

CHAPTER 2.0—RECOMMENDATIONS AND A RANGE OF ALTERNATIVE RECOMMENDATIONS

2.1 INTRODUCTION

Alternatives including the Recommended Action is the heart of this document (Galena WA, Supplement—2002). This chapter describes the activities of the No-Action Alternative and all action alternatives. Then based on the descriptions of the relevant resources in Chapter 3: Affected Environment, and the predicted effects of all alternatives in Chapter 4.0 Environmental Consequences, this chapter presents the predicted attainment of project objectives and the predicted effects of all alternatives on the quality of the human environment in comparative form, providing a clear basis for choice among the options for the decision maker and the public.

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2.2 PROCESS AND DESIGN USED TO FORMULATE THE ALTERNATIVES

2.2.1 PROCESS

The key issues to the recommended action described in Chapter 1 (see pages 30-34) of this document helped to formulate the range of alternatives, prescribe mitigation measures, and to focus the analysis to the affected environment.

In the Columbia River Basin, the Forest Service and the Bureau of Land Management manage salmonid habitat under the direction of PACFISH⁴² (USDA AND USDI 1994) and INFISH Inland Native Fish Strategy; (USDA 1995). These interim management strategies endeavor to protect areas that add to salmonid recovery and improve riparian habitat and water quality throughout the basin, which includes the John Day subbasin. These strategies have also facilitated the ability of the federal land managers to meet requirements of the ESA (see above) and avoid jeopardy. Under PACFISH/INFISH the seven subwatersheds have been denoted “key watersheds” to protect and restore important fish habitats. PACFISH guidelines have been used in recommendations for restoration in the analysis area for the protection of habitat and threatened populations of anadromous fish. These guidelines have been used in all design of recommended restoration for Aquatic, Vegetation and Infrastructure projects (see 2.2 Process and Design Used to Formulate the Alternatives, page 38). INFISH guidelines have been used in

⁴² *Interim Strategies for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California* USDA Forest Service and USDI Bureau of Land Management (February 1995). This is an interim strategy for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California.

recommendations for restoration in the analysis area for the protection of habitat and threatened populations of bull trout.

To meet recovery objectives, these strategies have been key in establishing watershed and riparian goals to maintain or restore all fish habitat. Under PACFISH/INFISH watershed analyses such as this present analysis will be used to set priorities and provide guidance on priorities for watershed restoration.

The no action alternative is included and provides a basis for comparing the environmental effects of the action alternatives including the recommended action.

Projects and associated mitigation were combined to address the key issues logically while moving toward fulfillment of the purpose and need.

Some resource projects and mitigation were common among the action alternatives, while other projects and mitigation varied across the range of alternative.

The decision maker will have the prerogative to combine design or mitigation elements from any of the alternatives in the decision document—to form the Forest Service's Recommended Alternative.

2.2.2 DESIGN

Multiple projects or actions were identified that would begin to effectively move resources in the *Analysis Area (Galena WA, Supplement—2002)* toward the desired conditions. The major project categories are **Aquatics, Vegetation, and Infrastructure**. These projects impact the hydrologic function and vegetation character of the area and are aligned with the Purpose and Need (see page 6). These categories are used in the following detailed descriptions for all action alternatives.

2.2.2.1 Aquatics

Proper aquatic function across the landscape is invaluable to all resources and in particular the riparian-wetland areas. The proper upland hydrologic function directly influences riparian areas and benefits a wide variety of needs for fish and wildlife habitat, watershed protection, and human uses. Projects were designed to meet objectives specifically for hydrologic function and fisheries habitat; but are expected to have benefits for all resources across the landscape. Projects includes: riparian planting and protection, in-stream structure creation, woody debris placement, channel modification and slash-filter windrow placement in uplands.

The scale of projects vary across the range of alternatives, and will have varying levels of success in meeting the purpose and need for recommended action. Cumulatively, projects described later under vegetation and infrastructure would also contribute to the long-term benefits in the function of the area's aquatics.

The Analysis Area (*Galena WA, Supplement—2002*) supports the following Threatened Endangered and Sensitive fish species (TES): Columbia Basin Bull Trout (Threatened), Mid-Columbia River Summer-run Steelhead (Threatened), and Chinook Salmon (Sensitive) that must be considered for Essential Fish Habitat. Projects were designed to improve habitat and rectify elements of undesired conditions that are detrimental to threatened fish.

2.2.2.2 Vegetation

Vegetation projects in the action alternatives are designed to move vegetation toward the Historic Range of Variability (HRV) making them more resilient to disturbances such as wildfire and insect infestations, reducing the uncharacteristic severity that has been occurring due to current forest stand conditions. These treatments would move forest stands toward a more resilient balance of forest stand and tree composition, structure, and distribution.

Implementation Tool—Mechanical Treatments

All action alternatives reduce tree stocking by way of mechanical harvest, including both commercial and non-commercial harvest (i.e. precommercial thinning). Moderate- to high-risk forest stands were included for treatment to reduce stocking, or to shift tree species composition from encroaching late seral species, such as grand fir back to historic ponderosa pine and western larch dominated stands. The amount of stand management and treatments prescribed depends on the issues that an individual alternative is addressing. These features are included in 2.5 Format and Description of the Projects, page 48; Implementation Tool—Mechanical Treatments.

Implementation Tool—Fire Treatment

All action alternatives would implement prescribed fire. Prescribed burning would be implemented in forest stands that are primarily stocked with ponderosa pine, western larch, and Douglas-fir and which may contain understories of undesirable species such as grand fir or western juniper that have become established as a result of fire exclusion. A low intensity ground fire with flame lengths less than four-feet is planned to meet the objectives of fuel reductions, vegetation treatment, and resource protection. Burn intensity would be varied on a site-specific basis, depending on weather, fuel, topographic, and tree characteristics to result in no more than 30 percent crown scorch of the dominant and co-dominant trees. The scorching of the lower live branches is desirable to reduce the chance of tree crowns being ignited by a wildfire. Understory trees that are in excess and not needed to meet other resource needs can exceed 30 percent crown scorch. Mosaic burning including some unburned areas is desirable to have diversity in ground vegetation stages. This vegetation modification would allow prescribed fire to be safely used at the landscape level, in an effort to mimic the historic role of fire as described below.

The amount of prescribed fire will vary across the action alternatives depending on the level of harvest and issue implementation. Harvest prescriptions incorporate fuel reduction by mechanical methods and prescribed fire as a connected action. In the areas outside these harvest areas, fire would be implemented to restore resilient structure and restore fire regimes and establish a trend toward HRV.

Mechanical and burning prescriptions were designed, in part, to address: hydrology, fisheries, visual, wildlife, recreation and heritage resources. These features are included in 2.5 Format and Description of the Projects, page 48; Implementation Tool—Mechanical Treatments page 59 and 2.5.4.2 Implementation Tool—Fire Treatment page 70.

Dedicated and Replacement Old Growth Designation

To provide future habitat needs for pileated woodpeckers and pine martens, the action alternatives would expand Dedicated Old Growth (DOG) areas, Replacement Old Growth (ROG) areas, and Pileated Woodpecker Feeding Areas (PWFAs). Alternatives vary as to the number of acres managed for these species. A system of DOGs, ROGs and PWFAs would provide the means for managing large contiguous blocks of habitat through time.

Wildlife connectivity between old-growth areas would be addressed through a system of wildlife corridors, also referred to as *Land and Resource Management Plan* Amendment #2 wildlife corridors or LRMP2 corridors. Mechanical and fire prescriptions would be modified to maintain higher levels of wildlife cover than the standard prescriptions.

Aspen Restoration

The action alternatives would help restore aspen stands. Conifer trees encroaching on aspens would be harvested, felled and left on site, or converted into wildlife snags. Fences would be constructed around aspen stands to protect new regeneration from deer, elk or livestock.

Noxious weeds

The action alternatives would treat noxious weed sites. Alternatives vary regarding whether chemical or manual measures are used to eradicate the weeds.

2.2.2.3 Infrastructure

Resource needs, user groups, modes of travel, economic and legal issues, traffic, and safety requirements were all considered in developing projects responding to the network of roads, trails and trailheads, and dispersed campsites. National and Regional policy was incorporated along with Forest direction and standards from the *Land and Resource Management Plan*.

An optimum road and trail system is a function of land stewardship needs and management objectives. These needs and objectives are in a state of change. Therefore, reassessing road and trail systems and their needs is a dynamic process. A balance between the benefits of public and management access and potential effects on other values and resources such as clean water, fish and wildlife habitat, and maintaining choices for future generations is explored in this project.

A proper balance will result in a more efficient transportation system with less risk to the environment and public safety. Methods considered in responding to resource and public needs were: decommissioning, closing, constructing, reconstructing, maintaining, and relocating the roads, trails, or campsites.

2.2.3 ADAPTIVE MANAGEMENT/MONITORING

2.2.3.1 Vegetation

Harvest

A number of units contain a minimal amount of saw log material. If during layout of these mechanical prescriptions, the market values are down and the cost of harvesting a particular unit is not economical, the benefits of pre-commercial thinning, decking the material, removal of the material by other methods, or burning would be explored. If a change or changes are made and not considered substantial and are within or near the anticipated affects described in Chapter 4.0, then documentation of these changes would be filed and projects would be implemented. However, if the changes are considered substantial, the effects are outside the current ranges of alternatives, or the responsible official feels that the interested public should be informed and given an opportunity to respond to the changes, then additional NEPA or public participation would occur.

Harvest and small tree thin prescriptions implemented in the range of action alternatives include commercial thinning (HTH), commercial thinning in connectivity stands (HTH1), shelterwood (HSH), salvage removal (HSV), understory removal (HUR), small tree thinning (SPC), and modified small tree thinning (SPC1).

Prescribed Fire

Actual acres burned over the ten-year project activity period would probably be fewer than recommended. It is ultimately up to the burn boss on each prescribed fire to meet resource objectives.

Before prescribed fire can be ignited, a burn plan would be prepared outlining some of the decisions of where and when to burn in order to meet:

- ❑ Resource Objectives;
- ❑ Area by area conditions (e.g. forest stand density, fuel accumulations);
- ❑ Designed mitigations for resource protection, and
- ❑ Weather conditions needed to meet the fire intensity and treatment objectives.

A combination of drip torches, fusees, flare guns, ATVs with mounted drip torches, and helicopters may be used to ignite these burns.

Implementing burning may take place over a 10 year period due to:

- ❑ The large size of the area to be burned,
- ❑ Smoke management restrictions,

- Limited days that conditions would allow burning e.g. weather, and
- Timing of possible timber sales and other mechanical treatments.

However, this burning program should be examined every 3 to 5 years to ensure intent of this decision, objectives for the burn, and trends or results of applied burns are meeting current management direction at that time.

2.2.3.2 Infrastructure

The *Southeast Galena Roads Analysis* as directed by the USDA Forest Service (August 1999) was conducted specifically for this Analysis Area (Galena WA, Supplement—2002). The roads analysis process is intended to complement and integrate previous and ongoing analytical processes. This document incorporates information from the Roads Analysis and may be modified through an adaptive management approach as refinement and better, site-specific information is gathered.

If changes occur and continue to be within the anticipated effects analyzed in the context of this analysis, they may be implemented as needed. If the change is found to be outside the range of anticipated effects or the responsible official feels that the public should be informed and allowed opportunity to respond to these changes, then additional NEPA, or public involvement will be needed. Regulatory agencies would be informed, per Endangered Species Act requirement as this new information becomes available.

2.3 ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

2.3.1 Roads in Roadless Areas (*Land and Resource Management Plan Appendix C*)

Pending the Final Rule of 36 CFR Part 294 Special Areas; *Roadless Area Conservation*, direction from this rule was considered in this analysis process. Early in the planning process, consideration was given to building roads into the Dixie Butte Roadless Area. New roads would have facilitated ground-based logging systems to provide the most economic return while reducing forest stand risk to insect infestation, disease infection, and reducing the likelihood of uncharacteristically severe wildfire. Subpart B Section 294.12 of the above Rule states that road construction and road reconstruction in inventoried roadless areas are prohibited with some exceptions. The purpose and need for the *Southeast Galena Restoration Project* would not meet the criteria as any of these exceptions. Therefore, pursuant to prohibitions in the aforementioned Rule, road construction in Dixie Butte Roadless Area was dropped from detailed analysis.

2.3.2 Harvest and Prescribed Fire in the Scenic and Wildlife Emphasis Areas

Timber harvest and prescribed fire were both considered within portions of the Vinegar Hill-Indian Rock Scenic Areas and the Dixie Butte Wildlife Emphasis Area (see Appendix E, Map 3-Management Areas and Roadless Areas). The *LRMP* does not permit scheduled harvest within these Management Areas unless it benefits respective resources.

Timber harvest was considered but dropped because in the short-term existing vegetation is currently in a condition that generally benefits, rather than harms, wildlife and scenic integrity. Most of these areas are in Cold Forest and Moist Forest types. Vegetation conditions are relatively close to historic conditions particularly at higher elevations in these areas. Although conditions in lower elevations may be outside HRV, the 2000 *Canada Lynx Conservation Assessment and Strategy* suggests a conservative approach toward habitat management. In addition, the 1996 Summit Fire destroyed a large portion of the available

lynx habitat in the Galena Watershed. Consequently, additional habitat modification should be deferred until portions of the Summit Fire area have revegetated.

Prescribed fire was considered but dropped for two reasons: 1) frequent underburning is outside the historic fire regime for Cold Forest types and much of the Moist Forest types; and 2) where frequent fire was the historic fire regime, such as in lower elevations, existing vegetation conditions are not within the expected HRV in structure and composition that would allow prescribed fire without resulting in unacceptable tree mortality (see 2.3.6 Prescribed Fire within Higher Elevation Moist & Cold Forest Stands, page 44).

Therefore, because of the considerations just described, a conservative approach was decided upon for both the scenic and wildlife emphasis areas in order to preserve the current amenities.

2.3.3 Harvest within RHCAs

Analysis of timber harvest within RHCAs to help sustain riparian objectives was considered early in the process of project objectives. Field reconnaissance and stream surveys have revealed that many stream channels in the Analysis Area (Galena WA, Supplement—2002) do not have sufficient large wood. An exception is the headwaters of Vinegar Creek where a blow down event occurred, leaving an excess of large down wood on about 1,400 acres (see 1.2.1.3 **Undesired Condition: Damaged Aquatic** Habitat page 11). A portion of this downed material is being included for removal in action Alternatives 2 and 5 to reduce fuel accumulations and assist in lowering the severity of potential fire and improving ease of control of wildfire, which may occur. Prescribed fire would also be allowed to back down into RHCAs in some locations in Alternatives 2, 4 and 5. Some RHCAs have been denuded of vegetation and soil due to past hydraulic mining (see 1.2.1.3 **Undesired Condition: Damaged Aquatic** Habitat page 11).

Harvest within RHCAs, was eliminated from detailed study due to the overall lack of large woody material and riparian vegetation, except for: 1) the area in Vincent and Vinegar Creek headwaters where the wind event of 1998 occurred; and 2) treatment in aspen enhancement units (treatment of conifers encroaching into Aspen stands) in Alternatives 2 and 5. Therefore, other than the previously mentioned two exceptions, harvest in RHCAs was eliminated from detailed analysis because of the overall lack of large woody material and the general lack of riparian vegetation within the Analysis Area (Galena WA, Supplement—2002).

2.3.4 Reconstruction of Forest Rd. 4559 access to Lemon Cabin

A segment of Forest Road 4559 is currently closed due to a washout of the road at the Lemon Creek drainage which occurred in 1998. Reconstruction would allow vehicles to access a cabin site as well as the scenic area trailhead. The Lemon cabin, built in the 1920s for a mining claim and is now National Forest property. Reconstruction of Forest Road 4559 for access to Lemon Cabin and Vinegar Hill-Indian Rock Scenic Area trailhead was considered. Reconstructing the closed segment of Forest Road 4559 would entail removing the deposited material from the washout (in an area with threatened fish species), installation of a major culvert which meets current standards at the Lemon Creek crossing, and replacement of an existing bridge over Granite Boulder Creek (just above the cabin). Such an undertaking would be costly and produce limited benefits. Even if a new culvert is installed, because large debris deposits have accumulated upstream, the Lemon Creek crossing would continue to be vulnerable to another washout. Therefore, decision not to repair this bridge was based on the age and high cost of bridge repair. Additionally, a decision not to reconstruct Forest Road 4559 to allow vehicles to access the cabin site, as well as the scenic area trailhead, was made in a similar manner based on the high cost of such a project and the distinct possibility of a continued failure of Lemon Creek drainage after reconstruction.

2.3.5 Blackeye and Tempest Mine Trailheads

The following actions were considered for the Forest Road 4559, the Blackeye Trailhead, and the Tempest Mine Trailhead: 1) Currently, a road closure on Road 4559 and Junction of Road 4559283 is not adequate for a trailhead. This area was considered for a trailhead, but because it can not facilitate vehicles with horse trailers, or recreational vehicle campers, this area is not adequate. Creating a trailhead here would have created traffic problems which could not have been alleviated without cost-prohibitive and adverse impacts to fisheries resources. This site was not large enough to support a desired level of parking, or would have required removal of a large amount of fill dirt causing affects to fish habitat. Therefore, a road closure on Road 4559 and Junction of Road 4559283 is not adequate for a trailhead. 2) Another trailhead location was considered at the end of Road 4557; this new section of trail would have been on steep ground and consequently not a good location. The final location which was considered but eliminated from detailed analysis is located at the end of Road 4559283. To connect this new trailhead location to the existing trail, construction of a connector trail would have been necessary this action would have crossed the headwaters of Granite Boulder Creek creating resource concerns in an area with threatened fish species. Therefore, the trailhead options described above were eliminated from detailed analysis because of inadequate location and because two existing trailheads provide adequate access to the trail system into the Vinegar Hill—Indian Rock Scenic Area. One of these trailheads are located off Forest Road 4555 on the Sunrise Butte Trail system, and the other is located on Forest Road 2010 (see Appendix E, Map31—recommended Trails, Trailheads, and Campsite Projects—for Action alternatives).

2.3.6 Prescribed Fire within Higher Elevation Moist & Cold Forest Stands

Prescribed fire was considered in the wetter portions of the Moist Forest and Cold Forest types. However, these forest types are dominated by late seral species with thin bark and full crowns that often reach the ground, creating ladder fuels. As a result, heavy mortality can be expected from most fires due to bole scorch, torching, and crowning activity even in low intensity fires.

Therefore, due to these areas currently resembling what can be expected in these forest types and due to the risk of a severe fire to occur, it was decided to not apply prescribed fire at this time. High tree mortality and large block of acres can be expected to be lost. Additionally, because of the uncharacteristically severe wildfires of the 1990's in the Galena watershed, the creation of additional areas of stand replacement burns is not desired.

2.4 ALTERNATIVES CONSIDERED IN DETAIL

The following alternatives are described with recommended actions which differ alternative to alternative.

2.4.1 Alternative 1—No Action

No action would occur under this alternative meaning that existing *Land and Resource Management Plan* activities and past decisions would continue as currently planned. Other opportunities may be implemented on a subwatershed scale, or smaller as the need arises and proper planning procedures are conducted. Current Access Travel Management planning would continue communication with consulting agencies. Activities such as road maintenance, fire suppression, firewood cutting, administering recreation policies and routine trail and road maintenance would continue to occur as well as wildlife, vegetation, hydrologic, and cultural surveys. Restoration planning activities on a large landscape scale as described in the recommended action and other alternatives to the recommended action would not happen. However, site specific opportunities with the appropriate planning documents for implementation could occur at any time.

2.4.2 Alternative 2—Recommended Action

This alternative would initiate restoration management across the landscape: this includes 20% mechanical treatment by commercial harvest; 6% mechanical treatment by pre-commercial thinning; and prescribed burning on 47% of the Analysis Area (Galena WA, Supplement—2002). The total Analysis Area (Galena WA, Supplement—2002) includes National Forest land and other ownerships encompassing seven subwatersheds totaling 49,473 acres of the greater Galena Watershed (see Map A Vicinity Map page i). Restoration projects are designed to begin reversing adverse hydrologic/fisheries and vegetation trends while accelerating other slowly improving riparian trends. Project activities would improve hydrologic/fisheries conditions such as stream-channel stability, riparian shade, stream meander, and peak stream flows in early spring toward their properly functioning condition. Heavy equipment would be used within stream channels to improve hydrologic function and fisheries habitat.

Vegetation projects are designed to move forest stands and associated vegetation such as stand structure and tree species mix toward their historic range. New roads would be included in this proposal to access areas for management as well as relocate other roads currently located in RHCAs. Most new roads would be closed upon completion of these projects and a number of roads no longer needed for management, recreation access, or are causing resource damage would be decommissioned and removed from the transportation system. Prescribed fire and mechanical methods, including commercial harvest using tractor, skyline, and helicopter systems and precommercial thinning would be used to implement vegetation prescriptions in order to improve and enhance the growth, quality, vigor, and resiliency of forest stands across the landscape. This includes intermediate treatments (thinning), within the Malheur National Forest *Land and Resource Management Plan* designated Roadless Areas (LRMP Appendix C). A number of wood products including commercial timber, post and poles, pulp wood, fire wood, and biomass for power generation would be realized with this treatment. Aspen stands would also be enhanced through a number of restoration projects including felling or girdling of encroaching conifer, hand piling and burning of slash, planting of aspen, and fencing to discourage ungulate pressure. Trees felled within conifer treatment in aspen sites, which occur in RHCAs may be removed as long as down and in stream LWD standards are met.

Restorative activities described below could have begun in 2003, and most actions would have been completed within the next five years. The timing of restorative measures such as prescriptive harvest and thinning, prescribed fire and road work will be dependent upon further legal planning requirements, timing opportunities, funding, and safety factors. Because safety and other factors must be applied on a project by project basis, it is estimated that fire prescriptions may take up to ten years to complete. In 3 to 5 years after legal planning requirements are met, projects such as prescribed fire that are not complete will be evaluated to ensure management direction and intent are being met at that time.

Aquatics Projects

While some riparian areas are slowly improving naturally, implementation of aquatic projects now, would begin accelerating conditions in a manner that threatened fish populations would begin to benefit from an improved riparian environment at the time of implementation. Aquatic project activities would improve hydrologic/fisheries conditions such as: stream-channel stability; riparian shade; and the lack of a meandering nature streams currently exhibit. These conditions collectively cause peak stream flows in early spring to allow too much water to leave the landscape too soon, with the consequence of low water flow and high water temperatures during late summer months. To improve hydrologic function and fisheries habitat, some projects within certain stream channels it would be necessary to implement the use of heavy equipment in stream channels. Project actions would improve hydrologic/fisheries conditions toward a properly functioning condition (e.g. culvert replacement at road crossings to allow all life stages of threatened fish stream connectivity).

