioning because the roads may continue to be used by the private landowner. No specific recommendations are made for removing roads from the system.

Add to System

Opportunities may exist to add some roads to the system. Some roads exist that may be utilized for future land management activities, but are currently not on the system. Costs to open and maintain these roads during use would be borne by the projects utilizing the roads. 47 road segments, with approximately 23 miles previously determined to be decommissioned and 36 miles previously determined to be converted to non-motorized trails are recommended for inclusion in the system as maintenance level 1 roads (closed to motorized traffic except for less than annual, short term use for specific land management activities.) These road segments are included in Appendix D - Recommended Changes to Roads.

Aggressive Storm-proofing

Installation of well-designed drainage dips at regular intervals can ensure long-term stability with reduced future maintenance costs. The benefits of expending maintenance funds to do this should be compared with the potential costs of future maintenance and repairs that would be needed if the drainage dips were not installed. No specific recommendations are made for aggressive storm-proofing.

Minimum Road System

The minimum road system is the road system needed for safe and efficient travel and for administration, utilization and protection of the National Forest System lands. (36 CFR 212.5(b)(1))

Roads included in the minimum road system serve the Forest Service mission by providing access for forest management activities, recreational opportunities and utilization of forest resources. The minimum road system includes roads designated for public motorized use as well as closed roads that are necessary for forest management.

This recommended minimum road system was developed to represents the best current minimum road system. It is difficult to know what routes may be needed in the future; therefore, the minimum road system may need to be updated, adjusted or revised as conditions warrant.

Federal regulations require the Agency to identify roads that are no longer needed to meet forest resource management objectives and those that should be recommended to be decommissioned or considered for other uses, such as conversion to trails. Future NEPA analyses for various projects will consider the recommendations in this travel analysis report and will implement or revise the recommendations based on more site specific information.

Process Used to Develop the Minimum Road System

In addition to the information produced in the Risk/Benefit Analysis Matrix, the following issues were considered in identifying the minimum road system:

- Are there any non-system routes that should be part of the road system?
- Is a Forest system road redundant with another road that leads to the same area? If so, one of the roads is likely not needed.

- Is a Forest system road located properly (i.e., not in drainage bottoms, on steep slopes, or on erodible soils)?
- Does the route create unacceptable resource impacts?
- If resource impacts are acceptable, is a Forest system road needed for public or administrative use?

The logic used by the staff specialists in forming recommendations involved whether there are resource reasons not to identify a route as part of the minimum road system (risks) and whether there will be access or recreational needs provided by identify such a route (benefits). Generally, if there are benefits provided and no major resource reasons not to identify, the route was recommended for the minimum road system. Generally, if resource reasons not to identify that cannot be mitigated or are not cost effective to mitigate and benefits are minimal then the route was recommended to be removed from the road system. In some cases, routes were identified as not needed simply because they were redundant with other routes. In this manner, benefits and risks were compared in developing recommendations for the minimum road system.

The opportunities resulting from this final step of integrating all the considerations can be found in the spreadsheet in Appendix D.

White River National Forest Minimum Road System

The results include potential changes to roads that are open to public motorized use as well as to roads that are closed to public motorized use. Roads that are not needed are recommended to be removed from the system through several different methods.

Some roads may be recommended to be added to the system. The majority of these roads are roads that were constructed for Forest Service timber sales. These roads should have been added to the system at that time, but were not. These roads are needed for long-term Forest management and were assigned a preliminary maintenance level. None of the roads proposed to be added to the system are user-created routes. As with all recommendations and opportunities listed in this report, none of them can be implemented without a NEPA analysis being conducted.

The mileages for the currently identified minimum road system compared with the existing condition are shown in the table below. In addition, the minimum road system is depicted on a map in Appendix C. Appendix D contains a list of recommended changes to roads and Appendix E contains a list of likely not needed roads for the future road system.

Table 5: Mileages of Minimum Road System Compared to Existing Road System

Maintenance Level	Current Miles	Minimum Road System Miles	Difference
5	14	14	0
4	48	48	0
3	325	323	- 2
2	1,029	1,011	-18
1	4	66	+62
Total	1,420	1,462	+42

Future Actions

The minimum road system in this document is a recommendation only. As stated previously, future site specific NEPA analyses that include public involvement may carry forward for implementation, reject, or change the recommendations in this report and provide the basis for making specific road related decisions. These future decisions will include consideration of the minimum road system along with other factors such as environmental, social and economic implications. These NEPA analyses, in combination with strategic prioritization of anticipated allocated funding, will determine how this report is implemented or modified. As additional information is gathered in the future, this information may result in future modifications to the recommendations in this Travel Analysis.

