CHAPTER 9 - MANAGEMENT OPPORTUNITIES FOR WOLF CREEK

The preceeding chapters have attempted to lay the ground work for understanding the past conditions of the watershed the current conditions and the desirable future conditions (the future condition is being worked on). It should not be looked upon that systems need to be fixed in order to proceed to some desired goal. This analysis is only the first of many to follow and future iterations will have the opportunity to address specific issues in detail and to gather specific data. The following opportunities are not exhaustive by any streatch but, will begin the first attempt to return complexity back to the ecosystem. As we learn and understand the science of ecosystems additional opportunities will surface.

The Aquatic Ecosystem

Erosion/Sediment - There are opportunities to reduce the estimated sediment yield from roads. Contrary to popular assumption, dirt spurs are playing a minor role (3% of total yield) as are bare cut banks along gravel roads. The greatest opportunity for reducing total tons of annual sediment yield (82% of total) is on the heavy traffic, mainline haul roads that parallel most major drainages and Wolf Creek itself.

Lowering traffic levels is not considered feasible as land ownership is a checkerboard pattern with every other section owned by the public and the sections in-between owned by International Paper Company for the most part.

Road sediment, generated by large truck traffic, can be reduced by utilizing reduced tire pressure by as much as 50 percent through the application of Central Tire Inflation (CTI) technology on large trucks operating within the watershed. This has an added benefit of lowering road maintenance costs.[1] Paving the mainline, moderate and heavy traffic haul routes, has the potential to reduce the sediment from roads in the Wolf Creek Basin by 70 percent, thus eliminating all but 538 tons/year of sediment from roads.

Other less significant opportunities include subsoiling, seeding, planting dirt surfaced roads, and eliminating them from the road network. This would, however, only address 3 percent of the yield. Low traffic gravel spurs could be gated further reducing traffic on these roads for a small but significant reduction of about 14 percent. A combination of gating low traffic gravel roads with contributing potential, and the paving of mainline haul routes along Wolf Creek and major tributaries such as Oat Creek, Swamp Creek, Eames Creek, and Panther Creek would reduce sediment yields from roads to about 15 percent of their current levels.

Hillslope surface erosion potential is low for the watershed as a whole, but there are areas that have moderate and high potential for erosion if mineral soil is exposed and disturbed (see Map 4). The most effective method to assure insignificant surface erosion, even on the low erosion potential areas, is to maintain a cover of vegetation and duff. In most instances, maintenance of the duff layer will maintain the natural rate of hillslope surface erosion. The duff layer acts as a cover to prevent raindrop dislodgment of soil particles, acts as a sponge to absorb water, and increase the infiltration capacity of the site. Therefore, it is most important to maintain the protective covering for soils with "High" and "Moderate" erosion potential.

Forest management activities that are likely to cause the most soil disturbance, and thus the greatest potential for increased erosion, are road and landing construction, log yarding, and broadcast burning. Current, state of the art road construction practices have dramatically reduced the landslide frequency rate from that of pre-1975 road construction practices.

"Root strength" is the one factor influencing slope stability that is under human control or influence to a great degree, and plays a major role in affecting the natural rate and impacts of landslides in these watersheds. The root masses of trees and brush perform 4 functions critical to the stability of slopes within the watershed:

- Deplete soil moisture
- Anchor the soil mass through joints, fractures and bedding planes

- Contribute to soil aggregation by binding masses of soil particles together
- Co-occupy a common soil volume by lateral edges of 2 or more neighboring root masses

Impacts from harvesting to the beneficial attributes of root masses take 3 to 5 years because of the gradual loss of tensile strength as the roots decay. Impacts from hot, intense fire can be almost immediate due to actual destruction of roots through burning. Leaving the trees and other vegetation on site in critical landform positions is theoretically capable of preventing most of the acceleration in either rates (frequency) or magnitude (volume, length, etc.) of landslide events over the natural rates and volumes.

Both International Paper Company and the BLM have, at considerable expense, recovered side cast on old roads that showed future potential for instability. The road system within the Wolf Creek watershed is up to current specifications and is unlikely to generate a pattern of accelerated sliding during even a catastrophic storm year.

