5. SYNTHESIS AND INTERPRETATION

5.1 *Issue:* Provide stable roads and trails to the extent needed to meet public and agency needs.

Key Question: What types of roads are likely to fail?

Roads that have the highest potential for failing have the following characteristics:

- They are located on slopes with a high susceptibility to landslides and debris torrents.
- Mid-slope roads are more likely to have multiple stream crossings, and may have culverts that are too small to handle the water and debris associated with a 100-year storm event (Appendix 7.5).
- They are usually older roads that were built using "sidecast" construction. The older roads may also have a higher number of culverts that are rusting and are likely to collapse sometime in the future.
- They usually have a history of road maintenance problems or other failures, such as small sidecast failures.

Key Question: What types of roads have a high potential for resource impacts due to landslides?

Roads that have the highest potential have the following characteristics:

- They have characteristics that suggest a high possibility for failure (see preceding key question), AND
- The resulting debris torrent or landslide has a high probability of reaching a stream channel.

Key Question: What types of roads are most likely to alter stream flow?

Mid-slope roads can make the watershed more efficient at routing water by intercepting subsurface downslope flow, capturing the subsurface flow in ditchlines and carrying it to stream channels. Valley bottom roads reduce the amount of floodplain available for groundwater storage, and also intercept downslope groundwater flow.

Key Question: What criteria should be used to select roads for upgrading or obliteration?

Roads should be selected for stabilization work based on the degree of risk the road poses to other resources. Whether the road is upgraded or decommissioned should be balanced between the future need for that road, and the risk of erosion or failure (USDA 1994).

Appendix 7.3 contains a table that has information regarding the risk factors for each road segment, and future administrative use of the road. This table is intended to give managers the information needed to prioritize roads for stabilization work. These roads must be field-checked to verify specific problems and conditions.

The Siuslaw National Forest ATM plan is a strategy to define a minimal network of roads which provide adequate and safe access for management (including fire protection) with a minimum impact to the environment. For this reason this analysis, along with the ATM plan, should serve to make strategic long-term decisions as to what roads to upgrade for resource protection and extended service life, which roads to close to vehicle use in order to preserve for future planned use, and which roads to decommission (obliterate) for resource protection. Secondary roads planned for low clearance travel (passenger car) and high clearance travel (truck) are displayed on Map 8. ATM is also a strategy by which to utilize county and state highways as much as possible for access and travel rather than reliance on the forest system, which was built for timber access. The ATM plan therefore defines the desired future condition for a travel network. Overall, ATM road density contained within this watershed is approximately 0.9 miles/sq. mile (Figure 4.8-1). This represents approximately 26% of the existing Forest System Roads. Analysis also defines non-ATM roads to include 51% of existing Forest System for closure and 23% for decommissioning.

Appendix 7.4, Access & Travel Management Benefit-to-Cost, defines economic costs and maintenance levels of current (historic) road segments, as well as a economic comparison to the ATM plan (desired future condition). All costs are in terms of present-net-worth and in the context of total life-cycle costs, 38 years, based on road age and reconstruction periods. Comparing historic maintenance costs with risk factored in with those defined by an ATM plan results in a Benefit-to-Cost (B:C) ratio. Large ratios indicate excellent opportunities for restoration action. This can range from road stabilization, including road closure to eliminate traffic impacts and associated costs, to obliteration of road elements for decommissioning. One of the single most effective means of road stabilization has been to waterbar high clearance travel roads and closed roads. Risk rating correlates to potential failures due to inherent geological instabilities, road age, maintenance levels, road structure and channel crossing inadequacies. These benefit cost ratios result from the cost differential of desired future condition (ATM) versus the cost to maintain all roads for access against these risks. High B:C ratios indicate potential cost savings in the desired future condition expressed by the ATM plan. Costs, risk and planned uses expressed per road segment and subwatershed should assist managers in identifying priorities for upgrades, road closures, and decommissioning roads within subwatersheds.