It should be noted that road maintenance needs and expenses must be considered together in developing the minimum road system. The road maintenance costs in Appendix A indicate that the appropriated funding is adequate to perform annual maintenance on many, but not all, roads on the White River National Forest. The deferred maintenance costs are considerably higher than the appropriated funding. As a result, most of the deferred maintenance needs are not currently being addressed. However, creating a road system to match the available funds by simply closing and decommissioning roads will not result in a road system that meets the access needs for public and administrative purposes. Items that were considered in achieving a fully functional, affordable minimum road system included decreasing the miles of roads on the system, lowering the maintenance levels of system roads as appropriate, converting roads to trails as appropriate and decommissioning or removing from the system unneeded system roads.

Travel Analysis Report
White River National Forest
Version 1.0
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Revisions

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APPENDIX A: ROAD MAINTENANCE ACTIVITIES AND FUNDING

Maintenance is the act of keeping fixed assets (such as roads) in acceptable condition. It includes preventive maintenance normal repairs, replacement of parts and structural components and other activities needed to preserve a fixed asset so that it continues to provide acceptable service and achieves its expected life. Maintenance includes both annual maintenance and deferred maintenance. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than those originally intended. (Financial Health – Common Definitions for Maintenance and Construction Terms, September 29, 1998)

Annual maintenance is work performed to maintain serviceability, or repair failures during the year. It included preventative and/or cyclic maintenance performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance. (Financial Health – Common Definitions for Maintenance and Construction Terms, September 29, 1998)

Deferred maintenance is maintenance that was not performed when it was scheduled and therefore was subsequently delayed for an indefinite period of time. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair and decrease in asset value. (Financial Health – Common Definitions for Maintenance and Construction Terms, September 29, 1998)

Road Maintenance Budget

The White River National Forest receives an annual appropriation of funds for road maintenance. In fiscal year (FY) 2015 the amount was approximately $1,380,000. Road maintenance funding has been declining for many years. In FY 2009 the three-year running average (FY 2007-2009) was $2,400,000, which included an average of $1,310,000 designated for specific deferred maintenance projects. Funding for specific deferred maintenance has declined to near zero. The preliminary FY 2016 (beginning October 1, 2015) total road maintenance budget is estimated at $1,230,000.

Deferred maintenance since FY 2008 has included funding for specific projects that included several replacements of aging stream crossing culverts with newer structures that also provide improved passage for fish and other aquatic organisms. Other deferred maintenance work has included adding or replacing crushed rock on roads, replacement of deteriorated ditch relief culverts, and repair and replacement of bridges. Substantial funding has also been utilized for decommissioning roads identified in the 2011 Travel Management Plan ROD, with 138 miles accomplished since FY 2008.

The three-year running average of road maintenance funds, excluding specific deferred maintenance funding, has declined from $1,710,000 in 2009 to a current level of $1,320,000. This is what is available for annual routine maintenance and repair on the 1420 miles of WRNF roads and associated bridges, including forest-wide base operation, program management, travel management, and transportation planning costs.

Road Annual Maintenance

Most all of the 387 miles of ML 3, 4, and 5 roads receive some maintenance on an annual basis. Most of these roads are also included in one of the six cooperative agreements with counties, under which counties perform some annual maintenance, utilizing state highway user tax funds. Overall,

maintenance on ML 3, 4, and 5 roads is accomplished with a combination of forest service force account crews, contractors, and counties.

Over the seven years of FY 2008-2014 an average 166 miles of ML 2 roads have been maintained annually. This can be correlated to an estimated 6-year return interval of maintenance on the 1,029 miles of ML 2 roads. Maintenance of ML 2 roads is mostly accomplished with forest service force account crews, as well as some contract work and maintenance performed by timber sale operators or other commercial users.

Following are descriptions of typical maintenance activities:

Maintenance Level 1 Roads:

Maintenance Level 1 (ML1) roads are closed to public motorized use and are used infrequently for administrative purposes. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns. No maintenance other than a condition survey may be required so long as no potential exists for resource damage. Most of these roads are in a stable, re-vegetated condition with functioning drainage; however, a few might have drainage and/or erosion control issues. In general these roads cost very little to maintain. Installation and maintenance of closure devices such as gates, berms and boulders is needed on these roads. Condition surveys are done very infrequently and maintenance needs on ML1 roads are identified by each district when inspections reveal site specific issues.

Maintenance Level 2 Roads:

Maintenance Level 2 (ML2) roads are open for use by high clearance vehicles and the comfort or the user convenience of passenger vehicles are not considerations. Warning signs and traffic control devices are not provided with the exception that some signing may be posted at intersections; therefore motorists should have no expectations of being alerted to potential hazards while driving these roads. Maintenance consists of maintaining the road prism for passage of high-clearance vehicles, maintaining drainage facilities, removing/repairing slides and slumps, brushing, cutting fallen trees off the roads and installing/repairing seasonal closure gates. ML2 roads range from rocky roads that require little maintenance to incised roads in erosive soils that require frequent attention. Some of these roads require armoring of drainage dips to handle the traffic loads and minimize resource impacts and sporadic road condition surveys are done. Work typically includes reshaping dips, filling in deep ruts, pulling lead-out ditches and maintaining the occasional culverts.