Hydrology/Channel Morphology - There are several methods to manipulate stream flows through vegetation manipulation and changes in road location, type, and density. No flow manipulation should be attempted at this time, because the effects of different flow regimes on beneficial uses are not known. As these effects become understood for the Wolf Creek watershed, the opportunity for change may be available.

There is an opportunity to add structure to the streams. The removal of stream structure has had the greatest negative impact on the aquatic ecosystem of all human activities. There is also the highest confidence that lack of stream structure is detrimental to the hydrologic functioning and the amount of habitat in the stream system. There are opportunities to add structure to streams and mitigate much of the past damage as well as opportunities to speed up the natural input of structure, through silvicultural treatments in riparian areas.

There are opportunities to add temporary structures to the streams until natural processes recover. This structure will provide habitat for fish and other aquatic organisms as well as improve channel morphology and improve the hydrologic functioning of stream channels, riparian areas, and flood plain.

The main stem of Wolf Creek below Oat Creek will get the greatest benefit from added structure. A plan is already developed to add fish habitat structures in the Wolf Creek Basin, and some of the work has already been done. This plan includes adding logs and boulders to the creek in order to trap sediment and gravels which will raise the stream bed. It is also designed to provide habitat for salmonids. In order to improve the channel morphology, hydrology, and riparian function in the watershed it will be necessary to continue with this work. If the work is stopped now, a great opportunity will be lost. There is an opportunity to improve the present plan and use new and innovative methods to increase the benefits of this work. No amount of artificial structures will replace natural structure.

There is an opportunity to improve stream structure by including channel morphology considerations in the design of any stream crossing structure. Presently, culvert installation and replacements are designed for fish passage and road protection. Because culverts act as controls on stream gradient they often lower the stream bed. Culvert design can be used to accomplish many of the objectives of stream channel improvement. A procedure that ensures that channel morphology and fish habitat considerations are included in culvert design is needed.

Fisheries - Habitat improvement projects should continue to be a priority for project development within the Wolf Creek watershed, especially along the main stem of Wolf Creek. Other project areas include: Saleratus, Bill Lewis, Pittenger, Gall, Oat, Grenshaw, Swamp, Panther, and Swing Log creeks. These projects should be developed with the naturally occurring processes in the watershed taken into account. There have already been several areas within the watershed that have been designated as project areas. These areas have been surveyed and mapped for several projects both on BLM and private lands. Cooperation with adjacent landowners for the placement of in-stream structures should be actively encouraged and continued.

To ensure that the projects designed for aquatic restoration or fish habitat improvement meet the needs of the watershed, the objectives for these projects should be in concert with the natural processes in the watershed. Further analysis in the watershed may discover processes currently unknown, and projects can be tailored to those processes. Monitoring

of these projects should be a priority to determine if the objectives are being met.

Riparian conversion or enhancement projects are currently being planned in the watershed. There have been several areas designated as needing some level of riparian vegetation enhancement on public lands. These creeks include: Bill Lewis, Pittenger, Gall, Grenshaw, Eames and Wolf creeks. Projects of this type need to take into account the time line for meeting the project objectives. The ultimate goal for these projects is to develop reserve areas where the introduction of down woody material into the stream occurs naturally. These projects will not meet full fruition for approximately 125 to 150 years, depending on the natural soil productivity and development of planted conifers. Short-term benefits are realized by the introduction of man-made structures into the system; however, these projects last approximately 25 to 50 years if the conditions are right. Therefore, after the decline and breakdown of the structure placed into the stream, the riparian vegetation improvement projects will not benefit the stream system for approximately another 50 to 75 years.[2] This produces a gap of time when there is essentially no structure in the stream system. Methods of remedying this may include:

- creating additional structures in the stream system at 25 to 50 years after the first structures are placed;
- reconstructing existing structures; or
- planting trees that grow much quicker and provide structural components at a faster rate than Douglas-fir.

