willamette
NATIONAL FOREST

Road Investment Strategy

for the greatest good

September 2015

Table of Contents

Introduction

Roads, and the motorized access opportunities they provide, touch nearly every value that the American public has for their public lands. Whether it's hiking in the wilderness, cutting firewood, collecting mushrooms or other forest products, hauling timber to a local mill, or fishing a favorite hole, virtually every use of national forest lands, including the Willamette National Forest, requires a road at some point in the journey.

Roads are also not without impacts to the ecosystem. Scientists and managers are documenting changes that include the amount, timing and flow of water in this forest. Our winter and spring continue to be warmer and wetter with occasional intense storms. Our summers are getting hotter and drier. Some roads are designed to handle these hydrological changes, but some are not. Due to their age and our inability to do regular maintenance on all roads, the Willamette National Forest's road system will continue to see the effects of storm damage, heavy rains, and quickly growing vegetation.

This Road Investment Strategy presents an opportunity to strategically and responsibly focus public funds on repairing, protecting and maintaining the public's most important roads in the face of these changes, in order to protect continued access to those places the public values so greatly.

Specifically, this Road Investment Strategy does two things:

- Identify priorities for preserving motorized access:
    - Roads and special places that are important to the public
    - Roads and places that are important for managing the Willamette National Forest
- Identify opportunities for managing roads differently:
    - For restoring watershed health
    - To protect the public's infrastructure investment

The Road Investment Strategy will help inform and guide both short-term and long-term decisions about road management for all of the Willamette National Forest, including how to spend limited maintenance funding and what roads to target for other activities, like conversion, closure or decommissioning.

Our Intent and Values

Throughout the planning effort, our intent was to "Work together in community to identify a road investment plan that is the greatest good for people and the land."

When thinking about roads, the access they provide and impacts they have, the Willamette National Forest will strive to honor these values:

- Balance human needs and forest health
- Meet long-term needs of both the community and the land
- Uphold the tradition of abundant access to National Forests
- Recognize that the public's values and priorities are central to effective management of public land and roads
- Acknowledge that not all parties may agree
- Listen to all perspectives
- The "greatest good" changes with time

This document outlines the process the Willamette National Forest undertook to meet this intent and honor these values and the results of this planning process. This report:

- Includes a description of the existing road system and management issues related to that system,
- Outlines the public and community involvement,
- Explains the analysis process used to identify risks, opportunities and access values,
- Summarizes the results of the analysis and public involvement, and
- Finishes with the next steps and how this will be used in the future.

Public uses of roads:

- Scenic/pleasure driving
- Dispersed camping
- Hunting and fishing
- Collecting special forest products (mushrooms, tree boughs, beargrass, etc.)
- Firewood
- Mining
- Accessing recreation sites
- Mountain biking
- Equestrian use
- Accessing energy/water infrastructure
- OHV use
- Tribal use
- Skiing
- Snowmobiling
- And more…

Administrative needs for roads:

- Fire management
- Timber management
- Resource management and restoration (botany, fish, wildlife, etc.)

Existing Situation

The road system on the Willamette National Forest is vast and extensive. While initially built primarily in support of timber management, the road system is now used in support of fire management, restoration activities, and by the visiting public, in addition to continued timber management. See the sidebar for a list of many public and administrative uses for the road system.

Road System

On the Willamette National Forest, there are about 6,550 miles of roads under Forest Service management. Along with these roads, there are over 200 bridges and 60,000 culverts. The value of this system is roughly estimated to be about $1 billion.

The majority of these roads were built for timber harvest during the 1960s-1980s; during the 1970s and early 1980s, an average of over 200 miles of new road was built every year. During this same time, an average of 727 million board feet of timber was sold every year.

Since the early 1990s, there has essentially been no new permanent road construction[1], and the overall road system mileage has decreased slightly. Over the last 10 years, an average of 78 million board feet was sold every year, about 10% of what was cut annually during the 1960s-80s. Figure 1 shows the history of history of timber volume sold and total road mileage for the Willamette National Forest, since 1934.

[1] Temporary roads are often constructed to support timber harvest activities, but these are obliterated after harvest activities are completed and were never considered part of the National Forest Road System.

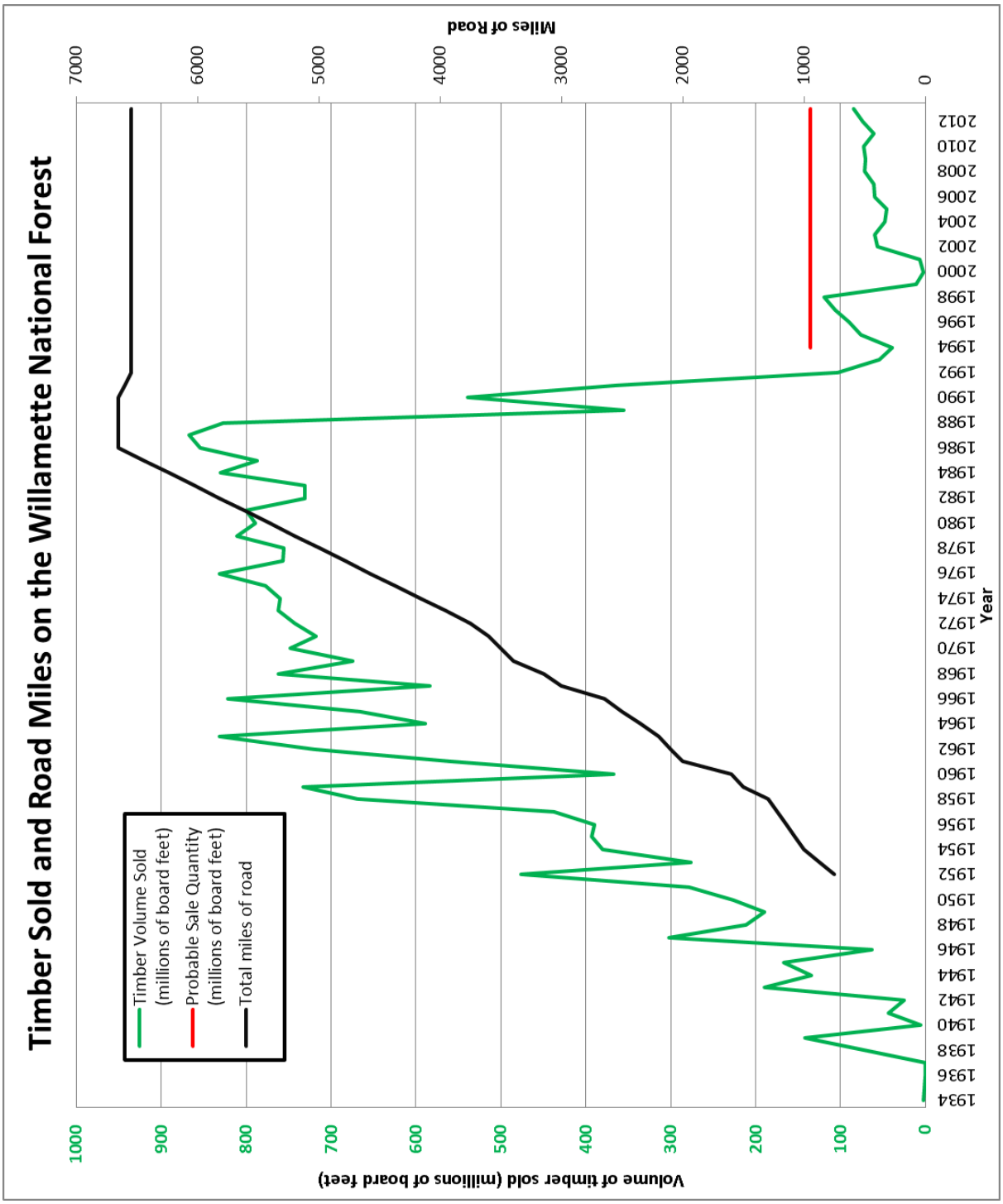

Figure 1: The history of timber volume sold and road construction on the Willamette National Forest, from 1934-2013. Probable Sale Quantity was the estimated annual timber harvest for the Willamette National Forest in the Northwest Forest Plan during the first ten years after implementation.