Maintenance Level 3 Roads:

Maintenance Level (ML3) roads are opened and maintained for use by standard passenger vehicles and the comfort and convenience of the user are not considered priorities. Warning signs and traffic control devices are provided to alert motorists of situations that may violate expectations. These roads are should typically be surfaced with aggregate but with declining allocated funds many of these roads are native surface. A combination of drainage dips and culverts provide drainage and some potholes or washboard may exist. These roads are subject to the requirements of the Highway Safety Act. Maintenance guidelines include replacing the base course and surfacing as needed, surface blading, cleaning ditches, cleaning/replacing culverts, cleaning/replacing cattleguards, clearing fallen trees off the roads, controlling the vegetation to provide for sight distance,

repairing/removing slides and slumps, installing/maintaining regulatory signs per the Manual on Uniform Traffic Control Devices (MUTCD) and installing/repairing seasonal closure gates.

Surface blading and ditches: Most of these ML3 roads are bladed minimum of once a year; however, more frequently traveled roads may require a more aggressive blading schedule than once per year. Severe washboarding and potholing can create hazardous driving conditions causing inexperienced or imprudent drivers to lose control of their vehicles. The aggregate surface on many of these roads has deteriorated to a point that they are no longer bladeable, causing rutting and other damage to the roads. Surface replacement is needed on many of these ML3 roads to bring these roads up to the appropriate objective maintenance levels. Several site specific surveys indicate that although the road surface is deteriorating, resource impacts are generally not occurring. Ditches are pulled only when the drainage is no longer functioning.

Culverts, cattleguards and gates: Many of the ML3 roads are evaluated on an annual basis by staff from each respective district, engineering or C&M road crew who identifies any non-functional culverts and/or catch basins, inoperative cattleguards and/or any downed, bent or broken gates in need of repaired or replacement. Slumps, slides and boulders in the road are removed and culverts are replaced when necessary.

Signing: The sign crew is responsible for installing, replacing and straightening regulatory, warning and guide signs on the forest which will adhere to the new MUTCD guidelines require that the retro-reflectivity requirements are met on these signs by 2015.

Dust abatement: The annually applying magnesium chloride to select highly traveled ML3 roads Forest-wide.

Maintenance Level 4 Roads:

Maintenance Level (ML4) roads are open roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane with turnouts, some may be paved and/or dust abated. These roads are subject to the requirements of the Highway Safety Act and the MUTCD is applicable.

Maintenance Level 5 Roads:

Maintenance Level (ML5) roads are open roads that provide a high degree of user comfort and convenience. These roads are normally double lane with paved surfaces. However, some may be aggregate surfaced and dust abated.

Road Deferred Maintenance

Beginning in 1999, the forest conducted road condition surveys and recorded work items to determine the cost of maintaining the road system to standard and to determine what required road work was necessary to bring the roads up to the desired maintenance level from deferred maintenance due to the lack of funding. The NRM INFRA database is used by the forest as a bookkeeping tool to document and track deferred maintenance needs on National Forest System Roads. Detailed surveys and investigation are required on aggregate surfaced roads in optimizing aggregate replacement and investment; utilizing appropriate surface maintenance procedures are essential to maximizing surfacing life and ensuring maximum return on the surfacing dollar. Thus, deferred maintenance numbers in INFRA may not be indicative of the actual funding needed for adequate road maintenance.

Road Maintenance Costs

Costs vary widely from road to road based on site specific conditions. Appropriated funding is adequate to perform annual maintenance on many, but not all, roads on the White River National Forest. The deferred maintenance costs are considerably higher than the appropriated funding. As a result, most of the deferred maintenance needs are not currently being addressed. This Travel Analysis will inform subsequent site specific NEPA analyses that may carry forward for implementation, reject, or change the recommendations in this report. These NEPA analyses, in combination with strategic prioritization of anticipated allocated funding, will determine how this report is implemented or modified. As additional information is gathered in the future, this information may result in future modifications to the recommendations in this Travel Analysis.

Other Road Maintenance Funding Sources

Other funding sources supplement the appropriated funding. The Forest Service, the counties and the State of Colorado have signed agreements (Schedule A) whereby the counties are paid to perform road maintenance on Forest Service roads (primarily blading of Level 3 and 4 roads). The counties are funded to perform this work through State of Colorado allocations of the Highway User Tax Funds. The work performed by the counties partly offsets the deficit in appropriated road maintenance funding.

Commercial undertakings such as timber sales, oil and gas wells, hauling from private lands, etc. have been charged a percentage of road maintenance costs or have conducted road maintenance actions as part of the project. Road maintenance is provided through these activities for the locations and timeframes when the commercial activity takes place.

