CHAPTER 5

RECOMMENDATIONS

The purpose of this section is to identify those management activities that could move the system towards reference conditions or management objectives, as appropriate. Following the narrative, Table 40 summarizes recommendations by Issue identified in Chapter Two.

ISSUE 1: THREATENED, ENDANGERED AND SENSITIVE SPECIES

1. ***Unknown Occurrence:*** Continue surveying for sensitive and rare plants and animals to identify their distribution throughout the watershed and determine stability of populations. If management actions might impact populations, recommend mitigation measures follow recommendations in conservation strategies.

2. ***Frasera:*** Analyze the effect of roads on the meadow inhabited by the *Frasera* population. If changes are caused by hydrological events, identify any possible mitigation measures that would restore the hydrologic regime.

3. ***Cimicifuga:*** Analyze the possibility of treatment in the form of complete removal, topping or pruning a few overstory trees to open the canopy and let more sunlight into the population of tall bugbane. This will enhance reproduction and recruitment of the *Cimicifuga* population along Fall Creek.

4. ***Northern Spotted Owls:*** Continue to monitor spotted owls and update status of activity centers within the matrix portion of the watershed. Avoid incidental *"Take"* where possible, based on the latest USFWS Biological Opinion.

5. ***Peregrine Falcon:*** Monitor potential nest sites, assessing the possibility of disturbance detrimental to peregrine occupation. Recommend permanent or seasonal closure of specific roads in the watershed which may influence habitat use through the District Access and Travel Management Plan (ATM). If activity is documented at specific sites, consider improving foraging habitat for prey species adjacent to the site.

6. ***Harlequin Duck:*** Monitor to increase understanding of breeding behavior and habitat selection for nesting and rearing. Assess impacts of recreational use on the Harlequin duck in the highest recreational use areas: mainstem Fall Creek, lower Hehe and Portland Creeks.

7. ***Torrent Salamander and Tailed Frog:*** Survey to expand information about distribution of the two torrent species that can potentially occur within the watershed. Protect or enhance riparian areas to benefit this species, especially at seep areas in the headwater of the watershed. Consider road rehabilitation/decommissioning, especially of those roads becoming inaccessible due to low maintenance priorities, which could pose a threat to riparian or water quality.

8. ***Red Legged Frog:*** Survey to determine location and breeding sites within the watershed. Monitor the Ninemile Creek pond and determine the effects of adjacent harvest activity on this site, including increased windthrow into the pond itself. Plant shade species for cover adjacent to the harvest unit.

9. ***Band-tailed Pigeon:*** Survey and monitor the known mineral lick site for occurrence and impacts from human use.

10. ***Northwest Pond Turtle:*** Current conditions indicate that turtles occur in the upper end of Fall Creek Reservoir. Concern is regarding lack of recruitment of young into the lake system. This could be due to predation from native and non-native species and lack of amount and access to suitable nesting habitat. Continue to monitor turtle activity in the upper end of the reservoir using radio telemetry and other observation methods to determine human impacts on turtle nesting and reservoir use.

11. ***Townsend's Big-eared bat and other bat species:*** Protect known cave in the watershed from disturbance and impacts. Survey bridge sites to determine use by all bat species and impacts from human activity.

12. ***Bald Eagle:*** Continue to monitor use patterns of the reservoir and work with USACE and BLM to enhance or maintain nesting habitat adjacent to the reservoir.

ISSUE 2A: TERRESTRIAL VEGETATION

1. Disturbance

Fire: Although fire suppression will continue to protect valuable forest resources and interrupt the natural fire cycle, management techniques which mimic natural fire disturbance should be applied. Use of prescribed fire, given the right circumstances, may be appropriate to manage forest structure and diversity, create fuelbreaks and reduce the risk of catastrophic fire. Use of different harvest treatments should attempt to mimic natural fire disturbances. Keep different levels of retention in regeneration harvests and use various thinning regimes to mimic conditions left after natural fires. These treatments would provide control over stocking levels and fuel loading by manipulating the forest composition and structure.

Underburning or prescribed fire is still in its infancy. More information and research is needed to better understand its applicability and role in the forest ecosystem.

Successional process change: The amount of late-successional forest is below the historic range of variability as a result of timber harvest. Timber harvest has converted stands from late seral to early seral at a faster rate than under natural succession. In matrix land allocation, given the objective of producing commercial forest products, the amount of late-successional forest will continue to decline. Remaining late-successional stands in matrix should be evaluated for their contribution to landscape dynamics and scheduled over time to allow recovery of other stands into late-successional habitat. The decline of late-successional forest in the matrix will be offset by late-successional forest recovery in the no-harvest allocations of the Forest Plan, riparian reserves, and LSRs. Recovery of these stands will take time but is important in bringing the level of late-successional forest within historic

ranges. Focus for treatments should be on managed plantations in riparian reserves and LSRs. Priorities would include stands that could acquire late-successional characteristics more rapidly with treatment, or are prone to fire, diseases, winds, or other disturbances. Depending on stand conditions, treatments in riparian reserves would include:

- Stand density management (thinning) to create patches and produce larger diameter trees,
- Creation of gaps to promote multi-storied canopies,
- Development of snags, malformed trees, and coarse woody debris,
- Reforestation for establishment, stocking level maintenance, and species diversity,
- Underplanting to expedite development of stand layering,
- Release advanced regeneration of conifers, hardwoods or other plants,
- Treatments to reduce the risk to insects and diseases, and/or
- Use of prescribed fire to reduce fuel loading and/or risk of catastrophic wildfire.

Thinning prescriptions should encourage development of diverse stands with large trees and a variety of species in the overstory and understory. Prescriptions should vary within and among stands.

Early Seral Conditions over Time: Some general conclusions/recommendations can be drawn from the guilding process used in the watershed. Results indicate that long-term habitat trends for species dependent on early seral conditions are declining in the watershed. The matrix portion would maintain a certain amount of habitat for these species due to continued harvest activity, yet the watershed as a whole would not have the habitat currently available. It is recommended that population trends within the entire range of these species be evaluated to identify any species that could become at-risk.

Windthrow: Although windthrow is not a major problem within the watershed, it will continue to occur along the "high contrast" edges of harvest units. Forest susceptibility to windthrow will remain high given riparian reserve requirements, green tree retention, wildlife trees, and large woody debris. Careful planning and implementation will be needed in the placement of dispersed trees and green tree retention areas. Retention trees should be feathered along riparian reserve edges, and located to minimize exposure to prevailing winds. Topping portions of the live tree crown may be necessary to reduce the risk of windthrow.