Roads with known specific, chronic problems are listed below:

Forest System Road 19 from the concrete bridge east of the Drift Creek camp to the Skunk Creek slide south of the Drift (Siletz) watershed analysis area boundary should be considered for decommissioning. During winter storms of November and December (1995), the Skunk Creek slide was reactivated, and blocked Road 19. This slide has been active for a number of years, as the road cuts through the toe of a rotational slump and has destabilized the slope. Numerous attempts to stabilize the slide have failed. Further attempts to keep the road open are likely to continue to destabilize the slide above the road. During the February 1996 flood, Road 19 between the concrete bridge and the

Skunk Creek slide had one debris torrent which crossed the road and reached Drift Creek. Two other sites along this road segment have a high potential of failure. Maintaining this road will be costly, and rebuilding or relocating the road will also be expensive. Slopes in this area are very steep, so in order to move the road bed, a very high cutbank will have to be created in unstable bedrock, the Siletz River Volcanics, or retain present location with a retaining wall. Even if the 19 road is kept open from the concrete bridge to the top of the ridge through the Drift Creek watershed, the Skunk Creek slide is likely to keep the road blocked. Road 19 is used as a utility corridor, which may preclude the decommissioning option.

Road 19 from Road 17 to Road 1929 (Gordey/Lower Drift and Quarry subwatersheds) should be considered for decommissioning. This road segment is already closed due to a culvert failure and debris torrent that dissected the road in 1995. Other stream crossings on this road have a high risk of failure.

Road 1956 is a dead-end ridgetop road that is only accessible from road 19. It is on the southern boundary of the Drift (Siletz) watershed analysis area in the Wildcat subwatershed. It should be considered for decommissioning along with road 19; otherwise, it will be cut off from future access.

Road 1980 from the intersection with 19 to 1958 should be considered for decommissioning. A debris torrent removed much of the road bed during the winter of 1995 just east of the intersection with road 19. It lies on unstable bedrock on steep slopes. Springs are present above the road. This road provides the only access to road 1958 across National Forest land, which may limit options for decommissioning in the near future.

5.2 *Issue:* Provide and maintain quality fish habitat with emphasis on road stability and woody debris .

Key Question*:* What problems are affecting crucial fish habitat?

There are several problems affecting crucial fish habitat in the Drift (Siletz) WA area. Landslides, sediment input from roads, increased peak flows from clearcut harvesting and road building, increased stream temperatures and decreased bank stability from harvest of riparian vegetation all have contributed to the degradation of aquatic habitat. The most important factor affecting fresh water fish production, however, is most likely the reduction in large woody debris levels.

- Increased landslides, particularly in the 2PSR2 LTA, have resulted in the direct mortality of fish and reduced the ability of riparian areas to provide LWD.
- Landslides associated with roads and clearcuts are primarily introducing sediments without the LWD to keep the sediments stable.
- Pool quality has been reduced in most stream channels due to debris removal.

- In Rock and Schooner Creeks, pool quality has probably declined from increased fine sediments.
- Substrate conditions are not optimal for fish production, however a causal link to management is not apparent. Part of the problem may be the inherent nature of bedrock in the drainage.
- Pool area meets the reference condition in only one subwatershed (Quarry Creek, which has no anadromous fish.) Deficiencies in pool area are most likely due to reductions in LWD levels.
- Off-channel habitat is not meeting the reference condition in seven of nine subwatersheds. This is most likely due to reductions in LWD levels.
- Temperatures in the watershed are above state water quality standards and above the desired level for fish production.

Key Question: What are the historic levels, current recruitment levels and long-range potential of woody debris in streams?

Historically LWD levels fluctuated in streams in the Drift (Siletz) area in response to major disturbances such as fire, major wind storms, and floods. Debris levels probably exceeded 80 pieces per mile on an average throughout the basin. The absolute magnitude of in-channel wood levels was not ascertained in this analysis.

