Little Naches Travel Analysis Rational by discipline

Recreation and Special Uses

Assessment Criteria: Roads were assessed as High, Moderate or Low for Recreation and Special Uses based on the following:

- High – The road was rated as high if it provides access to a developed site such as a campground, trailhead, or Sno-Park; is heavily used for pleasure driving/sightseeing and/or provides a heavily used loop experience for such; provides access to multiple, regularly used dispersed camp sites; recreation residences, necessary for access to other permitted special uses or mining claims; provides a bypass opportunity around more difficult sections of system four wheel drive routes or motorcycle trails; is a primary system snowmobile route. A road was also rated as high if used for several of the following recreation activities: access to several regularly used dispersed camp sites, open firewood cutting areas, a viewpoint, rock pits used for rock crawling and/or shooting; is heavily used during big game hunting season; or if it provides secondary access to a system trail. Finally, a road was rated as high if highly valued for access/response time by law enforcement and/or OHV rangers.

- Moderate - The road was rated as moderate if regularly used for more than one of the following recreation activities: provides access to more than one regularly used dispersed camp site, an open firewood cutting area, a viewpoint, a location with cellular service availability, is heavily used during big game hunting season, or provides secondary access to a system trail. A road rated as moderate would not be as heavily used as a road rated high.

- Low – A road was rated as low if recreation activities dependent on motorized access are currently light or nonexistent; there is little or no evidence of dispersed camping use; if it has been previously noted as a problem area for law enforcement personnel or OHV rangers (known as a disruptive party location or recurrent resource impacts) or has presented a known safety problem for motorized recreationists.

Range

- High: road is the only access to a range allotment or necessary for maintenance of range improvements
- Moderate: road provides a secondary access route into or through the allotment
- Low: road does not access a range allotment or is not needed for allotment management

Hydrology

Development of the Hydrologic Impact/Risk Factors

Hydrologic factors were developed to capture key processes associated with roads as they link to aquatic environments. The list of factors includes: geologic hazard; road related sediment; floodplain off-channel habitat riparian reserve function; flow effects; and wetlands.

Geologic hazard: This factor was developed to incorporate the natural risk of mass wasting as an effect on roads or potential for roads to accelerate mass movement events. Three forms of mass movement were identified: debris slides (shallow rapid landslides); earth slumps (fairly deep land slides); and deep-seated landslides. On the Okanogan- Wenatchee NF debris slides are often associated with coarse textured sediment, earth slump medium textured sediment, and deep seated fine and very fine sediment.

The interpretation of mass wasting was taken from the Landtype Associations of North Central Washington a preliminary report. These interpretations were based upon observations of landslide features, Landtype Association site features, and literature references. The interpretations are based upon geomorphic mapping, bedrock weathering properties, geologic structural features, slope gradient, drainage characteristics and patterns, and regolith features.

Geologic hazard was considered to be a highly important factor relating to aquatic conditions. Each road segment will receive a rating for Geologic Hazard. Listed below is a summary of the hazard rating:

- 0 = low risk
- 2 = moderate risk
- 6 = high risk
- 9 = very high risk

Road Related Fine Sediment: Surface erosion occurs on wildland roads due to erosion of the road surface, cutslopes and fillslopes and accelerated mass failures. Surface erosion of the road is sensitive to road design, road maintenance and geologic hazard. Road surface, design and maintenance of drainage structures can influence the amount of road surface erosion. Insufficient drainage structures, culverts, including ditch-relief culverts can also be sources of sediment. Roads crossing areas of high geologic hazard or with unstable fill slopes may contribute to accelerate mass wasting initiated by the failure of the fill slope. Culverts at stream crossings can be a sediment source if the culvert is under-sized and the hydraulic capacity is exceeded, or the culvert inlet is plugged causing streamflow to overtop the road. Large amounts of sediment or mass wasting can also be generated if the plugged culvert results in failure of the crossing resulting in a debris flow, when the culvert is overrun resulting in the stream

flowing down the road surface eroding the surface and fill. Ditch relief culverts that erode fill material directly into streams are another sediment source.