Vegetation Projects

This recommended action would initiate restoration management across the landscape: this includes 20% mechanical treatment by commercial harvest; 6% mechanical treatment by pre-commercial thinning; and

prescribed burning on 47% of the Analysis Area (Galena WA, Supplement—2002) . A number of projects are designed to move vegetative conditions such as forest stand structure and tree species mix toward an historic range. Prescribed fire and mechanical methods accomplish this transition. Mechanical methods include: commercial harvest implemented by tractor; skyline; and helicopter systems. Additionally, pre-commercial thinning would be used to implement vegetation prescriptions in order to improve and enhance the growth, quality, vigor, and resiliency of forest stands across the landscape. This includes intermediate treatments (generally small-diameter trees), within the Malheur National Forest *Land and Resource Management Plan*⁴³ designated Roadless Areas (LRMP Appendix C). A number of wood products including commercial timber, post and poles, pulp wood, fire wood, and other wood products such as biomass would be an outcome of these treatments.

Infrastructure Projects

Some roads or road segments that are currently located in Riparian Habitat Conservation Areas (RHCA) would be relocated. For the location of Riparian Habitat Conservation Areas see Appendix E, Map 3—Management Areas and Roadless Areas and Map 29—Access Travel Management Plan Alternatives 2, 3, and 4. The relocated roads or road segments would be constructed outside of the RHCA area, and then the old locations would be decommissioned. New roads would be constructed to access areas for prescribed vegetation management where necessary. Many of the new roads would be closed upon completion of project activities. Existing roads that are still needed to provide access for management or recreation would receive reconstruction or maintenance work needed to improve user safety and reduce road related impacts to other resources. Roads no longer needed for management or recreation access would be decommissioned and removed from the transportation system.

To see specific project intensity for all projects, refer to **Table 68**, page 103. See also Appendix E, Map 8—Stream and Riparian Rehabilitation for Action Alternatives; Map 13—Recommended Logging Systems Alternative 2; Map 16—Prescribed Fire Opportunities Alternative 2 and 5; Map 20—Wildlife Connectivity—For Action Alternatives; Map 29—Access Travel Management Plan Alternatives 2, 3, and 4; Map 31—Recommended Trails, Trailheads, and Campsite Projects—For Action Alternatives; Map 28—Noxious Weed Sites—Existing Condition; and Map 9—Recommended Mechanical Treatments Alternative 2.

A non-significant *Land and Resource Management Plan* amendment would be required to :

- Reduce big game cover below *Land and Resource Management Plan* standards (in summer range) in the Little Boulder/Deerhorn subwatershed.

Modify existing DOG/ROG boundaries to match logical topographical features such as stream and roads and/or existing stand boundaries, and to meet minimum *Land and Resource Management Plan* standards.

2.4.3 Alternative 3—Reduced Short-Term Impacts

This alternative strives to reduce potential short-term impacts to the Analysis Area (Galena WA, Supplement—2002) from direct impacts from the long-term restoration treatments. For instance, only hand crews would be used to implement instream projects and heavy equipment would not be used. Approximately 15% of the Analysis Area (Galena WA, Supplement—2002) would be mechanically treated by commercial harvest (commercial thinning, understory removal, salvage, and shelterwood treatments), 5% would be pre-commercial thinned, and 22% of the Analysis Area (Galena WA, Supplement—2002) would be prescribed burned outside mechanical treatment areas (most areas mechanically treated would also be prescribed burned). There would be no use of chemical herbicides or rodenticides for seedling protection. There would not be any commercial harvesting in *Land and Resource Management Plan* inventoried roadless areas. The same access management plan would be implemented as for Alternative

⁴³ Malheur National Forest *Land and Resource Management Plan* 1990 (also referred to as the Forest Plan or LRMP)

2, with a few minor differences due to the reduced harvesting. Products such as commercial timber, post & poles, pulpwood, biomass, and firewood would still be realized.

For a better understanding of specific project intensity refer to Table 68, page 103. See also Appendix E, Map 8—Stream and Riparian Rehabilitation for Action Alternatives; Map 10—Recommended Mechanical Treatments Alternative 3; Map 20—Wildlife Connectivity—For Action Alternatives;; Map 14—Recommended Logging Systems Alternative3; Map 29—Access Travel Management Plan Alternatives 2, 3, and 4; Map 24—Big Game Cover Alternative 3; Map 28—Noxious Weed Sites—Existing Condition; and Map 31—Recommended Trails, Trailheads, and Campsite Projects—For Action Alternatives.

A non-significant *Land and Resource Management Plan* amendment would be required to :

- ❑ Modify existing DOG/ROG boundaries to match logical topographical features such as stream and roads and/or existing stand boundaries, and to meet minimum *Land and Resource Management Plan* standards.
- ❑ To expand DOGs/ROGs/PWFAs for pileated woodpeckers from 600 acres to 900 acres to better meet home range size.

2.4.4 Alternative 4—No Harvest Restoration

Alternative 4 strives to enhance and improve the area's vegetative processes with out the use of commercial harvest. The area's vegetation will be treated by use of prescribed fire on 39% and pre-commercial thinning on 6% of the Analysis Area (Galena WA, Supplement—2002) (2/3 of the thinning would be prescribed burned, 1/3 would not). Trees would not be removed as a timber sale product. Some relocation of roads out of RHCAs would occur and no heavy equipment would be used within stream channel restoration projects. Prescribed fire and pre-commercial thinning would occur within the *Land and Resource Management Plan* inventoried roadless areas. See the comparison table below for more detail.

For a better understanding of specific project intensity refer to Table 68, page 103. See also Appendix E, Map 11—Recommended Mechanical Treatments Alternative 4; Map 31—Recommended Trails, Trailheads, and Campsite Projects—For Action Alternatives; Map 29—Access Travel Management Plan Alternatives 2, 3, Map 28—Noxious Weed Sites—Existing Condition; and 4; Map 25—Big Game Cover Alternative 4; and Map 11—Recommended Mechanical Treatments Alternative 4.

A significant *Land and Resource Management Plan* amendment would be required to:

- ❑ Reclassification of Davis Creek Trail to non-motorized use exclusively.

A non-significant *Land and Resource Management Plan* amendment would be required to:

- ❑ Reduce big game cover below LRMP standards (in summer range) in the Little Boulder/Deerhorn subwatershed.
- ❑ Modify existing DOG/ROG boundaries to match logical topographical features such as stream and roads and/or existing stand boundaries, and to meet minimum LRMP standards.

2.4.5 Alternative 5—Additional Treated Areas— Increased Access

Alternative 5 is more aggressive in treating vegetation to increase sustainability and resiliency. Approximately 23% of the Analysis Area (Galena WA, Supplement—2002) would be mechanically treated by commercial harvest (commercial thinning, understory removal, salvage, and shelterwood treatments), 6% would be pre-commercial thinned, and 22% of the Analysis Area would be prescribed burned outside mechanical treatment areas (most areas mechanically treated would also be prescribed burned). This alternative reduces harvesting costs by incorporating more tractor skidding and less helicopter yarding. This alternative would require additional new roads and would leave more roads open than recommended in Alternatives 2 or 3. Identified roads no longer needed for management, recreation access, or are

causing resource damage would be decommissioned and removed from the transportation system. Hydrologic/fisheries projects are similar to Alternative 2 in that heavy equipment would be used within stream channels. The *Land and Resource Management Plan* inventoried roadless areas would also receive more treatment than in Alternative 2. Various wood products would be realized as in Alternative 2. For a more complete understanding of the intensity of the projects within this and each alternative see Table 68, page 103. See also Appendix E, Map 12—Recommended Mechanical Treatments Alternative 5; Map 15—Recommended Logging Systems Alternative 5; Map 16—Prescribed Fire Opportunities Alternative 2 and 5; Map 30—Access Travel Management Plan Alternatives 5; Map 28—Noxious Weed Sites—Existing Condition; and Map 31—Recommended Trails, Trailheads, and Campsite Projects—For Action Alternatives.

A non-significant *Land and Resource Management Plan* amendment would be required to :

- ❑ Reduce big game cover below LRMP standards (in summer range) in the Vincent and Little Boulder/Deerhorn subwatersheds.
- ❑ Reduce big game cover below LRMP standards (in winter range) in the Tincup/Little Butte subwatershed.
- ❑ Increase open road densities beyond LRMP standards in the Vincent subwatershed, (in summer range) and the Little Boulder/Deerhorn and Butte subwatersheds (in winter range).
- ❑ Modify existing DOG/ROG boundaries to match logical topographical features such as stream and roads and/or existing stand boundaries, and to meet minimum LRMP standards.

2.5 FORMAT AND DESCRIPTION OF THE PROJECTS

2.5.1 FORMAT

The format of the following project descriptions will use the same outline as displayed earlier with the major headings of **Aquatics**, **Vegetation**, and **Infrastructure**.

These three project headings are delineated further into the sub-headings listed below. This format will help the decision maker and reader to better understand and track the multiple projects within each alternative. **Aquatics** includes the sub-categories of Hydrology and Fisheries. **Vegetation** includes the sub-categories of Conifer and Associated Vegetation, Aspen Stands and Noxious Weeds. **Infrastructure** includes the sub-categories of Roads, Trails and Trailheads, and Dispersed Campsites.

Table 13 Projects per Alternative

PROJECTS	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Hydrology					
Streamside/Riparian Hardwood Protection	No	Yes	Yes	Yes	Yes
Streamside/Riparian Planting and Protection	No	Yes	Yes	Yes	Yes
Channel/Streamside Projects	No	Yes	Yes	Yes	Yes
Area Projects	No	Yes	Yes	Yes	Yes
Channel/Floodplain Rehabilitation	No	Yes	No	No	Yes
Fisheries					
New Instream Structures	No	Yes	No	No	Yes
Improve Existing Instream Structures	No	Yes	Yes	Yes	Yes
Riparian Planting	No	Yes	Yes	Yes	Yes

PROJECTS	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Culvert Removal or Replacement	No	Yes	Yes	Yes	Yes
Vegetation					
Conifer and Associated Vegetation					
Harvest	No	Yes	Yes	No	Yes
Pre-commercial Thin	No	Yes	Yes	Yes	Yes
Prescribed Fire	No	Yes	Yes	Yes	Yes
Aspen Enhancement	No	Yes	Yes	Yes	Yes
Noxious Weed Control (C,M)	No	C,M	M	M	C,M
Infrastructure					
Roads					
Hazardous Tree Removal	No	Yes	Yes	Yes	Yes
New Roads per Mechanical Treatment	No	Yes	Yes	No	Yes
Reconstruction	No	Yes	Yes	Yes	Yes
Decommission	No	Yes	Yes	Yes	Yes
Trails and Trailheads					
New Construction	No	Yes	Yes	Yes	Yes
Reconstruction	No	Yes	Yes	Yes	Yes
Decommission	No	Yes	Yes	Yes	Yes
New Trailheads	No	Yes	Yes	Yes	Yes
Removed Trailheads	No	Yes	Yes	Yes	Yes
Dispersed Camp Sites					
New Dispersed Camp	No	Yes	Yes	Yes	Yes
Improved Camps	No	Yes	Yes	Yes	Yes
Removed Camps	No	Yes	Yes	Yes	Yes

NOTE: C = Chemical M = Manual

2.5.2 DESCRIPTIONS OF THE PROJECTS BY ALTERNATIVES

Table 13 displays the array of projects that are a part of each alternative. However, the amount or intensity of the project does vary from alternative to alternative thus creating differences among the range of alternatives. Those differences are displayed in the tables later in this chapter.

2.5.3 Aquatics

The aquatics section is divided into **Hydrology** and **Fishery** projects. Both sets of projects overlap each other and will have cumulative impacts to consider. These projects also have potential long-term, beneficial impacts on other resources that depend on aquatic habitats. These projects are designed to help capture, store, and safely release snowmelt and rainfall, improving timing, quantity, and quality of stream flows. Due to these expected improvements, these projects specifically move the resources toward the Purpose and Need for these actions. See 1.2 Purpose and Need for Action, page 6 and 1.2.1 Undesired Conditions, pages 8 through 11. Recommended projects adhere to PACFISH strategy and objectives.

By implementing Aquatic Projects, damaged stream segments within the analysis area would be repaired to create habitat which improves and sustains viable populations of fish species.

2.5.3.1 HYDROLOGY

The following project descriptions are those brought forward in this restoration effort. The tables following the descriptions display the amount or intensity of the project being applied per subwatershed (SWS).

These projects can be tracked to Undesired Conditions and the Desired Conditions and objectives for treatment found in the purpose and need for this project (see 1.2 Purpose and Need for Action, page 6; see also 1.2.1 Undesired Conditions, beginning on page 8 and 1.2.2 Desired Conditions, beginning on page 21).

2.5.3.1.1—Streamside/Riparian Hardwood Protection

Native hardwoods are needed to create shade that helps maintain cooler water temperatures and improve stream bank stability and floodplain function. In protecting and allowing reestablishment of the hardwoods, the results would include the following benefits:

- ❑ Retained early season runoff becoming available for late season flows enhancing fish habitat,
- ❑ Stabilized stream banks reducing erosion,
- ❑ Established hardwoods withstanding ungulate browsing,
- ❑ Established hardwoods providing a future seed source, and
- ❑ Recovered floodplains enhancing vegetative diversity improving fish and wildlife habitat.

Many hardwoods along Davis/Placer, Vinegar, and Little Boulder/Deerhorn Creeks are sparse, decadent, or heavily browsed. Existing hardwoods would be caged or fenced along the streams in these subwatersheds, using hand crews. This Restorative project is the same for all action alternatives.

Table 14 Stream side/Riparian Hardwood Protection

Subwatersheds	Alternative 2, 3, 4 & 5	
	Miles	Acres
Davis/Placer Gulch	1	4
Vinegar	0	5
Vincent	0	0
Little Boulder/Deerhorn	2	1
Tin Cup/Little Butte	1	2
Butte	0	0
Granite Boulder	0	0
TOTALS	4	12

2.5.3.1.2—Streamside/Riparian Planting and Protection

In planting and protecting these planted native hardwoods, many of the benefits and results would be the same as displayed above. Hardwood vegetation is sparse or absent along stream segments in Davis/Placer, Vinegar, Little Boulder/Deerhorn, Tin Cup/Little Butte, and Granite Boulder subwatersheds. Hardwood shrubs of alder, dogwood, and maple would be planted and protected using native seed sources. Hand crews would protect plantings with fences or small cages.

Table 15 Streamside/Riparian Planting and Protection

Subwatersheds	Alternative 2, 3, 4 & 5	
	Miles	Acres
Davis/Placer Gulch	8	2
Vinegar	2	5
Vincent	0	0
Little Boulder/Deerhorn	4	3
Tin Cup/Little Butte	0	6
Butte	0	0
Granite Boulder	2	0
TOTALS	16	16

2.5.3.1.3—Channel/Streamside Projects

Projects of this nature would improve channel function, shade, and stream bank protection that would promote the formation of riparian meadows. Many of these areas lack habitat that would allow a proper functioning condition. Hand placement of coarse woody material, fiber matting, hardwood protection, and hardwood planting, would occur along many stream reaches. Plantings would include cottonwood, willow, alder, dogwood, and maple from native seed sources. As in the previous project descriptions, these streamside projects are the same for all action alternatives.

Table 16 Channel/Streamside Projects

Subwatersheds	Alternative 2, 3, 4 & 5
	Miles
Davis/Placer Gulch	19
Vinegar	18
Vincent	3
Little Boulder/Deerhorn	15
Tin Cup/Little Butte	13
Butte	15
Granite Boulder	7
TOTALS	90

2.5.3.1.4—Area Projects

These projects tend to be larger, generally contiguous areas that include both uplands and connected channels or riparian areas. The results of these projects would slow runoff, which would limit sediment movement. As concentrated flows decrease, sediment accumulates, vegetation recovers, and long-term water storage is increased.

These areas contain unstable soils where rilling, gullyng, or sheet erosion has occurred with many of these areas denuded of ground vegetation. Coarse woody material, woody windrows, and fiber matting would be placed by hand crews across the uplands. Planting, protection of existing hardwoods, and coarse wood placement would occur in the drainages within these areas. This project is the same for all action alternatives.

Table 17 Area Projects

Subwatersheds	Alternative 2, 3, 4 & 5
	Acres
Davis/Placer Gulch	0
Vinegar	960
Vincent	260
Little Boulder/Deerhorn	20
Tin Cup/Little Butte	40
Butte	30
Granite Boulder	140
TOTALS	1,450

2.5.3.1.5—Channel/Floodplain Rehabilitation—Area Projects

Projects of this nature focus in on the drainage floodplains to help improve the following:

- Reduce entrenchment,
- Stabilize valley bottom and floodplain,
- Raise water table,
- Decrease sediment input,
- Improve aquatic and terrestrial habitats,
- Improve aquatic and riparian productivity,
- Improve aesthetics,
- Improve diversity and vigor of riparian vegetation, and
- Reduce risk of wide-scale flood damage.

In improving these factors, fisheries and wildlife habitat conditions are enhanced, creating better distribution and protection of aquatic and terrestrial species dependent of these habitats.

Identified channels recommended for this project lack sinuosity, riparian vegetation, and properly functioning floodplains due to past activities e.g. hydraulic mining.

These projects would require the use of heavy equipment such as excavators, backhoes, or bulldozers along with some handwork to rehabilitate channel shape and function. Re-establishment of channels would occur on former floodplains by using relic channels or constructing new channels, including filling of existing channel; raising or lowering existing channel bed to connect with restored floodplain; and decreasing width/depth and entrenchment ratio by shaping upper slopes of channel and stabilizing both channel bed and banks.

This project is the same for action Alternatives 2 and 5 and is not implemented in action Alternatives 3 and 4.

Table 18 Channel/Floodplain Rehabilitation

Subwatersheds	Alt 1		Alts. 2 & 5		Alts. 3 & 4	
	Miles	Acres	Miles	Acres	Miles	Acres
Davis/Placer Gulch	0	0	0	0	0	0
Vinegar	0	0	0	0	0	0
Vincent	0	0	2	10	0	0
Little Boulder/Deerhorn	0	0	1	4	0	0
Tin Cup/Little Butte	0	0	0	0	0	0
Butte	0	0	0	0	0	0
Granite Boulder	0	0	0	0	0	0
TOTALS	0	0	3	14	0	0

2.5.3.2 FISHERIES

Recommendation in the *Galena Watershed Analysis* identified stream rehabilitation needs in four drainages: Granite Boulder, Vinegar, Butte, and Davis Creeks. These streams supported bull trout habitat historically, a threatened species in the Middle Fork John Day Sub-basin. Recommended projects adhere to PACFISH strategy. The following project descriptions are those brought forward in this restoration effort. The tables following the descriptions display the amount or intensity of the project being applied per subwatershed (SWS).

2.5.3.2.1—New In-stream Structures

The objectives for these structures in improving and enhancing fish habitat are:

- Increase pool frequency and provide high quality pool habitat,
- Increase spawning gravels,
- Create winter rearing habitat for salmonids, and
- Improve accessibility of fish habitat.

Conditions in many stream segments echo the same conditions as outlined in the hydrology section above. Elements such as stream sinuosity, disconnected flood planes, lowered water tables, reduced habitat complexity (particularly deep pool habitat), and the lack of soils to support riparian vegetation are among the most important fisheries habitat concerns. Log and rock weir structures would be placed in stream by a backhoe, excavator, or superhoe. Access for streamside projects would be scarified, water barred, planted, and seeded to reduce risk of erosion, if needed. A combination of hardwoods, conifers, sedges, and grasses would be planted to revegetate and stabilize soil surface and stream banks.

This project is the same for action Alternatives 2 and 5 and is not implemented in action Alternatives 3 and 4.

Table 19 New Instream Structures

Subwatershed	Alt. 1	Alts. 2 & 5	Alts. 3 & 4
Davis/Placer Gulch	0	0	0
Vinegar	0	3	0
Vincent	0	0	0
Little Boulder/Deerhorn	0	0	0
Tin Cup/Little Butte	0	0	0
Butte	0	14	0
Granite Boulder	0	62	0
TOTAL	0	79	0

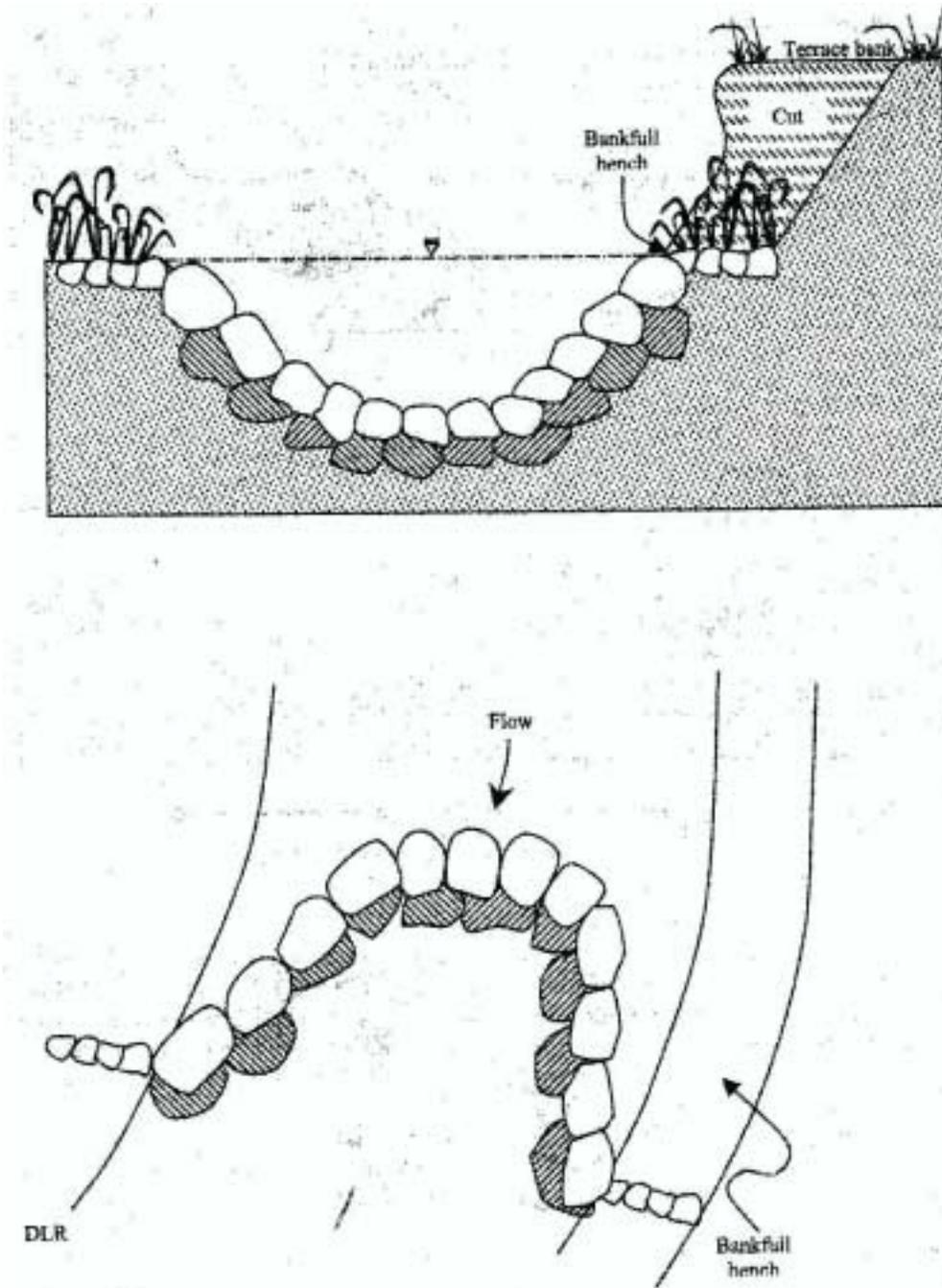


Figure 3—Boulder Cross-vane: Is a method used to enhance fish habitat by creating pool habitat.
Graphic courtesy of Wildland Hydrology, Pagosa Springs, Colorado.