Table 5.2-1 Percent of stands within 200' of stream channels in mid and late seral condition

Subwatershed	Managed	Natural	Total
ERICKSON	4.5%	94.5%	40.2%
GORDEY/L. DRIFT	37.8%	91.6%	62.4%
L. SCHOONER	13.3%	95.0%	48.2%
LINCOLN CITY/DEVILS LAKE	30.0%	90.8%	54.1%
NORTH	10.0%	99.8%	57.5%
NORTH FORK SCHOONER	14.9%	99.8%	67.0%
QUARRY	1.7%	86.6%	60.7%
ROCK1	6.2%	99.4%	34.8%
SAMPSON	11.6%	96.9%	23.5%
SMITH	17.2%	79.6%	34.5%
SOUTH FORK SCHOONER	8.3%	93.1%	46.0%
U. DRIFT1	11.9%	87.0%	39.9%
WILDCAT	30.3%	93.6%	76.8%
AVERAGE	15.2%	92.9%	49.7%

- Seral stages are heavily skewed towards the early seral class in most watersheds (Table 5.2-1).
- Area wide the current recruitment availability is about 54% of the reference condition.
- Recruitment levels are unlikely to meet the reference levels due to conversion of forested lands into agricultural and domestic lands. It is also likely that private lands within the recruitment zone of stream channels will not be managed exclusively for providing LWD to stream channels.
- Based on existing LWD and recruitment levels it is unlikely that LWD will meet the reference condition in the next 100 years without direct introductions of LWD from upslope sources.

- Recruitment recovery is being retarded because most riparian stands in the early seral stage are either densely stocked Douglas-fir plantations or alder and brush patches.
- Without intervention many overstocked plantations and alder patches will take hundreds of years to attain trees with sufficient size to function as stable LWD.

5.3 *Issue:* Maintain desired late-successional characteristics where they exist; manage vegetation to develop late-successional characteristics where they are currently lacking.

Key Question: What factors are preventing or inhibiting the development of late-successional characteristics?

- Fragmentation of mature conifer blocks by managed stands of varying ages.
- Even-aged and, often, single species composition of managed stands.
- Isolation of LSRs by short rotation timber management.
- Length of time for development of late-successional characteristics (Stands can be treated in many ways to accelerate growth and development of late-successional structure but it will take time for these structures to develop).

Key Question: What criteria determines which areas or stands will benefit by treatments designed to hasten the development of late-successional characteristics?

- Blowdown potential: topography, taper ratios, species susceptibility.
- Plant association and understory competition, for example:
  - Dry environments with salal understory - if overstory is opened greatly, salal will proliferate and suppress herb/forb layer, decreasing wildlife habitat.
  - Wet environments - salmonberry and alder are aggressive competitors with conifer seedlings.
  - Wet to moist environments - large, open grown conifers develop with alder understory; as alder senesces, uneven-age coniferous stands develop.
- Necessity of maintaining integrity of interior habitat (would treatment increase disturbance to interior habitat, e.g. through road-building, gap creation, etc.?).
- Insects and Disease: extent of root rot, Swiss needle cast presence, presence of dead and dying trees over large areas (bark beetles), etc.
- Stand Density: overstocked and stagnating stands.
- Proximity to mature conifer habitat blocks:
  - does stand fill in hole in habitat block or provide connection to other blocks of mature conifer?
  - does stand provide primary constituent elements of northern spotted owl or marbled murrelet critical habitat?
- To maximize the successful reproduction and dispersal of species dependent on mature forest habitat, prioritize the silvicultural treatment of stands which would fill in blocks of mature forest habitat or would increase the connectivity between blocks of mature

forest. Prioritize by location (subwatershed and stands that would logically be treated at the same time, even if not a wildlife priority) and by plantation age (older plantations would be more likely to be ready for commercial thinning than would 25 year old plantations, although plantation growth can differ by site and quality of original planting stock). The highest priorities to consider for thinning are listed in Tables 5.3-1 and 5.3-2.