- 1 = road segments with a paved surface, crossings are bridged or sufficient to pass the 100 year flood and associated debris. Cut and fill slopes are vegetated and not eroding. Crossings are not impacting channel morphology downstream.
- 3 = Road segment is native surfaced, or graveled but no visible erosion, ditch relief culverts are not causing erosion of fill into streams, crossings are perpendicular to the stream and sufficient to pass the 100 year flood, or designed so that if they do fail only the prism at the crossing fails. Crossings are not impacting channel morphology downstream or causing downstream bank erosion. There is no evidence of accelerated mass wasting due to the road segment.
- 5 = road segments not meeting above criteria to some degree but potential impacts to at risk fish habitat appear to be minor due to amount of erosion, potential sediment delivery if a crossing failure or fill slope failure were to occur, changes to channel morphology due to a crossing is confined to the site or does not alter the channel type.
- 10 = Road segments with high potential impacts to at risk fish habitat. Road surface and/or fill slopes exhibit either erosion into streams, visible ditch erosion, cut slope erosion into ditches and sediment directly enters fish-bearing stream from ditch, fill slopes beginning to fail, evidence of accelerated mass wasting due to the sediment; and/or crossings with high potential for failure where failure of the prism will result in a large amount of sediment into at risk fish habitat; or if culvert is over-topped it highly likely that the stream will travel down the road and deliver sediment to at risk fish habitat, crossing are altering stream channel type downstream and/or causing downstream bank erosion.

Floodplain Function, Off-Channel Habitat and Riparian Reserves: This factor addresses how the road segment has altered the function of a stream's floodplain and/or off-channel habitat. Floodplains are important regulators of streamflow and water quality. They absorb overbank floodwaters, allowing water to soak through vegetation/organic mat, and into the ground. Here water can be stored and released more slowly into streams. In doing so, functioning floodplains can provide more water in late summer and reduce peak floods in winter and spring. Roads can affect floodplains by limiting the frequency of overbank flows and concentrate greater volumes of water within streambanks, interfere with the ability of the stream to migrate across its floodplain, prevent hillslope runoff from recharging floodplain aquifers, intercept runoff and flood waters thereby eroding and degrading water quality, and indirectly degrade floodplain function by encouraging off-road motorized access from roads onto floodplains. Indicators of direct and indirect floodplain or riparian reserve degradation include soil compaction, noxious weed introduction, evidence of soil erosion or mass wasting of road fill during peak runoff, water quality changes, artificial confinement of streams, streambank erosion, interruption of hillslope delivery of water onto floodplain, and loss of downed or standing woody debris which is both an energy dissipater and a habitat component. Similar impacts occur if roads are within or provide vehicle access to the portion of a riparian reserve which affects aquatic habitat; loss of bank vegetation with associated loss in cover and accelerated bank erosion, reduction in large wood from the channel or potential large wood due to wood cutting or hazard tree removal, soil compaction and accelerated surface erosion. Off-road access, provided by roads onto floodplains or riparian reserves, is influenced by factors which include: proximity of road to floodplain, slope of ground leading from road onto floodplain, and desirability of floodplain determined by its width and demands for dispersed use. With more alteration, the likelihood increases that stream systems will not be proper functioning and those road segments within the floodplain will be at higher risk of damage.

Off-channel habitats provide important rearing habitat and refuge habitat during high flows. Roads in floodplain may isolate these off-channel areas so they are no longer accessible to fish or completely fill them. A road system may not isolate or fill an off- channel area but by providing access to vehicles result in loss of vegetation, bank stability, large wood input, cover and a loss of overall habitat quality.

- 1 = road segment is not located in valley bottom or is located on the toe slope in confined valley bottom outside the 100 year floodplain and not interfering with floodplain functions.