All Forest Service roads are designated a "maintenance level," which defines the level of service or types of use provided by a specific road and the maintenance required to maintain that level of service. Maintenance levels are from 1-5; maintenance level 5 roads provide the highest level of comfort and maintenance, and maintenance level 1 roads are closed to public and administrative use. Table 1 describes each maintenance level and includes the mileage of the current road system at each level.

Table 1: Explanation of maintenance levels 1 - 5 and the total miles at each level in the current road system

Maintenance Level	Description	Miles
5	Road is open to public and administrative use and is maintained to allow access by passenger car. Road provides a high degree of user comfort and convenience.	146
4	Road is open to public and administrative use and is maintained to allow access by passenger car. Road provides a moderate degree of user comfort and convenience at moderate travel speeds.	285
3	Road maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities.	271
2	Road is open to public and administrative use, however, it is only maintained to allow access by high clearance vehicles.	4,756
1	Road is closed to public and administrative use, but remains part of the NFS road system.	1,081

Unauthorized Roads

Due to the steep terrain and thick vegetation that make off-road travel difficult, there are very few roads on the Willamette National Forest that are not part of the official road system and that are used by the public on a regular basis. With the publication of the Motor Vehicle Use Maps (MVUMs), motorized use of unauthorized routes is prohibited. For these reasons, unauthorized roads are not included in this analysis.

Management Direction

Management direction for the development of a travel analysis plan, including the Travel Management Rule, Forest Service Washington Office and Regional Office guidance, and the Willamette Land and Resource Management Plan, is included in Appendix 1.

Financial Analysis

The interdisciplinary team (IDT) for this project conducted a financial analysis of the existing road system, identifying:

- The average road maintenance budget from 2008-2012
- The estimated cost to maintain the existing road system to standard
- Estimated maintenance cost of each road segment

Road Maintenance Budget

The Willamette National Forest received funding for road maintenance from three primary sources during the analysis period of 2008-2012: Congressionally appropriated funding, timber sale purchasers, and Title II Secure Rural Schools Act. Road maintenance includes regular maintenance tasks, including brushing, blading, pavement maintenance, signage, and other tasks. See Appendix 2 for a full list. Road maintenance does not include major improvement projects, such as culvert and bridge replacements and re-surfacing.

During the analysis period, the average funding level for road maintenance per year was $1,481,000, with a range from $1.8 million to $1.1 million, with an overall decreasing trend. Both congressionally appropriated funding and Title II funding from Secure Rural Schools Act decreased from 2008 to 2012. Table 2 shows the average funding amount for each source.

Table 2: Sources of road maintenance funding and the average funding levels from 2008-2012

Funding Source	Funding amount	Percent of budget
Congressionally appropriated funding	$380,000	26%
Timber purchasers	$545,000	37%
Secure Rural Schools Act, Title II	$556,000	38%
Total	$1,481,000	100%

The analysis did not include any maintenance that occurs in support of wildfire suppression efforts. Depending on the size and scale of a wildfire, the incident management team may have tens to hundreds of miles of roads brushed, bladed, and maintained in support of the firefighting effort, to ensure firefighter and public safety and sometimes to act as fire control lines. However, because these efforts are localized to the area surrounding the wildfire and are impossible to predict from year to year, this analysis did not include these efforts.

Maintaining the Existing Road System

To estimate the funding needed to maintain the existing road system to standards outlined in Forest Service Handbook (FSH) 7709, the IDT assigned each road segment a maintenance cost. The cost was based on the maintenance level of the road, and also the maintenance need (high, medium, low). The maintenance need was determined by the road's position (ridgetop, mid-slope, valley bottom), surface type, and functional classification (arterial, collector, local). Appendix 2 has a full description of the assumptions used to determine maintenance costs.

In 2012, costs were determined using the existing road maintenance contract to determine costs for each type of maintenance activity. The maintenance level and maintenance need determined the frequency of each activity, which in turn determined the annual road maintenance cost. The costs ranged from $8,035 per mile for maintenance level 5 roads, with a high maintenance need, to a low of $4 per mile for a maintenance level 1 road, with a low maintenance need. The annual cost to maintain the existing road system is an estimated $5,864,000. Table 3 shows the total costs of annual road maintenance by maintenance level.

Table 3: Estimated annual maintenance cost of the existing road system, by maintenance level.

Operational Maintenance Level	Miles	Total cost
5	146	$1,110,467
4	285	$1,216,698
3	271	$455,381
2	4,756	$3,073,983
1	1,081	$7,455
Total	6,539	$5,863,983

Threats to the Current Road System

With the maintenance budget shortfall, there are on-going threats to roads and the public and administrative access they provide. The highly productive lands of the Willamette National Forest are excellent for growing trees and for growing brush and other vegetation that encroaches upon roads. Without regular brushing, roads can become impassable as vegetation and trees grow in from the sides and from the middle of the road bed (see Figure 2). Vegetation can also impact paved roads, again by narrowing the driving lane and by affecting the pavement itself (Figure 2).

Without regular maintenance, roads can also be at risk from the effects of water. Erosion of the road bed, clogged ditches and culverts, and slope failures above or below roads can all adversely affect roads, including making them inaccessible (Figure 3). Regular maintenance, which includes clearing of ditches and drainage structures, helps avoid these impacts.

Figure 2: Examples of vegetation affecting roads, including vegetation encroaching from the sides and in the middle of the road way

Figure 3: Examples of how water can affect roads, including a slope failure (left) and erosion of the road bed (right)

Public Involvement

There is an important and inter-dependent relationship between people, water and roads in the Willamette National Forest. Over the next decade, there is an unprecedented opportunity to thoughtfully maintain access to important places while improving economic and natural conditions in key watersheds. Located in the Pacific-Northwest along the wetter west side of the Cascade Mountains, the Willamette National Forest acts like a big sponge, alternately absorbing and releasing water into thousands of miles of streams and acres of ponds, wetlands, lakes, and reservoirs. People rely heavily on both water and constructed roads for access to their favorite places for work, gathering and recreation. Most of the places people want to go involve traveling along creeks, streams, lakes and reservoirs and in watersheds that also supply irrigation and drinking water to cities and communities further downstream. Roads and their ditches and culverts can act like man-made creeks by extending and channeling water into these natural water courses.

Because roads are so critically important to the public, the WNF decided to engage in a robust public and community involvement effort for its Road Investment Strategy. This plan included three primary facets, each described in more detail below:

1. Engage local, county, state, federal and tribal governments by convening a Transportation Stakeholder Team
2. Reach out to local constituent groups by bringing presentations to organizations' meetings
3. Engage local communities and the public that uses WNF roads, both in person and online

Transportation Stakeholder Team

The WNF wanted to learn from the experience of other governments and agencies during the early stages of road investment planning and to develop a public outreach plan for this effort. To do this, the WNF convened a Transportation Stakeholder Team, consisting of representatives from local, county, state, federal and tribal governments and agencies. The WNF had two goals for the Transportation Stakeholder Team:

1. Share ideas and suggestions on how to analyze the access values and resource risks of the road system
2. Solicit ideas and suggestions on how to engage and talk to the public about road investment planning

Table 4 lists all of the governments and agencies that were invited to participate on the Transportation Stakeholder Team. Between fall 2012 and spring 2014, the team met a total of six times, and all meetings were facilitated by Dr. Gregg Walker. Meeting participation (not including Forest Service employees) varied from a high of 12 people to a low of four.

Table 4: Governments invited to join the Transportation Stakeholder Team

Government/Agency	Who Invited	Participated?
City Government	City of Oakridge	
	City of Sweet Home,	Yes
	City of Detroit	Yes
County Commissioners and Sheriffs	Lane County	Yes – County Commissioner
	Linn County	Yes – County Commissioner
	Marion County	Yes – County Sheriff
State Agencies	Oregon Department of Fish and Wildlife	Yes
	Oregon Department of Forestry	Yes
	Oregon Department of Environmental Quality	Yes
Federal Agencies	Environmental Protection Agency	Yes
	Bureau of Land Management – Salem District	Yes
	Bureau of Land Management – Eugene District	Yes
	U.S. Fish and Wildlife Service	
	U.S. Army Corps of Engineers	
	National Marine Fisheries Service	Yes
Tribes	Grand Ronde	Yes
	Siletz	
	Warm Springs	Yes

Results

The ideas, discussions and suggestions from the Transportation Stakeholder Team had a significant impact on the WNF's road investment planning effort; it was partially a result of this team's discussions that led to the framing of this project as a Road Investment Plan. In addition, the team's input was incorporated into the analysis of resource risks and access values and the two phases of public and community engagement effort, which are outlined below.