A tree species that may meet the third suggestion is the black cottonwood. These trees reach maturity in approximately 40 years of age and become large enough to be a benefit as structure in the stream. However, this species is of relatively low density within the watershed, with one large patch and individual trees scattered throughout the watershed. Where cottonwoods are present in the watershed, this technique may conform with the natural processes in those locations. The priority areas identified in the watershed for these types of projects are the lower and middle thirds of main stem Wolf Creek. These areas show the highest water temperatures and the least amount of habitat components currently available for instream structure. For instream structures to provide the most benefits in this area, the trees need to be of substantial size to span Wolf Creek for stability. In addition, the development of large trees will assist in lowering water temperatures by shading the creek. Currently, there are only 2 locations in the watershed where large woody material is naturally being produced and introduced into the stream system. These areas are located at the mouth of Saleratus Creek and near an unnamed tributary on the south side of Wolf Creek, approximately one-mile east of Eames Creek. Smaller structures can aid in the recovery of a habitat in a stream by falling in the stream and collecting other material at the same point. This can be as or even more effective as larger structures or components falling into a stream, provided these smaller components stay in the stream system and are not immediately flushed out.

Culvert replacements and improvements are another form of projects that have been identified for the Wolf Creek watershed. Fish biologists in the Coast Range Resource Area have identified at least 19 culverts in the watershed where fish passage could be improved (see Appendix 8). Improving or replacing culverts for fish passage can be the easiest and quickest way to add additional fish habitat to the entire watershed[2]. Initial costs could be relatively high; however this cost is outweighed by the ease of operation and long-term benefits.

The development of suitable rearing habitat for fish has historically occurred through beaver activities in the watershed. Trapping in the watershed has depleted the number of beavers, and current numbers are unknown. The reintroduction or transplanting of beavers into stream systems with relatively little activity, can provide habitat structures and create habitat with potentially little or no cost to land management agencies. These animals naturally create habitat components that humans attempt to simulate with man-made structures. In addition to in-stream structures, beavers are natural riparian conversion specialists, removing standing hardwoods and allowing young conifers to grow. Areas that may benefit the most and be the least difficult to reintroduce beavers are the major tributaries to Wolf Creek above the creeks' confluence with Wolf Creek. Analysis for this type of project should determine if the construction of beaver dams in the streams poses a hazard to highly traveled bridges, roads, or private property. Currently beavers are not introduced within 10 miles of residences unless all residents in that area agree. Projects of this caliber should only be conducted with the assistance of the Oregon Department of Fish and Wildlife. Evaluation of whether the reintroduction of beavers in the area is warrented or not should be conducted prior to such reintroductions. This would include surveys

to determine abundance and relative density of beavers already in the area.

The ultimate goal behind developing projects within the watershed is to provide suitable habitat for fish spawning and rearing. Both of these habitat types are very limited within the watershed and creation of off-channel pools, in-channel pools, improving or replacing culverts for fish passage, and riparian conversion projects should contribute to the overall ability of the watershed to provide fish habitat.

The Terrestrial Ecosystem

Silvicultural Objectives - The management activities need to reflect site specific prescriptions that embody the ecological principles and objectives from the ROD. The following are some of the management objectives identified in the ROD.

General Forest lands - "Production of timber and other commodities is an important objective for the matrix. However, forests in the matrix function as connectivity between Late-Successional Reserves and provide habitat for a variety of organisms associated with both late-successional and younger forests. Standards and guidelines for the matrix are designed to provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as downed logs, snags, and large trees. The matrix will also add ecological diversity by providing early-successional habitat." "Matrix objectives for silviculture should include:

- production of commercial yields of wood, including those species such as Pacific yew and western red cedar that require extended rotations,
- retention of moderate levels of ecologically valuable old growth components such as snags, logs, and relatively large green trees, and
- increasing ecological diversity by providing early-successional habitat."[3]

Late-Successional Reserves - "Desired late-successional and old growth characteristics that will be created as younger stands change through successional development include:

- multispecies and multilayer assemblages of trees,
- moderate-to-high numbers of large logs and snags,
- 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 accumulations of fungi, lichens, and bryophytes."

"Silvicultural Systems proposed for Late-Successional Reserves have two principal objectives:

- development of old forest characteristics including snags, logs on the forest floor, large trees, and canopy gaps that enable 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 the reserves to sustain viable forest species populations."