- 6 = road segment located on moderately confined valley or unconfined bottoms with localized areas of road encroachment on stream channel. Road location may be providing motorized off-road access onto floodplain or within riparian reserve such that floodplain or riparian habitat conditions which affect aquatic habitat showing signs of degrading in localized areas (see indicators above).
- 9 = road segment located on unconfined valley bottom which frequently or continuously restricts channel migration, off-channel habitat and riparian habitat conditions affecting vegetation, altering movement of water, accelerating erosion processes, interfering with recruitment of lwd, and/or is providing access for motorized off-road dispersed use within the floodplain or riparian reserve to the point riparian habitat conditions affecting riparian habitat are being degraded.

Flow effects: This factor addresses if road segments, 1) intercepts surface runoff and near surface ground water, along cut slopes and ditch lines, converting subsurface flows to surface flows, and 2) increases delivery efficiency of these flows by diverting them directly to streams. Where these combined flows are continuous between roads and stream systems there is hydrologic connectivity. Hydrologic connectively is defined as any road segment that during runoff has a continuous surface flow between any part of the road prism and a natural stream channel. Water moves from hillslopes to valley bottom via surface and subsurface paths. Roads affect flow when they cut across hillslopes and/or require fill material through depressions that interrupt these natural paths. Road cutslopes or ditches intercept surface runoff and groundwater, accelerating their movement toward stream crossings. This action frequently increases soil erosion risks and routing efficiencies, which deliver road derived sediments and contaminants to streams and can, alter peak flows and channel characteristics downstream. Precipitation/runoff mechanisms including rain-on-snow, spring snowmelt and convectional storms should be considered when evaluating a road segment's hydrologic connectivity. Indicators of these effects include water interception on road surfaces and ditch lines, absences of ditch line relief culverts or crossdrains, or interruption and detention of flows by road fill.

- 0=Road segment is not intercepting concentrating runoff or groundwater in ditch lines. Runoff is cross drained through a vegetative filter prior to reaching stream channels. Natural flow paths are maintained uninterrupted.

- 3=Road segment are occasionally intercepting runoff, esp. during peak events but generally not groundwater. Delivery efficiencies are low due to combination of landform slope and weakly developed stream networks. Some additional ditch relief is necessary for routing surface runoff through vegetative filter. Downstream stream reaches may be susceptible to damage from increase peak flows.
- 9=Road segment frequently intercepting both surface runoff and/or groundwater in sufficient volumes to influence flow downstream and delivering waters directly to streams. Landform

slopes are steep and drainage densities high, providing increased delivery efficiency to stream channels. Downstream stream channels are unstable and susceptible to damage from increased peak flows. Road prisms may be interrupting and detaining water preventing it from recharging floodplain aquifers. Road has high hydrologic connectivity to the stream system.

Wetlands and Wet Meadows: This factor addresses whether wetlands are present along road systems and do road segments interfere with their condition and function, ground water movement or wetland vegetation.

A road segment's influence on the condition and function of adjacent wetlands is a result of either a direct impact, such as a road location relative to the wetland, or indirect impacts related to the road's effect on the wetland's supporting hydrology, vegetative community and soil characteristics. The most notable effects include converting productive wetlands to compacted road surfaces, providing motorized off-road access into these areas, constraining and diverting both surface and subsurface flows that support the water table, intercepting runoff which can accelerate erosion and lower water tables, increase sediment loading and delivery of toxic pollutants, conversions in plant species composition by introducing noxious weeds, reduce baseflows and increase peak flow and flood frequencies and degrade water quality. Of these effects, those that affect the areas ability to receive, store and move water will likely have the greatest impact on the wetland's condition and function.