2. Altered Landscape Patterns

Fragmentation: The late-successional forest in the watershed is highly fragmented from the cutting patterns of previous timber harvest and it will take decades to change the landscape. Any future timber harvest should attempt to mimic natural fire patterns by creating larger patch sizes and openings on upper slopes and ridges with high snag intensities. This can be accomplished by increasing the size of patches and aggregating new harvest units adjacent to existing plantations, better known as the "minimum fragmentation" approach. Dispersal corridors should also be maintained by using various management techniques such as

scheduling stands for treatment over time, using different retention levels in regeneration harvest systems, and accelerating the development of dispersal and late-successional habitat in managed plantations. Areas of highest priority would be Fall Creek, Winberry Divide, main Fall Creek corridor to Wagon Wheel Pass, and along Alpine Ridge.

Loss of connectivity:

- Consider increasing the effectiveness of the mainstem Fall Creek corridor for wildlife dispersal/movement/migration. This might include silvicultural activity in managed stands within riparian reserve boundaries along the creek. The upper end of the drainage would be a priority due to higher fragmentation. If further monitoring indicates a serious conflict between human and wildlife use, such as impacts to the Harlequin duck, consider restricting recreational activities in these critical areas.

- Consider decommissioning roads which potentially disrupt wildlife movement by use of the District ATM. Priority areas for such closure should be roads in the LSR, riparian reserves and those located in saddles which serve as natural "funnels" for wildlife migration and dispersal. Examples include:

    1) Wagon Wheel Pass
    2) 1912/1839 Juntion, at the upper end of Delp Creek
    3) 1821/1821-199 Junction

- Maintain an intact connective corridor between the Fall Creek watershed and adjacent Winberry Creek watershed. The Andy Creek drainage provides good access through the low divide between Timber Butte and Saddleblanket Mountain, and should be considered a priority. This would provide an intact north/south corridor connecting the Little Fall Creek, Big Fall Creek and Winberry drainages through Slick/Bedrock/Andy Creek. These areas offer an opportunity to enhance potential dispersal habitat in managed stands through standard silvicultural practices of stand density management. Late-successional stands in this area could also be designated as a lower harvest priority until adjacent stands develop into dispersal habitat. As managed stands develop adequate dispersal conditions, current late-successional stands could be considered for harvest, perhaps with higher green tree retention requirements or other alternative prescriptions. As specific project planning is implemented in this area, more site-specific recommendations could be based on stand harvest priorities.

3. Stand Structure

All managed plantations within the watershed were established under management regimes guided by the goal to produce an optimum and sustainable yield of timber. These intensive management regimes consisted of a series of treatments to guarantee reforestation, species composition, stocking levels, and stand growth and development. The goals and objectives for the majority of these plantations have now changed under the Northwest Forest Plan. Approximately 53% (18,896 acres) of the plantations are in the LSR, 17% (5,912 acres) in

riparian reserves, and 29% (10,299 acres) are in matrix. Treatment objectives for the LSR and riparian reserves focus on development of late-successional forest characteristics and prevention of large scale disturbances by fire, wind, insects, and disease, which would destroy or limit their ability to sustain viable populations. Treatments in riparian reserves are further guided by objectives established in the Aquatic Conservation Strategy. Treatments should focus on:

- developing multi-species and multi-layered assemblages of trees,
- moderate to high accumulations of snags and large downed logs,
- moderate to high canopy closure,
- moderate to high numbers of trees with physical imperfections such as cavities, broken tops, and large, deformed limbs, and
- moderate to high accumulation of fungi, lichens and bryophytes.

The appropriate types of treatments for development of late-successional forest characteristics have been discussed in the previous section, under this Issue.

Objectives for the matrix are very similar to those of the original plantations. These objectives include commercial wood production; maintenance of old-growth components such as snags, downed logs, and relatively large green "leave" trees at moderate levels; and increasing diversity by providing early seral habitat. The full "tool box" of silvicultural treatments is available to meet these objectives and the appropriate treatments are discussed in the Forest Plan and Northwest Forest Plan.

4 & 5. Changes in Habitat Diversity and Noxious Weeds

- Attempt to restore species composition and reduce fragmentation of special habitats. Continue noxious weed surveys to identify sites in meadows and other areas where weeds may be outcompeting natives, in order to prioritize introduction of biological control agents. Emphasize prevention to keep new invaders from spreading into the watershed. Include blackberries and reed canary grass in riparian surveys to determine the extent to which they have taken over.

- Use prescribed fire, girdling and selective harvest methods to restore mesic and dry meadows to their natural size and species composition. Analyze the effectiveness of this technique in controlling noxious weeds at these sites. Sites should be analyzed at the project level and prescriptions written in SIA or Special Wildlife Habitat Management Plans.

- Consider closing and/or decommissioning roads which affect the hydrologic regime of mesic and wet meadow habitats and act as main travel routes for weeds through ATM and/or SIA Management planning. Continue collecting and propogating native species (both grasses and herbs) for use on decommissioned roads.

- Continue to classify and determine management effects on special habitats during project level planning. Prescriptions for those habitats affected by timber management or roads should aim for restoration of said habitat.

6. Big Game Habitat

With the changes in management emphasis, there is concern that the current modeling/habitat effectiveness indices used are not representative of habitat trends.

- Re-evaluate big game emphasis areas in the watershed. At the Forest level, work with ODFW to determine future concerns and trends in big game population levels.

Modeling results point out a few areas of concern, especially in the Lower Fall Creek area. Open road densities are still above the Willamette N.F. S&Gs by varying amounts.

- Recommend considering further closures (temporary and permanent) in Andy, Rubble, Timber, and Boundary Creeks using the District ATM.

- Maintain or increase forage in these drainages either by regeneration harvest or maintenance of permanent foraging areas.

- Maintain special open habitat areas throughout the watershed for forage, especially in the Upper Nevergo Creek and Upper Fall/Briem Creek areas.

7. Marten/Pileated Network

As addressed in *Chapter Three, Current Conditions*, the marten/pileated woodpecker network includes approximately 1174 acres within the matrix portion of the watershed. A screening process established that it is not essential to maintain the current network in this watershed due to lands currently set aside. The dendritic stream nature of the watershed provides marginal but adequate habitat for marten and pileated woodpecker utilization and dispersal within the matrix. The concern with this strategy is that the riparian reserve network, as depicted from GIS mapping, is an elaborate system of narrow, linear "polygons". In many instances this network might not provide quality interior habitat for the safe movement and dispersal of larger terrestrial organisms. The quantity of habitat is adequate but the quality and arrangement might not meet the needs of these species. The exposure of abrupt riparian reserve edges by regeneration harvest practices, could alter their effectiveness as dispersal habitat due to increased windthrow along these edges and overall lack of optimal interior forest. As interim riparian width strategy is implemented, monitoring should be geared toward evaluating the effectiveness of this strategy. Retention of large intact blocks of late-successional forest habitat is important in combination with a major portion of the riparian reserve network. Some adjustments to Class IV and intermittent riparian reserve boundaries could be made, supplimenting retention of more intact interior blocks of matrix habitat to better serve the dispersal and refugia needs of many wildlife species. Also, larger openings of early seral conditions could be created through silvicultural prescriptions, mimicing more natural disturbance patterns.