APPENDIX B: RISK/BENEFIT ANALYSIS RATIONALE AND METHODOLOGY

Risk

Condition/Maintenance and Repair Costs

Roads are rated based on their existing condition; routes in good condition met the standards for the route. All routes require annual or routine maintenance; routes in poor condition also have deferred maintenance and repair needs in order to bring them back up to standard. Routes in poor condition may also be causing soil and watershed impacts as discussed below.

A high risk rating (3) was assigned to roads in poor condition with high levels of deferred maintenance and repair needs as based on the presence of three or more of the following conditions: washboarding, surface deterioration, landslides, roadbed slumping, slope raveling, drainage problems, rutting or gullying, mud holes, poor condition drainage structures/culverts or design deficiencies. A moderate risk rating (2) was assigned to routes with moderate levels of deferred maintenance and repair needs as based on the presence of two or more of the above conditions. A low risk rating (1) was assigned to routes that are in fair or better condition with little or no deferred maintenance and repair needs, no existing damage, or one of the above conditions present.

Surface Water Resources

Roads can affect water resources primarily by sediment being transported off road surfaces into streams or wetlands. Open roads are devoid of vegetation and have compacted surfaces. A variety of drainage structures are used where they cross drainages and stream channels, such as fords, culverts and log culverts. Areas of poor drainage can develop mud holes which are deepened and churn up sediment every time vehicles pass through them. Poor route location and inadequate drainage when the route was constructed can exacerbate watershed impacts. For example a route that is adjacent to and parallels a stream is more likely to have poor drainage and direct sediment inputs to the stream than a route that is located further away from the stream and contours along a slope. Drainage structures need to be maintained on a regular basis in order to remain fully functional. Inadequate maintenance can result in increased sediment being transported to streams or wetlands. Closed roads are mostly vegetated and have fewer impacts to water resources, although drainage structures can fail and cause sediment to be introduced to streams or wetlands if the roads are not inspected periodically and maintained as needed.

A high risk rating (3) was assigned to roads located in close proximity to surface water and/or with a history of drainage problems or sediment being transported off the road. A moderate risk rating (2) was assigned to routes that have some vegetated buffer between the route and surface water and/or have some history of drainage problems or sediment being transported off the route. A low risk rating (1) was assigned to routes that are distant from surface water and/or have a minimal history of drainage problems or sediment being transported off the route.

Soil/Geologic Hazards

Roads can affect soils primarily by causing erosion and loss of soil. Erosion from roads is increased in areas with soils with high erosion ratings, steep slopes, or routes with steep gradients. Poor route

location, inadequate drainage structures and inadequate maintenance can exacerbate soil impacts. Closed roads are mostly vegetated and have fewer erosion problems and impacts to soils, although drainage structures can fail and cause erosion if the roads are not inspected periodically and maintained as needed.

Roads can either be affected by or cause impacts to geologic hazards, such as landslides, slumps, mudflows, or rockfalls. Poorly located routes can exacerbate land sliding. Routes can also be damaged by landslides, slumps, mudflows, or rockfalls, thereby increasing maintenance and repair costs.

A high risk rating (3) was assigned to roads with a history of road damage from landslides, slumps, mudflows, rockfall, retaining wall failure, gullying, soils that are unstable or extremely susceptible to erosion. A moderate risk rating (2) was assigned to routes that have a history of minor route damage from soil or geologic hazards. A low risk rating (1) was assigned to routes with no history of damage from soil or geologic hazards.

Wildlife Resources

Three risk ratings were identified for wildlife resources for the Travel Analysis Report. The three ratings were low, moderate, or high, with a single risk rating provided for each road analyzed. The ratings focus on risks to habitat rather than risks to species as there are many species utilizing the diversity of habitats across the White River National Forest and species response to disturbance associated with roads varies tremendously. A single risk rating that focuses on disturbance impacts to species would not suffice for all species and a single risk rating that considers risks to both habitat and species would be difficult as individual roads are located in multiple habitats used by multiple species. Risk ratings focus on impacts to wildlife habitat based on road densities and use in a given area as explained below.

The effects of roads on wildlife habitat depend on several important factors including their location within suitable habitat, densities within suitable habitat and amount and type of use occurring. Roads provide access into areas that provide opportunities for an array of recreational use such as firewood collection, rock and mineral collection, collection of medicinal and edible plants, camping in dispersed and in designated areas and other motorized and non-motorized uses year-round. Roads also provide access and opportunities for an array of forest management activities such as timber management, wild land and prescribed fire management, livestock grazing, oil and gas exploration, lands and special uses and other activities. Recreational and forest management activities have the ability to negatively or positively affect wildlife habitat depending on their overall affect to key habitats (riparian and wetlands) and habitat attributes utilized for foraging, breeding and security such as trees and shrubs, grass-forb vegetation, snags and downed logs and other woody debris.