Phase I: Outreach to Constituent Groups

The first phase of public and community engagement was focused on reaching out to local groups with connections to the WNF and that might be interested in or affected by road management changes. This first phase of outreach was targeted at these groups for two reasons:

1. The meetings had built-in constituency and member participation
2. Provide opportunities for open and honest dialogue about road management and access issues, where participants had many shared values and priorities.

There were also two primary goals for these meetings:

1. Broadly increase the education and awareness of existing and future road management issues on the WNF
2. Provide opportunities to solicit suggestions, feedback, and ideas about Road Investment Planning

Table 5: Organizations that hosted a Roads Investment Planning presentation

Date	Group	Participants
11/5/2013	Linn Forest Protective Association	23
11/6/2013	Middle Fork Willamette Watershed Council Board of Directors	12
11/13/2013	Oregon Hunters Association, Eugene Chapter	25
11/15/2013	East Lane Forest Protective Association	20
11/26/2013	Environmental Advocacy Groups – Oregon Wild, Cascadia Wildlands, Great Old Broads for Wilderness, Sierra Club, WildEarth Guardians (formerly Wildlands CPR)	8
12/17/2013	Obsidian Hiking Group	18
1/18/2014	Detroit Lake Recreation Area Business Association	15
1/21/2013	Emerald Trail Riders	30
2/5/2014	Backcountry Horsemen of Oregon, Salem Chapter	18
2/10/2014	Disciples of Dirt	13
2/12/2014	Backcountry Horsemen of Oregon, Eugene Chapter	25
2/13/2014	North Santiam Watershed Council	17
2/18/2014	South Santiam Watershed Council	8
2/18/2014	Society of American Foresters, Eugene Chapter	21
2/25/2014	Oregon Hunters Association - Capitol Chapter, Salem	22
3/6/2014	Oregon Equestrian Trails, Eugene Chapter	25
3/12/2014	Oregon Equestrian Trails, Mid Valley Chapter, Albany	25
3/17/2014	Oakridge/Westfir Chamber of Commerce	14
4/3/2014	Salem Jeepers	43
4/7/2014	GOATS (Greater Oakridge Area Trail Stewards)	15
4/10/2014	McKenzie River Watershed Council	23
	Detroit Lake Federal Lake Committee	10
11/7/2014	American Forest Resources Council	
11/20/2014	Native Plant Society	

The WNF reached out to wide array of different types of groups, including watershed councils, hunting and fishing groups, user groups (hiking, mountain biking, OHV/motorized recreation, and equestrian), timber industry, chambers of commerce, environmental advocacy and local business groups. Table 5 lists the groups that hosted a Roads Investment Planning presentation by a member of the IDT and the number of people in attendance.

Through these meetings, the WNF interacted with more than 450 individuals associated with 24 different groups. The typical meeting included a presentation about roads on the Willamette National Forest, including the history of road development, details about the current road system, challenges with managing the current system, and an outline of the Road Investment Planning process, and future opportunities for community and public engagement. Depending on the group, there was usually 15-30 minutes of questions and discussion following the presentation. Meeting participants were also given the opportunity to provide written comment and to sign up for future communication about the roads planning process.

Phase II: Public Meetings

Following the extensive outreach effort to organized groups and other agencies, the WNF hosted six meetings to provide the general public with the opportunity to learn about road management issues and provide feedback and comments to the Road Investment Planning effort. These meetings were similar in organization to Phase I meetings, except participants were also given an opportunity to participate in a mapping exercise. This entailed large maps laid out with the invitation to visitors to draw right on the map, circling areas of the WNF that were important to them, and then filling out comment cards where they could explain why these areas were important to them, what they liked to do in these areas, and what we should consider as we make long-term road management recommendations in these areas.

Table 6 shows where the meetings were held and the number of participants at each meeting; in total, there were 112 meeting attendees. The press releases for these meetings also generated interest in the local media, with stories, some of them substantial, in the (Santiam) Canyon Weekly, McKenzie River Reflections, Salem Statesman Journal, and Eugene Register-Guard newspapers.

Table 6: Public meeting locations and number of participants

Date	Where	Participants
9/6/2014	Detroit	11
9/23/2014	Sweet Home	15
9/24/2014	Gates	15
10/7/2014	Oakridge	35
10/15/2014	McKenzie Bridge	6
10/29/2014	Springfield	30

Online Mapping

In addition to being able to provide comments in person by attending a meeting, the WNF tried a new approach to soliciting comments by using a new online mapping and comment tool. The goal with this effort was to encourage comments tied to specific places within the WNF, encouraging people to begin to articulate the values they have for the landscape, what they enjoy doing in these areas, and how the WNF should manage roads in these areas.

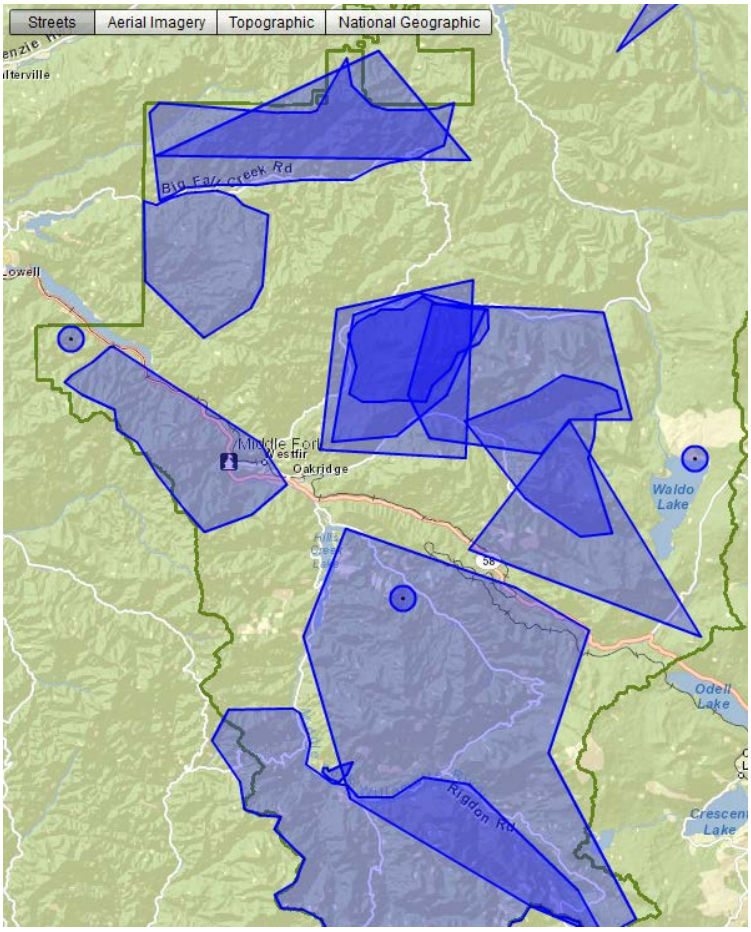

Figure 4: Screen shot of the online mapping and commenting tool

The online mapping and commenting tool was available to anyone with internet access and allowed people to draw right on the digital map, using points, lines or polygons; after making a mark on the map, people were prompted to provide a comment attached to their drawing. Figure 4 is a small area of the forest and shows what the map looks like, with spatial comments visible. As of July 23, 2015, the map and the public comments are still online and available for viewing (but not commenting) at https://my.usgs.gov/ppgis/studio/launch/11943.

The tool piqued the public interest and garnered public involvement and comments. Over 1,000 people clicked the link to the website, and there were 107 comments submitted. That said, a number of people found the tool slow and clunky to use, which likely discouraged many from going from clicking the link to actually leaving a comment.