8. Special Forest Products

- Balance customer service with avoidance of adverse impacts to any C-3 species (mosses, liverworts or lichens) in LSR or riparian reserves.
- In matrix, offer commercial harvest permits in timber sale areas.
- Monitor compliance with permit requirements in the LSR and riparian reserves to determine whether illegal harvest continues in Fall Creek. If so, consider an educational program explaining the effects of harvest on the resource.

9. Northwest Forest Plan Table C-3 Species

- Conduct surveys to determine which C-3 species occur in the watershed and manage for these species even though their distribution is not documented.
- Use mitigation measures outlined in *Chapter Three, Current Conditions,* to ensure survival of C-3 species, especially in matrix and riparian areas not providing adequate dispersal corridors and interior habitat.
- Consider survey and manage species when working in riparian areas. Consider retention of a diversity of tree species and maintenance of the diverse structural components (snags, downed woody material).
- Evaluate the use of prescribed burning in maintenance and/or enhancement of *Allotropa* habitat.
- If a "hot spot" for any group of survey and manage species is locted within the watersed, consider special land use designations such as mycological or bryological SIA.

ISSUE 2B: RIPARIAN VEGETATION

1. Riparian seral condition outside HRV

Since a substantial amount of the riparian reserve network has been impacted by past management activities, additional vegetation manipulation could promote development of desirable characteristics in managed stands within riparian reserves. These projects could increase the rate of development of late-successional forest conditions and assist in attainment of Aquatic Conservation Strategy (ACS) objectives. High priority riparian reserves for overall aquatic maintenance and enhancement consist of those areas with the best riparian condition *(See Chapter 4, Table 36).* However, since these areas are thought to have healthy riparian stands, second priority areas (those in poor condition) would benefit most from riparian silviculture projects. The latter include the following drainages: Timber, Andy, Boundary, North Fork Fall, Hehe, Logan, Portland, and Nevergo Creeks. *Table 38* lists activities which could occur in riparian reserves and would be consistent with attainment of ACS objectives. Included in this list are projects that would have a beneficial effect on aquatic and riparian resources by promoting the development of desired conditions at a faster rate than if left untreated.

It is recommended that interim widths for riparian reserves be maintained as stated in the Northwest Forest Plan. Riparian reserves provide dispersal and connective habitat for terrestrial animals and plants as well as protection of aquatic resoruces. The Northwest Forest Plan states that post-watershed analysis riparian reserve boundaries for permanently flowing streams should approximate the boundaries prescribed in the associated standards and guidelines (page B-13). The Northwest Forest Plan indicates that post-watershed analysis riparian reserve boundaries for intermittent streams may be different than the interim widths prescribed in the S&Gs. Adjustments to interim riparian reserve boundary widths, while ensuring attainment of ACS objectives and providing terrestrial habitat connectivity, were considered; however information supporting such adjustments was inadequate.

Due to the scope of this analysis, it is recognized that site-specific project analysis could reveal circumstances requiring consideration for modifications to the interim riparian reserve widths. If site-specific project analysis determines a necessity for deviation from the interim riparian reserve widths, the rationale for these deviations must be documented and demonstrate that ACS objectives and terrestrial habitat connectivity would not be adversely affected.

2. ***Roads adversely affect riparian dispersal by creating barriers***

There are high road densities throughout the watershed (483 total miles). A substantial portion of these roads (150 miles or 31%) occur within riparian reserves. Associated with these roads are numerous creek and channel crossings with culverts providing continual water flow. This could have major impacts on wildlife movement and dispersal. For example, culverts create barriers to dispersal of aquatic salamanders requiring water for movement/dispersal. Road surfaces could present barriers to some smaller organisms reluctant to move across a dry, non-forested environment.

It is recommended that roads in riparian reserves be evaluated to determine which are necessary for continued access to the district. Non-access roads should be assessed to determine impacts on wildlife movement/dispersal. Subsequent decommissioning or culvert replacement (for improved passage of aquatic animals) should be implemented where indicated.

ISSUE 3: AQUATIC HABITAT

The Aquatic Conservation Strategy in the Northwest Forest Plan explains that watersheds in the best condition should receive the highest priority for increased protection and for restoration projects (pg. B-9). This analysis has determined that drainages tributary to Fall Creek in the best condition include: Slick, Bedrock, Saturn, Platt, Briem, and Clark Creeks. Riparian vegetative condition and stream temperatures are generally good within these drainages. Therefore projects enhancing other aquatic parameters in these areas should receive a higher priority (e.g. potential sediment source areas associated with roads).

Areas of second priority for restoration would be those in the worst condition. These areas are delineated in *Issue 2B: Riparian Vegetation*, this Chapter, indicating highest priorities for

silviculture restoration projects. Instream structure projects and road/culvert upgrade or obliteration projects are prioritized below.

1. LWM Low within Stream Channels

Install stream structures in areas devoid of large woody material; however, this material should be placed with little or no tie-down. Many log and boulder structures were tied down within the watershed; additional untied structures with rootwads should be added to the watershed in limited amounts. Andy Creek is an area identified as a lower gradient stream in need of large woody material. The low gradient would be conducive to placing structures without tying them down. Continue monitoring instream structure projects.

2. Tiedown LWM Conflicts in Fall Creek

Reassess instream projects in Fall Creek. This watershed analysis has shown that habitat in Lower and Middle Fall Creek is in good condition due to deep pools and bedrock shelves. Habitat limitations in this part of Fall Creek are primarily due to high water temperatures. Therefore instream structure placement would not improve aquatic conditions. Instream projects may also conflict with other users such as kayakers and swimmers. Structures of obvious human construction may conflict with the scenic views some recreationists expect in Fall Creek. In addition, if logs were tied down with cable, maintanence of the structures would be mandatory, since failure may expose cable to boaters and other recreationists and create safety hazards.

3. Sedimentation

Slope failures due to timber harvest and road building are found throughout the watershed. Debris flow areas tend to be more prone to these events. Such failures need identification and restoration where possible. Areas are prioritized below:

1) *Hehe Creek drainage:* This area has many existing failures and the creek has been impacted by fine sedimentation due to road failures and fires. Limiting fines entering the system would enhance the instream structures installed in Hehe Creek.
2) *Delp Creek:* This tributary also has many existing slides; however, the instream large wood component and riparian condition is relatively healthy.
3) *Nevergo, Upper Portland and Alder Creeks:* Portland and Alder have had many instream structures installed. Limiting fines from slides due to road or harvest units would enhance the restoration work already completed.
4) *Jones Creek:* Upper Jones has several road-related slides that would benefit from some type of restoration.

Roads known to be sediment sources or without funding for maintenance should be decommissioned, obliterated or weatherized so they are self maintaining. Bin walls can also be installed where specified. Roads of particular concern are 1832 in Hehe Creek and 1832-343 in Blowout Creek. The landing on 1832-341 should also be obliterated. When

conducting an Access and Travel Management Plan objectives from the Northwest Forest Plan and the Aquatic Conservation Strategy should be included.