Areas with high road densities are expected to receive higher levels of public and administrative use; therefore, a higher probability of direct and indirect impacts to habitat or habitat attributes utilized by species for breeding, foraging and security resulting in high risk to the resource are high risk (3). Areas with moderate road densities are expected to receive moderate levels of public and administrative use, therefore resulting in moderate risk to the resource are moderate risk (2). Areas with low road densities are expected to receive less use; therefore, the degree and probability of impacting habitat and/or key habitat attributes is expected to be less resulting in low risk to the resource are low risk (1).

Invasive Species

Motor vehicle use has the potential to spread invasive species by dispersing the seed source. The three risk ratings identified for invasive species were low, moderate, or high, with a single risk rating provided for each road analyzed. Risk ratings were tied to both the size and distribution of existing noxious weed populations, as well as the potential for spread of invasive species. The invasive species considered for this analysis are the plant species listed on the Colorado Noxious Weed List.

Risk level 1 (low) was assigned to roads with only a few, small known noxious weed populations, or no know noxious weed populations. These populations do not appear to be spreading. Risk level 2 (moderate) was assigned to roads with several known noxious weed populations, of any size. These populations have the potential to spread. Risk level 3 (high) was assigned to roads with numerous, often large and contiguous, known noxious weed populations. These populations are often known to be spreading.

Cultural Resources

Continued use and maintenance of roads has the potential to affect historic properties. Impacts are most commonly found within the road disturbance itself as sites are exposed and damaged through use. Specific site types outside of the road area can also be adversely affected by the presence and use of roads (e.g., rock art panels, structures, Traditional Cultural Properties). Many roads have been in use since before the National Historic Preservation Act (1966) was passed or were constructed as standards for NHPA analysis were in development; many have not been formally inventoried for the presence of cultural resources according to modern standards. Roads which have already resulted in significant ground disturbance through their construction and maintenance (Road Maintenance Level 3 and higher) have already probably done the damage they are going to do to any sites which were located within the road prism. Continued use and maintenance of these roads has generally been considered exempt from field analysis as actions that *"do not have the potential to cause effects on historic Properties"* as per 36 CFR 800.3(a) and (a)(1). Maintenance level 3 roads (and higher) were generally awarded a "low" risk rating; however, sites may still exist and be impacted by continuing road use and maintenance along less improved dirt roads. The procedure used to award risk ratings along maintenance level 1 and 2 roads during the current analysis involved consulting GIS map layers and other available information to determine if a road or area had been inventoried for cultural resources according to modern standards (pedestrian inventory with transects of approximately 15 meters). Site records for resources located in or near roads were consulted to determine if formal determinations of eligibility to the NRHP had been made for cultural resources along roads. In cases where resources along maintenance level 1 and 2 roads qualified as historic properties risks were considered "high" (risk rating 3). In cases where eligibility recommendations for sites along roads were not available and/or there was inadequate inventory along the road, risks were rated as "unknown." Only in cases where there was adequate inventory along a road and no "needs data" or "eligible" sites were known to exist along the road, were maintenance level 1 or 2 roads awarded a risk rating of "low" (1).

The cultural resource road risk analysis was based on GIS layers available at the time this analysis was being conducted. The majority of roads within the analysis area do not have adequate inventory

available to assess risks. These roads are classified as “unknown.” The “unknown” category is not weighted in the risk analysis.

Jurisdiction

Roads that access private property where the majority of traffic on the road is related to the private property are better suited as county roads. The term "forest road" is defined by 23 USC § 101 as a road wholly or partly within, or adjacent to and serving the National Forest System that is necessary for the protection, administration and utilization of the National Forest System and the use and development of its resources. The use of forest roads for the purposes of accessing private property, while not necessarily prohibited, cannot be said to be contributing to the protection, administration and utilization of the Forest. In fact, the considerable maintenance and administrative costs associated with the private use of Forest roads, especially as relates to winter use and snowplowing, actually detracts from the agency's ability to manage roads for the purposes for which they were intended. Wheeled motor vehicle use in the winter and spring when roads are saturated results in road damage and off-road resource impacts including sedimentation into stream channels. Private property owner’s plowing Forest Service roads also limits winter recreation opportunities as it is illegal to ride a snowmobile on plowed roads according to state regulations. Roads that access multiple private parcels that are used year-round incur a higher maintenance cost than roads that are only used seasonally. Roads that provide access to multiple private parcels or large private development(s) were generally rated as 3 (high). Roads that provide access to few private parcels were generally rated as 2 (moderate). Roads that have no private access were generally rated as 1 (low).

Benefits

Motorized Recreation Use

Roads are used for various types of motorized recreation including driving for pleasure, 4-wheel driving, ATV and motorcycle riding and snowmobile riding. To evaluate the general level of benefit provided by each road to motorized recreationists, each route was assigned a benefit rating of high, moderate, or low according to its present level of use for recreation purposes. Routes that are frequently used for motorized recreation purposes were rated as high (3), routes that are occasionally used for motorized recreation were rated as moderate (2) and routes that are seldom or never used for motorized recreation were rated as low (1). Use levels were based on the combined professional judgment and field experience of the Districts specialists, as there was little quantitative data on actual road usage on the Districts available to the specialists at the time of analysis.