Results of Public Involvement

Between Phases I and II of public and community outreach and the online mapping tool, over 650 people participated in discussions about Road Investment Planning on the Willamette National Forest and had the opportunity to share their ideas, values, and perspectives that they want considered as the WNF makes road management decisions. While participants ranged across all spectrums of uses and ideologies, there were many consistent themes to the comments, questions and discussions during these meetings and in the comments submitted by participants, summarized below:

- Timber:
  - Why don't you cut more timber to pay for the roads?
  - How do you decide how much timber to cut each year?
  - Do you take advantage of timber sales to take care of roads?
- Closing roads:
  - Why do you spend money on closing roads, why don't you use that money to maintain them?
  - How is closing roads protecting the public's infrastructure investment?
  - Is there a target level or percent for closing roads?
- Funding/budgets:
  - Are you looking for more pots of funding for road maintenance?
- Recreation:
  - Do you use recreation fees for maintaining roads, and if not, why not?
  - Will you be converting roads to trails?
- Fire
  - Are you keeping roads open for fighting fires?
  - How do you use firefighting efforts to take care of roads?
- Planning effort
  - What is the final product going to look like?
  - Does this effort even matter, considering the budget situation?

Future Public Engagement

A mantra of this effort is "Road Management is Forever!" As long as there are roads on the landscape, the WNF will be managing them and public will be interested in the access they provide. The Forest Service's Washington Office's deadline for completing a forest-wide travel analysis is September 30, 2015. This Road Investment Strategy will be submitted by that date, fulfilling Washington Office expectations, and it will be used to inform future NEPA decisions at various scales, that will identify a road system that meets Subpart A of the Travel Management Rule. It also is designed to be a living strategy that evolves with changing conditions, including budget, ecological and landscape, public and political changes.

The public will continue to be engaged in road management decisions on the Willamette National Forest into the future. During the fall and winter of 2015, the public will be given an opportunity to review the Road Investment Strategy that the WNF submitted to the Washington Office and provide additional feedback and comments.

Because this Road Investment Strategy is not a formal decision document, the public will also have the opportunity to provide input and comment on road management decisions during future project-level NEPA analysis that include decisions about roads and public access.

Analysis Process

Relying on both the expertise of the interdisciplinary team (IDT) and the feedback from the public and community outreach, the long list of road management issues was narrowed down to eight key issues:

- Recreation access, including campgrounds, day use areas, hiking opportunities, and motorized recreation trails (ATVs, motorbikes, and other off-highway vehicles)
- Access for timber management
- Fire management access
- Water quality and fish habitat
- Impacts to threatened, endangered, and sensitive wildlife and botanical species
- Spread of invasive weeds
- Impacts to archeological and historic sites
- Financial ability to maintain road system

The IDT determined coarse level analysis tools to conduct an initial evaluation of all Willamette National Forest roads, using these key issues as guidance. Separated into "Access Values" and "Resource Risks", the eight analysis areas are outlined below, describing the criteria used to evaluate each road.

Access Values

The IDT identified four broad areas where it would analyze the access values of each road:

- Recreation and public access,
- Vegetation management,
- Fire management, and
- Archeological and Cultural Resources.

For each of these access values, the IDT developed a set of criteria, primarily GIS-based, that were used to evaluate every road segment and assign, or rank, how important, a segment is for access, as it relates to that particular value. Road segments were ranked with a value between 1 and 5. Roads with an access ranking of 5 are most important for access, and an access ranking of 1 is least important. Additionally, each access value also identified roads that were critical to sustaining that value and therefore should remain open to public and administrative use and should not be considered for closure; roads with this designation were identified as "Priority Roads" in this analysis.

Recreation and Public Access

Virtually all recreation opportunities on the Willamette National Forest are accessed through the use of roads, and in some cases, the roads themselves are used for recreation. Recreation and public access includes many activities: driving for pleasure, hiking and backpacking, picnicking, camping (both at developed sites and in dispersed, general forest sites), mountain and road biking, off-highway vehicle use, cabin and lookout rentals, equestrian use, access to sites under special use permits (including camps, recreation events, communication towers, powerlines, etc.), collection of firewood, mushrooms and other special forest products, and much more.

It was not possible to evaluate all possible recreation and public access uses in this analysis but the criteria were created to capture the most common and broadest uses. The analysis started with identifying priority roads, using the categories outlined in Table 7. Each road segment was also ranked 1 to 5, and the metrics for these rankings are in Table 8.

Table 7: Description of recreation and public access priority roads

Priority Road description	Miles
Access to recreation fee sites (campgrounds, highly developed trailheads, rental cabins/lookouts)	224
Access to free highly developed recreation sites	111
Roads within a designated OHV area	167
Designated Scenic Byways (National, Forest Service, Backcountry)	69
Access to site(s) under special use permit	124

Table 8: Recreation and Public Access Value ranking and metrics

Access Value	Metric	Miles
5 (highest need for access)	Developed recreation sites (not included in "Priority Road" criteria) Trailheads that provide access to designated wilderness areas	432
4	Access to non-wilderness trailheads Popular dispersed camping corridors Administrative access to recreation sites	1132
3	"Other" recreation sites Dispersed camping areas* Hunting, fishing & rafting *	40
2	Loop roads*	103
1 (lowest need for access)	None of the Above	4188

* To be determined at during site-specific NEPA analysis

Vegetation Management

The Willamette National Forest is consistently one of the highest timber producing National Forests across the country, and road access is critical to on-going timber management and ecological restoration. Additionally, a significant portion of the road maintenance on national forest roads that occurs every year is supported by timber, either directly by the timber purchasers, or by funds from timber receipts. The roads deemed critical to supporting these efforts were labeled "Priority Roads" and are outlined in Table 9.

Table 9: Priority Roads important to vegetation management access value

Priority Road description	Miles
Access to seed orchards	28
Paved roads	211

After identifying "Priority Roads," the remaining road segments were ranked to determine their importance to the vegetation management access value. To determine each road segment's value for on-going timber management, the metric used four variables:

- Age of forested stands along roads (0-40 years old, 40-80 years old, 80-120 years old, over 120 years old), in management area allocations allowing timber harvest
- Stands within planning areas proposed for analysis on the Five Year Action Plan
- Road quality, as indicated by the number of digits in a road's name;
    - Four digit roads tend to be collector and arterial roads,
    - Seven digit roads tend to be "local" roads and spurs
- Number of spurs/entrances on a road segment

Each ranking used different criteria within each variable, outlined in Table 10.

Table 10: Analysis matrix for the vegetation management access value rankings

Access Value	Description	Miles
5 (highest need for access)	"Four digit" roads that access 40-80 year old stands "Seven digit" roads that access 40-80 year old stands in planning areas, with 3 or more entrances	2452
4	"Seven digit" roads that access 40-80 year old stands in planning areas, with 1-2 entrances "Seven digit" roads that access 0-40 year old stands in planning areas, with 3 or more spurs/entrances "Four digit" roads that access 0-40 year old stands	743
3	"Seven digit" roads that access 40-80 year old stands not in planning areas "Seven digit" roads that access 0-40 year old stands in planning areas, with 1-2 spurs/entrances "Seven digit" roads that access 80-120 year old stands in planning areas, with 3 or more spurs/entrances "Four digit" roads that access 80-120 year old stands	1859
2	"Seven digit" roads that access 0-40 year old stands not in planning areas "Seven digit" roads that access 80-120 year old stands in planning areas, with 1-2 spurs/entrances	932
1 (lowest need for access)	"Seven digit" roads that access 80-120 year old stands not in planning areas Roads that access stands over 120 years old	371

Fire Management

Roads can be a critical tool to fighting and managing wildfires. Roads provide access for firefighters, engines and other resources. Generally speaking, the closer a fire is to a road, especially during initial attack, the easier it is to get the fire under control. Roads also provide access to water sources (usually lakes, rivers or creeks), viewpoints, helicopter landing areas, and escape and/or safety zones. On bigger fires, roads are often used as fire control and containment lines, or used as a place to initiate back burns. Table 11 outlines the metrics used to determine the fire management access value rankings.