Culvert failure may occur if culverts are not sized correctly or if maintenance is reduced. Culverts in danger of failing should be replaced so they can accomodate a 100-year event. Culverts surveyed in Portland and Hehe Creeks A survey was completed in Portland and Hehe Creeks and culverts needing replacement are listed in *Table 39* at the end of this Chapter.

The remainder of the watershed requires survey. Priority areas are similar to Items 1-4 listed above.

Types of road surfacing and amount of use can influence the quantity of fine sediment entering streams. Poor aggregate road surfacing should be identified throughout the watershed. Enhancement includes restricting use, resurfacing, reconstructing, decommissioning or stabilizing the aggregate. Again, priority areas would be similar to the ones stated above.

4. Maintain or Enhance Possible Cold Water Tributaries

The Northwest Forest Plan indicates the need to identify possible cold water refugia areas and to further enhance and protect those areas from habitat degradation. Possible cold water refugia locations were based on the riparian condition. These have been broken into three levels: the primary and best condition includes Slick, Bedrock, Clark, Platte, Briem and Saturn Creeks; secondary are Jones, Rubble and Gales Creeks; and Upper Alder and Delp Creeks are tertiary. These drainages should be surveyed to identify potential upslope enhancement projects that would further enhance aquatic habitat. Such projects may consist of riparian silviculture, road decommissioning or upgrading and culvert replacement. Riparian reserves should be maintained to their fullest widths.

5. High Stream Temperature

High stream temperature has been a concern in the Fall Creek drainage; however, it has improved over time. Riparian reserve width should be maintained throughout the watershed to assist this trend.

6. Unnatural Migration Barriers

Opportunities exist to increase connectivity in the aquatic system by eliminating upstream migration barriers to fish. Many culverts within the watershed do not allow upstream fish passage. This condition has created isolated resident populations of fish and eliminated fish from some reaches containing suitable habitat. Restoration projects allowing fish passage should be prioritized by the amount, quality and significance of habitat available to migrating fish.

Replace the identified culverts in Portland and Hehe Creeks from the survey *(See Table 39)*. Inventory the remainder of the watershed.

7. Anadromous Fish

Numbers of salmon and steelhead returning to the entire Willamette River system are dropping. However, the anadromous fishery in Fall Creek appears to be improving due to changes in drawdown during smolt outmigration. Cooperation with Oregon Department of Fish and Wildlife and Army Corps of Engineers should continue.

8. Facilities Located in Riparian Reserves

Assess recreation areas for erosion concerns within the riparian reserves. These areas should be stabilized to reduce fine sediment input to streams. Bedrock Campground is a known site in need of such enhancement.

ISSUE 4: LATE-SUCCESSIONAL RESERVES

The main intent of the Late Successional Reserve is to maintain a functional, interacting, late-successional forest ecosystem. There is a concern about conflicts with other uses in the LSR, such as recreation and road use/maintenance. Realizing that roads, trails and associated activities will continue in the future, the following recommendations are mitigation measures for this presence:

1. ***Road Density:*** Consider road closures throughout the LSR, while meeting multi-resource demands. These would be dead-end roads with low maintenance priority and potentially high resource impacts, if left open. A high priority closure to benefit wildlife would be the Briem/Platt Creek area (Road 18-365). Recommendations for road closures should be addressed in the District Access and Travel Management Plan.

2. ***Young Managed Plantations:*** Recommend silvicultural prescriptions that would enhance late-successional forest habitat within the LSR. Prescriptions would address:

   - Development of old-growth forest characteristics including snags, logs on the forest floor, large trees, and canopy gaps enabling establishment of multiple tree layers and diverse species composition, and
   - Prevention of large-scale disturbances by fire, wind, insects, and diseases that would destroy or limit the ability of reserves to sustain viable forest species populations.

   Priority stands would be identified in a more detailed Late-Successional Reserve Assessment.

3. ***Public Awareness:*** Provide interpretive signs along main Fall Creek addressing the current allocations within the watershed, with emphasis on the Late-Successional Reserve. Use a variety of methods to educate people before and during their visit to the watershed.

4. ***High Fuel Loading:*** Develop a Fire/Fuels Management Plan for the LSR. This should be incorporated into the Late-Successional Reserve Assessment.

ISSUE 5: RECREATION/SOCIAL

As the state population continues to increase and more people are expected to recreate outdoors (SCORP), it is recommended that the Lowell District continue to be proactive in managing the recreation resource. With monitoring information, the District can focus on areas requiring attention. Developing different methods to reach and educate forest users should reduce on-site infractions and increase user satisfaction and pride in their National Forest. Like all resources, forests are a function of socio-cultural appraisal; their apparent usefulness a reflection of societal perception. Hence the meaning and value of forests change over time and space (Stankey and Clark, 92).

1. ***Unsanitary site conditions***

- Monitor levels and location of occurance.
- Contact people at dispersed sites and demonstrate proper waste disposal methods; leave brochure if site is occupied, but no one is present.
- Analyze and implement corrective actions at heavily impacted sites. This could include closing the site temporarily or permanently; installing a temporary or permanent toilet; ticketing the offenders and charging them for clean up; or other management actions.

2. ***Increased recreation traffic***

- Monitor impacts to dispersed sites and trails.
- Rip and replant compacted areas of heavily impacted sites and repair trail sections identified in monitoring program.
- Contact users before they enter the watershed about minimum impact actions they can use to reduce damage.
- Analyze and implement actions to correct loss of vegetation, site compaction or erosion. These could include ripping and revegetating heavily impacted sites; temporary (during the wet season) or permanent closure; day use only; limitation on the length of site visits; signs or other methods of outreach on minimum impact camping techniques; site hardening or other management actions.

3. ***Restriction of access (road closure)***

- Analyze impacts to public and involve them during the ATM process.
- Write management guides for the Fall Creek viewshed, and Special Interest Area.
- Locate partners to help maintain roads, for example selling roadside alder blocking roads to purchasers for use in commercial mushroom production.
- Closed roads may be converted to trails for hikers, equestrians, mountain bikers and off road vehicles.

4. *Harvest Cycles*

Rehabilitation projects can utilize appropriated funds to accomplish management objectives. To better understand the complex relationship between the forest, the watershed, the Lowell Ranger District, local communities (Lowell, Pleasant Hill, Dexter, Eugene and Springfield) and their economic interdependence, a social assessment should be completed. This is best accomplished in a broad-scale analysis, at the Providence level.

5. *Adjacent land owners*

Initiating dialogue with adjacent and inholding land owners is good business. Trust can go a long way towards building partners in improving and maintaining the watershed.