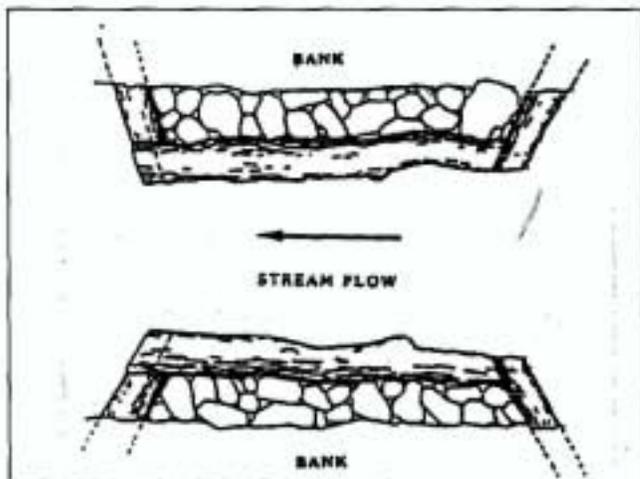


Figure 4—Channel Constrictor: Purpose is to narrow and deepen channel generally up to 80%.

Graphic courtesy of Wildland Hydrology, Pagosa Springs, Colorado.

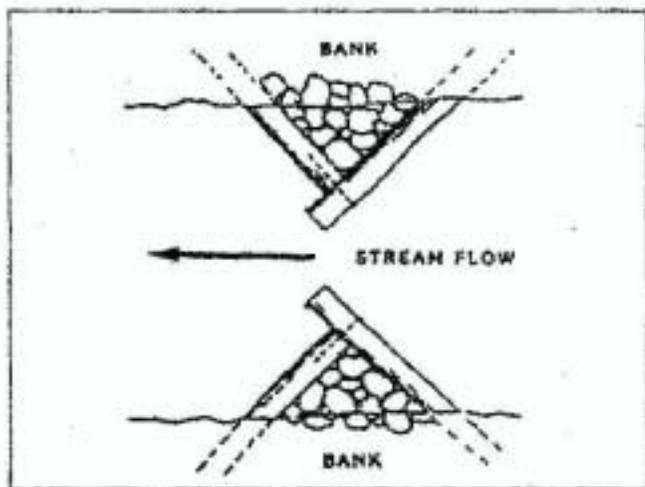


Figure 5—Double wing deflector: Purpose is deflect stream flow to narrow channel and increase stream velocity so that a deep pool is scoured in center of channel.

Graphic courtesy of Wildland Hydrology, Pagosa Springs, Colorado.

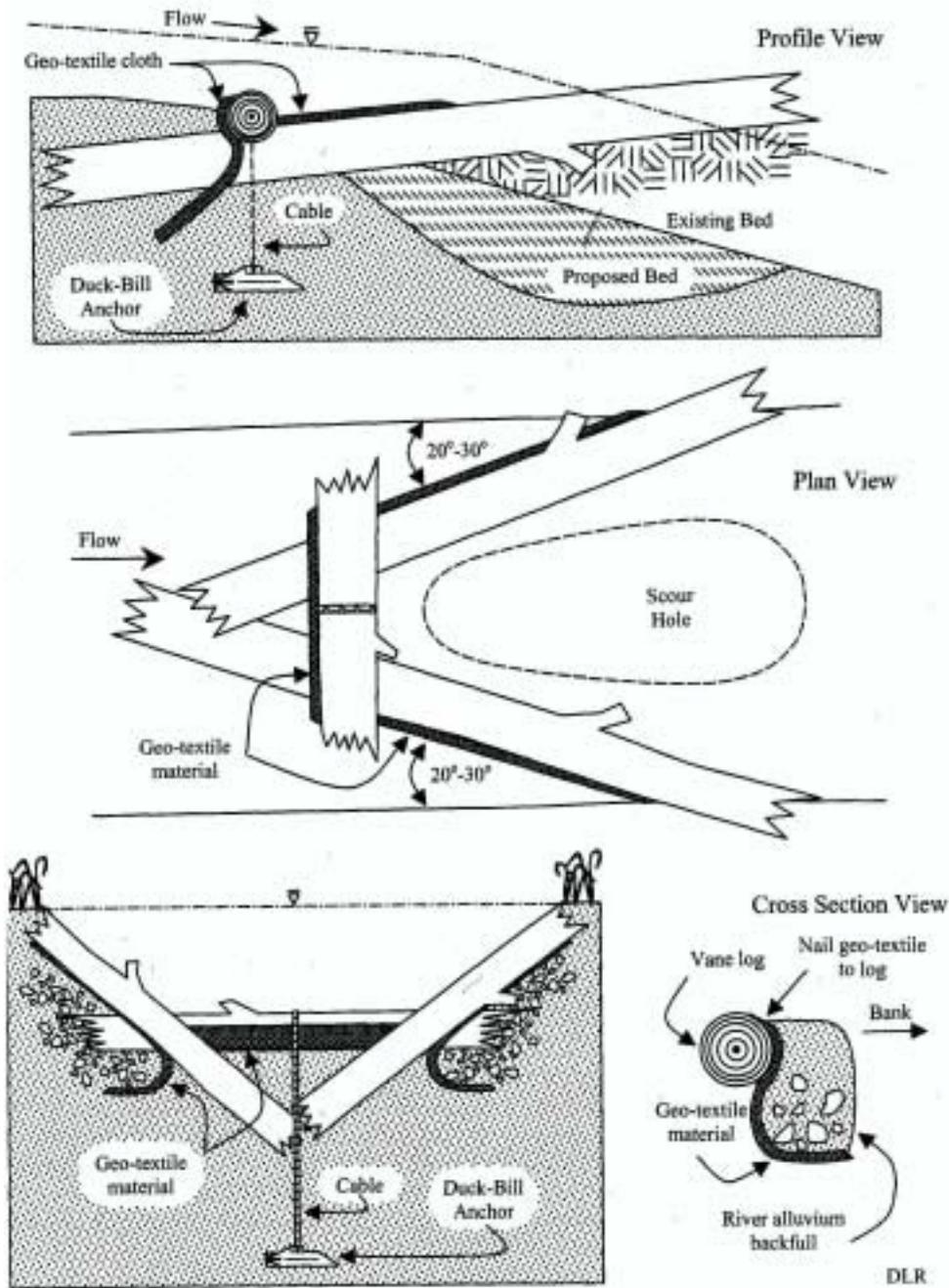


Figure 6—Cross-Vane using logs and a duck-bill anchor will increase stream velocity so that a deep pool is scoured in center of channel increasing pool to riffle ratios thereby enhancing fish habitat which has had a scarcity of pools because of mining and other activity.

Graphic courtesy of Wildland Hydrology, Pagosa Springs, Colorado.

2.5.3.2.2— Existing Instream Structure Improvements

The objectives for repairing these existing structures are to:

- Improve them to accomplish the above objectives outlined under new instream structures and
- Allow year-round fish passage.

Many of the existing instream structures are not functioning as intended and acting as partial fish barriers. Hand crews would improve existing structures during the same time period that nearby new instream structures are installed. If structures cannot be repaired by hand, they would be repaired using the same equipment as new structures under action Alternatives 2 and 5 but not under action Alternatives 3 and 4.

Table 20 Existing In-stream Structure Improvements

Subwatersheds	Alts. 2 & 5	Alts.3 & 4
Davis/Placer Gulch	0	0
Vinegar	0	0
Vincent	0	0
Little Boulder/Deerhorn	0	0
Tin Cup/Little Butte	0	0
Butte	29	0
Granite Boulder	7	0
TOTALS	36	0

2.5.3.2.3—Riparian Planting

Planting would enhance riparian and fish habitat, with the following benefits expected:

- Increased shade to maintain water temperatures and provide fish hiding cover,
- Improved stream bank stability to reduce erosion, and
- Decreased width to depth ratios that improve fish habitat and connectivity.

Many channel segments and associated floodplains in Vinegar Creek are currently recovering from past mining (primarily). Sinuosity, hiding cover, and pool development are improving but are not yet creating high quality fish habitat. Therefore, planting with a combination of hardwoods and conifers in segments in Vinegar Creek is the only recommended project at this time.

Davis Creek is similar to Vinegar Creek in that channel structure is generally recovering but fish habitat still needs improvement. Riparian planting would be beneficial as described above.

Table 21 Riparian Planting

Subwatersheds	Alts. 2, 3, 4 & 5
	Linear Feet
Davis/Placer Gulch	5,900
Vinegar	18,000
Vincent	0
Little Boulder/Deerhorn	0
Tin Cup/Little Butte	0
Butte	5,200♣
Granite Boulder	Yes♥
TOTALS	29,100
TOTALS	5.5 Miles
NOTES: ♣ 5,200 linear feet plus associated instream structure work.	
♥Associated with instream structure work	

2.5.3.2.4—Culvert Removal or Replacement

These improvements would increase fish access to historic use areas and reduce sediment.

The identified locations are currently blocked due to an insufficient size or placement of culverts; or there is a ford through the stream channel. In Butte Creek, the remains of a log culvert located just upstream of

Bennett Creek, would be removed and the banks contoured to the natural grade. The same would be applied to the remains of a culvert in Sulphur Creek. Where soil disturbance is caused by the project, it would be seeded to reduce potential sediment delivery. The Butte Creek crossing is in conjunction with the Davis Creek Trail, which is the portion of the trail that would be decommissioned and no longer used. It is highlighted here to emphasize the importance of this work getting accomplished regardless if the trail project is implemented or not. The existing ford at the intersection of Davis Creek and Forest Road 2614 needs to be replaced with a large culvert.

In 2001 the Malheur National Forest initiated a Forest-wide evaluation of road crossing sites where structures exist that could present barriers to fish passage. Road crossing improvement work that involves fish passage issues is recommended with all of the action alternatives (see Table 22). Funding for the improvement of culverts with passage problems will be associated with timber sale activities (haul routes) or sought from Forest Service Regional Office, Blue Mountain Demonstration Area funds, Title II funds, and other cooperative agreements.

These projects would be accomplished using heavy equipment from existing road bed (equipment would not be allowed to enter into stream channels) and during seasonal periods of low to no water flows and during the July 15-August 15 in-stream work period (PACFISH/INFISH 1995).

Table 22 Culverts on Fish Bearing Streams

Subwatersheds	Alts. 2, 3, 4 & 5
Davis	2 replace or improved
Vinegar	5 replace or improved
Vincent	3 replace or improved
Little Boulder/Deerhorn	2 replace or improved
Tin Cup/Little Butte	6 replace or improved
Butte	2 removals
Granite Boulder	4 replace or improved
TOTALS PROJECTS	22 replace or improved 2 removed

2.5.4 Vegetation

To clearly address the projects brought forward under vegetation, this section is further divided into the following categories: Conifer and Associated Vegetation, Aspen Stands, and Noxious Weeds. The goal for these recommendations would be to begin moving the area toward many of the desired conditions outlined in Chapter 1. These projects specifically address the following Undesired Conditions Outlined in Chapter 1:

- 1.2.1.4 Undesired Condition: Vegetation Outside , **page 14**.
- 1.2.1.5 Undesired Condition: High Wildfire **page 17**.
- 1.2.1.6 Undesired Condition: Degraded Wildlife Habitat, **page 18; and**
- 1.2.1.7 Undesired Condition: Noxious Weeds, **page 20**

Issue statements in the *Galena Watershed Analysis* (pages 4-18 to 4-49) concur with the findings in this document that vegetative conditions in the analysis area are not desirable and recommend projects which would begin managing vegetation toward a more resilient, sustainable condition, in a manner stated in the Purpose and Need for this DEIS. Although conifer stands are highlighted in this proposal, the total vegetation diversity, including hardwoods and grasses, benefit from the following actions:

2.5.4.1 Treatments for Restoration of Conifers and Associated Vegetation

The management tools of mechanical and fire treatments are recommended to begin moving the vegetative resources toward desired conditions. Mechanical treatments include cutting and skidding of

trees for removal, thinning of young trees, and non-fire treatment of down fuels (including chipping, mastication, piling, or scattering slash). A detailed description of this proposal follows.

Implementation Tool—Mechanical Treatments

Mechanical treatments are designed to reduce the risk of a major adverse event by shifting these forest stands toward a more desired variation in forest stand structure, composition, and fuel levels to produce a forest landscape that is healthier, more resilient, and sustainable.

The action alternatives include a number of harvest prescriptions using mechanical treatments (chainsaws or mechanical harvesters) with the following connected actions:

- ❑ Pre-commercial thinning to reduce tree competition and for reverting tree composition to historic values;
- ❑ Treatment of harvest or pre-commercial thinning produced slash by skidding to landings for potential utilization for forest products, mastication or crushing, or hand piling, or burning to reduce accumulated fuels to reduce fire intensity;
- ❑ Site preparation, and
- ❑ Planting with protection measures for young trees to achieve desired species composition and stocking levels.

Alternatives 2 and 5 propose mechanical treatment within *Land and Resource Management Plan* Roadless Areas while Alternatives 3 does not. Alternative 4 proposes only pre-commercial thinning in the roadless area. Each action alternative also proposes a number of pre-commercial thinning areas not associated with a harvest prescription.

A range of products and benefits from the harvest and pre-commercial thinning would be realized that may include saw logs, post and poles, firewood, or other fiber products such as pulp wood, chips, and hog fuel for power generation. A number of new roads may be needed along with reconstruction to accomplish the recommended restoration work.

The following describes the recommended mechanical prescriptions.

Commercial Thin—HTH

This prescription would harvest merchantable trees in immature forest stands to reduce stocking levels and to enhance individual tree growth. A secondary objective in mixed species stands would be to select for retention of ponderosa pine and western larch. It's designed to reduce the competition among trees for sunlight, water, and nutrients. The result would be a more vigorous, healthier forest stands. Trees would be left at a varied spacing, as opposed to even, standard spacing. In addition, trees 21" dbh and larger (as with all prescriptions) would be retained (except hazard trees) to keep a varied stand structure (multiple age classes) across the landscape to mimic a more natural appearing forest within the historic range of variation.

Commercial Thinning in Connectivity Corridors—HTH1

This prescription is a modification of commercial thinning in response to the *Land and Resource Management Plan* Amendment #2 to establish old growth connectivity corridors (LRMP2 corridors) and the *2000 Canada Lynx Conservation Assessment and Strategy* to establish Key Linkage Areas (KLAs) for wide-ranging carnivores. A similar philosophy for wildlife connectivity has been incorporated into the SPC1 prescription (see Pre-commercial Thin in Connectivity Stands—SPC1 page 64). This prescription retains additional trees per acre compared to that of HTH, to provide denser forest stands for security. LRMP2 corridors and KLAs provide vegetation in quantity and arrangement to provide wildlife species with sufficient habitat for dispersal and movement across the landscape. Connected forests allow animals to easily move long distances in search of food, cover and mates. This application varies across the alternatives.

Table 23—HTH & HTH1 Prescription per Subwatershed

Subwatershed	ALT. 2 Acres		ALT. 3 Acres		ALT. 4 Acres		ALT. 5 Acres	
	HTH	HTH1	HTH	HTH1	HTH	HTH1	HTH	HTH1
Davis/Placer Gulch	1,090	0	1030	0	0	0	1,120	0
Vinegar	570	430	570	430	0	0	970	0
Vincent	900	580	890	470	0	0	1,380	0
Little Boulder/ Deerhorn	1,440	120	1,030	0	0	0	1,650	120
Tincup/L. Butte	1,190	100	780	0	0	0	1,550	100
Butte	550	0	90	0	0	0	390	0
Granite Boulder	0	0	0	0	0	0	0	0
TOTAL	5,720	1,230	4,390	900	0	0	7,060	220

NOTES: These acres are approximate

Shelterwood—HSH

This prescription treats forest stands that were historically composed primarily of ponderosa pine and western larch, but are currently overstocked and composed largely with grand fir and Douglas-fir. This prescription would remove a large proportion of the grand fir and Douglas-fir, while retaining the ponderosa pine and western larch. Treated stands would vary in appearance, depending on the amount of pine and larch present. Leave tree spacing would be variable. Undesired trees under merchantable size would be removed and slash would be reduced. Stands stocked below recommended levels would be planted and seedlings would be protected from vegetation competition and animal damage to ensure adequate survival. The objective is to convert these stands from mostly grand fir and Douglas-fir to a majority of ponderosa pine and western larch. In time, these forest stands would be managed for the reintroduction of fire.

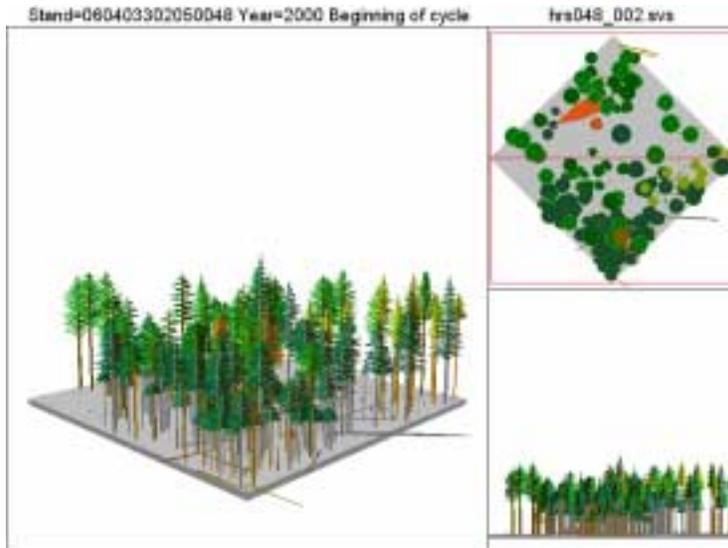


Figure 7 No Treatment

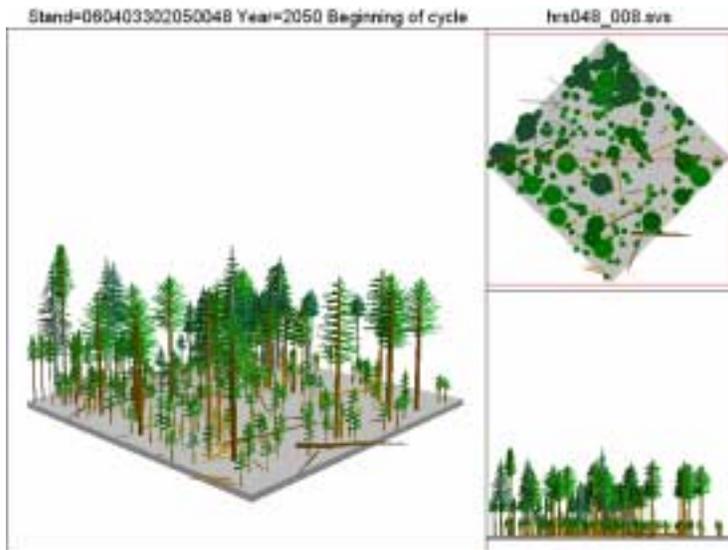


Figure 8—HSH Treatment after 50 years

Table 24—HSH Prescription per Subwatershed

Subwatershed	ALT 1 Acres	ALT. 2 Acres	ALT. 3 Acres	ALT. 4 Acres	ALT. 5 Acres
Davis/Placer Gulch	0	400	200	0	470
Vinegar	0	260	210	0	850
Vincent	0	150	100	0	400
Little Boulder/ Deerhorn	0	280	120	0	280
Tincup/L. Butte	0	290	260	0	290
Butte	0	310	310	0	310
Granite Boulder	0	0	0	0	0
TOTAL	0	1,690	1,200	0	2,600

NOTES: These acres are approximate

Salvage—HSV

Dead or down trees would be removed to reduce fuel levels. Areas stocked below recommended levels would be planted and seedlings would be protected from vegetation competition to insure adequate survival. The objective is to remove trees killed as a result of a 1998 wind event in the Vinegar and Vincent Creek subwatersheds and revegetate unstocked areas. As in all treatments for this project, down woody material and other *Land and Resource Management Plan* standards would be met.