Listed below is a summary of hazard rating for road segments:

- 0= road segment is either not near or adjacent to wetlands/wet meadows, or road design characteristics are providing for the uninterrupted movement of surface and groundwater necessary to support the wetland's vegetation and soil characteristics.
- 3 = road segment is adjacent to, or crosses small localized wetlands or wet meadows. Road design characteristics, particularly crossings of surface and near surface water paths are limiting the available water necessary to inundate and saturate the landform and support the wetland's vegetation and soil characteristics. Initiation of wetland degradation including noxious weed establishment, increased sediment loading, and decreased area of saturation is occuring.
- 6= road segment is adjacent to, or crosses landscape scale wetlands or wet meadows. The road's location and design have displaced or degraded the wetland's size and function. Runoff is being delivered directly to the wetland, increasing sediment and contaminant loadings. Crossings of surface and near surface water paths have severely limited the volume, timing and distribution of water necessary to saturate the landform and support the wetland's vegetation and soil characteristics. Road segment may be providing motorized off-road vehicles access into the area, further contributing to its degradation.

Total ratings were summed and put into the following categories:

Low= 0 – 15
Moderate= 16 -30
High= 31 and higher

Fuels Management

Assessment Criteria and Rationale:

Roads were given an assessment rating of low, moderate, or high based on current project needs, and future management needs. Ratings were assigned in relation to their level of importance to retain, for example high being of high importance.

- Roads were initially analyzed based on current maintenance level and frequency of use.
- **Low:** Road does not provide critical access to any current or future projects, and ok to be kept at current maintenance level.
- **Moderate:** Road provides some access to a larger area either by vehicle or foot traffic for current or future projects, and could be considered as a primary option to future projects if maintained at the current level.
- **High:** Road provides main access to multiple locations that are pertinent to current and future projects, as well as critical access for potential fuel break construction in the event of a wildfire.

Fisheries

Each road segment is rated for its risk to fisheries habitat based on condition metrics grouped at the HUC 7 sub-watershed scale. Sub-watershed risk scores depend on overall road density, predicted drainage network increase (roads within 300 feet of stream channels), fish barrier culverts specific to that road segment, and stream crossings/mile within the HUC 7 sub-watershed. Proximity to ESA critical habitat was also evaluated for a risk score. Five elements were rated with possible scores of 0, 1, 3, 5, and 10 by element. Risk ratings possible range was 0-50.

Element 1 – Endangered Species Critical Habitat present within HUC 7 watershed for road segment:
NO in HUC 7 and HUC 12 = 0
NO in HUC 7, but YES in HUC 12 = 3
YES in HUC 7 =10

Element 2 – HUC 7 Drainage Network Increase Metric
0=0
≤5% = 1
>5% to ≤20% =5
>20% = 10

Element 3 – Total system road density in HUC 7 sub-watershed
0=0
≤1.0 mi/sq.mi =1
>1.0 to ≤2.4 mi/sq.mi =5

>2.4 mi/sq.mi =10

Element 4 – Fish barrier culverts identified on road segment
No=0
Yes (non-ESA fish) =5
Yes (ESA fish) =10

Stream crossings (system roads) per mile in HUC 7 sub-watershed
0=0
≤0.4=1
>0.4 to ≤0.8=5
>0.8=10

Total Metric Score to Risk Rating for individual road segment
0-15 score = LOW risk
>15 - <30 score = MEDIUM risk
≥30 score = HIGH risk

Vegetation Management

Assessment Criteria:
Roads were assessed **Low**, **Moderate**, or **High** based on potential current Project related needs, and future management needs.

- If a road was rated **Low** overall it was generally a road segment that exists in currently identified Inventoried Roadless Areas, is contributing to detrimental stream degradation, or has no impact on current or future management capabilities, and may be proposed for potential decommissioning.
- Otherwise, roads were proposed to be maintained in current status, or maintained as ML 1 (Storage) unless needed for long term constant use.

Assessment ratings rationale:

- **Low:** Road is not essential for current or future access due to redundancy or proximity to stream system, and does not provide feasible logging access for ground-based or skyline systems.
- **Moderate:** Road provides feasible access for skyline logging, which is considered a secondary priority to ground-based logging due to higher cost of harvest and management.
- **High:** Road provides prudent access for ground-based logging, which is considered the priority for logging access due to lower costs of harvest and management

Wildlife

The following wildlife species groups or habitats were used to identify roads with higher risks to wildlife: wide-ranging carnivores, late-successional associated species, riparian-dependent species, ungulates and unique habitat.