The following table summarizes activities which may occur in Riparian Reserves. All projects must be consistent with the "Aquatic Conservation Strategy" (ACS) developed in the Northwest Forest Plan. The most important criteria for activities is maintaining or enhancing and not retarding or preventing attainment of the ACS. Activities listed below are based on the Northwest Forest Plan (FSEIS) or are recommendations from the watershed team (REC).

Table 38. Acceptable Management Activities in the Fall Creek Watershed

ACTIVITY	FSEIS	REC	COMMENTS
SALVAGE	☑		When catastrophic events degrade riparian conditions; If site-specific CWD requirements are met; Apply silvicultural practices needed to attain ACS; *Site specific NEPA is required.*
LOGGING SKYLINE CORRIDORS		☑	No closer than 200 feet; No wider than 20 feet; Trees cut must be left; *Site specific NEPA required.*
CABLE YARDING TAILHOLDS/ GUIDELINES		☑	No closer than 25 feet of the stream channel or above the break in slope; *Site specific NEPA required.*
CREATING/MAINTENANCE OF WATERSOURCES, (PUMP CHANCE)		☑	Allow for upstream mitigation and fish; Remove temporary structures at end of season; *Site specific NEPA required.*
FUEL TREATMENT		☑	Prescribe burning in native stands; Fuel reductions in managed stands(i.e., handpiles); Meadow maintenance; *Site specific NEPA required.*
NOXIOUS WEED TREATMENT		☑	
ROAD CLOSURES OR RECONSTRUCTION	☑		*Site specific NEPA required,* and/or ATM Plan.
ROCK QUARRY CONSTRUCTION		☑	Cannot occur in the riparian reserves.
ROCK QUARRY REHAB/CLOSURE		☑	*Site specific NEPA required.*
EROSION CONTROL-SEED AND FERTILIZATION		☑	Use native species, wherever practical.
ROADSIDE WASTING	☑		Restrict sidecasting as necessary to prevent the introduction of sediments into stream.
COMMERCIAL THINNING	☑		• Apply silvicultural practices for desired vegetation characteristics needed to attain ACS objectives (FSEIS, TM-1, C, pg.C-32). • 25-50' no-thin buffer; Variable density 50-300"; Target areas with low CWD and overstocking; Maintain tree species diversity. • Consider fire/landscape effects when planning no-thin areas; Retain all existing snags and down logs; Leave at least 2 trees per acre for CWD of the DBH class thinned; Minimum canopy closure should be approx. 50% of post-thin; *Site specific NEPA required.*

Table 38 *(continued)*. Acceptable Management Activities in the Fall Creek Watershed

ACTIVITY	FSEIS	REC	COMMENTS
PCT/YOUNG STAND DENSITY MANAGEMENT AND RELEASE		☑	Retain streambank trees; 25' no-thin on at least 20% of Class IV stream miles w/in a project area or w/in each watershed to provide heterogeneity of the landscape; Retain all hardwoods and yew; *Site specific NEPA required.*
PLANTING AND UNDERPLANTING		☑	Maintain diversity of tree and plants species for nonvascular epiphytes; *Site specific NEPA required.*
COLLECTION OF RESTORATION MATERIALS.		☑	Native species.
COLLECTION OF SPECIAL FOREST PRODUCTS			Cannot occur in the riparian reserves.
ROADSIDE MAINTENANCE	☑		See FSEIS, RF-2, a-g, pg.c-32
ROADSIDE BRUSHING		☑	*Site specific NEPA required.*
WILDLIFE TREE CREATION		☑	Retain tops on site; *Site specific NEPA required.*
IN-STREAM ENHANCEMENT PROJECTS	☑		Improve stream habitat and channel condition; Evaluate short-term impacts vs. long term benefits; *Site specific NEPA required.*
BROWSE CUTBACK/RELEASE OF TREES		☑	Maintain diversity of species and enhance structure for epiphytic nonvascular species; *Site specific NEPA required.*
FERTILIZATION-AERIAL		☑	Timing of application; rehabilitation purposes; keep out of open water; *Site specific NEPA required.*
FERTILIZATION-GROUND		☑	Timing of application; rehabilitation purposes; keep out of open water; *Site specific NEPA required.*
ANIMAL DAMAGE CONTROL		☑	*Site specific NEPA required.*
PRUNING		☑	No pruning w/in 50' of water and reduce prune stocking; *Site specific NEPA required.*
TRAIL / CAMPGROUND MAINTENANCE	☑		*Site specific NEPA required.*
TRAIL CONSTRUCTION/ RECONSTRUCTION	☑		*Site specific NEPA required.*

ATM and General Transportation Recommendations

Currently there are approximately 481 miles of road in the Fall Creek Watershed. At one time the Lowell Ranger District constructed about 12 miles of road per year, of which 60% were in the watershed. At present, no roads are being built and there are no plans to construct any within the next three to four years. Historically, the major use pattern has been one of 70% industrial (logging) and 30% public use (primarily recreation). These patterns are now reversed, with a public use of about 70%. Most of this is within two miles of the watershed edge, with a flurry of activity in the higher elevations during hunting season. Commercial use is expected to increase as logging resumes, but commercial use will never reach previous levels, while recreation use should grow reflecting the growth of nearby communities.

Road Management Objectives are currently in place for most roads owned by the Forest Service within the watershed, but these are outdated due to reallocation of land in the current Forest Plan (as amended by the Northwest Forest Plan). The RMOs address repeated access for the critical vehicle, currently listed as large yarders. This is no longer true, especially of land contained within the Late-Successional Reserves. Today the critical vehicle is a small self-propelled mobile yarder.

The Transportation Management System (TMS) database was field verified for the watershed analysis area and matches well with the GIS "Tran" layer. Much of the data within TMS is not geographic, however, and requires verification with current use trends and anticipated future requirements.

In the early 80's, an inventory of all-wheel track roads within the watershed was conducted under the direction of Emergency Directive Ten. At that time the District proactively identified roads required for future management, and they were added to the system. Other roads were closed or decommissioned. Few wheel track roads are left unmanaged within the watershed, but roads previously converted to system roads may no longer be required.

Road maintenance has decreased directly with the reduction in commercial use. Though maintenance records on specific roads were not kept, road maintenance budgets in general have been reduced to approximately 20% of historic levels. This cutback in funding resulted in a corresponding reduction in road maintenance. Previously, roads were maintained each year; some above their required maintenance level. Currently no roads are maintained above their assigned level, and it is thought that few, if any, are maintained at the level specified in the TMS. This is reflected in the current increase in slough material filling ditches and reduction in road width due to encroaching brush. As brush continues to encroach, these roads will become ever more difficult to access with heavy equipment to perform maintenance, resulting in more plugged drainage structures causing failed culverts and an increase in the amount of sediment delivery to an already stressed stream system. This makes the identification of unnecessary roads more critical and the need for decommissioning more obvious.