Table 25—HSV Prescription per Subwatershed

Subwatershed	ALT. 2 Acres	ALT. 3 Acres	ALT. 4 Acres	ALT. 5 Acres
Davis/Placer Gulch	0	0	0	0
Vinegar	250	250	0	250
Vincent	0	0	0	0
Little Boulder/ Deerhorn	0	0	0	0
Tincup/L. Butte	0	0	0	0
Butte	0	0	0	0
Granite Boulder	0	0	0	0
TOTAL	250	250	0	250

NOTES: These acres are approximate

Understory Removal—HUR

Immature trees such as grand fir and Douglas-fir that have grown in underneath larger ponderosa pine or western larch would be removed. The larger tree component would be retained and natural regeneration would be allowed to restock these units. The objective is to convert these stands into single-story stands of large trees that would withstand the reintroduction of fire. After treatment, these stands would resemble the historical open forest stands of large trees.

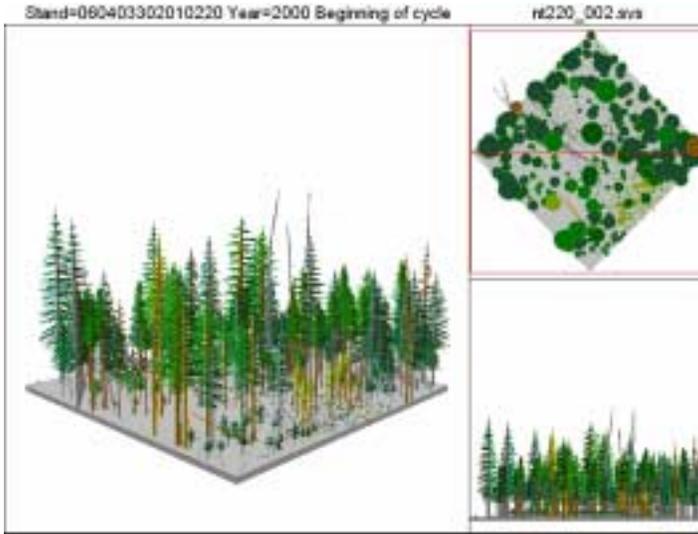


Figure 9—No Treatment

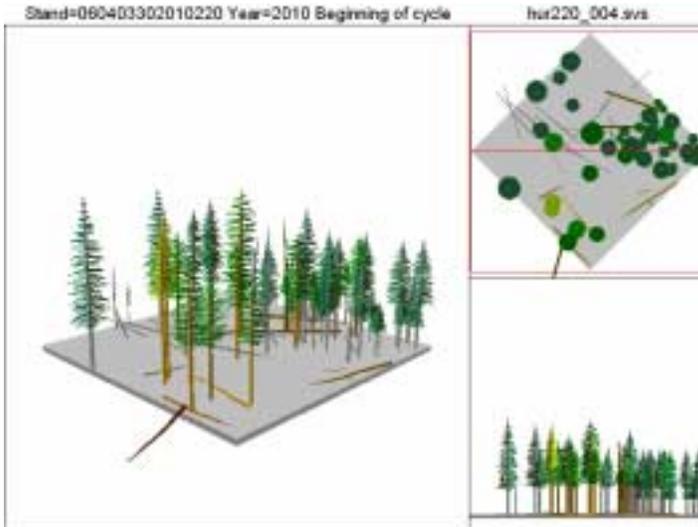


Figure 10—HUR Treatment

Table 26—HUR Prescription per Subwatershed

Subwatershed	ALT. 2 Acres	ALT. 3 Acres	ALT. 4 Acres	ALT. 5 Acres
Davis/Placer Gulch	330	250	0	380
Vinegar	220	220	0	290
Vincent	0	0	0	170
Little Boulder/ Deerhorn	60	0	0	120
Tincup/Little Butte	210	30	0	210
Butte	60	60	0	60
Granite Boulder	0	0	0	0
TOTAL	880	560	0	1230

NOTE: acres are approximate

Pre-commercial Thin—SPC

This treatment would thin small trees that are not economical to remove with commercial harvest. The trees cut may have value as other forest products such as chips, post and poles, or firewood and could be utilized as such in order to reduce slash disposal costs and to reduce risk of severe fire. This prescription is designed to reduce the competition among these smaller trees for sunlight, water, and nutrients. The expected result is a vigorous, healthy forest stand similar to those produced by the HTH prescription described above. The objective is to reduce stocking levels and in some cases to select younger ponderosa pine and larch for retention. This treatment would be applied to areas within and outside of harvest units.

Pre-commercial Thin in Connectivity Stands—SPC1

This prescription is a modification of SPC in response to the *Land and Resource Management Plan Amendment #2* to establish old growth connectivity corridors (LRMP2 corridors) and the *2000 Canada Lynx Conservation Assessment and Strategy* to establish key linkage areas (KLAs) for wide-ranging carnivores. A similar philosophy for wildlife connectivity has been incorporated into the HTH1 prescription (see Commercial Thinning in Connectivity Corridors—HTH1, page 59). This prescription retains additional trees per acre compared to that of SPC, to provide denser forest stands for security. LRMP2 corridors and KLAs provide vegetation in quantity and arrangement to provide wildlife species with sufficient habitat for dispersal and movement across the landscape. Connected forests allow animals to easily move long distances in search of food, cover and mates. This application varies across the alternatives.

Table 27—SPC & SPC1 Prescription per Subwatershed

Subwatershed	ALT. 2 Acres		ALT. 3 Acres		ALT. 4 Acres		ALT. 5 Acres	
	SPC	SPC1	SPC	SPC1	SPC	SPC1	SPC	SPC1
Davis/Placer Gulch	630	0	630	0	630	0	660	0
Vinegar	330	390	330	390	330	310	640	0
Vincent	20	430	20	340	20	210	250	0
Little Boulder/Deerhorn	790	40	530	0	720	40	1,010	40
Tincup/L. Butte	90	90	20	90	90	90	170	0
Butte	310	0	310	0	310	0	350	0
Granite Boulder	0	0	0	0	0	0	0	0
TOTAL	2,160	950	1,840	820	2,100	640	3,080	40

NOTE: These acres are approximate

Acres Treated and Volumes by Harvest System

In implementing the mechanical prescription described above, the following harvest systems and outcomes would occur:

Table 28—Alt. 2 Harvest System Acres/Volumes

Subwatershed	Tractor			Skyline			Helicopter		
	Acres	Volume MBF	Volume CCF	Acres	Volume MBF	Volume CCF	Acres	Volume MBF	Volume CCF
Davis/Placer Gulch	1,530	6,140	11,810	210	1,280	2,460	80	510	980
Vinegar	800	3,670	7,060	450	2,200	4,230	460	2,380	4,580
Vincent	960	4,010	7,710	460	1,690	3,250	180	1,200	2,310
Little Boulder/ Deerhorn	960	4,310	8,290	320	1,760	3,380	630	3,250	6,250
Tincup/Little Butte	740	3,320	6,380	400	910	1,750	1,010	5,520	10,620
Butte	100	480	920	270	1,400	2,690	310	930	1,790
Granite Boulder	0	0	0	0	0	0	0	0	0
TOTAL	5,090	21,930	42,170	2,110	9,240	17,760	2,670	13,790	25,530

NOTES: MBF = Thousand Board Feet CCF = Cubic Feet

Table 29—Alt. 3 Harvest System Acres/Volumes

Subwatershed	Tractor			Skyline			Helicopter		
	Acres	Volume MBF	Volume CCF	Acres	Volume MBF	Volume CCF	Acres	Volume MBF	Volume CCF
Davis/Placer Gulch	1,300	5,110	9,830	190	1,150	2,210	30	190	370
Vinegar	750	3,430	6,600	450	2,300	4,420	460	2,370	4,560
Vincent	880	3,520	6,770	390	1,680	3,230	170	1,180	2,270
Little Boulder/ Deerhorn	710	3,170	6,100	250	1,440	2,770	190	1,060	2,040
Tincup/Little Butte	840	3,170	6,100	210	700	350	120	580	1,120
Butte	100	480	920	230	1,250	400	120	460	880
Granite Boulder	0	0	0	0	0	0	0	0	0
TOTAL	4,580	18,880	36,320	1,720	9,520	16,380	1,090	5,840	11,240

NOTES: MBF = Thousand Board Feet CCF = Cubic Feet

Alternative 4 does not propose any harvest prescriptions; therefore, tractor skidding, skyline skidding, or helicopter yarding are not within the design of the alternative.

Table 30—Alt. 5 Harvest System Acres/Volumes

Subwatershed	Tractor			Skyline			Helicopter		
	Acres	Volume MBF	Volume CCF	Acres	Volume MBF	Volume CCF	Acres	Volume MBF	Volume CCF
Davis/Placer Gulch	1,540	6,170	11,870	250	1,580	3,040	190	1,040	2,000
Vinegar	1,090	5,910	11,370	780	1,680	9,000	480	2,480	4,770
Vincent	1,120	5,670	10,900	610	2,740	5,270	230	1,250	2,400
Little Boulder/ Deerhorn	1,270	5,550	10,670	360	2,050	3,940	550	3,240	6,230
Tincup/Little Butte	1,200	5,640	10,850	340	1,360	2,620	690	3,300	6,350
Butte	100	480	920	270	1,400	2,700	430	1,570	3,020
Granite Boulder	0	0	0	0	0	0	0	0	0
TOTAL	6,320	29,420	56,580	2,610	13,810	26,570	2,570	12,880	24,770

NOTES: MBF = Thousand Board Feet CCF = Cubic Feet

Biomass Opportunities

The following tables show estimates for biomass between 5 and 7 inches dbh within recommended tractor units that could be skidded to landings. Since these sizes are less than the commercial utilization standards, the skidding can be done as a through other contract types after the timber sale or skidded during the sale. This material could provide biomass for sale in the form of decks, or as a biomass sale. Stand exam info was used to estimate the amount of material and a reduction of 25% was used due to

losses that can occur from skidding and decay. An average of 4 cubic feet per tree was used. There may be other opportunities in pre-commercial thin units; however, this analysis only included potential harvest tractor areas.

Table 31 Biomass volume estimates

ALT. 1			ALT. 2			ALT. 3			ALT. 4			ALT. 5		
Acres	CCF	MBF												
0	0	0	511	133	69	242	26	14	0	0	0	873	193	100

NOTES: ALT. = Alternative CCF = Thousand Cubic Feet MBF = Thousand Board Feet

Connected Actions

Other management-connected actions include removal of undesired trees, hand line, machine line, prescribed burn, hand pile and burn, sub-soil, competing vegetation control, plant, pocket gopher control, ungulate browse control, and stocking surveys. These actions are included to reduce harvest produced slash and to ensure areas are reforested within 5-years.

New Roads

Construction of a new road begins by determining the clearing needed to build the road, which include what trees and brush need to be cut and removed.

After the brush and trees have been cut, a dozer is typically used to construct a rough or “pioneer” road within the clearing limits, which includes removal or “grubbing” out stumps within the roadway. Once the pioneer road is constructed, the merchantable trees are cut to specific log lengths and decked and remaining slash is disposed of, this includes stumps, limbs, and brush. The slash is treated by being piled and burned, buried, chipped and scattered, removed, or simply scattered.

The remaining road excavation and embankment is usually done with a large dozer or excavator. This excavates the cut slope materials and compacts the fill materials in layers until the road is roughly finished to grade and specified width.

Construction of or installation of drainage structures, as well as any other specified items (such as French drains, etc.) would take place next. Once the road surface is finished to grade and specified width and is compacted as specified, any spot rocking or aggregate surfacing that is needed is placed and compacted.

Once construction is completed, any disturbed ground is seeded and fertilized.

Table 32—New Road

Subwatersheds	ALT. 2	ALT. 3	ALT. 4	ALT. 5
	Miles	Miles	Miles	Miles
Davis/Placer Gulch	2.7	2.6	0.5	2.7
Vinegar	4.5	4.3	0.0	5.3
Vincent	3.9	4.1	0.0	4.8
Little Boulder/ Deerhorn	3.8	3.4	1.7	5.8
Tincup/Little Butte	2.4	2.2	0.0	3.2
Butte	0.3	0.3	0.0	0.3
Granite Boulder	0.1	0.1	0.0	0.1
TOTAL	17.7	17.0	2.2	22.2

Removal of Undesirable Trees

Trees of less than merchantable size and not desired for retention would be removed, reducing competition among the remaining trees, resulting in a healthier, vigorous forest stand.

Table 33—Removal of Undesirable Trees

Subwatershed	ALT. 2 Acres	ALT. 3 Acres	ALT. 4 Acres	ALT. 5 Acres
Davis/Placer Gulch	730	490	0	850
Vinegar	480	430	0	1,130
Vincent	150	100	0	570
Little Boulder/Deerhorn	340	120	0	390
Tincup/Little Butte	500	290	0	500
Butte	370	370	0	370
Granite Boulder	0	0	0	0
TOTAL ACRES	2,570	1,790	0	3,810

Treatment of Slash Resulting From Harvest

Yard Tops

Where sufficient nutrient recycling material is available, tops from felled trees would be skidded to landing to help reduce fuel levels. This would prepare the areas for a more controllable, safer reintroduction of fire to the ecosystem. These landing piles would then be available for other products e.g. firewood or burned.

Hand Line

Hand crews dig a holding fire line down to bare mineral soil about 18 inches wide. This line is used to help contain prescribed fire within a given area and is typically used on skyline or helicopter ground. Hand lines are mostly used in mechanical treatment units where slash is to be burned. This same method is also used to protect unique or sensitive resources from prescribed fire.

Machine Line

A bulldozer is used to develop a fire line removing vegetation down to mineral soil generally at about 7-foot wide. This line is used to help contain prescribed fire within a unit that has been mechanically treated and is typically used on tractor ground.

Reserve Tree Protection

In reforestation units, reserve trees would be protected by: 1) pulling material away from the reserve tree, 2) material around trees would be burned prior to the prescribed fire ignition, or 3) a hand line would be scratched around the tree. This application would help protect these trees from mortality.

Prescribed Burn

The use of prescribed burning is for reducing accumulations of natural and activity generated fuels; and for general landscape use which uses low intensity fire to mimic a natural historic role. Prescribed fire reduces the risk of an uncontrolled fire. This effort would be accomplished by using a combination of drip torches, fusees, flare guns, ATVs with mounted drip torches, and helicopters to ignite these burns.

Hand Pile

Hand piling is used to pile logging slash before burning. This is used in areas where the level of slash is too high to ignite a prescribed burn safely without the risk to loss to residual trees. Typically this is applied to skyline or helicopter areas due to steepness of ground but can be applied to tractor ground for other resource reasons.

Table 34— Slash Disposal with Prescribed Fire Alternatives 2 and 3

Subwatershed	ALT. 2				ALT. 3			
	Handline Miles	Mach.Line Miles	Rx Burn Acres	Handpile Acres	Handline Miles	Mach.Line Miles	Rx Burn Acres	Handpile Acres
Davis/Placer Gulch	9.0	6.3	730	0	6.5	4.3	490	0
Vinegar	7.0	1.1	480	307	7.3	1.0	430	307
Vincent	1.5	2.2	150	364	1.5	1.2	100	284
Little Boulder/Deerhorn	5.6	0.1	320	304	1.1	0.1	120	146
Tincup/Little Butte	6.5	1.1	500	67	3.6	1.1	290	0
Butte	8.0	0.8	370	206	8.0	0.8	370	206
Granite Boulder	0.0	0.0	0	0	0.0	0.0	0	0
TOTALS	37.6	11.6	2,550	1,248	28.0	8.5	1,800	943

NOTES: ALT. = Alternative Mach. = Machine Rx = Prescribed Rx Burn Acres includes both brush disposal and silvicultural funded site preparation.

Table 35— Slash Disposal with Prescribed Fire Alternatives 4 and 5

Subwatershed	ALT. 4				ALT. 5			
	Handline Miles	Mach.Line Miles	Rx Burn Acres	Handpile Acres	Handline Miles	Mach.Line Miles	Rx Burn Acres	Handpile Acres
Davis/Placer Gulch	0	0	0	0	11.6	6.6	850	34
Vinegar	0	0	0	290	15.3	7.4	1,130	290
Vincent	0	0	0	168	10.1	4.6	570	192
Little Boulder/Deerhorn	0	0	0	324	5.6	0.1	390	488
Tincup/Little Butte	0	0	0	67	6.5	1.1	500	67
Butte	0	0	0	206	8.0	0.8	390	249
Granite Boulder	0	0	0	0	0.0	0.0	0	0
TOTALS	0	0	0	1055	57.1	20.6	3,830	1,320

NOTES: ALT. = Alternative Mach. = Machine Rx = Prescribed Rx Burn Acres includes both brush disposal and silvicultural funded site preparation.

Dozer Treatment

For areas with slash generated by service or stewardship contracts including removal of undesired trees and in areas per-commercially thinned on slopes permitting ground based equipment. Slash in these areas would be treated mechanically using one or a combination of: skidding material to landings for utilization or to be burned, masticated, or crushed.

Table 36a—Additional Actions in Acres

Subwatershed	ALT. 2				ALT. 3			
	Yard Topes	Protect Trees	Mech. Treat Pre-commercial thinning slash	Mech. Treat Undesired thinning slash	Yard Topes	Protect Trees	Mech. Treat Pre-commercial thinning slash	Mech. Treat Undesired thinning slash
Davis/Placer Gulch	1,090	3,600	625	355	1,030	3,110	625	183
Vinegar	900	4,300	417	48	900	4,300	417	0
Vincent	1,290	820	87	69	1,220	820	77	20
Little Boulder/Deerhorn	1,260	3,210	523	0	840	1,160	381	0
Tincup/Little Butte	750	5,020	106	0	700	2,850	106	0
Butte	80	3,280	101	39	40	3,280	101	39
Granite Boulder	0	0	0	0	0	0	0	0
TOTAL ACRES	5,370	20,230	1,859	511	4,730	15,520	1,707	242

NOTES: ALT. = Alternative Mech. Treat = Mechanical Treatment

Table 37b—Additional Actions in Acres

Subwatershed	Alternative 4				Alternative 5			
	Yard Topes	Protect Trees	Mechanical Treatment Pre-commercial Trees	Mechanical Treatment Undesired Trees	Yard Tops	Protect Trees	Mechanical Treatment Pre-commercial Trees	Mechanical Treatment Undesired Trees
Davis/Placer Gulch	0	0	625	0	1,090	5,350	625	355
Vinegar	0	0	350	0	870	8,390	350	340
Vincent	0	0	54	0	1,190	4,290	54	139
Little Boulder/Deerhorn	0	0	438	0	1,350	3,210	558	0
Tincup/Little Butte	0	0	115	0	1,060	5,020	115	0
Butte	0	0	101	0	80	3,280	101	39
Granite Boulder	0	0	0	0	0	0	0	0
TOTAL ACRES	0	0	1,683	0	5,640	29,540	1,803	873

Sub-Soil

Areas that have past or expected compaction exceeding 20% of the area would be sub-soiled with a winged type ripper. This application is generally applied on skid trails and landings to reduce soil compaction, increase water infiltration, and reduce runoff.

Competing Vegetation Control

In Alternatives 2 and 5 sod-forming grasses in certain units would be reduced with herbicides and manual methods, while Alternative 3 would reduce competing vegetation by manual control methods to reduce competition with tree seedlings for space, water, and nutrients. Possible herbicides that may be used include glyphosate and hexazinone which would be spot applied in a four foot diameter circle around the tree seedlings. Manual control methods may include scalping, mulching mats, grubbing, clipping, or pulling. These applications would increase the ability of tree seedlings to grow and survive.

Reforestation (planting of seedlings)

Seedlings would be planted in areas that are understocked due to harvest or natural disturbances. This would help meet NFMA requirements that all suitable forested lands in the National Forest System would be reforested within 5 years to maintain appropriate forest cover.

Table 38—Acres of Site Preparation and Regeneration

Subwatershed	Alternative 2			Alternative 3			Alternative 4			Alternative 5		
	Sub-Soil	Competing Vegetation Control	Plant	Sub-Soil	Competing Vegetation Control [▲]	Plant	Sub-Soil	Competing Vegetation Control	Plant	Sub-Soil	Competing Vegetation Control	Plant
Davis/Placer Gulch	0	140	400	0	140	200	0	0	0	0	140	470
Vinegar	80	140	500	80	140	460	0	0	0	160	350	1,090
Vincent	0	130	150	0	80	100	0	0	0	0	340	400
Little Boulder/Deerhorn	0	130	280	0	20	120	0	0	0	0	130	280
Tincup/Little Butte	50	200	290	50	200	260	0	0	0	50	200	290
Butte	60	160	310	60	160	310	0	0	0	60	160	310
Granite Boulder	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL ACRES	190	900	1,930	190	740	1,440	0	0	0	270	1,320	2,840

NOTE: ▲ Hand methods only

Pocket Gopher Control

Where pocket gophers are damaging and killing trees in reforested areas, poison baits, fumigation, or trapping would be used to reduce the numbers of pocket gophers in the planted shelterwood areas of Alternatives 2 and 5. Only trapping would be used in Alternative 3 for gopher control. This would help ensure NFMA required stocking levels.

Deer/Elk/Cattle Browse Control

Where ungulate are browsing the planted seedlings and reducing tree-survival, protective netting would be used to help meet the NFMA requirement for tree stocking levels in shelterwood units.

Stocking Surveys

Periodic examinations of planted and natural seedlings would be conducted to determine survival, tree stocking levels, damage, and the need for additional protection in shelterwood, salvage, and understory removal units.

Table 39—Seedling Protection Alternatives 2 and 3

Subwatershed	Alternative 2			Alternative 3		
	Pocket Gopher Control	Browse Control	Stocking Surveys	Pocket Gopher Control ♦	Browse Control	Stocking Surveys
Davis/Placer Gulch	400	400	730	200	200	490
Vinegar	260	260	720	210	210	680
Vincent	150	150	150	100	100	100
Little Boulder/Deerhorn	280	280	340	120	120	120
Tincup/Little Butte	290	290	500	260	260	290
Butte	310	310	370	310	310	370
Granite Boulder	0	0	0	0	0	0
TOTALS	1,690	1,690	2,810	1,200	1,200	2,040

NOTE: ALT. = Alternative ♦ Trapping only

Table 40—Seedling Protection Alternatives 4 and 5

Subwatershed	Alternative 4			Alternative 5		
	Pocket Gopher Control	Browse Control	Stocking Surveys	Pocket Gopher Control	Browse Control	Stocking Surveys
Davis/Placer Gulch	0	0	0	470	470	850
Vinegar	0	0	0	850	850	1,380
Vincent	0	0	0	400	400	570
Little Boulder/Deerhorn	0	0	0	280	280	390
Tincup/Little Butte	0	0	0	290	290	500
Butte	0	0	0	310	310	370
Granite Boulder	0	0	0	0	0	0
TOTALS	0	0	0	2,600	2,600	4,060

2.5.4.2 Implementation Tool—Fire Treatment

Fire prescriptions would be applied primarily to Dry Forests. There are inclusion of Moist Forest types within the prescribed burning area

Objectives in applying prescribed fire in many of these areas may be a combination of the following:

- ❑ Decrease high fuel loadings which would protect soil productivity and water quality from uncharacteristically severe wildfires,
- ❑ Remove excess small tree stocking and favor retention of fire tolerant species;
- ❑ Remove lower crown branches by scorching, reducing chances of future torching;
- ❑ Encourage sprouting of aspen clones;
- ❑ Improve ground vegetation vigor by removal of excess woody material which causes nutrient release, small trees which reduces light and moisture competition;
- ❑ Protect and enhance riparian areas;
- ❑ Maintain or improve visual quality of units within visual corridors; and
- ❑ Maintain live and dead vegetation needed to meet wildlife habitat needs.