Recreation Access/Connectivity

Roads are often used to provide motor vehicle access to recreational activities occurring off roads, such as hiking, camping, hunting, foraging, etc. Roads also can provide important connectivity to other roads. To evaluate the level of this type of benefit, roads were assigned a rating of high (3) if they provided access to numerous or high value recreation opportunities and/or connectivity to many other motorized routes, a rating of moderate (2) if they provided access to some recreation opportunities and/or connectivity to other motorized routes and low (1) if they provided access to limited recreation opportunities and/or connectivity to other motorized routes.

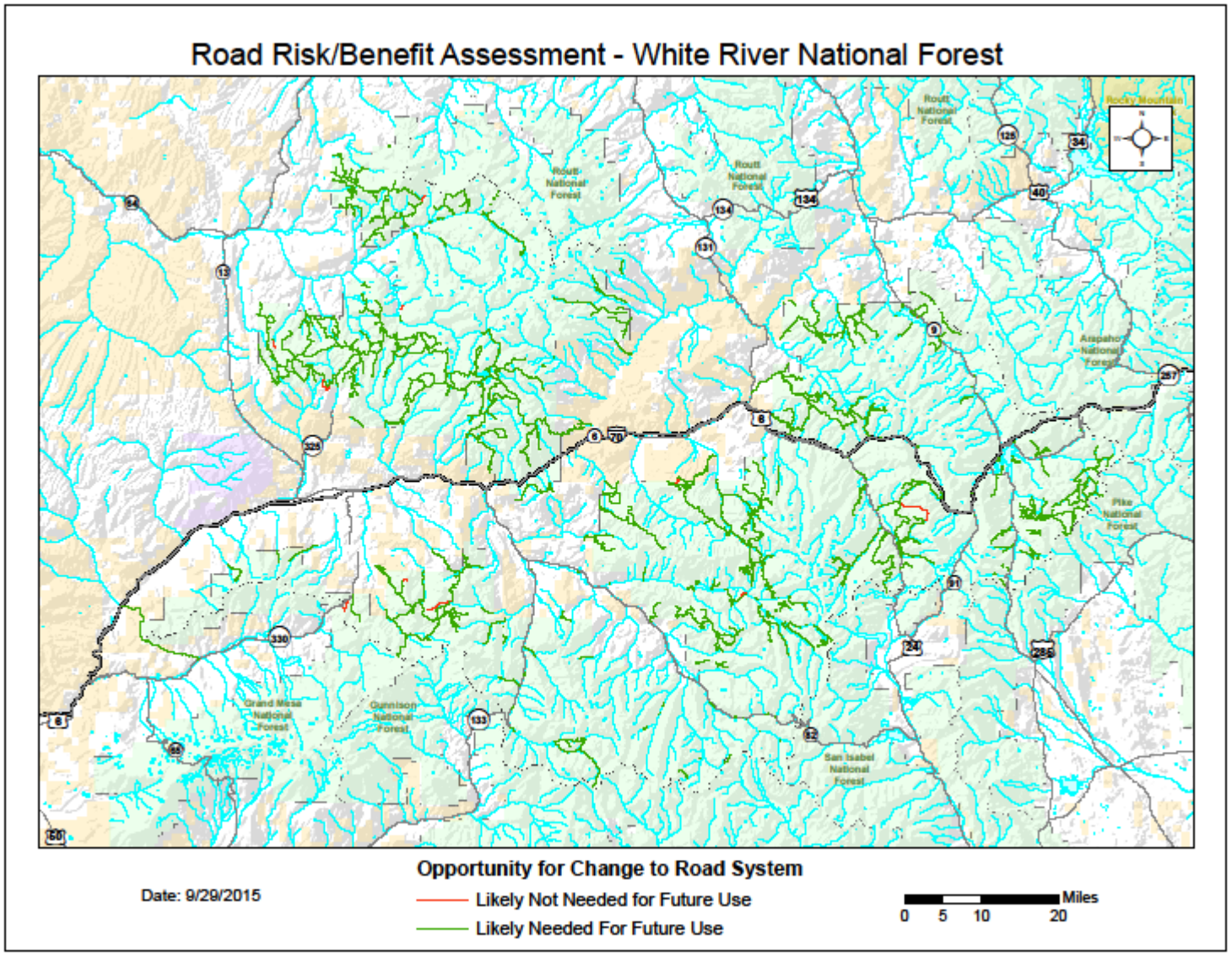
Forest Management Access

Roads are used in various forest management activities such as vegetation management, wild land and prescribed fire management, range management, oil and gas development, lands and special uses. Roads that provide motorized access to areas that periodically undergo management in multiple resource program areas were generally rated as high (3). Routes that provide motorized access to areas that infrequently have active management in more than one resource program area were generally rated moderate (2). Routes that provide motorized access to areas that rarely have active management or serve only one resource program area were rated low (1).