Table 5.3-1 Acres of Potential Thinning to Block-up Mature Conifer or Provide Connectivity on National Forest Lands

High Priority (Low Priority)- Fills-In Blocks of Mature Conifer

Subwatershed	35-40 yrs. old	30-34 yrs. old	25-29 yrs. old	High Priority
N. Fk Schooner	90	0	0	90
S. Fk. Schooner	81	0	0	81
Gordey/Drift	35	164	35 (60)	234
Quarry	114 (194)	(7)	0	114
North	84	127	136	347
Wildcat	(1)	51	(31)	51
TOTAL	404 (195)	342 (7)	171 (91)	917

High Priority (Low Priority)- Provides Connectivity

Subwatershed	35-40 yrs. old	30-34 yrs. old	25-29 yrs. old	High Priority
Rock	139 (70)	71	139 (63)	349
Erickson	0	246	0	246
N. Fk Schooner	0	198	0	198
S. Fk. Schooner	114	69	39	222
L. Schooner	247	0	(48)	247
North	50 (19)	94 (29)	0	144
Upper Drift	62	0	0	62
TOTAL	612 (89)	678 (29)	178 (111)	1,468

Table 5.3-2 Acres of Potential Thinning to Block-up Mature Conifer or Provide Connectivity on BLM Lands

High Priority (Low Priority)- Fills-In Blocks of Mature Conifer

Subwatershed	35-40 yrs. old	30-34 yrs. old	25-29 yrs. old	High Priority
Smith Creek	0	0	16	16

High Priority (Low Priority)- Provides Connectivity

Subwatershed	35-40 yrs. old	30-34 yrs. old	25-29 yrs. old	High Priority
L. Schooner	0	0 (28)	0	0
Upper Drift	0	0 (9)	22	22

6. RECOMMENDATIONS

The ability to implement these recommendations is contigent upon funding and workforce availability.

6.1 *Issue:* Provide stable roads and trails to the extent needed to meet public and agency needs.

Information on the Forest Service system roads has been compiled in the table in Appendix 7.3. This information is intended to guide management decisions regarding road upgrading and decommissioning. Roads that should be reviewed as high-priority decommissioning candidates are those with high risk scores, little need for silvilculture access, and high maintenance costs. Intermediate term decommissioning candidates are roads that may be needed for future silviculture access, and have a high risk of failure. Table 6.1-1 lists roads with a "risk score" greater than 4 (range is 0-7). The risk score reflects a number of factors that contribute to road instability; the higher the number, the more factors an individual road segment has that contributes to its susceptibility to landslides. Road 19 in the Quarry and Wildcat subwatersheds received the highest risk score of all road segments in the Drift (Siletz) watershed analysis area. For more information on data used to compile the table, see Appendix 7.3.

Silvicultural projects located along roads that have a high risk of failure should receive a high priority for treatment in the near future, so that the roads may be closed as soon as possible.

For project level work, refer to the USDA Siuslaw National Forest Road Obliteration and Upgrade Guide (1995c).

Consult with other agencies and landowners before roads are closed or decommissioned.

Table 6.1-1: High-risk roads listed by subwatershed.