In the past, fuel reduction treatments included thinning of conifers, regeneration harvesting and treatment of slash, and prescribed burning. However, these past actions had not treated large enough areas to reduce the hazard of an uncharacteristically severe wildfire.

In this project, prescribed fire would be used either in the spring or fall depending on burning conditions. Implementation of this action would reduce future wildfire intensity.

The desire is to manage fire more frequently over the long-term in a fire dependent ecosystem naturally or by prescription. This periodic fire favors native vegetation, and increases forest stand resilience to wildfire. Frequent, low intensity fires also maintain fuel loadings at levels where wildfires can be suppressed safely and economically.

The following table displays prescribed burn acres outside mechanically treated units, within thinning and pre-commercial thinning units, and within reforestation and understory removal units. There is no overlap among these acres.

Table 41—Acres of Prescribed Fire

Subwatershed	ALT. 2			ALT. 3			ALT. 4		ALT. 5		
	Acres Outside Treated Units	Acres within Commercial & Pre-commercial Thinning Units	Acres within Reforestation & Understory Removal Units	Acres Outside Treated Units	Acres within Commercial & Pre-commercial Thinning Units	Acres within Reforested & Understory Removal Units	Acres Outside Treated Units	Acres within Pre-commercial Units	Acres Outside Treated Units	Acres within Commercial & Pre-commercial Thinning Units	Acres within Reforested & Understory Removal Units
Davis Creek/Placer Gulch	410	1,620	730	310	1,490	490	370	592	250	1,780	850
Vinegar	940	1,720	480	925	1,720	430	2,580	640	980	1,610	1,130
Vincent	1,420	1,930	150	1,290	1,720	100	3,500	220	1,550	1,630	570
Little Boulder/Deerhorn Ck	4,380	2,250	320	3,480	1,560	120	4,640	0	3,930	2,700	390
Tincup/ Little Butte	2,690	1,460	500	1,020	1,920	290	3,490	170	2,430	1,720	500
Butte	450	850	370	680	400	370	1,070	310	560	740	370
Granite Boulder	1,080	0	0	880	0	0	1,080	0	1,080	0	0
TOTAL	11,370	9,830	2550	1,0640	8,810	1,800	1,7230	1,930	10,780	10,180	3,810
GRAND TOTAL			23,750			19,190		19,160			24,770

Rounded to the nearest 10 acres Alternative3 does not include RHCA acres, all others do.

2.5.4.3 Old Growth Habitat and Connectivity

2.5.4.3.1 Modifying DOG/ROG/PWFA Boundaries

The *Land and Resource Management Plan*, Management Area 13 (MA-13) provides for the management of old growth habitat through a system of dedicated old growth (DOG) units and replacement old growth (ROG) units. In SE Galena, thirteen DOG units and two ROG units have been delineated for pileated woodpecker, pine marten, or a combination of both species see Appendix E, Map 19—Dedicated and Replacement Old Growth For Action Alternatives.. Table 42 shows species designation and acres for each DOG unit and ROG unit.

The *Land and Resource Management Plan* directs that pileated woodpecker areas will be 600 acres, composed of a 300-acre DOG and a 300-acre pileated woodpecker feeding area (PWFA). ROG units are intended to be ½ the size of DOGs, i.e., 150 acres. ROG units may overlap with the feeding areas. Pine marten units are to be 240 acres, composed of a 160-acre DOG and an 80-acre ROG. Again, ROG units are

intended to be ½ the size of their corresponding DOG. DOGs managed for both species should be managed at the 600-acre home range recommended for pileated woodpeckers. Management requirements are derived from the US Forest Service 1986 Minimum Management Requirements.

Existing DOGs and ROGs do not always meet minimum size requirements, and they are not always tied to logical stand or topographical boundaries. ROGs have not been established for 11 out of 13 DOGs. Pileated woodpecker feeding areas have not been established for 4 out of 5 pileated woodpecker DOGs.

Alternatives 2, 3, 4 and 5 propose changes to the DOGs, ROGs and PWFAs to meet management requirements. See Appendix E, Map 19—Dedicated and Replacement Old Growth For Action Alternatives

Existing DOG and ROG boundaries would be adjusted to match topographical features such as streams and roads and/or existing stand boundaries (see Table 42). DOG/ROG units may be increased or decreased in size to match features/boundaries, and to meet minimum *Land and Resource Management Plan* standards. In comparison to the existing condition, DOG unit acres increase by 115 acres. Acres in existing ROGs increase by 154 acres.

ROG units 129, 243, 245, 248, 249, 250, 252,330,332, 433 and 533 are recommended where no ROG units currently exist for their respective DOG units (see Table 42). Added acres of new ROG units total 1,438 acres.

PWFAs are recommended for DOGs 129, 330, 332, 333 and 433. Recommended ROG units for pileated woodpeckers provide 863 acres of feeding habitat. Action alternatives propose an additional 747 acres. Total feeding acres would be 1,610 acres.

In some instances, DOG/ROG size exceeds minimum *Land and Resource Management Plan* standards. This can be attributed to several reasons:

- ❑ The Forest must meet Forest-level acre targets for MA-13 (72,690 acres across the Forest) as well as management requirements for individual DOGs/ROGs as described previously.
- ❑ DOG/ROG areas have been increased in size when areas include acres of non-forest.
- ❑ DOG/ROG areas have been adjusted in size to meet logical boundaries as described previously.

A non-significant *Land and Resource Management Plan* Amendment would be needed to modify existing DOG/ROG boundaries.

Table 42—Old Growth implementation—Dedicated Old Growth (DOG) Replacement Old Growth (ROG) Pileated Woodpecker Feeding Area (PWFA).

Dedicated Old Growth unit #	Habitat requirements for indicator species	Minimum Acres [▲]	Existing DOG acres	Recommended DOG acres	Existing ROG acres	Recommended ROG acres ²	Additional Feeding acres ²	Total Recommended . Acres
DOG 129	Pileated Woodpecker	600	397	4434	0	193 (46) ♥	137	773 (46) ♥
DOG 242	Pine Marten	240	249	268	47	142 (10) ♥	---	410 (10) ♥
DOG 243	Pine Marten	240	204	208 (22) ♥	0	109 (5) ♥	---	317 (27) ♥
DOG 245	Pine Marten	240	214	235	0	132	---	367
DOG 248	Pine Marten	240	149	161	0	124	---	285
DOG 249	Pine Marten	240	168	191	0	87	---	278
DOG 250	Pine Marten	240	169	170	0	97	---	267
DOG 252	Pine Marten	240	153	152	0	89	---	241
DOG 330	Woodpecker/Marten	600	340	337	0	160	173	670
DOG 332	Woodpecker/Marten	600	302	298 (6) ♥	0	171	140	609 (6) ♥
DOG 333	Woodpecker/Marten	600	366	332 (14) ♥	134	193 (8) ♥	137 (7) ♥	66♣ (29) ♥
DOG 433	Pileated Woodpecker	600	171	1684	0	146	160	474
DOG 533	Pine Marten	240	217	251	0	130 (8) ♥	---	381 (8) ♥
TOTALS		4,920	3,099	3,214 (42) ♥	181	1,773 (77) ♥	747 (7) ♥	5,734 (126) ♥

[▲] Old-growth Management Area (MA-13) Minimum Management Requirements:
 Pileated Woodpecker Areas = 300-acre DOG + 300-acre feeding area = 600 acres. ROG = 150-acres and overlap with feeding areas.
 Pine Marten = 160-acre DOG + 80-acre ROG = 240 acres
[♣] ROG acres also contribute towards pileated woodpecker feeding acres. "Recommended ROG Acres" and "Additional Pileated Feeding Acres" fields should total at least 300 acres for each DOG.
[♥] Non-forested or unsuitable inclusions (acres) are displayed in parentheses.
[♦] Recommended DOG 433 at 168 acres falls short of minimum size requirements for a pileated woodpecker DOG (300 acres); however DOG 129 is immediately adjacent to DOG 433 and includes 143 surplus acres. Combined, the two DOGS contain 611 acres, a sufficient number of acres to meet requirements (600 acres).

Current scientific literature (Bull and Holthausen 1993) indicates habitat needs for pileated woodpeckers may not be adequately met by current *Land and Resource Management Plan* direction. *Land and Resource Management Plan*, Appendix G, p. G-19, recommends reviewing additional data on home range size as it becomes available and adjusting management area size accordingly. Alternative 3 increases the size of pileated woodpecker areas from 600 or more acres to 900 or more acres to reflect home range size recommended by Bull and Holthausen (1993). DOGs 129, 330, 332, 333, and 433 would be expanded (see Table 43). The additional 300+ acres would not be officially added to DOGs or ROG, but rather, these acres would be mapped and harvest treatment would be deferred until the next round of Forest planning determines appropriate management strategies. The 900-acre areas would include acres designated as DOG, ROG, and feeding areas plus the additional 300 treatment-deferred acres. Pine marten areas will remain as described in Table 42.

Under Alternative 3, a non-significant *Land and Resource Management Plan* Amendment would be needed to expand DOG/ROG/PWFAs from about 600 acres to 900 acres.

Table 43 Expanded Pileated Woodpecker areas(Dedicated Old Growth (DOG) Replacement Old Growth (ROG) Pileated Woodpecker Feeding Area (PWFA)

Dedicated Old Growth Unit #	Desired home range acres ¹	Recommended DOG acres	Recommended ROG acres ²	Additional PWFAs. acres ²	Total Recommended Acres—current LRMP direction	Home range additions	New total acres
DOG 129	900	443 ⁴	193 (46) ³	137	773 (46) ³	302	1,075 (46) ³
DOG 330	900	337	160	173	670	285	955 (6) ³
DOG 332	900	298 (6) ³	171	140	609 (6) ³	303	912
DOG 333	900	332 (14) ³	193 (8) ³	137 (7) ³	662 (29) ³	306	968 (29) ³
DOG 433	900	168 ⁴	146	160	474	309	783
TOTALS	4,500	1,578 (20) ³	863 (54) ³	747 (7) ³	3,188 (81) ³	1,505	4,693 (81) ³

¹ Home range size recommended by Bull and Holthausen (1993)

² ROG acres also contribute towards PWFAs. "Recommended ROG Acres" and "Additional PWFAs Acres" fields should total at least 300 acres for each DOG.

³ Non-forested or unsuitable inclusions (acres) are displayed in parentheses.

⁴ Recommended DOG 433 at 168 acres falls short of minimum size requirements for a pileated woodpecker DOG (300 acres); however DOG 129 is immediately adjacent to DOG 433 and includes 143 surplus acres. Combined, the two DOGS contain 611 acres, a sufficient number of acres to meet requirements (600 acres).

2.5.4.3.2 Timber Harvest/Prescribed Fire within Old Growth Habitat and Connectivity Corridors

Timber harvest and prescribed fire can be used to help restore historic stand structure and fire regimes, in particular, on Dry Forest types. *Land and Resource Management Plan*, Amendment 2 and the *Galena Watershed Analysis* recommend conversion of OFMS stands back to historic conditions of OFSS, where appropriate. *Land and Resource Management Plan*, Amendment 2 directs that younger stands should be managed towards OFMS or OFSS.

The Action Alternatives treat old-growth habitat and LRMP2 wildlife corridors at varying levels. Table 44 summarizes these recommended treatments by alternative. Treatments are prescribed where current vegetation conditions do not meet historic conditions, and stands are considered at risk. All recommended management actions are consistent with *Land and Resource Management Plan* standards for maintaining DOG and ROG habitat. Treatments, where recommended, are considered beneficial to related old growth dependent species in the long-term (25+ years). Mitigation measures for large diameter trees, wildlife snags, down woody debris, LRMP2 corridors and prescribed burning are described in 2.5.6 MITIGATION, page 90.

Table 44 Summarizes treatment within old growth habitat by alternative.

Alternative	Harvest Acres in DOGs	Harvest Acres in ROGs	Harvest Acres in PWFAs	Harvest Acres in 300-acre Additions ¹	Harvest Acres in Old Growth Outside DOGs/ROGs	Harvest Acres in LRMP, Amendment 2 Corridors
Alternative 1	0	0	0	0	0	0
Alternative 2	0	131	195	257	313	220
Alternative 3	0	0	0	0	223	0
Alternative 4	0	0	0	0	20	38
Alternative 5	0	192	195	257	326	220

¹Only Alternative 3 expands pileated management areas by 300 acres. Harvest activities are deferred. Alternatives 2 and 5 treat these areas as General Forest MA-1.

2.5.4.4 Aspen Restoration

The Malheur *Land and Resource Management Plan* has identified stands of quaking aspen⁴⁴ (*Populus tremuloides*) as unique and sensitive habitat that should be maintained and enhanced. The *Galena WA* (Issue Statement #3) described aspen stands as generally decadent, heavily encroached by conifers, declining in health and vigor, and over-browsed by big game and livestock.

Experience in the Blue Mountains has shown that a combination of conifer competition reduction, prescribed fire, and fencing from grazing provides the most effective strategy for regenerating aspen stands (see Decision Memo Geary Aspen Stand Improvement, March 1993). Conifer removal increases sunlight to shade-intolerant aspen, prescribed fire kills the above ground stems, stimulating root suckering (Schier *et al*, 1985), and fencing protects new suckers from browsing animals. This approach would be applied in all action alternatives.

To reduce competition with aspen by encroaching conifers, the conifers will be felled, or girdled and left as wildlife snags, according to the following guidelines:

Within aspen groves, conifers of 21" and greater dbh will be evaluated on a site specific basis for adverse impacts on the clone. These trees may be considered for snag creation by topping, girdling, or inoculation. They will not be removed by timber harvest.

Up to 100 feet from the outside edge of each aspen grove would have competing conifers felled to encourage expansion of the aspen grove.

Any conifers within 25 feet of stream channels, springs, or wetlands would be girdled and left as snags.

Larger diameter conifers less than 21" dbh and more than 25 feet from wet areas and still within RHCAs, would be felled and removed during harvest if other riparian objectives are being met.

Smaller diameter trees and slash from larger trees would be bucked, hand piled, and burned.

Any conifers located outside RHCAs may be removed also.

In aspen groves encroached upon by lodgepole pine, felled lodgepole would be used on site to build protective buck and pole fences.

As noted in the table below, several aspen groves are associated with potential harvest units. Where this is true, removal of encroaching conifers would occur in conjunction with harvest of the rest of the unit, while any burning and fencing would be accomplished after the harvest is completed.

In aspen sites not associated with a commercial sale, or if the harvest units with associated aspen stands are not implemented, treatment of these groves may occur as soon as funding allows. Fences would be built as soon as practical after all other treatments have been finished, with the goal of protecting new suckers.

⁴⁴ Malheur National Forest *Land and Resource Management Plan* (Forest Plan) Forest Wide Standard—57 Maintain or enhance quaking aspen stands.

Aspen site A-17 currently has no aspen, although site conditions closely resemble those of nearby groves in aspect, slope, and vegetation. This site has been selected for experimental re-introduction of aspen by hand-planting of nursery-propagated material from a nearby grove, and fencing to allow the new trees to establish. The development of hardwood root systems and the dense groundcover associated with an aspen overstory and grazing exclosures would compliment planned channel rehabilitation just below the site.



Photo 10—An example of Plastic Aspen fence from nearby Summit area.

The following priority aspen groves would be treated across all action alternatives as described (see Appendix E, Map 27 Aspen Enhancement Sites for Action Alternatives).

Table 45—Aspen Sites and Recommended Treatments

Site	Vegetation Treatment	Slash Treatment	Fence Type	Fence Acres	RHCA & Stream Category	Commercial Product ♦
A-1A	SRL	Handpile/Burn	Buck/Pole	5.0	Yes; 2	No
A-1B	SRL	Handpile/Burn	Buck/Pole	0.75	Yes; 2	No
A-2A	SRL	Handpile/Burn	Buck/Pole	2.0	Yes; 2	5000♣
A-2B	SRL	Handpile/Burn	Buck/Pole	0.75	No	No
A-2C	SRL	Handpile/Burn	Buck/Pole	0.75	No	No
A-3A	SRL	Handpile/Burn	Buck/Pole	0.75	Yes; 4	2250♣
A-3B	SRL	Handpile/Burn	Buck/Pole	2.0	Yes; 1	6000♣
A-3C	SRL	Handpile/Burn	Buck/Pole	0.75	partial	2000♣
A-3D	SRL	Handpile/Burn	Plastic	0.75	Yes; 4	2000
A-3E	SRL	Handpile/Burn	Plastic	0.75	Yes; 4	500
A-3F	SRL	Handpile/Burn	Plastic	0.75	Yes; 5	1500
A-3G	SRL	Handpile/Burn	Plastic	0.75	Yes; 1	2250
A-4A	none	Handpile/Burn	Plastic	0.75	No	No
A-4B	SRL	Handpile/Burn	Plastic	0.75	Yes; 2	No
A-5	SRL	Handpile/Burn	Buck/Pole	0.75	Yes; 1	No
A-6A	SRL, RPL	Handpile/Burn	Buck/Pole	3.0	Yes; 4	9000
A-6B	SRL	Handpile/Burn	Buck/Pole	0.75	Yes; 4	1000
A-6C	SRL	Handpile/Burn	Plastic	0.75	Yes; 4	1000
A-7	none	N/A	Plastic	0.75	Yes; 1	No
A-13	SRL	Handpile/Burn	Buck/Pole	1.0	Yes; 1	No
A-14	SRL	Handpile/Burn	Buck/Pole	3	Yes; 4	No
A-15	SRL	Handpile/Burn	Buck/Pole	0.75	Yes; 4-5	No
A-16	SRL	Handpile/Burn	Plastic	0.75	No	No
A-17	SRL, RPL	Handpile/Burn	Plastic	0.75	Yes; 5	No
A-18	SRL	Handpile/Burn	Buck/Pole	0.75	Yes; 2	3000♣
NOTES: Numbers in the RHCA column indicate category of the associated stream. SRL = stand release of aspen (girdling and/or felling of conifers) RPL = replant aspen SWS = Subwatershed ♦ in board feet ♣Product included in estimates of larger associated harvest unit.						

2.5.4.5 Noxious Weeds

Since the *Forest Noxious Weed Environmental Assessment* (Malheur National Forest 1999) was written, 10 new weed populations have been located, with 6 of those populations (total of 1.5 acres) recommended for possible chemical treatment, as listed in the following table. Also see Appendix E, Map28 Noxious Weed sites—Existing Condition. Just these new sites are analyzed in this document.

Table 46—Southeast Galena Restoration—Weed Treatment Acres

Treatment	Number of Sites	Acres
Manual—Total Area	4	0.4
Chemical—Total Area	6	1.5
Total Area	10	1.9
Chemical—RHCAs Only	4	1.3
Manual—RHCAs Only	3	.3
Total—RHCAs Only	7	1.6

In most of the new sites recommended for manual treatment, numbers of plants are small and the populations are located in riparian zones. Six infestations are recommended for possible chemical treatment as well, in case initial manual removal is ineffective and the populations prove to be persistent or increasing. The total area to be treated with herbicide within RHCAs is 1.3 acres, with 0.2 of the chemical treatment acres occurring outside of RHCAs.

Table 47—New Noxious Weed Sites

SWS	SITE #	SPECIES	COMMON NAME	ACRES	RHCA	TREATMENT
30213	300700	<i>Cirsium arvense</i>	Canada thistle	0.1	Yes	manual
30209	300726	<i>Centaurea diffusa</i>	diffuse knapweed	0.1	Yes	manual/glyphosate
30211	300728	<i>Centaurea maculata</i>	spotted knapweed	1.0	Yes	manual/ glyphosate
30211	300729	<i>Senecio jacobea</i>	tansy ragwort	0.1	Yes	manual
30211	300730	<i>Centaurea maculata</i>	spotted knapweed	0.1	Yes	manual/ glyphosate
30211	300732	<i>Hypericum perforatum</i>	St. Johnswort	0.1	No	manual/ glyphosate
30209	300733	<i>Linaria vulgare</i>	common toadflax	0.1	Yes	manual
30213	300800Q	<i>Cynoglossum officinale</i>	houndstongue	0.1	No	manual
30215	300801Q	<i>Cirsium arvense</i>	Canada thistle	0.1	No	manual/ glyphosate
30217	300802Q	<i>Centaurea maculata</i> <i>Hypericum perforatum</i>	Spotted knapweed St. Johnswort	0.1	Yes	manual/ glyphosate

“Q” following a site number indicates the site is in a quarry pit. See following discussion of quarry treatments.

Diffuse knapweed (site number 300726) is growing at the junction of the 4550 Road and Highway 20. Because of its proximity to the highway roadbed, the knapweed is especially likely to be spread by passing vehicles and needs to be eradicated as quickly as possible. It covers less than 0.1 acre. Because the 4550 Road site is within 50 feet of standing water and 150 feet of the Middle Fork John Day River, only direct wick application or spot application of herbicide using a backpack sprayer will be allowed. (Malheur NF *Noxious Weed Environmental Assessment* 2001).

The St. Johnswort (site number 300732) is in the uplands of the Butte Creek drainage. It is small enough to hand-pull, however access is difficult. To be effective, hand-pulling should be done two or three times during the growing season. One or two applications of herbicide are far more likely to eradicate the plants if they are already well established. Because the population includes fewer than 20 plants, manual treatment in 2002 may prove effective. If not, glyphosate could be used the following year.