Table 11: Analysis matrix for fire management access value rankings

Access Value Ranking	Description	Miles
5 (highest need for access)	Roads that lead to, border/surround, and are within wildland-urban interface (WUI) areas, private timberlands and other private lands	986
4	Roads that lead to designated helispots, water sources, vistas and vantage points	928
3	Roads that lead to and border/surround Inventoried Roadless Areas, Long-term research projects and other designated high priority areas that require fire protection	3530
2	Ridge top roads and roads that run north and south that can be used as fire breaks during east wind event fires	1154
1 (lowest need for access)	Roads to limited access areas	

Archeological, Historic, and Cultural Resources

Archeological and cultural resources include a diverse array of cultural sites, structures, features and artifacts related to past cultural activities often with distinct management considerations and needs. Federal agencies are charged with preserving historic values and protecting those resources that are determined to be historically or culturally significant as defined under the National Historic Preservation Act of 1966, as amended (NHPA). Roads, and the access they provide, can be both beneficial and harmful to archeological and cultural resources. The negative impacts of roads on archeological and cultural resources are discussed in the Risks section of this analysis.

There are three areas where roads are beneficial to archeological and cultural resources:

- Access for maintenance of historic properties;
- Access for the interpretation and public use of historic properties;
- Road access for traditional cultural purposes.

Table 12 shows the how roads were evaluated to determine their access value to archeological and cultural resources, reflecting the priorities listed above. Not all of the values were readily identified or available in GIS. What that means is in future, site specific roads analysis projects, the IDT will identify these additional features that have an access value and incorporate into their road management discussions.

Table 12: Analysis matrix for archeological and cultural resource access values

Access Value	Metric	Notes
5 (highest need for access)	Roads that provide access to actively managed or utilized historic sites and structures, priority heritage assets, and multiple use assets	63 miles
4	Roads that provide access to interpretive sites at historic properties	Data not available in GIS; to be determined on a case-by-case basis
3	Some historic linear features that coincide with the modern road system	To be determined on a case-by-case basis; not differentiated in GIS
2	Continued use of surfaced roads	Roads that have not been determined to have higher value for protecting, interpreting, or otherwise managing heritage resources
1 (lowest need for access)	Some historic properties (including archaeological sites) are better served by minimizing access via the forest road system.	6534 miles

Risks

The IDT identified four resource areas where it would analyze the risks of each road:

- Aquatics: hydrology and fisheries
- Wildlife
- Plants and invasive weeds
- Archeological and Cultural Resources.

Each of these resource areas developed a set of criteria, primarily GIS-based, that were used to evaluate every road segment and assign, or rank, the level of risk that particular road segment presents to the resource area. Road segments were ranked with a risk from 1 to 5. Roads with a risk ranking of 5 present the highest risk to that resource, and a risk ranking of 1 presents little to no risk.

Aquatics: Hydrology and Fisheries

The hydrology of an area and local fisheries can all be affected by where a road is located, whether and how a road is maintained, and on-going use of a road. To analyze the effects of roads on aquatic systems, the hydrologist and fisheries biologist on the IDT developed a metric to determine risk rankings that looked at both chronic and acute sources of impacts.

Acute sources:

- Soil instability: percent of road length in high instability categories in the Willamette National Forest Soil Resource Inventory (SRIs)
- Road position: percent of road length located mid-slope along hillsides with over 70% gradient
- Stream crossing density: number of stream crossings per mile of road

Chronic sources:

- Fine sediment potential: percent of road miles in three categories based on road surfacing (pavement, gravel, dirt) and proximity to stream crossings
- Riparian proximity: percent of road miles within 170 feet of perennially flowing (Class 1-3) streams
- Proximity to anadromous fish and municipal water sources: percent of road miles within 500 feet of streams that have threatened or endangered fish, and/or contribute to a municipal watershed (Class 1 streams)
- Proximity to non-anadromous fish: percent of road miles within 500 feet of streams with management indicator species (Class 2 streams)

Each of these potential impact sources was given a range of values, reflecting the potential severity of impacts to aquatic systems. For each road segment, the values of each impact source were summed, creating an overall aquatic risk value. To turn the overall aquatic risk value into a risk ranking, the distribution of risk values was separated between the risk rankings of 1 to 5 using a bell curve. Table 13 shows the number of miles of each risk ranking.

Table 13: Mileages of aquatic rank rankings

Risk Ranking	Miles
5 (highest risk)	537
4	1528
3	2237
2	1373
1 (lowest risk)	922

Wildlife

Roads can affect wildlife is multiple ways. For this analysis, the most important issues resulting from roads that affect wildlife are:

- Roads that might disturb nesting peregrine falcons and bald eagles
- Open road densities that exceed management thresholds in Late Successional Reserves
- Open road densities that exceed management thresholds in Big Game Emphasis Areas
- Roads in spotted owl nest cores, small late successional reserves, and pileated woodpecker, bald eagle, and marten management areas

The description of the risk ranking criteria is in Table 14.

Table 14: Wildlife risk ranking criteria

Risk ranking	Metric description	Miles
5 (highest risk)	Bald Eagle and Peregrine Falcon nest sites Late Successional Reserves (LSRs) where open road density exceeds >2 miles/mi^2 Big Game Emphasis Areas – where road density is 50% higher than guidance	667
4	Big Game Emphasis Areas – where road density is 10-49% higher than guidance	547
3	Big Game Emphasis Areas – where road density is 1-9% higher than guidance Small LSRs and spotted owl activity centers Large LSRs, Pileated Woodpecker and Marten areas	1090
2	Secondary peregrine falcon nest zones	312
1 (lowest risk)	No issues	3981

Botany

Roads can have an adverse effect on botanical resources. Roads open up the forest canopy and change the habitat of and offer easy access species listed on the federal threatened and endangered list and species on the Northwest Forest Plan's survey and manage list. Road maintenance is a large factor contributing to the spread of invasive weed species along these corridors. Roads built through meadows and wetlands changed the hydrological character of sites and make it easier for off-highway vehicles to be able to access these open areas, which can be tempting for some drivers. Table 15 outlines the criteria used for each risk ranking.

Table 15: Botany risk ranking criteria

Risk ranking	Metric description	Miles
5 (highest risk)	Roads intersect with buffered threatened, endangered, or survey and manage botanical species	106
4	Roads that intersect with special habitats	1188
3	Roads that intersect with known invasive weed locations	996
2	Potential for weeds along identified log haul corridors	1469
1 (lowest risk)	No known issues	2838

Archeological, Historic, and Cultural Resources

Roads can have an adverse effect on heritage resources. Archaeological sites have been inadvertently affected to various degrees (i.e., exposed, disturbed, damaged, destroyed) though road construction activities. Beyond the disturbance related to initial road construction, road maintenance and reconstruction are a continuing threat to the integrity of these sites; archaeological deposits exposed though these activities are at continued risk of looting and

vandalism. Roads built to or through archaeological sites and other historic properties can alter the character of these sites and may provide access for off-road vehicles which can further degrade sites, or may increase the probability of vandalism and inappropriate use, especially at historic structures.

Historic linear features include early transportation and travel routes, such as wagon roads, railroads, and trails, and often coincide with the current road system as they often represent the most favorable routes of travel. The historic integrity of linear features can be adversely affected by the road system in some of the same ways as previously described for effects to archaeological sites. When the modern road system utilizes these older existing routes, the historic features may be affected to various degrees (i.e., exposed, disturbed, damaged, destroyed) through road building activities depending on the scale of the road construction. Table 16 has the description and mileage of each risk ranking.

Table 16: Description of heritage resource risk rankings

Risk ranking	Metric description	Miles
5 (highest risk)	Un-surfaced roads that intersect or provide access to (within 100 feet) recorded archaeological sites (includes isolates) Road segments that overlay or are parallel to historic transportation routes (linear features)	236
4	All roads that provide access (within 1000 feet) to historic structures that are not actively managed or occupied.	275
3	Roads that coincide with or intersect historic linear features, transportation routes	98
2	Continued use & maintenance of surfaced roads which intersect or access archaeological sites.	
1 (lowest risk)	Roads that do not provide access to historic properties or archaeological sites.	5987

The Road Investment Plan

The Road Investment Plan identifies both short-term and long-term road management priorities. Short-term priorities will be used to inform decisions about how to use the limited maintenance funding available to the Willamette National Forest. Long-term priorities are recommendations for how roads should be managed into the future, including whether they are needed for on-going public and/or administrative access, or whether they can be closed, decommissioned or used in another way.