Roads requiring immediate attention due to their history of chronic maintenance problems include all or portions of the following:

- Road 1832 above the Hehe Burn (portions of this road continually migrate downslope into the Hehe Drainage.
- 1832-342 and 1832-341
- 1830-405, 1830-407 and 1830-409 roads constructed under the Starlite and Moonshine Sales
- Roads with tendencies toward or currently active landmovements: 1800-365, 1844, 1845, 1839, 1825, and portions of 1835.

Most of these roads are in Late-Successional Reserves and funding for corrective maintenance is not available through the timber sale program. These problem areas should be investigated for repair or decommissioning and submitted to the "Jobs in the Woods" program.

No existing data shows which roads are a concern for continuous delivery of sediment except those in danger of catastrophic failure, listed above. It is known, however, that all roads deliver sediment, and those driven deliver more sediment, especially if constructed from marginal quality rock. An investigation to identify roads contributing to fine sediment problems in streams is recommended.

All areas of the watershed are highly roaded and do not meet the open road density requirements as specified in the Wisdom Model for Big Game. This is true regardless of the area designation (High, Medium or Low Elk emphasis area). Clearly, if we are to meet these requirements, roads need to be decommissioned or closed for a portion of the year.

1. Road crossings at fish bearing streams:

- Identify and improve those stream crossings where fish passage has been eliminated or where crossing is determined to pose a substantial risk to riparian conditions
- Improve the structure so that it will accommodate the 100 year flood including associated bedload and debris.
- Perform a risk analysis on all Class I, II and III stream crossings to determine which crossings pose the highest risk of overtopping and schedule for repair as money becomes available.

2. Road surfacing:

- Identify locations, in riparian reserves, where poor quality aggregate contributes to sediment.

- Where possible, close those roads to use by motorized vehicles. Where vehicle restriction is not practicable, stabilize the rock by surface treatment, or blanket with a layer of high quality rock to provide a non sediment pNorthwest Forest Planucing wearing course. Where roads will be needed for commercial haul, encourage the use of CTI, by financial contributions, to reduce sediment pNorthwest Forest Planuction through rutting and maintenance.

3. ***Drainage structures in non fish bearing streams and ditch relief:***

- Identify where confined drainage is causing unacceptable erosion and correct through the addition of drainage structures, or, where possible, remove the drainage structure and outslope the road to restore natural drainage. If road is to be used for timber haul, identify and repair those places where confined drainages have caused excessive erosion and repair with purchaser credit.

4. ***Road fills and sidecast material:***

- Identify locations through field inventory.

- Where failures are identified, pull back unstable sidecast and fill material.

- Where the road facility is needed for continued access, stabilize through the use of geotextiles and remove the unstable buried woody debris. Where the road is not needed for future management, decommission road after doing material pull-back.

5. ***Stable but unvegetated fill and cut slopes:***

- Identify locations where fill and cut slopes are unvegetated and surface erosion is causing sedimentation problems, particularly in Riparian Reserves. Stabilize the slopes through the use of geotextiles and/or vegetative materials,.

6. ***Wet areas where road construction and the installation of CMP's has consolidated water causing changes in the micro-watershed:***

- Identify locations where this has occurred. Where roads must remain open for public or administrative needs, install additional structures to minimize disruption of natural hydrologic flow patterns, including diversion of streamflow and interception of surface and subsurface flow. Where roads are no longer needed, remove the structure and fill to allow the natural system to recover.

7. ***General Recommendation:***

- Complete an Access and Travel Management Plan for the Watershed to determine which roads are needed for continued access for our public and for administrative uses.

- Store roads with intermittent use in a closed condition. Decommission roads no longer needed to administer the Watershed. Where decommissioning is not feasible, reconstruct the roads so they do not contribute sediment to the watershed.

Table 39: Summary of culvert analysis for Portland and Hehe Drainages.

Road No.	Location	100 Year Storm Overtop Fill	Risk of Overtopping	Fish Passage	Fill Armored	Inside LSR	Priority for Repair
1825	MP 6.71 NEVERGO FK.	YES	HIGH	NO	NO	NO	HIGH
1825	MP 7.08 NEVERGO FK.	NO	HIGH	YES	YES	NO	LOW
1825	MP 7.83 NEVERGO CR.	NO	HIGH	NO	NO	NO	MEDIUM
1824210	MP0.41 NEVERGO FK.	NO	HIGH	NO	NO	NO	MEDIUM
1835	MP 11.93 PORTLAND FK	NO	HIGH	YES	NO	NO	MEDIUM
1835	MP 14.65 PORTLAND FK.	YES	HIGH	YES	NO	NO	HIGH
1835	MP 15.73 PORTLAND FK.	YES	MEDIUM	YES	NO	NO	HIGH
1835230	MP 0.33 PORTLAND FK.	YES	HIGH	YES	NO	NO	HIGH
1835240	MP 2.69 PORTLAND FK.	YES	MEDIUM	NO	NO	NO	MEDIUM
1835241	MP 0.95 PORTLAND FK.	NO	HIGH	NO	NO	NO	MEDIUM
1831	MP 0.63 SUNSHINE CR.	YES	LOW	NO	NO	YES	MEDIUM
1831	MP 0.84 HEHE TRIB.	NO	HIGH	NO	NO	YES	MEDIUM
1831	MP 1.62 HEHE TRIB.	YES	HIGH	NO	NO	YES	HIGH
1831	MP 3.17 HEHE TRIB.	NO	HIGH	NO	NO	YES	MEDIUM
1831	MP 3.93 HEHE TRIB.	NO	HIGH	YES	NO	YES	MEDIUM
1831	MP 4.12 HEHE TRIB.	YES	HIGH	NO	NO	YES	HIGH
1831	MP 6.80 HEHE CR.	NO	HIGH	NO	NO	YES	MEDIUM
1831382	MP 1.14 HEHE TRIB.	YES	MEDIUM	NO	NO	YES	HIGH
1831383	MP 1.35 HEHE TRIB.	NO	HIGH	NO	NO	YES	MEDIUM

TABLE 40: RECOMMENDATIONS

Issue 1: Threatened, Endangered and Sensitive Species

↑= Improving conditions ➔= Continuing/No Change
↓= Declining conditions ? = Unknown; Further Data Needed