Emergency Access

Roads were rated as to their benefit for motor vehicle use for emergency access, primarily fire suppression and search and rescue. To evaluate the general level of benefit provided by each road to emergency access, each route was assigned a benefit rating of high, moderate, or low according to its past use or expected future use for emergency access. Routes that receive high public use, provide access to areas with high public use, or provide access to or are adjacent to private property generally were rated as high (3). Routes that receive moderate public use, provide access to areas with moderate public use, or provide access to or are adjacent to sparsely populate private property generally were rated as moderate (2). Routes that receive little or no public use, provide access to areas with low public use, or do not provide access to or are adjacent to private property generally were rated as low (1). Past and expected future emergency access use levels were based on the combined professional judgment and field experience of the Districts specialists, as there was little quantitative data on actual emergency access usage on the Districts available to the specialists at the time of analysis.

APPENDIX C: WHITE RIVER NATIONAL FOREST MAP OF ROAD RISK/BENEFIT ASSESSMENT



APPENDIX D: RECOMMENDED CHANGES TO ROADS

ID	NAME	BMP	EMP	SEG_MI	ADMIN_ORG	OP_ML	RECOMMENDATION
105.3S	SELLAR PARK	0	1.97	1.97	021503	2	Establish last 0.4 miles as ML1.
105.4S	LITTLE DEADMAN	0	0.99	0.99	021503	3	Decom.
1351.1A	SLATE CREEK	0	0.7	0.7	021510	2	Establish as ML1.
1425.1	COLUMBINE RANCH	0	1	1	021510	3	Establish as ML1.
221.1	UPPER WEST MILLER	0	2.9	2.9	021502	2	Convert last 0.99 miles to foot and horse trail.
232.1	HILL CR	0	0.71	0.71	021502	2	Decom.
232.1	HILL CR	0.71	0.86	0.15	021502	2	Decom.
260.2A	PERUVIAN MINE	0	0.6	0.6	021510	2	Establish as ML1.
260.2B	HORSESHOE BASIN	0	1.1	1.1	021510	2	Establish as ML1.
270.1H		0	1.63	1.63	021508	1	Decom.
270.1K		0	0.28	0.28	021508	1	Decom.
276.1	HUNKIDORI MINE	0	2.5	2.5	021510	2	Establish as ML1.
2851.1	GREEN MOUNTAIN OVERLOOK	0	0.1	0.1	021510	2	Decom.
293.1	LOST PARK	0	0.86	0.86	021502	2	Decom.
2950.5A	WILLIAMS PEAK	0	0.05	0.05	021008	2	Establish as ML1.
2950.5A	WILLIAMS PEAK	0.05	0.37	0.32	021510	2	Establish as ML1.
2950.5A	WILLIAMS PEAK	0.37	5.3	4.93	021510	2	Establish as ML1.
2W.3A	SFTS	0	2.24	2.24	021510	1	Establish as ML1 and trail.
300.1P	PIPELINE	0	10.2	10.2	021503	2	Decom 2.94 miles west of 320.1 intersection.
354.2A	NORTH SWAN	0	2	2	021510	2	Establish as ML1 and trail.
401.1B	SHEEPHORN SALE SPUR	0	0.4	0.4	021507	1	Establish as ML1.

401.1C	SLATE CREEK	0	2	2	021507	1	Establish as ML1.
401.1D	SLATE CREEK	0	1.75	1.75	021507	1	Establish as ML1.
434.1	ROCK CREEK PARK	0	1.33	1.33	021507	1	Establish as ML1.
434.1A	ROCK PARK SPUR	0	2.2	2.2	021507	1	Establish as ML1.
441.1	THREE LICKS CREEK	0	0.76	0.76	021507	1	Establish as ML1.
45.1	LAKE HILL	0	1.8	1.8	021510	2	Establish as ML1 and trail.
45.1A	OLD DILLON RESERVOIR	0	0.53	0.53	021510	2	Establish as ML1 and trail.
45.1B	OLD DILLON RESERVOIR	0	0.6	0.6	021510	2	Establish as ML1 and trail.
451.1	SLOUGH GRASS LAKE	0	0.9	0.9	021507	1	Establish as ML1.
451.1A	SLOUGH GRASS SPUR	0	0.54	0.54	021507	1	Establish as ML1.
452.1	SLOUGH GRASS	0	0.59	0.59	021507	1	Establish as ML1.
452.1A	LONE LICK CREEK	0	0.6	0.6	021507	1	Establish as ML1.
461.1	FIRE BOX	2.87	3.54	0.67	021504	2	Decom.
700.2A	FREEMAN CREEK	0	1.2	1.2	021507	1	Establish as ML1.
700.2B	MONIGER PARK	0	0.4	0.4	021507	1	Establish as ML1.
700.2C	MONIGER	0	0.5	0.5	021507	1	Establish as ML1.
702.1	RESOLUTION	6.02	7.39	1.37	021507	3	Convert to foot and horse trail.
707.2A	TIGIWON SALE SPUR 2A	0	1.1	1.1	021507	1	Establish as ML1.
707.2B	TIGIWON SALE SPUR 2B	0	0.1	0.1	021507	1	Establish as ML1.
707.2C	TIGIWON SALE SPUR 2C	0	0.2	0.2	021507	1	Establish as ML1.
707.2D	TIGIWON SALE SPUR 2D	0	0.4	0.4	021507	1	Establish as ML1.
720.1	NORTH SANDSTONE	0	3.32	3.32	021507	1	Establish as ML1.
720.1A	N. SANDSTONE SPUR A	0	1.7	1.7	021507	1	Establish as ML1.
720.1B	N. SANDSTONE SPUR	0	0.6	0.6	021507	1	Establish as ML1.
720.1C	N. SANDSTONE SPUR	0	0.5	0.5	021507	1	Establish as ML1.