Scattered plants of spotted knapweed have been found in a meadow along lower Butte Creek (site number 300728), covering about an acre of ground at low density. They would be treated with spot application of glyphosate. A nearby population of spotted knapweed (site #300730) occurs above a culvert that carries a

small intermittent tributary to Butte Creek under the 072 Road. Plants at this site would be treated with herbicide if hand pulling is not effective in eliminating the population.

The total acreage being recommended for chemical treatments is 1.5 acres, with 0.1 acres in the Tincup/Little Butte subwatershed (30209), 1.2 acres in Butte (30211), and 0.1 acres in each of Beaver/Ruby (30215), and Dry/Sunshine (30217) subwatersheds. The other new sites are not recommended for herbicide treatment due to their proximity to active stream channels (within 5 feet of flowing water), or because of the ease of hand treatment as in number 300800Q. In the case of number 300730, the knapweed is growing in a seasonally dry channel above a culvert, about 75 feet from Butte Creek.

Fifteen quarry sites have been identified as potential sources of rock for surfacing of roads within this project. Quarry sites, or rock pits, not only pose high risks for noxious weed occurrence due to their own continuously disturbed surfaces, but also present high potential for widespread dissemination of weed seeds into susceptible roadside habitats through the spreading of road surfacing materials during project work. Ten out of 15 of the rock pits have been surveyed for the presence of noxious weeds during the growing season, 2001, and at this time three contain infestations in need of treatment. Any quarries to be used for road work will be monitored annually for noxious weeds.

The quarry pit in riverside Gulch (site number 300802Q) contains two noxious weed species, spotted knapweed and St. Johnswort. Only three plants of each species were present in 2001, and because the pit is within an RHCA, glyphosate would be used if manual pulling proves ineffective, and herbicide treatment would be solely by wick application. Site number 300800Q, on the 4557 Road west of Granite Boulder Creek contains a small infestation of houndstongue that can be effectively pulled by hand. Site number 300801Q along the 4555 Road in the upper Dry Creek drainage harbors a small patch of Canada thistle of fewer than 50 stems, which will be most effectively eliminated by spot herbicide application.

Due to the high risks of infestation and of inadvertent seed spread with road surfacing materials, the 15 potential quarries to be used with this project need to be closely monitored throughout the implementation. Whether done manually or with herbicides, timely treatment of new infestations before any plants can set and disperse seeds can eliminate the possibility of any weed increases from these susceptible sites. Location of each of these quarries is listed in Table 58, page 86 and in Map 28—Noxious Weed Sites—Existing Condition.

The total acres column below shows the final projected size of each rockpit. Sites #2, 9, 14, and 15 are new sites that have not been previously developed, and will require space for stockpiles and crusher set-ups, hence the relatively large acreages involved. The three sites that currently harbor weeds have only a few plants each, requiring hand pulling or spot spraying with glyphosate. Although the total acreage that is at risk for weed infestation is 42 acres, it should be noted that only 0.3 acres are currently infested.

Alternatives 2 and 5 propose that 1.5 acres would be subject to wick or spot application of the herbicide glyphosate to noxious weed plants, with the expectation that all of the six populations involved would be eliminated in 2 to 5 years. Glyphosate is recommended because it is effective on all noxious weed species to be treated, but is the least toxic to aquatic organisms. Several of the weed treatment locations are within RHCAs. Four tenths of an acre of weeds would be treated manually, with the expectation that the four populations involved would be reduced in size, and prevented from setting and dispersing seed during all years that they are treated. These populations may not be completely eliminated, and would likely require long-term monitoring. Very small areas of ground disturbance would accompany the pulling or grubbing of weeds at the four manual treatment sites.

Alternatives 3 and 4 would continue monitoring and containment by hand of newer noxious weed sites as funding allows. Populations of noxious weeds included in the noxious *Noxious Weed Environmental Assessment* would be treated as analyzed in that document.

2.5.5 Infrastructure

Infrastructure is divided into elements of Roads, Trails and Trailheads, and Dispersed Campsites. Identified in the *Galena Watershed Analysis* Issue Statements #1, #4, and #5 relate to these Infrastructure elements in context of sediment delivery to nearby drainages and hydrologic concerns.

The Infrastructure projects below were brought forward from the *Galena Watershed Analysis* recommendations and were designed to improve or enhance the hydrologic function, fisheries habitat, and safe access needs for the *Southeast Galena Restoration* analysis area’s multiple uses. These projects help to address all undesired conditions, outlined in **1.2.1 Undesired Conditions**, beginning on page 8, at different intensities and levels.

Roads

The following road projects were designed to improve hydrologic and fish habitat conditions while providing safe and affordable roads.

Alternatives 2, 3 and 4 would not reopen the isolated transportation system within the Deerhorn and Little Butte drainages. These roads would be decommissioned and removed from the Forest Transportation System. In the past, this area was accessed by a ford crossing the Middle Fork of the John Day River, which is a Category 1 fish-bearing stream containing bull trout and steelhead. The Forest has previously eliminated use of this ford due to sediment concerns and past degradation on fisheries habitat by ATV and four-wheel truck recreational use.

Alternative 5 would utilize the existing Deerhorn and Little Butte transportation system by constructing a tie through road off the end of forest road 2614452.

Access Area Plan Per Alternative

The following tables display the results as if the access plan were implemented. The results are divided into the alternatives by item per subwatershed per management area. Brief descriptions of the columns follow these tables.

Table 48—Alternatives 2 Roads and Densities

SUBWATERSHED	Total miles	Total road density (miles of road per square mile)	Open miles	Closed miles	Open road density (miles of road per square mile)
Davis/Placer Gulch	37.9	3.3	17.8	20.1	1.7
Vinegar	37.4	3.2	20.4	17.0	1.4
Vincent	29.3	5.0	10.2	19.1	3.3
Little Boulder/Deerhorn	33.4	1.9	14.7	18.6	1.1
Tincup/Little Butte	29.3	2.5	9.5	19.7▲	1.7
Butte	20.4	2.7	7.2	13.2	1.7
Granite Boulder	31.3	2.7	11.1	20.2▲	1.8
GRAND TOTAL	207.0		99.5	107.6	
NOTE:▲ Includes about 12.5 miles of seasonal closures					

Table 49—Alternatives 3 Roads and Densities

SUBWATERSHED	Total miles	Total road density (miles of road per square mile)	Open miles	Closed miles	Open road density (miles of road per square mile)
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SUBWATERSHED	Total miles	Total road density (miles of road per square mile)	Open miles	Closed miles	Open road density (miles of road per square mile)
Davis/Placer Gulch	37.9	3.3	17.8	20.0	1.7
Vinegar	37.4	3.2	20.4	17.0	1.4
Vincent	29.3	5.0	10.2	19.1	3.3
Little Boulder/Deerhorn	33.4	1.9	14.7	18.2	1.1
Tincup/Little Butte	29.3	2.5	9.5	19.7▲	1.7
Butte	20.4	2.7	7.2	13.2	1.7
Granite Boulder	31.3	2.7	11.1	20.2▲	1.8
GRAND TOTAL	207.0		99.5	107.1	

NOTE:▲ Includes about 12.5 miles of seasonal closures

Table 50—Alternatives 4 Roads and Densities

SUBWATERSHED	Total miles	Total road density (miles of road per square mile)	Open miles	Closed miles	Open road density (miles of road per square mile)
Davis/Placer Gulch	35.6	3.1	17.8	17.7	1.5
Vinegar	33.0	2.8	20.4	12.5	1.7
Vincent	25.4	4.3	10.2	15.3	1.7
Little Boulder/Deerhorn	30.9	1.8	14.7	16.2	0.9
Tincup/Little Butte	26.9	2.3	9.5	17.3▲	0.8
Butte	20.1	2.6	7.2	12.9	0.9
Granite Boulder	31.2	2.7	11.1	20.1▲	1.0
GRAND TOTAL	203.1		90.9	112.0	

NOTE: ▲ Includes about 12.5 miles of seasonal closures

Table 51—Alternatives 5 Roads and Densities

SUBWATERSHED	Total miles	Total road density (miles of road per square mile)	Open miles	Closed miles	Open road density (miles of road per square mile)
Davis/Placer Gulch	38.8	3.3	30.3	8.5	2.6
Vinegar	38.4	3.2	28.9	9.6	2.4
Vincent	29.9	5.1	21.5	8.4	3.7
Little Boulder/Deerhorn	36.9	2.1	27.5	9.4	1.6
Tincup/Little Butte	32.5	2.8	22.1	10.4	1.9
Butte	20.5	2.7	14.9	5.6	2.0
Granite Boulder	31.4	2.7	18.9	12.5	1.6
GRAND TOTAL	228.4		164.1	64.4	

Total Miles

The total transportation system miles may be open or closed. System roads are used by Forest managers to gain access for the protection, administration, and utilization of its resources and by the public for use, recreation, and pleasure for personal needs and values.

Total Road Density

This density represents the total transportation system miles, open and closed, compared to the amount of acres they access (by subwatershed) displayed as miles of road per square mile. This density helps managers to determine potential concerns relating to hydrologic function and fish and wildlife habitat.

Open Miles

This is a road, or segment thereof, that is open to the public without restrictions other than general traffic control or restrictions based on size, weight, or class of vehicle. An open road may be closed during scheduled periods, extreme weather conditions, or emergencies. Routine maintenance of road and ditch blading, drainage structure cleaning and maintenance, some brushing, some rocking and adding cross ditches would be performed. Along these open roads, hazard trees would be dropped and may be removed for the safety of the user. Prior to removal of these hazard trees, other resource needs would be met e.g. RHCA down woody needs.

Closed Miles

These are roads which motorized traffic has been excluded by regulation, barricade blockage, or by obscuring the entrance. Short-term closed roads remain on the Forest Road Transportation System and are still operational but are closed to use, yearlong or seasonal. These roads are expected to be needed on an occasional or intermittent basis, and require periodic monitoring and basic custodial maintenance.

Where management has determined a road would not be needed for an interval of at least ten years, they would be inactivated. Motorized traffic would be excluded for an indefinite period by regulation, barricade blockage, or by obscuring the entrance. Along inactivated roads, all stream crossing structures would be removed, and the stream crossing areas reshaped to resemble a natural condition. Ditches or ruts would be removed, and road surface drainage reshaped so that no segments have a continuous surface flow path to a stream channel. An inactivated road is left in a condition such that basic custodial maintenance is not needed, but the road remains on the Forest Road Transportation System. If a later decision determines the road should be decommissioned, no additional work would be needed.

Along all closed roads(other than inactivated roads) due to potential administrative or permittee use, hazard trees would be dropped and may be removed, to reduce safety concerns. Prior to removal of these hazard trees, other resource needs would be met e.g. RHCA down woody needs.

Open Road Density

This density represents the amount of open roads compared to subwatershed area displayed as miles of roads per square mile. Open road density was established by the *Land and Resource Management Plan* in response to road management policy in relation to big game habitat and hunting. By closing certain roads, this would provide escapement areas for big game in addition to providing areas for non-motorized hunting experience (*Land and Resource Management Plan* ROD p. 23). Use of closed roads would not physically be evident and trips would not average more than one per week (*Land and Resource Management Plan* p. IV-28).

Along these open roads due to potential administrative, permittee, or public use, hazard trees would be dropped and may be removed, to reduce safety concerns. Prior to removal of these hazard trees, other resource needs would be met e.g. RHCA down woody needs.

Road Work Per Alternative

The next set of tables display the work that would be applied per alternative and the amount that would impact each subwatershed. The three types of projects include constructed road miles, reconstructed road

miles, and decommissioned road miles. All numbers are rounded to the nearest tenth of mile. Description and definitions describing the columns follow these tables.

Table 52 Alternatives. 2 Road Work to be Accomplished

Subwatershed	Constructed miles	Reconstructed Miles		Decommissioned Miles
		Minor	Major	
Davis/Placer Gulch	2.7	12.8	15.5	10.0
Vinegar	4.5	26.9	3.4	12.0
Vincent	3.9	22.6	1.2	5.7
Little Boulder/Deerhorn	3.8	19.7	6.3	12.1
Tincup/Little Butte	2.4	17.2	3.3	10.2
Butte	0.3	13.5	2.8	8.1
Granite Boulder	0.1	15.2	4.7	8.9
Analysis area Total	17.7	127.9	37.2	67.0
Outside Analysis area	0.0	6.0	6.6	0.0
GRAND TOTAL	17.7	113.9	43.8	67.0

Table 53 Alternatives. 3 Road Work to be Accomplished

Subwatershed	Constructed miles	Reconstructed Miles		Decommissioned Miles
		Minor	Major	
Davis/Placer Gulch	2.6	12.8	15.5	10.0
Vinegar	4.5	26.9	3.4	12.0
Vincent	3.9	22.6	1.2	5.7
Little Boulder/Deerhorn	3.4	19.7	6.3	12.1
Tincup/Little Butte	2.4	17.2	3.3	10.2
Butte	0.3	13.5	2.8	8.1
Granite Boulder	0.1	15.2	4.7	8.9
Analysis Area Total	17.2	127.9	37.2	67.0
Outside Analysis Area	0.0	6.0	6.6	0.0
GRAND TOTAL	17.2	113.9	43.8	67.0

Table 54 Alternatives. 4 Road Work to be Accomplished

Subwatershed	Constructed miles	Reconstructed Miles		Decommissioned Miles
		Minor	Major	
Davis/Placer Gulch	0.5	12.8	15.5	10.0
Vinegar	0.0	26.9	3.4	12.0
Vincent	0.0	22.6	1.2	5.7
Little Boulder/Deerhorn	1.7	19.7	6.3	12.1
Tincup/Little Butte	0.0	17.2	3.3	10.2
Butte	0.0	13.5	2.8	8.1
Granite Boulder	0.0	15.2	4.7	8.9
Analysis Area Total	2.2	127.9	37.2	67.0
Outside Analysis Area	0.0	6.0	6.6	0.0
GRAND TOTAL	2.2	113.9	43.8	67.0

Table 55 Alternatives. 5 Road Work to be Accomplished

Subwatershed	Constructed miles	Reconstructed Miles		Decommissioned Miles
		Minor	Major	
Davis/Placer Gulch	2.7	14.4	14.9	9.2
Vinegar	5.4	26.2	4.1	11.4
Vincent	4.8	23.1	1.2	5.9
Little Boulder/Deerhorn	5.8	19.4	7.7	10.6
Tincup/Little Butte	3.3	17.1	5.5	7.9
Butte	0.3	13.9	2.9	8.0
Granite Boulder	0.1	16.2	4.7	8.9
Analysis Area Total	22.4	130.3	41.0	61.9
Outside Analysis Area	0.0	6.0	6.6	0.0
GRAND TOTAL		136.3	47.6	61.9



Photo 11 Roads constructed would include clearing excavation, drainage and surfacing of roads, including the relocation of roads currently located in RHCA's.

Constructed Miles

These miles consist of clearing, excavation, drainage, and possible surfacing of roads that would be added to the Forest Transportation System. These miles include those roads constructed to replace roads poorly located, i.e. in RHCA's.

Reconstructed Miles

Minor Reconstruction: Includes brushing out of encroaching vegetation, blading and shaping the existing roadbed, turnouts, and turnarounds, hazard tree removal, cleaning and repair of existing drainage structures and spot rocking.

Major Reconstruction: Includes the work listed for minor reconstruction but also one or more of the following: substantial removal of brush and trees from the roadbed, adding new drainage structures, adding new turnouts or turnarounds, widening of the roadbed, and substantial surface rock placement or replacement.

Decommissioned Miles

Decommissioned Roads are permanently removed from service and the Forest Transportation System. These roads have no reasonably foreseeable need for use, and/or continued use is not compatible with other resource protection needs. The objective is to restore the roadway to other resource uses

established for the area, and to leave it in a condition that would not require custodial maintenance. All stream crossing structures would be removed and the stream crossing areas reshaped to the natural surrounding area. All culverts, roadside ditches, and ruts would be removed, and the road surface shaped so that no segments of the roadbed provide a continuous surface flow to a stream channel. Revegetating of decommissioned roads could be natural or accomplished by other methods to recover vegetation within ten years after the last activity.

Road Work Per Alternative Specific To RHCA's

The next set of tables display the work accounted for in the previous tables but specific to RHCA's. This helps to determine what direct short-term impacts may occur for the intent of a long-term benefit.

Table 56 Alternative. 2, 3 & 4 Roads in RHCA's

SUBWATERSHED	OPEN MILES	CLOSED MILES	DECOMMISSIONED MILES	RECONSTRUCTED MILES	
				Minor	Major
Davis/Placer Gulch	3.6	1.5	4.9	1.6	1.4
Vinegar	4.0	1.0	3.8	3.7	0.4
Vincent	3.2	1.4	2.5	3.6	0.0
Little Boulder/Deerhorn	4.0	1.7	4.2	3.6	0.3
Tincup/Little Butte	4.8	1.5▲	1.8	1.4	0.6
Butte	2.1	0.9	2.8	2.2	0.5
Granite Boulder	2.0	3.9▲	3.9	3.6	0.4
TOTALS	23.7	11.5	23.9	19.7	3.6

NOTE: Same definitions as described above ▲ Includes 2.7 miles of seasonal closures

Table 57 Alternative. 5 Roads in RHCA's

SUBWATERSHED	OPEN MILES	CLOSED MILES	DECOMMISSIONED MILES	RECONSTRUCTED MILES	
				Minor	Major
Davis/Placer Gulch	4.9	0.5	4.6	2.0	1.3
Vinegar	4.3	0.6	3.9	3.6	0.5
Vincent	4.4	0.2	2.6	4.1	0.0
Little Boulder/Deerhorn	5.9	0.6	4.0	3.6	0.6
Tincup/Little Butte	5.7	0.6	1.8	1.4	0.6
Butte	2.9	0.1	2.8	2.2	0.5
Granite Boulder	4.3	1.7	3.9	3.9	0.4
TOTALS	32.4	4.3	23.6	20.8	3.9

NOTE: Same definitions as described above

Rock Quarries

The table below displays the rock quarries that may be needed, including some located outside of the analysis area.

Table 58—Rock Quarries

SITE #	QUARRY	CURRENT ACRES	PROJECT ACRES	IN/OUT OF ANALYSIS AREA
1♣	Dan's Creek, 566 rd	3	4	Out
2♣	Placer Gulch, 453 rd	0	5	In
3	Vinegar Creek, 121 rd	2.5	3	In
4	Vinegar Creek, 073 rd	0.5	1	In
5	Upper Morning Creek, 255 rd	1.5	2	In
6	Vincent creek, 2010 rd	2	3	In
7	Vinegar Creek, 959 rd	0.5	1	In
8	Cow Camp Meadows, 2055 rd	1.5	2	In
9	Murdock Creek, 161 rd	0	5	In
10	Granite Boulder Creek, 4557 rd	0.5	1	In
11	Lemon Creek, 4557 rd	0.5	1	In
12	Dry Creek, 350 rd	6	6	Out
13♣	Riverside Gulch, 199 rd	2	2	Out
14♣	Riverside Gulch, 218 rd	1.5	2	Out
15♣	Riverside Gulch, 2050 rd	0	4	In
NOTE: rd = road ♣ New site ♣ RHCA				

Rock quarry sites provide rock and gravel sources for the recommended roadwork. Three new quarry sites (numbers 2, 9 and number 15) would be developed in conjunction with closing quarry site number 14 located in RHCA, and one stockpile site, number 13.

The Riverside Gulch quarry site #14 located within a non-fish bearing RHCA has been heavily used in the past twenty years. A new location has been selected to replace this site. A subsurface investigation would be conducted to determine quality and quantity of materials available at the new location.

One existing quarry site located in Placer Gulch adjacent to Forest Road 2614 is located within the Placer Gulch RHCA. This site has not been utilized since 1984 and was limited to removal of shallow layers of surface materials. The site has healed naturally. It is hydrologically sound and is not in need of further rehabilitation. Due to its location and current condition, this site will no longer be used.

2.5.5.2—Trails and Trailheads

Three trails analyzed in this document are the Blackeye and Tempest Mine Trail, which are non-motorized (hiker, horse, and bicycle) and the Davis Creek Trail (motorized). See Appendix E, Map 31—Recommended Trails, Trailheads, and Campsite Projects—For Action Alternatives. Preliminary concerns include:

Sediment delivery to streams due to current drainage of the trails and trailheads as well as trail drainage crossings; and

Safety for the trail user due to condition of the trail and hazards along these routes.

DESCRIPTION OF TRAIL PROJECTS

Blackeye Trail 243 (Tempest Mine Trail 256)

A new trailhead would be constructed on the east end of this trail system at Forest road 2010 about 0.25 mile north of the existing trailhead adjacent to Forest Road 2010. The trailhead would be a size to accommodate four vehicles with horse trailers. Information signs would be placed at this trailhead.

To access this new trailhead location, about 1 mile of the 2010 road would need to be reconstructed. The existing access road is native surface and is rutting. Forest Road 2010/219 is steep in places and has some 12-inch ruts that make access to the existing trailhead with a horse trailer and most other vehicles quite

difficult and dangerous and a sediment source concern. This road would be decommissioned and removed from the transportation system.

In addition, about 1 mile of new trail would need to be constructed from the existing trailhead to the new one along the 2010 road. This trail would accommodate both foot and horse traffic.

The existing trailhead near Lemon Cabin on the west side of the Tempest Mine and Blackeye Trails would be eliminated (decommissioned) along with about 1 mile of Forest road 4559. Road 4559 was the access to this west end trailhead.

A storm event washed out the 4559 road at the Lemon Creek drainage cutting off access to the trailhead. In addition, from near Lemon Cabin to the existing trailhead (about 1 mile), the 4559 road contains ruts and is rilling and eroding causing sediment concerns to the nearby drainages.

This closure would be located at intersection of 4559283 and 4559. Decommissioning would occur from the closure to a former trailhead near the scenic area boundary. Portions of the roadbed would be scarified, planted with trees, and grass seeded to help stabilize the soil and reduce potential sediment delivery. Culverts and gates would be removed. In connection with this decommissioning, a bridge on the 4559 road that crosses Granite Boulder Creek near Lemon Cabin would be removed. This bridge is currently closed to traffic due to unsafe conditions; it would no longer be used as a trail bridge.

About 1.3 miles of a hiker/horse connector trail would be constructed. This connector would create a lollipop-shape loop trail with the Blackeye and Tempest Mine Trails. It would allow the trail users a return route to the eastside trailhead with minimum overlap. Construction of this trail would have minimal impact since it uses an existing jeep trail. This approach opens up future management options for accessing the Princess Trail system if an easement through private land is no longer allowed on this trail. The remaining trail is in fairly good condition and would require normal maintenance of clearing, grubbing, water bars, and removal of hazard trees.