Criterion Number 1: Wide-Ranging Carnivores-gray wolf (endangered) and wolverine (proposed), Canada lynx (threatened)

Several studies have documented the effects of road-associated factors on carnivores and have included hunting, poaching, collisions, chronic negative human interactions, movement barriers, displacement/avoidance, habitat loss and fragmentation (Thiel 1985, McLellan and Shackleton 1988, Mech et al. 1988, Kasworm and Manley 1989, Mace et al. 1996, Singleton and Lehmkuhl 1998. Several questions remained unanswered about the relationship between lynx and roads. There is some speculation that roads used during the winter for snowmobile routes may increase the interactions between lynx and other competitors such as bobcat and coyotes (Buskirk et al.1999). Since no groomed snowmobile trails or ski trails occur within lynx habitat within the LAU within the Landscape Analysis Area, no road risk will be evaluated for the lynx.

Rating

Analysis area: The watersheds within the sub-basin (Little Naches Landscape Analysis Area).

1. Identify issues and priorities within each watershed within the sub-basin based on the following:
   a. amount and location of security habitat in the watershed
   b. Road density within the watershed, defined as: high = >2mi/mi2, moderate = 1-2mi/mi2, and low = <1 mi/mi2.

3. Relative Ranking:
   a. Low (1) – low potential to improve security habitat for the target species.
   b. Moderate (5) – moderate potential to improve security habitat for the target species.
   c. High (9) – high potential to improve security habitats for the target species.

Criterion Number 2: Late-Successional Associated Species

Over 100 wildlife species identified on the Wenatchee National Forest were associated with some type of late-successional forest type (USFS 1997). A review of the available literature on these species showed that approximately one-third could be affected by roads or road-related activities (USFS 1997). Road-associated factors that could affect these species include collisions, movement barriers, displacement/avoidance, habitat loss and fragmentation (USFS 1997. Singleton and Lehmkuhl 1998, Wisdom et al. 1999).

Ratings

1. Analysis area: The watersheds within the sub-basin (Little Naches Landscape Analysis Area).
2. Follow the process outlined in the "Wenatchee National Forest Late-Successional Reserve Assessment" (USDA Forest Service 1997, p. 107). Refer to the LSRA to determine the current condition of security habitat within the LSR.

3. Identify the issues and priorities within each watershed within the sub-basin based on the
   following:
   a. amount and location of late-successional security habitat within the LSR;
   Juxtaposition of late-successional habitat to road or road segment.
   b. Road density (high = >2mi/mi2, moderate = 1-2mi/mi2, and low = <1 mi/mi2.)
   within the LSR.
4. Relative ranking. Based on the above information rank the watershed and the major arterial and collector roads as follows:
   a. Low (2) – Low potential to improve the security habitat and habitat effectiveness in the LSR.
   b. Moderate (6) – Moderate potential to improve the security habitat and habitat effectiveness in the LSR.
   c. High (10) – High potential to improve the security habitat and habitat effectiveness in the LSR.
   d. If none of the watershed is within an LSR, score as 0.

   Haystack MLSA—road density=5.04 mi/mi² (low quality); security hab=6% (low qual)
   Milk Cr MLSA—road density= 4.3mi/mi² (low); security hab= 2% (low)
   Manastash Ridge LSR—road density=2.47 mi/mi² (med); security hab= 22% (low)

Criterion Number 3: Riparian-Dependent Species

This group of wildlife species includes about 285 vertebrate species that are either directly dependent on riparian habitat or use them more than other habitats (Thomas et al. 1979). Road associated factors that could affect these species include collisions, movement barriers, displacement/avoidance, habitat loss and fragmentation (U.S.D.A. Forest Service 1997, Singleton and Lehmkuhl 1998, Maxwell and Hokit 1999, Wisdom et al. 1999).