"Thinning prescriptions should encourage development of diverse stands with large trees and a variety of species in the overstory and understory."[2]

Riparian Reserves - One of the objectives of the Aquatic Conservation Strategy is to "maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration, and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability." "Active silvicultural programs will be necessary to restore large conifers in riparian Reserves. Appropriate practices may include planting unstable areas such as landslides along streams and flood terraces, thinning densely-stocked young stands to encourage development of large conifers, releasing young conifers from overtopping hardwoods, and reforesting shrub and hardwood-dominated stands with conifers. These practices can be implemented along with silvicultural treatments in upland areas, although the practices will differ in objective and, consequently,

design."[2]

Silvicultural Treatments - The management opportunities involving silvicultural treatments are numerous throughout the watershed. Existing stands still need continued management. The gamut of treatments considered range from traditional activities like planting and replanting, animal protection, vegetation management, release, precommercial thinning, and fertilization to noxious weed control.

Planting and Replanting - These are approved treatments across all Land Use Allocations (LUA). The stocking objectives for these stands currently remains unchanged.[4] Therefore, these stands need to be planted/replanted to a stocking level sufficient to at least meet current minimum stocking standards. The prescription for these treatments is expected to vary in species mix and/or planting density to reflect the different management objectives by LUA. This is particularly the case within the interim Riparian Reserves.

Protection Treatments - These treatments are approved for use across all land use allocations. Protection treatments necessary to support meeting the stocking objectives are a site specific prescription. The protection prescription is expected to be site specific and vary somewhat between LUAs to accommodate the different objectives, especially within the interim Riparian Reserves.

Vegetation Management - Application of stand maintenance treatments to control competing vegetation on unestablished stands are approved treatments across all LUAs. However, the site specific prescription that designates species to be controlled or favored needs to be reflective of the long-term management objectives for that LUA (see Silvicultural Objectives, Chapter 9). This is especially true in the Riparian Reserve areas where maintaining the species mix as well as assisting in the establishment of conifers are both important outcomes (see Chapter 5, Riparian Area species composition).

Stand Release Treatments - Release treatments applied to established stands are approved for all LUAs. Stand release is designed to produce stands that are "free to grow" as a result of treatment. The objectives for stand release need to be clearly identified for the different LUAs to customize application not only to the LUA but also the individual site (Chapter 9, Silvicultural Objectives). The species mix and stand composition, growth rates, and stand density need to be well documented in order to monitor the effectiveness of the prescription in meeting landscape and LUA goals. The prescription for some stands may vary within the stand. For instance, the interim Riparian Reserve area may have a different prescription then the upland areas.

Precommercial Thinning/Density Management - Precommercial thinning (PCT) and density management are approved treatments for all LUAs. Precommercial thinning is designed primarily to produce fast growing, evenly spaced forests for commercial purposes. Density management is a thinning/removal treatment designed to redistribute growth among individuals, species, or portions of stands to meet management objectives other than commercial forest products. Precommercial thinning is a planned part of the harvest scheduling model for General Forest lands and as such is expected to be applied within that LUA. Density management treatments are more suitable for application within Riparian Reserves, Late-Successional and Marbled Murrelet Reserves and can be utilized to promote differential growth rates between individuals or species within a stand. The use of density management treatments to grow bigger trees faster is the intent, although it has not yet been tested and proven. Both PCT and density management may be applied to the same stand. The application of either of these treatments requires clearly identified objectives for each site to prepare the appropriate prescription.

Fertilization - Fertilization is an approved practice within the General Forest lands and was a planned component in the harvest scheduling model for these lands. Application of fertilizer on General Forest lands is intended to enhance and maintain the growth rates of trees within selected stands. Fertilization has historically been applied to stands that have already been thinned or are considered well spaced. However, the use of fertilization need not be restricted to General Forest lands only. There may be need/reasons to perform individual tree/clump fertilization to accomplish objectives other then enhancing growth of commercial forest stands. Using fertilization to produce large trees within Riparian Reserves or other important locations within the basin requires careful application and consideration, but may be a useful treatment for meeting LUA objectives.

Noxious Weed Control - Opportunities exist for the control of noxious weeds within the watershed. The primary species of concern are Scotch broom and meadow knapweed. Projects are currently under development for manual and mechanical removal of these 2 species watershed wide. These projects need to concentrate on the most recent infestation sites where the probability of successful removal/eradication is highest. The overall strategy of treating new infestations is first to create weed free areas and then move into the older, more established weed sites over time.