Davis Creek Trail 244

The Davis Creek Trail is designated for motorized use. However, it originally was constructed to accommodate two-wheeled traffic (motorcycle). Due to the popularity of four-wheelers, the demands on this trail have expanded to include wider-based motorized vehicles or four-wheel all terrain vehicles (ATV). This trail and surrounding resources are sustaining damage resulting from inadequate width for the vehicles currently using it. Several sections of the trail are also unsafe for ATV use due to the narrow nature of the trail and steep slopes. Nine drainage crossings are too narrow for ATV use, so users drive their ATVs around the bridges, fording the streams, thus creating sediment.

In Alternatives 2, 3, and 5, the project would widen the trail to a minimum width of 62 inches, using small-motorized equipment to reconstruct the 8.3 miles of trail. Trail crossings at Placer Gulch, Deerhorn, Gorge, East and West Little Butte, and Butte Creeks would be widened, including culverts, bridges, and rock. Hazard trees along the route would be felled for safety reasons. Alternative 4 would reclassify this trail to non-motorized use. Therefore, reconstruction would not occur, however, hazard tree would still be felled.

In all action alternatives, a new trailhead would be constructed on the west end, which would eliminate three crossings of Butte Creek and one trailhead within a RHCA. The new location would be on Forest road 2050072 on the ridge east of Butte Creek. About 1/2 mile of new trail would be constructed to connect the new trailhead location to the existing trail. Information signs would be installed at the trailhead location. This trailhead would accommodate a minimum of four vehicles with ATV or horse trailers.

Signing indicating this new trailhead location would be placed along County Road 20. An existing horse stall on Forest road 2050, which is presently in a riparian area, would be moved to the new trailhead location. The old horse stall location and parking area would be scarified, reshaped, seeded, and closed to access.

Access to the recommended Davis Creek Trailhead on the west end would need to be upgraded to accommodate the expected use. About 1.6 miles of roads 2050032 and 2050666 would be reconstructed.

In addition, the Davis Creek Trail would include numerous improved channel crossings to reduce sediment input.

These trail projects include decommission, reconstruction, construction, and trailhead work. These projects are designed to contribute to the overall purpose of improving the hydrologic function, enhancing fish habitat, and providing a safer use of these facilities. Definitions follow these tables.

Table 59 Alternatives 2 & 3 Trails and Trail Head Work

TRAIL NAME	DECOMMISSION MILES	RECONSTRUCTION MILES	CONSTRUCTION MILES	TRAIL HEADS	
				New	Removed
Blackeye Trail	0.7	0	0.5	1	2
Tempest Mine Trail	0	0	1.3	0	0
Davis Creek Trail	1.0	8.3	0.5	1	2
Totals	1.7	8.3	2.3	2	4

Table 60 Alternative 4 Trails and Trail Head Work

TRAIL NAME	DECOMMISSION MILES	RECONSTRUCTION MILES	CONSTRUCTION MILES	TRAIL HEADS	
				New	Removed
Blackeye Trail	0.7	0	0.5	1	2
Tempest Mine Trail	0	0	1.3	0	0
Davis Creek Trail	1.0	0	0.5	1	2
Totals	1.7	0	2.3	2	4

Alternative 4 eliminates the recommended reconstruction on Davis Creek as displayed on Alternative 2 and 3 due to a proposal to change the use designation from motorized to non-motorized (a *Land and Resource Management Plan Amendment* would be needed). The reconstruction would no longer be needed, however, hazard tree would still be felled.

Table 61 Alternative. 5 Trails and Trailhead Work

TRAIL NAME	DECOMMISSION MILES	RECONSTRUCTION MILES	CONSTRUCT MILES	TRAIL HEADS	
				New	Removed
Blackeye Trail	0.7	0	0.5	1	2
Tempest Mine Trail	0	0	1.3	0	0
Davis Creek Trail	1.0	8.3	6.1	1	2
TOTALS	1.7	8.3	7.9	2	4

Alternative 5 would also see an addition of 6.1 miles of delineated trail on the Davis Creek Trail to create a loop for users to enjoy minimal overlap. This addition is contingent upon recommended new road construction connecting the existing Deerhorn and Little Butte drainage transportation system.

Decommissioned Miles

Trails removed from the trail system with no anticipated future use. The trail would be obscured by re-contouring or re-shaping the trail back to the conotour of the surrounding landscape or allowed to just re-vegetate.

Reconstructed Miles

The trail would be reshaped and widened to meet today's standards for the appropriate use. Reconstruction would improve safety for the user, hydrologic function of the drainages, and habitat for the fish.

Constructed Miles

New trail construction consist of clearing, excavating, and installing of proper drainage to trails that would be added to the Forest Trail System. Existing road or jeep trails would be upgraded and used where feasible.

Trailheads

New trailheads would be constructed to accommodate vehicles depending on the designation of the trail use. The sites would be hydrologically sound and properly signed for information purposes. The removed trailheads would be obliterated to match the lie of the surrounding landscape and revegetating to reduce risk of erosion.

2.5.5.3 Description of Dispersed Campsite Projects

All action alternatives would discourage use of some dispersed sites and enhance others located within the RHCA of the Middle Fork John Day River. The following sites were identified as the priority sites to improve or relocate:

Three Relocation Dispersed Sites

Three dispersed sites: Tincup Relocation dispersed sites (Tincup Creek/Little Butte Creek subwatersheds), Flat Plantation dispersed sites (Little Boulder/Deerhorn SWS), and Vincent dispersed sites (Vincent Creek SWS), all would be constructed to replace dispersed sites currently located in riparian areas.

Four new graveled camp pads would be constructed to accommodate vehicle/trailer camping in Vincent Creek SWS. No other amenities are planned at this time. An approach would be constructed and graveled to access these pads about 0.2 miles up Forest road 2010072 from the 2010 intersection. This action would replace the campsite locations adjacent to Forest road 2010243 (Vinegar Creek) which were closed previously. Treatment of the Tincup Relocation dispersed sites would be the same as the Vincent dispersed sites. Access to these sites is near the junction of County Road 20 and Forest Road 4550. The locations in Flat Plantation dispersed sites (Little Boulder/Deerhorn SWS), would construct six graveled camp pads. These sites would be located west of Flat Creek off County Road 20 (see Appendix E, Map31—Recommended Trails, Trailheads, and Campsite Projects-for Action Alternatives).

Middle Fork Day Use Sites

The three dispersed sites mentioned previously (Tincup, Flat and Vincent), are being created to replace camping near the Middle Fork John Day River which have been causing impacts along the river's edge (see **Recreation Affects in RHCAs**, page 136). The Middle Fork areas where overnight prolonged camping has occurred would be converted to day use areas by being scarified, reshaped, seeded, and blocked where feasible. While access to these areas would remain for day use, the Middle Fork day use sites would be hardened and have boulders placed along the river's edge to prevent vehicle access to the river's edge (see Appendix E, Map31—Recommended Trails, Trailheads, and Campsite Projects-for Action Alternatives).

Murdock Dispersed Site

Dispersed site in the Tincup/Little Butte Creek subwatershed (historically known as Murdock) would be improved rather than removed. The access road is native surface and is deeply rutted in places and widened in areas where users have driven around these ruts. Soil compaction and loss of vegetation has occurred. the access road and camp sites are within 100 feet of the river, therefore this proposal would harden the site by placing rock in the access and three camp pads to minimize future soil damage and

subsequent sediment delivery (see Appendix E, Map31—Recommended Trails, Trailheads, and Campsite Projects-for Action Alternatives).

Dispersed Sites in Vincent Creek subwatershed

Another set of dispersed sites in the Vincent Creek subwatershed near Forest road 2010987 is currently blocked by pole barricade. This barricade would be relocated back about 500 feet, which would open up five or six dispersed sites. This location does not have any known resource concerns, yet would help provide dispersed sites, especially during hunting season (see Appendix E, Map31—Recommended Trails, Trailheads, and Campsite Projects-for Action Alternatives).

Deerhorn Forest Camp (Campground)

The Deerhorn Forest Camp (Campground), in Little Boulder/Deerhorn SWS, is another site to be improved rather than eliminated. Access to this site is rutting and has potholes, the camp sites are scattered, and foot access to the river is not controlled. Consequently, vegetation is being trampled and compacted due to this uncontrolled use. The proposal for this site is the installation of flat native boulders in a step design to encourage use of one area to access the river. Camp pads and the access road would be rocked to reduce rutting and sediment delivery. Boulders would be placed around camp pads and the dispersed site to control traffic and to keep vehicles away from the Middle Fork of the John Day River (see Appendix E, Map31—Recommended Trails, Trailheads, and Campsite Projects-for Action Alternatives).

2.5.6 Mitigation

2.5.6.1—Mitigation Common to All Action Alternatives

The following mitigation would be applied in all action alternatives to avoid, or reduce the risk of undesirable effects during or after implementation or restorative treatments.

2.5.6.1.1—Mitigation for Visuals (County Road 20 & Forest Service 2010 Road)

- ❑ Apply a harvest prescription within harvest units for the first 300 feet or what is visible from the road within this 300-foot area. These prescriptions would vary tree spacing up to 50% to create a visually diversified stand and tree spacing. The large tree component would be retained and thinning regimes would open up the forest stand to emphasize view of these larger trees. Paint bands on the trees would be marked on the side away from the road to reduce short-term visibility concerns.
- ❑ Cut stumps of trees harvested in the immediate foreground (300 feet or what can be seen from road) at a height <6 inches to reduce visual impacts.
- ❑ Treat logging slash in the immediate foreground (300 feet or what can be seen from road) using methods such as piling and burning, mechanical crushing, or yard tops attached to reduce impacts that detract from the natural character of the view.
- ❑ Seed areas in accordance with botany restoration standards where there are areas >200 square feet of soil disturbance in the immediate foreground (300 feet or what can be seen from road).

2.5.6.1.2—Mitigation for Noxious Weeds

- ❑ Incorporate the Best Management Practices (BMPs) identified in the PNW Region USDA-Forest Service Noxious Weed Strategy (1999).
- ❑ Remove mud, dirt, and plant parts from off-road equipment before it is moved into the analysis area. Cleaning must occur off National Forest lands (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the analysis area).
- ❑ Minimize ground disturbance with all activities.

- ❑ Inquire about all noxious weed sites before implementing ground disturbing activities (harvest, precommercial thinning, prescribed fire, stream channel work, trail construction, and any off road ATV use for Forest Service, or contract work, etc.). Actions or timing of actions may be modified to avoid these sites or avoid spreading noxious weeds.
- ❑ Modify timing of vegetative management (harvest or burn) in units with known noxious weed sites.
- ❑ Treat all noxious weed sites in rock sources before removal of rock is allowed for project work to reduce potential noxious weed spread. Monitor all rock sources annually.
- ❑ Apply native or non-persistent non-native seed to soils bared by ground-disturbing activities.
- ❑ Apply only certified weed-seed-free straw if used for soil stabilization and erosion control.

2.5.6.1.3—Mitigation for Hazard Tree Removal

- ❑ Remove felled hazard trees outside of RHCAs unless needed for woody debris standard for wildlife habitat and long-term site productivity.
- ❑ Remove portion of felled hazard trees within RHCAs that lies within the road prism. The portion of the felled tree outside the road prism will be left for terrestrial and fish habitat.

2.5.6.1.4—Mitigation for Working Within RHCAs

- ❑ In RHCAs work using heavy equipment would be completed when soil moisture is 10% or less. Accomplish actions recommended within stream channels (e.g. in-stream structure placement, culvert removal), from July 15 through August 15 reducing possible stress on fish populations due to potential sediment delivery (*Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 1997). By accomplishing project work during this time, when stream flows are at their lowest levels, sediment input to streams would be minimized. This time is outside fish spawning periods, reducing possible impacts to spawning adults and their eggs. Exact timing may be altered depending on stream conditions, fish movement, and depth of water flow. Changes in timing will require a recommendation by a fisheries biologist or hydrologist, consultation with appropriate agencies and approval of the Responsible Official.

2.5.6.1.5—Timing Restrictions

- ❑ Adhere to seasonal restrictions for specified wildlife species as identified in Table 62. Prohibited management activities include all Forest Service and contracted activities, including but not limited to, such activities as timber harvest, precommercial thinning, prescribed fire, and roadwork. A restriction may be waived based on a District biologist's recommendation and the Responsible Official's approval.

Table 62—Timing Restrictions for wildlife

Species	Restriction
Bull Trout, Steelhead, and Chinook Salmon (applies to in-channel activities in fish-bearing streams)	Activities can occur: July 15 to August 15
Lynx Denning Habitat (within ¼ mile of denning habitat)	Activities can occur: September 1 to April 30
Bald Eagle Winter Roosts (within ½ mile)	Activities can occur: March 16 to November 30
Occupied [▲] Goshawk Sites: Within post-fledgling areas (PFA's) Within ½ mile of nests or 30-acre nest areas	Activities can occur: October 1 to March 31
Other Occupied [▲] Accipiter Nest Sites (Sharp-shinned Hawk and Cooper's Hawk)	Activities can occur: September 1 to February 1
Other Occupied [▲] Raptor Nest Sites (within ½ mile)	Activities can occur: August 1 to February 1
Big Game Winter Range ^Δ	Activities can occur: April 1 to November 30
Big Game Winter Range – Seasonal Road Closure Restricts Vehicular Traffic On Forest Roads: 4559-000, -283, -284, 592, 642 and -956.	Activities can occur: April 1 to November 30
Identified Calving and Fawning Areas	Activities can occur: July 1 to April 30
[▲] Nests need to be occupied for restriction to apply. ^Δ Restriction may be waived during mild winter conditions.	

2.5.6.1.5—Mitigation for Burn Prescriptions

Silvicultural Mitigation

- ❑ Maintain a low intensity ground fire with average flame lengths less than 4 feet. The objective is to reduce the amount of material less than 3 inches in diameter, which is the prime carrier of fire.
- ❑ Limit tree scorch from fire to no more than 30% of the live crown of the dominant and co-dominant trees.
- ❑ Keep tree mortality to less than 10% for trees greater than 7-inch dbh. For trees less than 7-inch dbh, mortality should not exceed about 85% with a minimum of 15% of the understory trees retained in patches of at least one acre for wildlife hiding cover. In some locations, mortality thresholds would be set lower; see Soils, Hydrology Fishery Section, Wildlife Section and remainder of this section for details.
- ❑ Avoid young plantations.
- ❑ Limit mortality to 10% or less in areas where natural regeneration is needed to stock site in one quarter acre area (or larger) where feasible;
- ❑ Avoid burning of mountain mahogany patches greater than one-quarter acre and carefully ignite around individuals and patches to minimize mortality from fire.
- ❑ Reduce risk of damage of crown scorch or bole scorch which may kill genetic trees by a combination of one, or more of the following: 1) reduce excessive flammable material 50 feet around genetic trees; 2) adjust ignition pattern by starting ignition at base of genetic tree; 3) burn a strip around the genetic tree, 4) wet down the area around the genetic tree; or 5) rake duff from base of trees if needed in combination with options above.

- ❑ In reforestation units, protect reserve trees during site preparation burning by: 1) pulling material away from the reserve tree, 2) burning material around trees prior to the prescribed fire ignition, or 3) building a hand line around the tree, as needed.

Soils, Hydrology, Fishery Mitigation

- ❑ Avoid ignition in all RHCAs, except where handpile burning is prescribed in aspen stands.
- ❑ Avoid building fire lines unless needed for suppression. If fire lines are constructed, use best management practices such as water bars and seeding to minimize possible sediment delivery to stream channels.
- ❑ Use water for fire suppression within RHCAs; no retardants will be allowed.
- ❑ Limit mortality of trees to no more than 5% of all sizes of trees in RHCAs.
- ❑ Retain a minimum of ¼" duff layer over 90% of the area for soil protection.

Wildlife

- ❑ Retain higher levels of wildlife cover within *Land and Resource Management Plan Amendment 2* (LRMP2) corridors and the *Key Linkage Area* (KLA). Retain crown closure at the upper 1/3 of site potential. Retain trees 8 feet tall or greater at a minimum of 180 trees per acre. Management of the KLA differs from management of the LRMP2 corridors in that only 1/3 of the KLA needs to meet this mitigation at any point in time. See District biologist to identify stands which require mitigation.

In Alternative 2, 3 and 4, this prescription will be applied to treatments within all LRMP2 corridors and the KLA. In Alternative 5, only the crown closure mitigation will apply and only in LRMP2 corridors.

- ❑ Maintain down logs for wildlife habitat and long-term site productivity as described under harvest mitigation. Fire prescription parameters would ensure that consumption does not exceed three-inches total diameter reduction on the required large logs.
- ❑ Retain wildlife snags at levels to provide for 100% population levels of primary cavity excavators as described under harvest mitigation. Avoid ignition within 100 feet of snags 15 inches dbh to 20 inches dbh. Use of helicopters may result in ignitions closer than 100 feet, so if used, monitoring will be needed to determine if snags are being retained as needed.
Larger snags can be of greater value to some primary cavity excavators and less easily replaced if destroyed. For snags 21 inches dbh or greater, reduce risk of damage by a combination of one or more of the following: 1) building fire line around snag; 2) rake duff from base of trees; or 3) wet down area around snag. Protections will be suited to the specific area.
- ❑ Avoid prescribed fire activities within 30-acre goshawk nest areas. Protect all other known raptor nests with a buffer of 100 feet around the nest tree.
- ❑ Prohibit prescribed fire in Dedicated Old Growth (DOG) areas. Permit prescribed fire in Replacement Old Growth (ROG) areas and Pileated Woodpecker Feeding Areas (PWFAs); however, limit mortality of trees to no more than 5% of all sizes of trees.
- ❑ Provide blue grouse winter roosts, large mistletoe infested or large limbed Douglas-fir trees retained at 5 to 8 trees per acres. Apply along ridge tops and large scab openings, where available.
- ❑ Protect "identified" calving and fawning areas using the seasonal restriction identified in Table 62. In areas not specifically identified for calving and fawning, burning crews will watch for lone elk or deer. If crews see lone animals, they will search the immediate area for calves or fawns and avoid lighting where young animals are discovered. Burning crews do not need to monitor elk and deer outside the May 1st to June 30th window.

Air Quality

- Adhere to the Oregon Smoke Management Program to minimize smoke impacts and to protect air quality. These conditions will be met from July 1 to September 15 in Class 1 areas (Strawberry Mountain Wilderness is the closest Class 1 area).

Noxious Weeds

- Treat populations of noxious weeds that can be stimulated from a burn prior to applying prescribed fire or do not allow the infested site to burn e.g. tansy ragwort, common toadflax. Inquire about possible new noxious weed sites before applying prescribed fire.

Public Safety and Private/Federal Property

- Protect improvements such as private land, range fences, survey monuments, bearing trees, dispersed campsites, and aspen fences.

2.5.6.1.6—Mitigation for Heritage Resource

- Protect cultural resource sites in accordance with the National Historic Preservation Act of 1966 and the Programmatic Agreement among the Forest Service, Advisory Council on Historic Preservation, and Oregon State Historic Preservation Officer. There are two different types of cultural resource values present in the Southeast Galena Analysis area. 1) Some sites in the planning area are valued because they can potentially yield scientific or scholarly information through the study of their artifacts, features, and sediments. 2) Other sites are valued because they can visually convey an association with important patterns of historic events or display distinctive architectural or engineering characteristics. Many of these latter sites are associated with broad historic patterns such as the development of the western mining frontier, homesteading, or railroad logging.

1) For sites that possess potential scientific data potential, we are primarily concerned with mitigating ground disturbance. In the vast majority of cases, sites of this type will be totally avoided by management activities. However, 15 sites of this type are within recommended harvest units. Mitigation that will be used in all action alternatives for activities within the perimeter of this site type include:

1a) Allow only low intensity prescribed fire within the boundaries of most archaeological sites. Concentrated heavy fuels such as piles of slash will not be allowed to burn within these sites.

1b) Avoid prescribed fire in archaeological sites that are known to hold fire sensitive material such as wood.

1c) Avoid construction of mechanical fire line within the boundaries of this site type.

2) For heritage sites that visually illustrate an association with important episodes of history or display distinctive architecture or engineering design, we are primarily concerned with mitigating damage to the visual appearance. Most of the activities set forth in the action alternatives will not significantly alter the visual appearance of this site type. Mitigation that will be used in all action alternatives for activities within the perimeter of this type of site include:

2a) Reclamation of sites to a state that is as near as practical to its original condition. An example includes re-contouring landscape features at the close of the activity.

2.5.6.1.7—Mitigation for Aspen

- Within aspen groves, conifers of 21 inches and greater dbh will be evaluated on a site specific basis for adverse impacts on the clone. These trees may be considered for snag creation by topping, girdling, or inoculation. They will not be removed as timber harvest.

- ❑ Prohibit skidding within 25 feet of stream's channel, spring, or wetlands. Within these 25-foot zones, conifers greater than 8" dbh and less than 21" dbh are to be girdled and left standing as snags. Permit skidding outside these 25-foot zones within RHCAs when ground is dry or frozen to prevent compaction and the formation of ruts or furrows.
- ❑ Permit use of ATVs for delivery of fence materials to the site, but prohibit ATV within 25 feet of stream channel.
- ❑ Avoid skidding across adjacent non-forested lands, where feasible, to minimize displacement, erosion, and irreversible damage to soils.

2.5.6.1.9—Mitigation for Dispersed Campsites

- ❑ Avoid implementation of these projects within RHCAs from July 15 through August 15 reducing possible stress on fish populations due to potential sediment delivery. This is the time of year when stream flows are at their lowest, reducing the chance of sediment reaching the stream. This time is outside fish spawning periods, reducing possible impacts to spawning adults and their eggs. Exact timing could be altered depending on stream conditions, fish movement, and depth of water flow. The responsible official would make this decision with consultation of appropriate specialists and agencies.

2.5.6.2 MITIGATION COMMON TO ACTION ALTERNATIVES 2, 3, & 5

2.5.6.2.2—Mitigation for Harvest Operations

Human Utilization and Aesthetic Consideration

- ❑ Retain all live trees 21 inch dbh or larger except for those determined to be hazardous to logging operations or other forest users, or if they need to be removed for roadwork.
- ❑ Cut stumps no more than six-inches high for 75 feet on both sides of Forest Service established trails. Post signs at trail heads, closing them to public use during logging operations. Remove hazard trees along trails. Identify opportunity to remove trees to open up views along the trails.