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
1. Unknown Occurence		Throughout Watershed	?	?	♦ *Data Need:* Maintain or increase survey and monitoring effort
2. *Frasera* habitat	Harvest, Roads	Portland Creek	↓	↓	♦ Restore Hydro Regime/ habitat
3. *Cimifuga* habitat	Succession	Fall Creek	↓	↓	♦ Restore by over-story treatment of three to five trees in each occurrence area
4. Spotted Owl distribution in the Watersheds	Timber harvest, road building and interior forest habitat fragmentation	Throughout Watershed	↓	↑	♦ Enhance LS Forest Components, maintain interior habitat integrity ♦ Maintain and create CWD and snags where site specific analysis determines low levels
5. Impacts to potential Peregrine Falcon habitat	Timber harvest, road building and accompanying disturbance	Identified sites within the Watershed	?	?	♦ Enhance Forage ♦ Reduce disturbance by seasonal road closures ♦ *Data Need:* Increase survey and monitoring effort for this species
6. Harlequin Duck	Timber harvest, roads human use in riparian areas	Fall Cr, Lower Portland Cr, Lower Hehe Cr	?	?	♦ *Data Need:* Monitor to determine effects on breeding and nesting behavior during critical spring months ♦ Recommend mitigation if sensitive areas are found
7. Torrent Salamander. Tailed Frog	Timber harvest and roads	Upper Fall Cr, Nevergo Cr, Delp Cr, Alder Cr	↓	?	♦ *Data Need:* Monitor for presence and disturbance ♦ If found, assess risk of roads to sensitive sites ♦ Mitigate to reduce potential for road failures adjacent to riparian areas
8. Red Legged Frog	Timber harvest	Ninemile pond and other unknown locations	?	?	♦ *Data Need:* Survey other potential sites; monitor the Ninemile pond to determine changes in hydrology regime from timber harvest/road building ♦ Rehabilitate Ninemile pond by planting shade species

Fall Creek Watershed Analysis: Table 40.

↑= Improving conditions	➔= Continuing/No Change
↓= Declining conditions	? = Unknown; Further Data Needed

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
9. Band-tailed Pigeon	Human use in riparian areas	Fall Cr	?	?	• *Data Need*: Monitor known site to determine human use impact in the area and survey for other sites
10. Northwestern Pond Turtle	Human use in riparian areas & predation by exotic species	Full pool -Fall Cr Reservoir	↓	?	• *Data Need:* Work with ACE to determine nest location/use by radio telemetry and monitor impacts from recreational activities in the reservoir • *Data Need:* Determine impacts of exotic species on juvenile turtle recruitment into the reservoir population
11. Townsend's Big-eared Bat and other bat species	Timber harvest and roads	Throughout Watershed	?	?	• *Data Need:* Continue to survey and monitor for suitable sites and use of bridges in the watershed. Assess impacts of human use on known roosting/hibernacula sites • Protect and monitor the known cave site
12. Bald Eagle	Human use in riparian areas	Junction of Fall Creek and Fall Creek Reservoir			• Monitor BLM BEMA to determine use • Continue to monitor use of the reservoir and implement projects to enhance perch, roost and nest areas.

Issue 2A: Terrestrial Vegetation

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
1. Disturbance					
• Interrupted Natural Fire Cycle	Fire Suppression	Throughout Watershed	↓	↓	• *Data Need:* Research underburn regimes • Thinning • Prescribe burns • Mimic stand structure with variable density thinning or different retention levels in regeneration harvest units
• Successional process change, Late-Successional forest below Natural Range of Variability	Timber harvest	Throughout Watershed	↓	↑	• Accelerate late-Successional forest development

Fall Creek Watershed Analysis: Table 40.

↑ = Improving conditions	→ = Continuing/No Change
↓ = Declining conditions	? = Unknown; Further Data Needed

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
Disturbance (cont).					
♦ Loss of early seral conditions over time*	Fire suppression and reduced timber harvest	LSR		↓	♦ *Data Need:* Assess contribution of the watershed to overall viability of early seral associated species
♦ Increased windthrow on edges	Timber harvest, roads	Throughout Watershed	→	→	♦ Feather edges ♦ Minimize exposure ♦ Windproof trees by topping to reduce crown
2. Altered landscape patterns					
♦ Fragmentation of mature stands	Timber harvest, roads and fire suppression	Throughout Watershed	↓	↑	♦ Minimize fragmentation
♦ Loss of connectivity			?	↑	♦ Maintain and enhance dispersal corridors ♦ *Note:* Priority enhancement for dispersal/LS-Forest habitat would be along Alpine Ridge and Fall Creek/Winberry Divide. Maintain or improve late-Successional forest conditions where possible in the Andy Creek drainage. Harvest of late-Successional forest should be a low priority in this area. ♦ Use different management techniques in these corridor areas (vary retention levels and harvest methods)
♦ Smaller Patches			→	↑	♦ Increase patch size by aggregating harvest units with existing plantations
♦ Increased Edge			→	→	♦ Feather edges
♦ Reduced Interior Habitat			↓	↑	♦
♦ Reduced Late-Successional Forest Connectivity to Adjacent Watersheds			↓	↑	♦ Maintain an intact connective corridor between the Fall Creek watershed and adjacent Winberry Creek through the Andy Creek subwatershed; LS harvest should be low priority in this area

* Long-term trend (30-50 years from present)

Fall Creek Watershed Analysis: Table 40.

↑ = Improving conditions	→ = Continuing/No Change
↓ = Declining conditions	? = Unknown; Further Data Needed

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
3. Less Diverse Stand Composition and Structure	Timber harvest, roads and fire suppression	Throughout Watershed	↑	↑	♦ *Data Need:* Snag and CWD inventories in matrix lands ♦ Lower Fall Creek snag creation in natural stands. ♦ Thinning to create diversity and patchiness ♦ Snag/CWD retention and creation ♦ Underplanting to promote multi-storied stands
4. Changes in habitat diversity					
♦ Species composition	Timber harvest, roads and fire suppression	Throughout Watershed	↑	↑	♦ *Data Need:* Inventory SHAB's to determine effects of management and write restoration prescriptions ♦ Prescribed burning in dry meadow habitats ♦ Closing roads through the ATM process
♦ Habitat Fragmentation			↓	↑	♦
5. Noxious Weed Invasion	Roads, timber harvest	Throughout Watershed	→	→	♦ *Data Need:* Inventory roadless areas and meadows for invasion ♦ *Data Need:* Inventory noxious weeds and prioritize intNorthwest Forest Planuction of bio. control agents ♦ Develop non-invasive erosion control seed mix ♦ Prevention measures for invaders (Education)
6. Big game habitat quality					
♦ High open road density		Lower Fall Creek	→	→	♦ Identify roads to permanently or seasonally close through the ATM process
♦ Reduced early seral habitat over time, due to reduced regeneration harvest		LSR		↓	♦ Maintain or enhance Special Habitats (natural openings) ♦ Forage enhancement opportunities
♦ Conflict in Management direction for habitat effectiveness analysis/S&G's			→	→	♦ Conflict in management direction - Change and update big game modeling parameters to better represent management activities and habitat conditions

Fall Creek Watershed Analysis: Table 40.