Short-term Road Management Priorities

In order to preserve access on the roads and to the places that are important to the public and to the Forest Service, the Road Investment Plan identifies priorities for use of the limited maintenance funding. Maintenance priorities are determined by both the aquatic risk as well as the continued public and/or administrative access needs of each road. Table 17 outlines the process used to determine the priority of each road segment, as well as the total mileage in each level of priority.

Table 17: Maintenance priority mileages

Priority	Aquatic Ranking	Access	Miles
1	4 or 5	Priority Roads	257
2	5	Any access value of 5	288
3	4	Any access value of 5	712
4	1-3	Remaining Priority Roads	483
5	4 or 5	Any access value of 4	225
6	1-3	Remaining access values 4-5	2,132
7	4 or 5	Any access values 1-3	583
8	1-3	Any access values 1-3	1,916

These maintenance priorities will be only one element under consideration when the annual road maintenance plan is developed at each ranger district. Other considerations that may be incorporated into the maintenance plan include health and safety issues for the public, contractors and permittees, and employees; access needs not identified in through this process, such as fire or timber management, critical maintenance needs as a result of a road failure, or other unforeseen circumstance.

Long-term Road Management Recommendations

The IDT developed seven possible long-term road management recommendations that could be assigned to each segment, which are outlined in Table 18. To determine which recommendation should be assigned to each road segment, the IDT developed an algorithm using the "Access Values" and "Risk Rankings." The algorithm compared the risks and values and existing operational maintenance level of each road segment to identify an initial road management recommendation for each road segment.

The initial recommendations were then evaluated by additional WNF employees with local knowledge, and where necessary, were revised to reflect the expertise and experience of the group. Public and community engagement feedback was incorporated and used to further revise the recommendations. The final results of the analysis and revisions are included in Table 19.

In addition to the potential road management recommendations included in Table 18, there are other possibilities for managing roads over the long-term that could also yield budget savings, while still meeting public and administrative access needs. These recommendations were not included in the algorithm and would be made during the site-specific NEPA analysis discussions.

Conversion to trails: in some limited cases, existing roads could be converted to motorized or non-motorized trails. The trail maintenance budget has had the same downward trend as the road maintenance budget, but in cases where volunteers, user groups, or other stakeholders are committed to on-going maintenance support, the Willamette National Forest may consider making these changes. Motorized trails may also become eligible for grants that support OHV opportunities.

Table 18: Descriptions of the different long-term road management recommendations

Road Management Recommendations	Description
Remain Closed	Roads are already closed to public use and would remain closed to public use.
Analyze for Closure	The resource risk from these roads potentially outweighs the current access value, but the road may be needed for administrative use in the future. The road should be analyzed for closure to public and administrative use until needed again.
Analyze for Decommissioning	The resource risk from these roads potentially outweighs the access value and the road is very unlikely to be needed for administrative use in the future.
Defer Recommendation	Roads have competing resource risks and access values and a determination about long-term public and administrative access would be made during project level analysis after resource specialists have evaluated and verified the resource risks and access values.
Cost share/easement	Roads may have either a cost share agreement or an easement with a private party, ensuring continued access. These roads would remain open.
Remain Open	Roads are currently open to public use and would remain open; access values potentially outweigh resource risks.
Priority Roads	Roads that are very important to administrative and public use and would remain open.

Change the maintenance level: another option to reduce maintenance costs is to reduce the operational maintenance level of roads. While not always feasible due to road design or condition (it's very expensive to unpave a paved road), reducing the maintenance level can have significant savings. For example, reducing a road from maintenance level 3 to maintenance level 2 could potentially save almost $1,500 per mile annually.

Table 19: Long-term road management recommendations

Road Management Recommendations	Miles
Remain Closed*	853
Analyze for Closure	750
Analyze for Decommissioning	796
Defer Recommendation	515
Cost share/easement	850
Remain Open	2,092
Priority Roads	740

*The mileage for "Remain Closed" is less than the current mileage for Maintenance Level 1 because some ML1 roads are proposed to be analyzed for decommissioning

Summary

The long-term road management recommendations developed through this process are only recommendations, not decisions. Before any roads are closed, decommissioned, or changed in any other way that affects public access, there will be additional, site-specific NEPA analysis by Forest Service specialists and opportunities for the public, partners, and other stakeholders to share their perspectives.

That said, the recommendations do propose a smaller, more sustainable road system than what currently exists on the landscape. The analysis identified almost 800 miles of road that are unlikely to be needed for future management, do not provide significant public access and could be analyzed for decommissioning. The analysis identified another 750 miles of road that are currently open to public and administrative use but could be analyzed for closure. Combined with the 850 miles of road proposed to remain closed, the Willamette National Forest open road system would change from about 5,450 miles to about 4,200 miles (about 23% smaller).

The reduction in open road mileage would also reduce the annual maintenance needs. Instead of $5,864,000 that is needed to maintain the current system, the new annual maintenance cost would be approximately $5,240,000 – a reduction of $624,000. This reduction in annual maintenance costs is notable; however, the remaining annual maintenance budget need is still significantly higher than the amount available (average of $1,481,000 – see Table 2). The proposed recommendations are an important step toward a more sustainable road system, yet even this step is largely insurmountable at this time. There is not the funding available to make such large scale changes to the road system. Despite this barrier, the Willamette National Forest will continue to address roads with the highest risks to aquatic and other natural resources as funding is available.

Next Steps

The Road Investment Strategy is not a formal decision-making document, and the long-term road management recommendations are just that, recommendations. In virtually every instance where the Forest Service permanently closes a road to public access, the effects of the closure(s) would be analyzed and the public would have a chance to review this analysis and provide comment and share their perspective; this is the typical NEPA (National Environmental Policy Act) process.

The recommendations included in this Road Investment Strategy will play a critical role in helping inform any NEPA process that includes road management. As the Willamette National Forest does project level NEPA analysis, whether associated with timber and vegetation management, fuels reduction, or road management, the interdisciplinary teams will often also evaluate the road system in the project area. During the analysis process, the IDT and the decision maker will use the long-term road management recommendations and all of the associated data collected throughout this process (access values, resource risks, public comments, maintenance costs) as part of their discussions. One role of the IDT will be to verify the analysis that led the recommendation, since much of the analysis was GIS based and therefore only as good as the data. Additionally, the road information will prompt the IDT to look into whether there are potential easement or cost share issues with a road, and whether a road may provide access to a mining site.

By making it easy for the IDT to analyze and discuss existing ecological, financial and social data about each road, the IDT and the deciding official will have a more robust interdisciplinary discussion. This holistic information may also be shared with the public throughout the analysis process so they can also understand the often competing issues surrounding each road.

Because there is another analysis process before any actual decisions are made about the long-term management of a road, the final decision may differ from the recommendations developed as part of the Road Investment Strategy. This may include keeping roads open that were identified “Analyze for Closure” and it may include closing roads identified to remain open to the public.

Appendix 1: Management Direction

Travel Management Rule

Forest Service regulations at 36 CFR 212.5(b)(1) require the Forest Service to

> "…identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands. In determining the minimum road system, the responsible official must incorporate a science-based roads analysis at the appropriate scale and, to the degree practicable, involve a broad spectrum of interested and affected citizens, other state and federal agencies, and tribal governments. The minimum system is the road system determined to be needed to meet resource and other management objectives adopted in the relevant land and resource management plan (36 CFR part 219), to meet applicable statutory and regulatory requirements, to reflect long-term funding expectations, to ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance."

Forest Service regulations at 36 CFR 212.5(b)(2) require the Forest Service to:

> "…review the road system on each National Forest and Grassland and identify the roads on lands under Forest Service jurisdiction 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. Decommissioning roads involves restoring roads to a more natural state. … Forest officials should give priority to decommissioning those unneeded roads that pose the greatest risk to public safety or to environmental degradation."