Rating

1. The analysis area: The watersheds within the sub-basin (Little Naches Landscape Analysis Area).
2. Determine the area within riparian reserves and density of roads within riparian reserves.
3. Identify the issues and priorities within the watershed within the sub-basin based on the following:
   a. Proportion and area of the watershed in riparian reserves.
   b. Proportion of the riparian habitat influenced by open roads
   b. Road density within the riparian reserves (high = >2mi/mi2, moderate = 1-2mi/mi2, and low = <1 mi/mi2).
4. Relative ranking. Based on the above information rank the watershed and major arterial and collector roads as follows:
   a. Low (2) – Low potential to restore riparian habitat and habitat connectivity.
   b. Moderate (6) – Moderate potential to restore riparian habitat and habitat connectivity.

c. High (10) – High potential to restore riparian habitat and habitat connectivity.
d. None (0) – Road not located in a riparian reserve.

Criterion Number 4: Ungulates

This group of species includes mule deer, elk, mountain goats, and bighorn sheep. Road associated factors that could affect these species include hunting, poaching, collisions, movement
barriers, displacement/avoidance, habitat loss and fragmentation (U.S.D.A. Forest Service 1997, Singleton and Lehmkuhl 1998, Canfield et al. 1999, Wisdom et al. 1999).

Ratings

1. Analysis area: The watersheds within the sub-basin (Little Naches Landscape Analysis Area).
2. Identify the issues and priorities for further analysis and major arterial and collector roads restoration opportunities based on the following:
   a. Proportion and area of the winter range, young rearing areas, and migration routes in each watershed.
   b. amount and location of ungulate (deer & elk) security habitat within the watershed.
3. Relative ranking. Based on the above information rank the major arterial and collector roads and watershed as follows:
   a. Low (1) – Low potential to enhance security habitat and habitat effectiveness of winter ranges, young rearing areas, migration routes.
   b. Moderate (5) – Moderate potential to reduce the human zone of influence and habitat effectiveness of winter ranges, young rearing areas, and migration routes.
   c. High (10) – High potential to enhance security habitat and habitat effectiveness of winter range, young rearing areas, and migration routes.

Criterion Number 5: Unique Habitats

Unique habitats include meadows, wetlands, talus slopes, caves, cliffs, snag patches, hardwood forests, etc. These habitats tend to be used disproportionate to their availability on a landscape, making them particularly important for wildlife and greatly enhancing biodiversity. Road-associated factors that could affect the wildlife species associated with these habitats include collisions, movement barriers, displacement/avoidance, habitat loss and fragmentation (U.S.D.A. Forest Service 1997, Singleton and Lehmkuhl 1998, Wisdom et al. 1999).

Rating

1. The analysis area: The watersheds within the sub-basin (Little Naches Landscape Analysis Area).
2. Identify the unique habitats within each watershed.
3. Identify the issues and priorities for further analysis, and major arterial and collector roads restoration opportunities based on the following:

a. amount and location of unique habitat; juxtaposition of unique habitat to road or road segment.

4. Relative ranking. Based on the above information rank the watershed as follows:
   a. Low (2) – low potential to improve unique habitat; unique habitat is infrequent along road segment.
   b. Moderate (6) – moderate potential to improve unique habitat; road segments access moderate level of habitats.
   c. High (10) – high potential to enhance unique habitat; able to prevent access to large amounts of unique habitat.
   d. None (0) –Roads do not affect unique habitats.

Table I-1.
Relative ranking scheme used to determine roads that have the highest risk to wildlife.

Species group/Habitat	High	Moderate	Low
Wide-ranging carnivores-wolf/wolverine	9	5	1
Late-successional species	10	6	2
Riparian dependent	10	6	2
Ungulates	9	5	1
Unique habitats	10	6	2

Table I-2. Example of ranking

Road Seg. #	FS rd. #	Seg. Length	Wolf/wolverine	Late success Species	Riparian dependent	Ungulates	Unique habitats	Wildlife total	Wildlife rating
Ex			9	5	6	10	2	32	high