↑ = Improving conditions	→ = Continuing/No Change
↓ = Declining conditions	? = Unknown; Further Data Needed

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
7. Current Martin/Pileated network	N/A	Matrix	?		• Conflict in management direction - With approximately 79% of the watershed in no harvest allocations and interim riparian widths, current martin/pileated areas should be returned to matrix
8. Special Forest PNorthwest Forest Planucts (SFP's) harvest levels	Harvest activity conflicts with Willamette's Forest Plan Direction	Matrix LSR	→	?	• *Data Need:* Monitor compliance with permit requirements • Offer SFP's in association with timber harvest units
9. Northwest Forest Plan Table C-3 Species	Timber harvest, roads and fire suppression	Throughout Watershed	↓	↑	• *Data Need:* Survey for C-3 species at the project level • Consider special land designations if "hot spots" are found • Evaluate role of prescribed burning in maintenance of *Allotrope* (Candystick)

Issue 2B: Riparian Vegetation

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
1. Riparian seral condition outside HRV % early seral is high % late seral is low	Timber harvest	Throughout Watershed	↑	↑	• Maintain Northwest Forest Plan riparian reserves • Accelerate Late -Successional conditions in riparian areas using various silviculture methods • Tributaries with the poorest riparian seral condition: Timber, Andy, Boundary, North Fork Fall, Hehe, Logan, Portland and Nevergo Creeks. Riparian silviculture projects may enhance conditions. • Recommend evakuation of private land in the watershed. • Work with private landowners to maintain or enhance habitat.
2. Roads adversely affect riparian dispersal-create barriers **See Table XX Chapter 3*	High road density especially in riparian areas	Throughout Watershed	→	?	• *Data Need:* Research and monitor roads and their impacts on wildlife movement and dispersal • Reduce road densities through decommissioning consistent with ATM and Northwest Forest Plan objectives

↑= Improving conditions ➔= Continuing/No Change
↓= Declining conditions ? = Unknown; Further Data Needed

Issue 3: Aquatic Habitat

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
1. LWM low within stream channels	Timber harvest and salvage	Throughout Watershed	↑	↑	♦ Continue to monitor previous enhancement projects for effectiveness ♦ Restore streams by placement of in stream structures. Recommend no tiedowns for a few structures per mile. ♦ Priority - Andy Creek
2. Tiedown - LWM conflicts with recreation ♦ Unknown impacts to a dynamic system from placement of static structures ♦ Impacts of structures on aesthetics and safety	N/A	Throughout Watershed	↑	↑	♦ Reassess the need for new projects in Fall Creek
3. Sedimentation					
♦ Slope failures	Roads and timber harvest	Throughout the watershed, and specifically: Landing pullback 1832/341; Hehe 1832; Blowout Creek 1832/343	➔	➔	♦ High priority areas for inventory and restoration work are 1) Hehe Creek 2) Delp/Nevergo/Upper Portland Creeks 3) Alder/Jones Creeks ♦ Specifically decommission/obliterate/install bin walls ♦ Utilize slope failure and culvert inventory information to assess failure impacts to resources
♦ Culvert failure	Size of culvert/reduced maintenance	Throughout Watershed	↓	↓	♦ *Data Need:* Survey watershed for potential culvert replacement. Prioritize based on risk to the resource. ♦ Replace specified culverts identified from Portland/Hehe Creeks inventory that do not meet 100 year event specifications.

♦

Fall Creek Watershed Analysis: Table 40.

↑= Improving conditions → = Continuing/No Change
↓= Declining conditions ? = Unknown; Further Data Needed

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
♦ Impacts from roads ♦ See Transprotation Section in Chapter 3 for specific sites	N/A	Throughout Watershed	→	→	♦ Need to identify where road surfacing is poor quality aggregate ♦ Restrict use or resurface with high quality rock ♦ Decommission ♦ Reconstruct ♦ Resurface ♦ Stabilize the aggregate or immobilize the fines in the aggregate
4. Maintain and enhance possible cold water tributaries	N/A	Listed in order of priority: Slick, Bedrock, Clark, Platt, Briem, Saturn, Jones, Rubble, Gales, Upper Alder, Delp	↑	↑	♦ *Data Need:* Survey and identify potential upslope enhancement projects
5. High stream temperature	Timber harvest, roads, salvage	Mainstem Fall, Hehe, and Portland Creeks	↑	↑	♦ Maintain Riparian Reserves
6. Unnatural migration barriers	Roads/culverts	Throughout Watershed	→	→	♦ *Data Need:* Inventory the watershed to determine barriers ♦ Replace culverts in Portland/Hehe Creeks that have previously been identified as barriers *(Refer to Transportation report at the end of this Chapter)*
7. Anadromous Fish	Fall Creek Dam	Fall Creek	→	→	♦ Continue cooperation with ODFW and ACE
8. Facilities are located in riparian reserves	Human use in riparian areas	Mainstem Fall Creek	→	→	♦ Mitigate sedimentation from recreation sites

↑= Improving conditions	➔= Continuing/No Change
↓= Declining conditions	? = Unknown; Further Data Needed

Issue 4: Late-Successional Reserves

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
1. High road density within LSR	Roads	Throughout LSR		➔	♦ Prioritize closure and/or decommission/obliterating during LSR assessment/ATM process
2. High percent of early seral stands that lack structure and diversity	Timber harvest and fire suppression	Throughout LSR		↑	♦ Prescriptions for young managed stands to move toward Late Successional forest
3. Need for public awareness/interpretation	N/A	Throughout LSR		↑	♦ Interpretive techniques explaining the purpose of the various land allocations within the watershed. Should be focused along main Fall Creek in high use areas.
4. High Fuel Loading	Fire Suppression	Throughout LSR		↓	♦ Identify and prioritize stands for fuels treatment to reduce fuel loadings above natural conditions

Issue 5: Recreation/Social

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
Human Activity					
1. Unsanitary site conditions (potentially health related)	Human use	Riparian Reserves	↓	↓	♦ *Data Need:* Monitor use ♦ Education in proper human waste disposal ♦ Mitigate the heavily impacted dispersed sites ♦ Ticket and require clean up

Fall Creek Watershed Analysis: Table 40

↑ = Improving conditions	→ = Continuing/No Change
↓ = Declining conditions	? = Unknown; Further Data Needed

Findings	Causal Activity	Location	Trend Matrix	Trend LSR	Recommendation
2. Increased recreational traffic (especially during wet season in dispersed sites)	Human use	Riparian Reserves	↓	↓	• Rehabilitate vegetation/compaction on heavy use sites • Monitor use/impacts • Educate for minimum impact camping/trail use • Harden sites for use to decrease sedimentation /site degradation • Close sites/trails • Limit number of days/length of stay • Day use only
3. Restriction of access	Road Closure	Throughout Watershed	↓	↓	• Address in ATM (Public involvement) • Prepare management plan for Fall Creek Special Interest Area • Find partners for maintenance • Convert roads to multi-purpose trails
4. Harvest Cycles	Change in management direction	Throughout Watershed	→	→	• Appropriated funds directed towards rehabilitation projects • Conduct social assessment • Continue use of LA's in Harvesting/treating hazard trees
5. Adjacent landowner	N/A	Downstream and inholdings	N/A	N/A	• Create partnerships • Consider inholding acquisition or exchange