Washington Office Guidance

From the March 29, 2012 letter from the Washington Office and Chief Thomas Tidwell:

> Travel analysis requires a process that is dynamic, interdisciplinary, and integrated with all resource areas. With this letter, I am directing the use of the travel analysis process (TAP) described in Forest Service Manual 7712 and Forest Service Handbook (FSH) 7709.55, Chapter 20. The TAP is a science-based process that will inform future travel management decisions. Travel analysis serves as the basis for developing proposed actions, but does not result in decisions. Therefore, travel analysis does not trigger the National Environmental Policy Act (NEPA). The completion of the TAP is an important first step towards the development of the future minimum road system (MRS). All NFS roads, maintenance levels 1-5, must be included in the analysis.
>
> …
>
> Results from the TAP must be documented in a travel analysis report, which shall include:

- A map displaying the roads that can be used to inform the proposed action for identifying the MRS and unneeded roads.
- Information about the analysis as it relates to the criteria found in 36 CFR 212.5(b)(1).

Previous Travel Management Decision

The Willamette National Forest signed a Decision Notice and Finding of No Significant Impact on October 14, 2009 for the Travel Management Rule Implementation Environmental Assessment. As required in Subpart B of the Travel Management Rule, this decision designated a system of National Forest roads and trails open to motorized use, and the first Motor Vehicle Use Maps were made available to the public in 2010.

Appendix 2: Financial Analysis

Maintenance Costs Assumptions

The analysis was conducted in 2012, the same year a new road maintenance contract was awarded. Using the costs from that contract, road engineers determined base costs for road maintenance activities, the necessary frequency of those activities depending on the road's operational maintenance level, and the maintenance need. The maintenance need was determined by the road's position (ridgetop, mid-slope, valley bottom), surface type, and functional classification (arterial, collector, local). Table 20 and Table 21 show the cost of maintenance activities and the annual cost of road maintenance, by operational maintenance level and maintenance need.

Table 20: Maintenance cost, by maintenance activity

Maintenance Task	Base Cost (per mile)
Pavement Mtc (DL Chip Seal)	$31,700
Pavement Mtc (SL Chip Seal)	$18,500
Pavement Mtc (Patching)	$3,100
Pavement Mtc (DL Striping)	$2,200
Pavement Mtc (SL Striping)	$1,100
Shoulder Mtc	$300
Slough / Slide Removal	$150
Ditch/Structure Cleaning	$1,280
Blading ML2	$480
Blading & Rolling ML2	$860
Blading & Rolling ML3&4	$940
Surface/Drainage Maint. (Native Surface)	$250
Spot Rock (Agg)	$2,500
Brushing ML 2	$715
Brushing ML 3-5	$580
Logging Out - ML3-5	$590
Logging Out ML2	$511
Danger Trees	$1,000
Signs ML3-5	$100
Signs ML2	$50
Barrier Mtc	$5
Other (ML 1)	$5

Table 21: Annual cost for road maintenance, broken down by operational maintenance level and maintenance need

Operational Maintenance Level	Maintenance Need	$/mile	Miles	Total
5	High	$8,035	122	$980,270
	Medium	$5,677	19	$107,859
	Low	$4,468	5	$22,338
ML 5 Subtotal:			***146***	***$1,110,467***
4	High	$4,807	108	$519,206
	Medium	$3,951	175	$691,367
	Low	$3,063	2	$6,125
ML 4 Subtotal:			***285***	***$1,216,698***
3	High	$2,925	22	$64,350
	Medium	$1,823	130	$237,033
	Low	$1,294	119	$153,997
ML 3 Subtotal:			***271***	***$455,381***
2	High	$1,458	1,233	$1,797,714
	Medium	$540	1,549	$837,054
	Low	$223	1,974	$439,215
ML 2 Subtotal:			***4,756***	***$3,073,983***
1	High	$14		
	Medium	$11	514	$5,470
	Low	$4	567	$1,985
ML 1 Subtotal:			***1,081***	***$7,455***
		Total	**6,539**	**$5,863,983**

Maintenance Level 1

- Assign low maintenance cost to all ridgetop maintenance level (ML) 1 roads
- Low standard ridge top roads typically have grades of less than 3%, and few to no drainage ditches. Ditch relief culverts and culverts in live streams are few to none. As a result the erosion issues and the need for road maintenance on a stored ridge top road are very minimal to nonexistent.
- Assign low maintenance cost to all mid slope ML1 roads that are less than 0.50 miles long. These roads typically have few culverts, do not cross live streams, and need very little in the way of waterbar or other drainage maintenance.
- Assign low maintenance cost to all "native" and "improved" surfaced ML1 roads less than 1.0 miles long. These roads typically grow in with vegetation, need very little drainage maintenance and only need occasional entrance maintenance such as re-establishing entrance berm.
- Assign a medium maintenance cost to all valley bottom ML 1 roads
- Valley bottom ML 1 Roads are often near areas of high public use. The road closure devices are occasionally breached by the public in search of dispersed recreation. Occasionally after storm events drainage maintenance, waterbar, or other repair is required.

Maintenance Level 2

- Assign low maintenance to all roads that are less than 1.0 mile long and have a functional classification of local. Roads with a "local" classification are typically dead end roads that connect a terminal facility such as a landing. They are single purpose roads and only receive intermittent use. They have very low traffic volumes and are maintained infrequently.
- Assign low maintenance to all roads that have an objective maintenance level of 1. These are intermittent service roads that are only being maintained infrequently. Brush is allowed to encroach into the road prism and drainage and surface maintenance is performed infrequently.
- Assign medium maintenance cost for ML 4 roads to all asphalt surface ML 2 roads. Even though these are ML 2 roads, they have asphalt surfacing that needs to be maintained.
- Assign high maintenance costs to all ML 2 roads that have a functional classification of "collector" or "arterial." Collector and arterial routes provide service to large land areas and major recreation sites. They generally have high public use. Surface, drainage, and brushing maintenance are performed frequently.
- Assign low maintenance costs to all "local" ridge top ML 2 roads greater. ML 2 ridgetop roads typically have fewer drainage ditches and culverts and they cross fewer live streams than mid-slope roads. Ridge top roads have fewer cross drain culverts and smaller culverts when crossing live streams. Brushing intervals are less frequent than mid-slope roads.
- Assign medium maintenance costs to all mid-slope ML 2 roads. These roads typically have more drainage ditches, more cross drain culverts, cross more live streams, have larger culverts and need more surface maintenance resulting from water running down steeper grades. Also assign medium costs to ML 2 valley bottom roads. There are larger culverts in live streams. Valley bottom roads provide access to dispersed recreation, streams. As a result brushing intervals and surface maintenance are more frequent.

Maintenance Level 3

- Assign ML 4 medium maintenance cost to all ML 3 roads with asphalt surfacing.
- Assign high maintenance cost for ML 3 roads that have an "arterial" functional classification. These roads have high passenger car traffic volume mixed with commercial use. Brushing and surface maintenance are performed frequently for safety, sight distance. The road surface must be maintained smooth enough for passenger cars. These roads provide access to large land areas, reservoirs, recreation sites. They are often main timber haul routes.
- Assign medium maintenance costs for ML 3 roads that have a "collector" functional classification. These roads connect to forest arterial routes. They are mostly not dead end single use roads. Commercial and recreation traffic drive these roads. "Collectors" typically have more frequent brushing for safety and sight distance. The surface is maintained to safely accommodate passenger cars. These are often the stem roads that have many ML 2 single use project roads branching off of them.
- Assign low maintenance costs to ML 3 roads with an objective maintenance level of 2. These roads are receiving low maintenance because they are being allowed to eventually become an ML 2.

Maintenance Level 4

- Assign high maintenance costs for all double lane paved ML 4 roads. These roads need more frequent patching, chip seals, brushing than the collector and local routes. Compare the work items and maintenance intervals on the financial analysis spreadsheet used for unit cost development.
- Assign medium maintenance costs for all single lane paved ML 4 roads.
- Assign low maintenance costs for all aggregate surfaced ML 4 roads.

Maintenance Level 5

- Assign high maintenance costs for all arterial ML 5 roads. These roads need more frequent patching, chip seals, brushing than the collector and local routes. Compare the work items and maintenance intervals on the financial analysis spreadsheet used for unit cost development.
- Assign medium maintenance costs for all collector ML 5 roads
- Assign low maintenance costs for all local ML 5 road.