Subwatersh	Road #	Length	# of culverts	Risk Score	silv needs	Historic maint costs	ATM plan costs	ATM rate of return
Erickson	1780-	1.97		4	thin 10 years	6.04	0.44	12.7
Erickson	1781-	0.85		4	thin 10 years	2.23	0.78	1.9
Erickson	1726	0.28		4		1.08	0.96	0.1
Gordey/L.	1700-	0.25		5		0.03	0.03	0
Gordey/L.	1700-	0.24		5	PCT	0.02	0.02	0
Gordey/L.	1928	1.69		5		5.81	0.41	13.2
Gordey/L.	1900	2.6	4	5		9.98	1.22	26.7
Gordey/L.	1700	4.2	5	4		16.13	19.44	-0.2
Gordey/L.	1700-	0.4		4	PCT	0.04	0.65	-0.9
Gordey/L.D	1928-	0.56		4		0.06	0.05	0
L. Schooner	1700-	0.44		4	thin 5 years	0.04	0.09	-0.5
L. Schooner	1700-	0.88	2	4	thin 5 years	2.3	0.58	3
North	1784-	0.6		4	thin 5 years	0.06	0.13	-0.6
North	1929	1.17		5		4.02	4.49	-0.1
North	1900	0.53		4		2.04	2.51	-0.2
North	1700	3.27		4		12.56	12.56	0
North	1784	2.31		5		7.95	0.56	13.2
Quarry	1900	4.78	16	7		18.36	12.51	4.1
Quarry	8493	0.26		4		0.89	0.4	23.2
Quarry	1929	1.27		5		4.37	4.88	-0.1
Quarry	1700-	0.09		4	thin 5 years	0.19	0.02	11.1
Quarry	1900-	0.54	2	4	thin 5 years	0.05	0.61	-0.9
Quarry	1900-	0.45	1	4	thin 5 years	0.04	0.29	-0.8
Quarry	1928-	0.76		4	thin 10 years	1.99	0.15	12
Quarry	1928-	0.7	9	4		1.79	1.83	0
Quarry	1928-	0.64		4		1.96	0.08	23.9
Quarry	1929-	1.45		4	thin 5 years	3.8	0.29	12
Quarry	1929-	0.31		4		0.03	0.03	0
Quarry	1928	1.54	4	4		5.3	1.51	2.5
Quarry	1929-	0.1		4	thin 10 years	0.01	0.02	-0.5
Quarry	1929-	0.5		4		0.05	0.04	0.3
Rock 1	1726	5.02		4		19.28	23.42	-0.2
Rock 1	1729	2.76		4		9.49	0.67	13.2
S. Fk	1700-	0.41		4	thin 5 years	1.26	0.09	12.7
S. Fk	1700-	0.36		4	thin 5 years	0.04	0.08	-0.6
Sampson	1701-	1.46		4	thin 5 years	3.82	0.29	12
Wildcat	1958	1.09		4		3.75	0.26	13.2
Wildcat	1900	2.23	5	6		8.56	13.93	-0.2

6.2 *Issue:* Provide and maintain quality fish habitat with emphasis on road stability and woody debris.

Vegetation:

- Priority work areas for riparian vegetation manipulation are Rock1, Sampson, South Fork Schooner, and Lower Schooner subwatersheds (Table 5.2-1).
- Riparian vegetation manipulation should occur primarily within and adjacent to managed stands.
- Manipulate vegetation within recruitment areas so that there is an excess of large (>24") free growing conifers as compared to natural late seral conditions until in channel woody debris levels approach reference levels.
- Remove no trees which could function as LWD from stands where sufficient large conifers are present in recruitment areas.
- Fall and leave trees should not exceed four trees/acre/every four years unless placed in the water to reduce the potential for large scale insect damage (Douglas-fir beetle (Dendroctonus pseudotsugae)) and riparian vegetation loss. Avoid falling and leaving spruce trees on a widespread basis because of the danger of infestation with spruce beetles (Dendroctonus rufipennis).
- When re-establishing conifers in the riparian area do not remove alder or other riparian hardwoods to a degree that decreases streambank or floodplain stability.

Roads:

- Priority areas for road work are Sampson, Gordey/L Drift, Wildcat and Quarry because of their extensive history of torrenting and their current fish habitat condition.
- Roads in other watersheds should be evaluated. Those that have been stable for long periods should be the lowest priority for restoration.
- Avoid road construction in areas with high slide potential. Ridge top locations are preferred for roads.
- Inventory and monitor substrate conditions throughout the analysis area and determine if sediment levels are indeed a problem.
- Road maintenance should concentrate on maintaining road crowns and outslopes, and keeping culverts open. Ditch pulling and minor slough removal should be minimized.