Timber Management

Timber harvest opportunities exist to a limited degree within the watershed. Based upon the Old Forest retention standards, there are 985 acres available. However, the LUAs further limit these opportunities. There are approximately 2,844 acres of General Forest LUA in the basin from our analysis with a total of 807 net operable acres from BLM inventory calculations. The timber management and harvest opportunities are expected to occur in 2 separate forms: final harvest and commercial thinning/density management harvests.

Final Harvest - Currently there are 35 to 40 acres of age 80 plus timber available for harvest within the General Forest LUA in the Wolf Creek watershed based upon current inventory calculations. There are approximately 122 net operable acres that are over the minimum harvest age of 40 available within the watershed, and about 85 net, operable acres in the age 60 to 79 age classes. Final harvest activities are expected to be very limited based upon these calculations and occur within the General Forest LUA.

Density Management/Commercial Thinnings - This form of harvest can be executed across all LUAs but the primary objectives are different in each LUA. Only stands less then 80 years of age are available for this treatment. Each planned treatment will need to identify the LUA objectives (see Silvicultural Objectives) and design the thinning or density management prescription based upon these objectives and site specific objectives and constraints.

BLM manages approximately 3,750 acres classified in the pole-young type across all LUAs with about 50 percent of this type within the Riparian Reserves. Approximately 2,100 acres (56%) of this pole-young type occur in Late-Successional Reserves and Marbled Murrelet Reserves and the remainder occur in the General Forest lands. From this, it is not totally clear the extent that density management and commercial thinning will play in the available timber harvest within Wolf Creek watershed.

Wildlife Habitat Management

There are many management opportunities and objectives listed in the Eugene District Fish and Wildlife 2000[5] that can be implemented in the Wolf Creek watershed. These objectives are designed to be accomplished independently and are ranked in order of priority. In all cases, the priority ranking reflects the District's view of those objectives most critical to meeting BLM mandates and goals.

The highest priority projects for terrestrial systems should be road management opportunities. This could be a full Transportation Management Objective (TMO) or projects on a case-by-case basis specifically designed for an area or road system. Road management can best alleviate the problem of habitat effectiveness for elk in the watershed. Even though it has been recognized that most spur roads in the watershed do not substantially introduce sediment to the streams, closing roads can help to stifle the impacts that siltation has on aquatic ecosystems.

There is no set directive for road closures that would provide the greatest benefit to wildlife and fisheries in the watershed. The Oregon Department of Fish and Wildlife (ODFW) suggested that the closure of roads benefiting elk should be spread throughout the watershed, particularly concentrating on spur roads and other dead-end roads. This method does not concentrate the hunting pressure on one particular area of the watershed, defeating the purpose of road closures. ODFW has found, through hunter surveys, that hunters prefer to hunt in areas where they can walk into easily and where there are no other hunters present.[6] By distributing road closures throughout the watershed, there will be more opportunities for this situation to occur. With higher concentrations of elk in the western portion of the watershed, road closures should be accomplished in this area first. Road closures in the eastern portion of the watershed, where there are residences, will be difficult and should be limited to short spur roads or areas of concern.

Another opportunity within the watershed to increase the habitat effectiveness for elk is to create small openings that would remain open for elk forage. The openings should be no larger than 200 yards across to provide foraging areas and still be close to cover. These areas would best benefit elk by seeding with native grasses and other native forage species. Current habitat conditions within the watershed show a large amount of forage available for elk in the western half. However, as private forested lands in the watershed, the amount of forage available for elk will decrease for approximately 40 to 50 years until harvesting begins again. Furthermore, because of the forest management techniques used in developing forest stands for harvest, the amount of forage that is available for elk is minimized as trees develop, the canopy closes, and the use of herbicides to control competition with young Douglas-fir. Naturally developing stands remain in a grass/forb/shrub seral stage much longer than those that are managed. This provides a higher variety and quality of forage for elk over a longer period. Therefore, there is an opportunity when developing Late-Successional Reserve management plans, to accommodate habitat essential for elk and create openings in the developing forests.

An opportunity involving Late Successional Reserve Land Use Allocations in the watershed involves the removal of large trees from LSR's to provide down wood in other Land Use Allocations that are lacking in the required amount. These large trees can also be used to provide habitat for amphibians and invertebrates where habitat for these species is limited or lacking.