Balancing Maintenance Costs with Available Budget

The reduction in open road miles needed to align the maintenance costs of a future road system with available funding is significant, and the specific roads and treatments needed to achieve those reductions too complex, for this analysis to identify a definitive set of recommendations to achieve that objective directly. However, regional guidance for this process requires that this report show at least one option of the size and composition of a road system where average annual maintenance costs are generally in balance with average annual funding. In order to achieve that goal, the changes needed to the current road system would be substantial and significantly impactful to both public access and management needs. One hypothetical scenario of a "balanced" road system is shown in Table 22.

Table 22: Hypothetical example of a road system that could be maintained with current available maintenance funding.

Maintenance Level	Maintenance Need	$/mile	Miles	Total
5	High	$8,035	73	$586,555
4	Medium	$3,951	73	$288,399
3	Medium	$1,823	50	$91,167
		ML 3-5 Subtotal:	**154**	***$91,167***
2	High	$1,458	100	$145,800
2	Medium	$540	75	$40,529
2	Low	$223	1,700	$378,250
		ML 2 Subtotal:	**1,875**	***$564,579***
1	Low	$4	4,467	$15,635
		ML 1 Subtotal:	**4,467**	***$15,635***
			6,538	**$1,546,334**

This "balanced" road system would reduce the miles of open road from about 5,400 miles to 2,050 miles, or a 62% reduction, with almost 91% only maintained for high-clearance vehicles

(ML 2 roads). Miles of road maintained for passenger vehicles would be reduced from 702 miles to 154 miles. Most of the roads remaining open would see a reduction in both the level and frequency of maintenance. In addition to the impact to access, the reduced maintenance levels would also have an increased negative impact on aquatic resources, including water quality and threatened and endangered species habitat.

The example above is just one scenario intended to show the type and scale of changes that would be necessary to bring the current road system in alignment with current funding. This scenario is not a "recommended" solution to the financial shortfall problem, as many other scenarios for changing the size and composition of the road system are also possible. The potential losses of public access and ability to allow for administration, utilization, and protection of National Forest System (NFS) lands, combined with the substantial real costs in implementing the scale of changes needed clearly demonstrate the challenge and complexity facing Forest Service road managers and decision-makers, but the analysis does not outline a real plan to be considered for implementation.

Funding Source	Annual Road Maintenance Budget						Average Annual Maintenance Budget
	2008	2009	2010	2011	2012	Total Road Maintenance	
CMRD*	$306,829	$293,564	$379,323	$294,671	$170,316	$1,444,703	$288,941
CMLG**	$184,628	$65,699	$116,019	$30,000	$60,000	$456,346	$91,269
CWF2***	$247,191	$715,081	$380,054	$584,818	$539,700	$2,466,844	$493,369
Secure Rural Schools Act, Title II	$1,041,729	$446,911	$207,149	$560,090	$525,827	$2,781,706	$556,341
Purchaser Maintenance****	$52,000	$52,000	$52,000	$52,000	$52,000	$260,000	$52,000
Totals	$1,832,377	$1,573,255	$1,134,545	$1,521,579	$1,347,843	$7,409,599	$1,481,920

*CMRD is congressionally appropriated funding for managing roads, including maintenance

** CMLG is congressionally appropriated funding from the Legacy Roads and Trails program, focused on watershed improvement

***CWF2 is funding from commercial road users and timber sales, paid by timber purchasers to the Forest Service for road maintenance activities

****Purchaser Maintenance is maintenance work done directly by timber sale purchasers

Appendix 3: Algorithm

Table 23 shows the 17 steps that make up the algorithm used to develop the initial long-term road management recommendation. The algorithm followed the steps and once it identified a recommendation for a particular road segment, that segment was no longer considered in later steps. Once the 17 steps of the algorithm were completed, the analysis to determine "Analyze for Decommissioning" was completed, since it relied on the initial recommendations from the algorithm.

The initial long-term road management recommendations were then reviewed and revised based on public input and Forest Service employee input.

Table 23: The 17 steps in the algorithm used to develop the initial long-term road management recommendation

Step	Road evaluation	Recommendation
1	All maintenance level 1 roads	Remain closed
2	All Priority Roads	Priority road
3	Any road with Botany or Cultural rating of 5 and no access value of 5	Analyze for closure
4	In Wildlife analysis, any BGEA and LSRs that met criteria for a 4 or 5 risk rating: if aquatic or botany values of 4 or 5	Analyze for closure
5	Any access value of 5 and any risk rating of 5	Defer recommendation
6	Any access value of 5, highest risk rating is 4	Remain open
7	Any risk rating of 5, highest access value is 4	Analyze for closure
8	Average access value is 2 points higher than average risk value	Remain open
9	Any access value of 4 and any risk rating of 4	Defer recommendation
10	Any access value of 4, highest risk rating is 3	Remain open
11	Any risk rating of 4, highest access value is 3	Analyze for closure
12	Any access value of 3 and any risk rating of 3	Defer recommendation
13	Any access value of 3, highest risk rating is 2	Remain open
14	Any risk rating of 3, highest access value is 2	Analyze for closure
15	Any access value of 2 and any risk rating of 2	Defer recommendation
16	Any access value of 2, highest risk rating is 1	Remain open
17	Any risk rating of 2, highest access value is 1	Analyze for closure

Decommissioning

Consider decommissioning for any roads identified as "Analyze for closure" or "Remain closed" and the timber and fire access values are two or below.

Washington Office

The Forest Service Washington Office is requiring all National Forests to complete travel analysis process by 9/30/2015 and provide a report and map documenting the analysis. The direction specifically requires the map and the analysis to categorize roads in two ways:

- Roads that are "likely needed for future use"
- Roads that are "likely not needed for future use"

The analysis in this TAP identified seven different possible long-term road management recommendations. Table 24 provides a crosswalk between the seven categories used in this report and the two categories required by the Washington Office.

Table 24: Crosswalk between WO categories and WNF recommendations

Road Investment Plan Recommendation	WO Category
Priority Road	Needed
Remain open	Needed
Cost share/ Seneca Road	Needed
Defer recommendation	Needed
Analyze for closure	Needed
Remain closed	Needed
Analyze for decommissioning	Not Needed

Maintenance priorities

Maintenance priorities are determined by the aquatic risk and continued public and/or management access needs of each road.

Priority	Aquatic Ranking	Access	Miles
2	5	Access value of 5	288
4	1-3	Remaining Priority Roads	483
6	1-3	Remaining access value 4-5	2132
8	1-3	1-3	1916

Appendix 4: Interdisciplinary Team

Name	Position
Duane Bishop	District Ranger, Middle Fork Ranger District
Brett Blundon	Fisheries Biologist
Joe Doerr	Forest Wildlife Biologist
Matt Ehrman	Recreation Planner
Stacey Forson	Recreation, Heritage, Lands, and Minerals Staff Officer
Cheryl Friesen	Science Liaison
Lisa Helmig	Forest Silviculturist
Jeremy Hobson	GIS Analyst
Johan Hogervorst	Forest Hydrologist
Shane Kamrath	Natural Resources Staff Officer, McKenzie River Ranger District
Helmut Kreidler	Transportation and Operations Manager, Sub-regional Engineering Organization
Zeke Langum	Project Engineer, Middle Fork Ranger District
Tim Lahey	Forest Products Program Manager
Cathy Lindberg	Forest Archeologist
Jenny Lippert	Forest Botanist
Jude McHugh	Public Affairs Officer
Grady McMahan	District Ranger, Detroit Ranger District
Matt Peterson	Project Team Leader and Recreation Program Manager
Linda Roblero	Transportation Engineer, Sub-regional Engineering Organization
Suzanne Schindler	Forest Planner
Dirk Shupe	Fire Planner
Jamie Statezny	Zone Engineer, Detroit and Sweet Home Ranger Districts
Jeff Trejo	Forest Products Program Manager
Palmer Utterback	Transportation Engineer, Sub-regional Engineering Organization
Trish Wilson	Natural Resources Staff Officer