In-channel work:

- Place wood in areas with high fish habitat potential.
- Sampson Creek, Drift Creek between Sampson and Barn Creek, North Fork Schooner Creek, and Lower Schooner Creek are highest priority for instream wood additions.
- Evaluate Erickson Creek and North Creek before planning structure projects.
- Encourage beaver activity in areas where fish habitat will benefit.

Project Level Guidance:
Riparian vegetation treatments:

- Evaluate stream channels within and below project areas prior to project planning.

- Stratify channels according to stream gradient, entrenchment ratio, bed and bank substrate composition, and bankfull width to bankfull depth.
- Evaluate channel stability and potential channel stability within each stratum.
- Vary riparian vegetation leave areas according to stratum and channel stability.
  * Very stable channels with stable channels downstream can accommodate small riparian vegetation leave areas (RVLA).
  * Stable channels with unstable or potentially unstable channels immediately downstream may require wider RVLAs than similar channels with stable channels below.
  * Unstable or potentially unstable channels may require RVLAs as wide as 500' or more.

Evaluate slope stability:

- On highly unstable slopes remove no more trees than necessary to achieve desired growth. If tree removal would substantially decrease rooting mass, consider no treatment in those areas.
- Potentially unstable slopes should not be categorically eliminated from thinning treatment. They are likely to serve as source areas for in channel woody debris in the future and so it is desirable to have large trees growing on them.

6.3 *Issue:* Maintain desired late-successional characteristics where they exist; manage vegetation to develop late-successional characteristics where they are currently lacking.

- Vegetation treatment to achieve late-successional characteristics should occur primarily within managed stands.
- Use the criteria developed under Section 5.3-Key Question 2 of the Late-Successional Characteristics Issue to select silvicultural prescriptions for commercial thinning.
- Provide connectivity to mature forest habitat on federal lands to the north and, through BLM lands, east to the Valley of the Giants Area of Critical Environmental Concern (ACEC) and northeast to the Saddleback Mountain ACEC.
- When possible, acquire non-federal lands to block up areas where connectivity is weak or where private lands interrupt a block of mature conifer. Particularly emphasize the acquisition of lands surrounded on 3-4 sides by federally owned lands.
- Retain western hemlock as a major component within plantations to provide future nest trees for marbled murrelets.
- Retain sufficient numbers of green trees to provide down wood and snags over the life of the stand. These need to be in the size and decay class distribution reflective of the level at which they are found in natural mature conifer stands in the area. Until more data is available, use the ***average numbers*** per acre listed for each plant association (Tables 4.6-7 and 4.6-8) as the ***minimum numbers*** to be left per acre.
- Within riparian reserves, the area outside of the stream LWD recruitment zone should be managed to achieve LSR objectives.

6.4 Other Recommendations

- Give special consideration to scheduling high priority thinning and road projects in the Rock Creek subwatershed because it has the highest coho spawning counts of any stream in the North Coast.
- Give priority to completing multi-project environmental assessments in Lower Schooner and South Fork Schooner because they are high priority subwatersheds under all three issues.
- Develop adequate population information for fish species within the watershed.
- Protect the integrity of existing study sites. Sites include three progeny sites (two Douglas-fir and one Western Hemlock) and the Hemlock Fertilization Study (see study files at Hebo Ranger District).
- Cooperate with Oregon Department of Agriculture, Lincoln County Vegetation Management and other interested parties to control noxious and invasive weeds.
- Periodically monitor historic/known sensitive, threatened or endangered species sites to identify any changes in occupancy or populations.
- Comply with "Survey and Management" strategies in the Northwest Forest Plan.
- Revise appropriate scenery objectives for consistency with late-successional reserve goals and objectives