Other opportunities for the enhancement of habitats within the watershed arise from acquisition and conservation easements. By consolidating and "blocking-up" land within the watershed, a more flexible management approach can be taken. With the current land ownership pattern in the watershed, the ability for BLM to manage one section of land hinges upon the management activities in the adjacent section of land. This is most crucial in the management of Riparian Reserves. Federal mandate requires that fish-bearing streams on federally managed lands have a buffer width of "a length equal to two site potential trees." Until further analysis is conducted, this distance will be approximately 420 feet on each side of the stream. The State of Oregon's Forestry Practices Act of 1994, has indicated that a no harvest buffer of 25 feet on each side of a fish-bearing stream be set aside as a stream buffer. Furthermore, the conditions of the current riparian buffers on private lands will not change appreciably over time, as private industry normally does not manipulate areas that are not used for timber production. With the disparity in the sizes of buffers across the landscape, it becomes more difficult for a Federal agency to manage these Riparian Reserves for the objectives that were designated. Species may benefit from the reserves on Federal lands, but because wildlife species are "ownership blind," they lose those benefits when crossing onto private lands.

There is an opportunity to provide additional special habitat within the watershed by acquiring and rehabilitating a drained pond existing on private land near Gall Creek (T. 18 S., R. 7 W., Section 34). This pond once provided habitat for frogs and other amphibians within the area; however, since the pond was drained it has overgrown with herbaceous plant species and has little or no standing water. This area includes several large cottonwood trees and other species of plants that survive in standing water.

Riparian Reserve Areas

Silviculture

Opportunities for stand management and manipulation exists in within the riparian areas. The primary area of focus is lower and middle main stem Wolf Creek. The majority of the riparian areas along Wolf Creek are lacking in large wood capability. The management opportunities involve density management/thinnings and underplanting to alter the stand structure and composition as well as to create larger diameter trees somewhat faster than without density management. The primary objectives for silvicultural treatments within the Riparian Reserves along Wolf Creek is not only the future large wood but to increase the shading of Wolf Creek. It is expected that by increasing the shading along Wolf Creek the water temperatures will be cooled. The species mix of these stands is expected to resemble the mix currently present in the basin's riparian areas: about 60 percent hardwoods, 25 percent Douglas-fir, and 10-15 percent other conifers. In addition, there is expected to be a lag time in the future when the man-made structures currently installed and proposed for installation deteriorate and cease functioning, and the time when the Riparian Reserve vegetation is capable of producing woody structure of sufficient size. In order to shorten or reduce this time lag, density management and thinning of the following stand types presents a current management need and opportunity.

Young Hardwood Stands - The management opportunity for these stands involves releasing existing conifers present within these stands as well as the introduction/underplanting of conifers into the stands where none currently exist. This can be done with a variety of silvicultural treatments. The treatment of this stand type needs to assure retention of all large, overstory trees, especially conifer and bigleaf maple, in order to fully meet the shade and large wood objectives.

Old Hardwood Stands - The management opportunity that is present in this stand type involves releasing existing conifers and underplanting conifers. These stands are capable of providing large wood to a limited degree to the stream system presently; therefore, large conifers and maples present in locations where these trees could fall into the stream need to be retained within the current stand. Alder patches that are present within these stands are candidates for removal and/or thinning to underplant.

Early Seral-Sapling Stands - These stands should be considered for management within the riparian areas so that thinning and density management treatments can be scheduled. Thinning of these stands will allow for the redistribution of growth potential within the stand to the better growing individuals. Selecting trees that are along the streams will provide for woody structure in the future, capturing the fast, juvenile growth period where tree size (diameter primarily) can be enhanced and increased. All large, overstory conifers and maples should be retained to provide near term wood supply to Wolf Creek. This is anticipated to be primarily a release type of prescription where no merchantable products are generated.

Pole-Young Stands - These stands offer some management opportunity of a commercial nature. The majority of these stands are of sufficient size and age to allow manipulation of the stand density by thinning and selective removal. Again, the primary focus is the redistribution of growth potential within the stand to selected individuals so that larger trees close to the streams can be grown more rapidly. This treatment is anticipated to generate products of commercial value and as such should be scheduled with thinnings and treatments of the upslope parts of these stands. This treatment needs to maintain the existing diversity in the stand composition, retain existing large overstory conifer and maples, be focused on reaches of the stream where this future large wood can end up in the stream, and be adaptable to on-site features and conditions.

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