720.1H	N. SANDSTONE SPUR H	0	0.67	0.67	021507	1	Establish as ML1.
729.1	DICKSON - RED SPRING	0	1.4	1.4	021507	1	Establish as ML1.
729.1A	DICKSON SPUR	0	1.4	1.4	021507	1	Establish as ML1.
733.1	HAYMEADOW	0	2.7	2.7	021507	2	Establish as ML1 and trail.
734.1C	FREEMAN SPUR	0	1.1	1.1	021507	1	Establish as ML1.
734.1D	BALLY HOO SPUR RD	0	0.46	0.46	021507	1	Establish as ML1.
734.1E	OLD FDR 734	0	0.8	0.8	021507	1	Establish as ML1.
747.1	WEARYMAN	0	4.03	4.03	021507	2	Decom.
804.1	TRAIL GULCH	0	3.07	3.07	021508	2	Decom northern 0.44 miles.
805.1A	BLUE LAKE SPUR	0	0.22	0.22	021510	2	Establish as ML1 and trail.
808.1A		0	0.2	0.2	021508	1	Establish as ML1.
835.1	COMPLEX	0	1.41	1.41	021508	2	Decom.
835.1	COMPLEX	1.41	2.15	0.74	021508	1	Decom.
835.1B		0	0.15	0.15	021508	2	Decom.
848W.1	HOOSIER RIDGE	0	0.5	0.5	021510	2	Establish as ML1 and trail.
853W.1A	BRECKENRIDGE	0	0.4	0.4	021510	1	Establish as ML1 and trail.
951.1A	OPHIR MOUNTAIN	0	5.7	5.7	021510	1	Establish as ML1 and trail.
951.1B	OPHIR MOUNTAIN	0	0.9	0.9	021510	1	Establish as ML1 and trail.
951.1C	OPHIR MOUNTAIN	0	0.2	0.2	021510	1	Establish as ML1 and trail.
951.1D	OPHIR MOUNTAIN	0	0.9	0.9	021510	1	Establish east 0.45 miles as ML1.
953.1A	MIDDLE BARTON GULCH-WHATLEY	0	0.29	0.29	021510	2	Establish 0.222 miles west of pvt as ML1.

APPENDIX E: LIKELY NOT NEEDED ROADS

ID	NAME	BMP	EMP	SEG_MI	ADMIN_ORG	OP_ML	RECOMMENDATION
105.4S	LITTLE DEADMAN	0	0.99	0.99	021503	3	Decom.
221.1	UPPER WEST MILLER	0	2.9	2.9	021502	2	Convert last 0.99 miles to foot and horse trail.
232.1	HILL CR	0	0.71	0.71	021502	2	Decom.
232.1	HILL CR	0.71	0.86	0.15	021502	2	Decom.
270.1H		0	1.63	1.63	021508	1	Decom.
270.1K		0	0.28	0.28	021508	1	Decom.
2851.1	GREEN MOUNTAIN OVERLOOK	0	0.1	0.1	021510	2	Decom.
293.1	LOST PARK	0	0.86	0.86	021502	2	Decom.
300.1P	PIPELINE	0	10.2	10.2	021503	2	Decom 2.94 miles west of 320.1 intersection.
461.1	FIRE BOX	2.87	3.54	0.67	021504	2	Decom.
702.1	RESOLUTION	6.02	7.39	1.37	021507	3	Change to foot and horse trail.
747.1	WEARYMAN	0	4.03	4.03	021507	2	Decom.
804.1	TRAIL GULCH	0	3.07	3.07	021508	2	Decom northern 0.44 miles.
835.1	COMPLEX	0	1.41	1.41	021508	2	Decom.
835.1	COMPLEX	1.41	2.15	0.74	021508	1	Decom.
835.1B		0	0.15	0.15	021508	2	Decom.