Soils, Hydrology, Fishery Mitigation

- ❑ Prohibit the use of mastication/crushing machines on soils during wet conditions when prone to compaction.
- ❑ Avoid skidding on unsuitable, non-forested land such as scab flats, where feasible, to minimize displacement, erosion and irreversible damage to soils. Cover skid trails on unsuitable land after use with enough slash to slow water movement and prevent soil movement. Designate and approve skid trail locations before logging, to minimize soil impacts.
- ❑ Use water, or lignin sulfate dust palliative or similar approved material for dust abatement.
- ❑ Prior to use, all water sources for road construction, reconstruction, and dust abatement will be reviewed by the fisheries biologist or hydrologist to ensure that no adverse alterations to the stream channel or bank stability occur.
- ❑ Rehabilitate pre-designated points where crossing may occur across ephemeral draws. Once harvest activities are complete, use slash and large wood to reduce potential erosion concern at these crossings.
- ❑ Use native surface roads for log haul only when dry or frozen.
- ❑ Reduce risk of erosion on road construction and reconstruction with measures determined on a site-specific basis including but not limited to season of road work to be accomplished, sediment fences, and hay bales.

- ❑ Minimize soil compaction in tractor units by not allowing skid trails to exceed about 14 feet in total width over 90 percent of the length except where otherwise authorized. Skid trails spacing will not generally be closer than 120 feet, center-to-center. Exceptions will exist where the skid trails approach the landing site.
- ❑ Minimize soil compaction in skyline units by locating cable corridors at intervals of about 150 feet. Corridor width will be kept to about 4 feet on either side of the center line. Exceptions will exist where corridors approach the landing site.
- ❑ Locate landings outside of draw bottoms. Where a conflict arises between landing location and the use of existing skid trails, it may be acceptable to trade off additional skid trails against draw bottom landings.
- ❑ Water bar and seed skid roads and skyline corridors that are >20 percent slope and areas of soil disturbed by harvest activities within 200 feet of stream for erosion control.
- ❑ Alleviate areas determined to exceed or is close to 20 percent detrimental compaction. A winged subsoil ripper will be used to help reverse this trend. Subsoiling should occur when soil moisture conditions are less than 20 percent.

Heritage Resources

- ❑ Utilize previously constructed skidding and decking patterns during skidding operations. This activity will be closely monitored by archaeologists or certified cultural resource technicians.
- ❑ Allow over snow tractor skidding within heritage site boundaries only under certain conditions. This activity will only occur if there is 20" of snow or more on the ground and temperatures are less than 35 degrees F. It will be closely monitored by archaeologists or certified cultural resource technicians.
- ❑ Allow skyline yarding over Cultural Resource sites with full log suspension.
- ❑ Applying operating techniques that do not result in visually conspicuous disturbance to sites or landscapes. This may include filling historic mining ditches with logs in order to bridge equipment crossings, or flush cutting stumps that are on historic sites or landscapes.

Noxious Weeds

- ❑ Treat weed-infested landings, skid trails, and helibases before logging activities occur.

Wildlife

- ❑ Develop structural diversity for wildlife habitat across each commercial thin (HTH) unit by varying tree density up to 50%. Patches should be 0.25 acre to 1 acre in size to replicate historic patch size (Agee 1993). Higher tree density areas should provide higher levels of cover in the short-term. Lower density areas will open up forest stands dramatically, permitting natural regeneration to occur; which in turn should provide patches of hiding cover in about 20 years.
- ❑ In understory removal (HUR) and pre-commercial thin (SPC) units, modify treatments to retain a minimum of 15% of each stand in untreated patches scattered throughout the unit to provide hiding cover. Each untreated area will be ¼ to 1 acre in size. Patches would be located adjacent to open roads, meadows, and natural openings. Where complimentary, these patches may be located to protect retained snags.
- ❑ Retain wildlife snags at levels to provide for 100% population levels of primary cavity excavators. Within the ponderosa pine, mixed conifer, and true fir communities, retain a minimum of 2.39 dead trees per acre, 21 inches dbh or greater. If 21-inch dbh trees are not available, retain 2.39 dead trees per acre of the largest representative diameter. Apply these guidelines unless these snags are considered to be a safety hazard during logging operations or if they need to be removed for roadwork. Under Alternative 3 exclusively, retain 4.0 wildlife

snags 21 inches dbh or greater, where available, to provide additional foraging opportunities for pileated woodpeckers. If 21-inch dbh trees are not available, retain 4.0 dead trees per acre of the largest representative diameter.

- ❑ Retain trees damaged during logging operations in harvest areas lacking in snag habitat, unless determined to be a safety hazard.
- ❑ Do not thin live trees around snags 12 inches dbh and greater to prevent the need to fall snags as hazard trees during tractor logging operations. The width of the unthinned band should be equivalent to the height of the snag.
- ❑ Retain 15 to 20 trees per acres and greater or equal to 12 inch dbh within recommended shelterwood (HSH) or understory removal (HUR) silvicultural prescriptions for future green tree replacements.
- ❑ Maintain down logs for wildlife habitat and long-term site productivity by maintaining the levels indicated below.

Table 63 Down Logs for wildlife

SPECIES	PIECES PER ACRE	MINIMUM DIAMETER @ SMALL END	MINIMUM PIECE LENGTH	TOTAL LENGTH FEET/ACRES
Ponderosa Pine	3-6	12 inch	>6 feet	20-40
Mixed Conifer	15-20	12 inch	>6 feet	100-140

- ❑ Retain higher levels of wildlife cover within *Land and Resource Management Plan* Amendment 2 (LRMP2) corridors and the Key Linkage Area (KLA). Retain crown closure at the upper 1/3 of site potential. Retain trees 8 feet tall or greater at a minimum of 180 trees per acre. Management of the KLA differs from management of the LRMP2 corridors in that only 1/3 of the KLA needs to meet this mitigation at any point in time. See District biologist to identify stands which require mitigation. In Alternative 2, 3 and 4, this prescription will be applied to treatments within all LRMP2 corridors and the KLA. In Alternative 5, only the crown closure mitigation will apply and only in LRMP2 corridors.
- ❑ Maintain concentrations of blowdown in lynx habitat to provide denning opportunities for Canada lynx. In salvage harvest (HSV) units and in RHCAs where blowdown is designated for removal, 10% of total acres will be retained in untreated patches of 2 to 5 acres. Patches will be located to meet the best conditions for denning habitat, i.e., concentrations of blowdown located over a variety of topographical types including ridges, saddles and riparian areas. A District wildlife biologist will assist in identifying concentrations of blowdown to leave untreated.
- ❑ Provide blue grouse winter roosts, large mistletoe infested or large limbed Douglas-fir trees retained at 5 to 8 trees per acres. Apply along ridge tops and large scab openings, where available.
- ❑ Avoid timber harvest and precommercial thinning within 30-acres goshawk nest areas. Protect all other known raptor nests with a buffer of 100 feet around the nest tree.

2.5.6.3 MITIGATION COMMON TO ACTION ALTERNATIVES 2 AND 5

2.5.6.3.1—Mitigation for Noxious Weed Prevention & Competing Vegetation— Herbicide Use

- ❑ Restrict herbicide use in RHCAs to the chemical glyphosate, and only use to treat noxious weeds. Do not spray directly onto water, or where soils are saturated. Apply with a wick applicator or spot sprayer.
- ❑ Avoid applying herbicides when wind speed exceeds 5 mph, or when weather forecasts predict rain within 48 hours.
- ❑ Apply herbicide to appropriate period of plant development to maximize effectiveness.
- ❑ Prohibit herbicide mixing, and filling and cleaning of spray equipment within RHCAs.
- ❑ Carry only enough herbicides daily to be used that day. Mix only enough to use that day.
- ❑ Secure herbicide containers and prevent them from tipping during transport.
- ❑ Develop spill plans and protocols prior to treatment. Emergency spill equipment must be on hand and sufficient to deal with herbicide amounts in transport.
- ❑ Use manual control methods as follow-up treatments to target plants that survive the herbicide application within any given growing season (i.e. use chemical treatment only once per year on a given site) to prevent seed set.
- ❑ Precautions will be taken to assure that equipment used for storage, transport, mixing, or application would not leak herbicides into water or soil.
- ❑ The burning of vegetation in the same year in which it has been treated with herbicides is prohibited.

2.5.6.3.2—Mitigation for Pocket Gopher Control—Pesticide Use

- ❑ Collect or promptly dispose of dead carcasses when discovered during routine inspections of strychnine treatments, to reduce chance of secondary poisoning of raptors or scavengers.
- ❑ Prohibit strychnine baiting within ½ mile of Canada lynx denning habitat, and at distances in excess of ½ mile, where lynx plant associations are continuous between denning habitat and a reforestation unit. Trapping and fumigation would be permitted in these areas.
- ❑ Prohibit strychnine baiting within ½ mile of dedicated and replacement old-growth areas managed for American pine marten; trapping and fumigation will still be permissible control measures for these areas.
- ❑ Prohibit strychnine baiting and fumigation within RHCAs; trapping would be permissible.

2.6 ALTERNATIVE RELATIONSHIP TO KEY ISSUES:

The following tables briefly describe how each alternative does or does not respond to the key issues as described in Chapter 1.0.

2.6.1 Alternative 2 and Key Issues

Table 64—Alternative 2 and Key Issues

ISSUE #1 Restricted Access	ISSUE #2 Effects of ATV Use	ISSUE #3 Effects of Ground Based Systems	ISSUE #4 Effects of Heavy Equipment in RHCAs	ISSUE #5 Effect of Prescribed Fire in RHCAs	ISSUE #6 Inadequate RHCA Size
An access plan was developed that included constructing, reconstructing, decommissioning, and closing of roads. The existing closed road system in Deerhorn and Little Butte Creek drainages would be decommissioned.	This alternative proposes to improve ATV use on Davis Creek Trail due to current RHCA impacts and safety concerns. Educational signs about off trail ATV use would be posted at Trailheads.	Tractor skidding and connected actions such as new roads, pre-commercial thins, and prescribed fire with associated mitigation is included in the alternative.	This alternative proposes to use heavy equipment with mitigation to help minimize anticipated impacts.	Ignition would not occur within RHCAs, however, fire backing or creeping into these areas at low intensity would be allowed, if within prescription.	Standard PacFish buffers are included in this Alt.
ISSUE #7 Blow down Harvest in RHCAs	ISSUE #8 Effects of Toxic Chemicals	ISSUE #9 Inadequate Amount of Treatment	ISSUE #10 Insufficient Pileated Habitat	ISSUE #11 Manage KLA's & LRMP 2 Corridors	ISSUE #12 Effects of Managing Roadless Areas
50 to 80% of the blowdown trees in the outer ½ of the RHCAs in Vinegar Creek would be removed if above LRMP Standards. This Alt. has one new stream crossing and proposes to remove conifer from aspen groves located within RHCAs.	This alternative proposes to use chemicals with mitigation for controlling competing vegetation, noxious weeds, and pocket gopher populations.	Of the total area identified as needing silvicultural treatment, about 50% would be mechanically treated.	This Alt. would retain 2.4 large snags per acre, where available and adjust DOGs, ROGs and PWFAs (600 – acres) meeting LRMP standards.	This Alt. applies a harvest prescription retaining additional trees per acre for both KLA's and wildlife corridors.	This Alt. would harvest, pre-commercial thin, and prescribe fire in Dixie Butte Roadless Area and prescribe fire in Greenhorn Mountain Roadless Area. Trail projects would occur in both Roadless Areas.

2.6.2 Alternative 3 and Key Issues

Table 65—Alternative 3 and Key Issues

ISSUE #1 Restricted Access	ISSUE #2 Effects of ATV Use	ISSUE #3 Effects of Ground Based Systems	ISSUE #4 Effects of Heavy Equipment in RHCAs	ISSUE #5 Effects of Prescribed Fire in RHCAs	ISSUE #6 Inadequate RHCA Size
Similar to Alt. 2. An access plan was developed that included constructing, reconstructing, decommissioning, and closing of roads. The existing closed road system in Deerhorn and Little Butte Creek drainages would be decommissioned.	This alternative addresses this issue in the same manner as Alt. 2. Improvements are recommended on Davis Creek. Trail and due to RHCA impacts and safety concerns. Educational signs about off trail ATV use would be posted at Trailheads..	Same approach as Alt. 2 but with less tractor skidded acres and fewer new roads needed to implement this alternative. Other actions of pre-commercial thin and prescribed fire would continue.	In this alternative, no heavy equipment would be used within RHCAs. Where practical, hand-crew would be used to accomplish some of the work.	Ignition would not occur within RHCAs. If prescribed fire from the upland areas approach RHCAs, it would not be allowed to burn into RHCAs.	An additional 25' on each side of the RHCA would be applied to the Category IV streams located on identified sensitive soils. This additional 25' would be a no equipment buffer; trees may still be removed.
ISSUE #7 Blow down Harvest in RHCAs	ISSUE #8 Effects of Toxic Chemicals	ISSUE #9 Inadequate Amount of Treatment	ISSUE #10 Insufficient Pileated Habitat	ISSUE #11 Effects on Connectivity for Wildlife	ISSUE #12 Effects of Managing Roadless Areas
No harvest or removal of trees would occur within blowdown area of Vinegar Creek RHCAs. This Alt. has one new stream crossing and would girdle or drop and leave conifer in aspen groves located within RHCAs.	This alternative would not use chemicals to control competing vegetation, noxious weeds, or pocket gophers.	Of the total area identified as needing silvicultural treatment, about 38% would be mechanically treated.	This Alt. would retain 4 large snags per acre, where available and increase PWFAs to 900-acres.	This Alt. applies a harvest prescription retaining additional trees per acre in KLAS. Wildlife corridors would not be treated in this Alt.	This Alt. would not manage the forest stands or apply prescribed fire in both Dixie-Butte or Greenhorn Mountain Roadless areas. Trail work would continue as recommended in Alt. 2.

2.6.3 Alternative 4 and Key Issues

Table 66—Alternative 4 and Key Issues

ISSUE #1 Restricted Access	ISSUE #2 Effects of ATV Use	ISSUE #3 Effects of Ground Based Systems	ISSUE #4 Effects of Heavy Equipment in RHCAs	ISSUE #5 Effect of Prescribed Fire in RHCAs	ISSUE #6 Inadequate RHCA Size
Similar to Alts. 2 & 3 but with less construction due to no recommended harvest. The existing closed road system in Deerhorn and Little Butte Creek drainages would be decommissioned.	Davis Creek Trail would be reclassified to accommodate foot and horse traffic only. Motorized use would not be allowed, eliminating RHCA impacts from ATV use.	No harvest is recommended in this alternative, pre-commercial thins and prescribed fire would still occur.	Same as Alt. 3. No heavy equipment would be used within RHCAs but where practical, hand-crew would be used.	Same approach as in Alt. 2. Ignition would not occur within RHCAs, however, fire backing or creeping into these areas at low intensity would be allowed, if within prescription.	This issue is not a factor in this Alternative due to no skidding equipment being used, therefore the standard PacFish buffers would remain.
ISSUE #7 Blowdown Harvest in RHCAs	ISSUE #8 Effects of Toxic Chemicals	ISSUE #9 Inadequate Amount of Treatment	ISSUE #10 Insufficient Pileated Habitat	ISSUE #11 Manage KLAS & Connective Corridors	ISSUE #12 Effects of Managing Roadless Areas
No harvest or removal of trees would occur within blowdown area of Vinegar Creek RHCAs. This Alt. has no new stream crossing and would girdle or drop and leave conifer in aspen groves located within RHCAs.	As with Alt. 3, this alternative would not use chemicals to control competing vegetation, noxious weeds, or pocket gophers.	Of the total area identified as needing silvicultural treatment, about 13% would be mechanically treated.	No harvest is recommended in this alternative. Some reduction may occur forest user safety. Some may be loss due to prescribed fire but others are expected to be created due to the same action.	This Alt. applies a pre-commercial thin prescription retaining additional trees per acre for both KLAS and connective corridors.	This Alt. would pre-commercial thin in Dixie Butte Roadless Area and prescribe fire would be applied in both Dixie Butte and Greenhorn Mountain Roadless Areas. Trail projects would be applied in both Roadless areas.

2.6.4 Alternative 5 and Key Issues

Table 67—Alternative 5 and Key Issues

ISSUE #1 Restricted Access	ISSUE #2 Effects of ATV Use	ISSUE #3 Effects of Ground Based Systems	ISSUE #4 Effects of Heavy Equipment in RHCAs	ISSUE #5 Effect of Prescribed Fire in RHCAs	ISSUE #6 Inadequate RHCA Size
Similar to Alt. 2 except with more land accessed by additional roads increasing tractor skidding and decreasing helicopter yarding. More roads would be left open compared to the other action alternatives. Plus, the existing, closed road system in Deerhorn and Little Butte Creek drainages would be reconstructed and left opened.	This issue would be addressed in the same manner as with Alts. 2 and 3. Improvements would occur to Davis Creek Trail due to RHCA impacts and safety of trail use. Educational signs discussing off trail ATV use concerns would be posted at the trailheads. Plus, an additional ATV loop trail would be added to the Davis Crk Trail.	Same approach as Alts. 2 & 3, however, there would be more tractor skidded acres and more miles of new roads needed to implement this alternative. Proper mitigation would be applied.	Same approach as in Alt. 2. Mitigation is included to help minimize impacts from projects within RHCAs recommended to use heavy equipment.	Same approach as in Alts. 2 and 3. Ignition would not occur within RHCAs, however, fire backing or creeping into these areas at low intensity would be allowed, if within prescription.	Standard Pac-Fish buffers are included in this Alt.
ISSUE #7 Blowdown Harvest in RHCAs	ISSUE #8 Effects of Toxic Chemicals	ISSUE #9 Inadequate Amount of Treatment	ISSUE #10 Insufficient Pileated Habitat	ISSUE #11 Manage KLAS & Connective Corridors	ISSUE #12 Effects of Managing Roadless Areas
Same approach as Alt. 2. 50 to 80% of the blowdown trees in the outer ½ of the RHCAs in Vinegar Creek would be removed if above LRMP Standards. This Alt. has two new stream crossing and proposes to remove conifer from aspen groves located within RHCAs..	Same as Alt. 2. Chemicals with mitigation for controlling competing vegetation, noxious weeds, and pocket gopher populations would be used..	Of the total area identified as needing silvicultural treatment, about 57% would be mechanically treated..	Same as Alt. 2. This Alt. would retain 2.4 large snags per acre, where available and adjust DOGs, ROGs and PWFAs (600-acres) meeting LRMP standards.	This Alt. applies the standard harvest prescription within KLAS to address Silvicultural concerns. The connective corridors would receive the prescription retaining additional tree as in Alt. 2.	Same as Alt. 2. This Alt. would harvest, pre-commercial thin, and prescribe fire in Dixie Butte Roadless Area and prescribe fire in Greenhorn Mountain Roadless Area. Trail projects would occur in both Roadless Areas.

2.7 COMPARISON SUMMARY OF THE ALTERNATIVES

This section compares the alternatives in a summary form of the information presented throughout this document.

2.7.1 Project Comparison Table

The following table presents summaries of the projects per alternative in a side-by-side comparison. This table displays the values and numbers of each project across the range of alternatives arranged by the major categories of Aquatics, Vegetation, and Infrastructure.

Table 68—Project Comparison Table(see notes at end of table page 105).

PROJECT	ALT 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
AQUATICS					
Hydrology					
Streamside/Riparian Hardwood Protection	0	4 Miles 12 Acres	4 Miles 12 Acres	4 Miles 12 Acres	4 Miles 12 Acres
Streamside/Riparian Planting and Protection	0	16 Miles 16 Acres	16 Miles 16 Acres	16 Miles 16 Acres	16 Miles 16 Acres
Channel/Streamside Projects	0	90 Miles	90 Miles	90 Miles	90 Miles
Area Projects	0	1,450 Acres	1,450 Acres	1,450 Acres	1,450 Acres
Channel/Floodplain Rehabilitation	0	3 Miles 14 Acres	0 Miles 0 Acres	0 Miles 0 Acres	3 Miles 14 Acres
Fisheries					
New Instream Structures	0	79 Structures	0 Structures	0 Structures	79 Structures
Improve Existing Instream Structures	0	36 Structures	36 Structures ♣	36 Structures ♣	36 Structures
Riparian Planting ♣	0	5.5 Miles	5.5 Miles	5.5 Miles	5.5 Miles
Culvert Removal, Improvement or Replacement on Fish Bearing Streams	0	2 Removal 22 Improve or Replace			
Old Growth					
Additional Replacement Old Growth Areas	0	1,592 Acres	1,592 Acres	1,592 Acres	1,592 Acres
Additional Dedicated Old Growth Acres	0	115 Acres	115 Acres	115 Acres	115 Acres
Delineated Pileated Feeding Areas	0	747 Acres	1,505 Acres	747 Acres	747 Acres
Expanded pileated home ranges	0	0	0	1505	0
Conifer and Associated Vegetation					
Commercial Thin	0	5,720 Acres	4,390 Acres	0 Acres	7,060 Acres
Commercial Thinning in Connectivity Corridors	0	1,230 Acres	900 Acres	0 Acres	220 Acres
Shelterwood	0	1,690 Acres	1,200 Acres	0 Acres	2,600 Acres
Salvage	0	250 Acres	250 Acres	0 Acres	250 Acres
Understory Removal	0	880 Acres	550 Acres	0 Acres	1,230 Acres
Precommercial Thin	0	2,160 Acres	1840 Acres	2,100 Acres	3,080 Acres
Precommercial Thin in Connectivity Corridors	0	950 Acres	820 Acres	640 Acres	40 Acres
Total Mechanical (incl. Harvest & Precommercial)	0	12,880 Acres	8,210 Acres	2,730 Acres	1,220 Acres
Tractor Skid	0	5,090 Acres	4,580 Acres	0 Acres	6,320 Acres
Skyline Skid	0	2,110 Acres	1,720 Acres	0 Acres	2,610 Acres
Helicopter Yard	0	2,670 Acres	1,090 Acres	0 Acres	2,570 Acres
Volumes Associated with a Timber Sale	0	44 MMBF	33 MMBF	0 MMBF	55 MMBF
Mechanically Treated Acres in Roadless Areas	0	930 Acres (Harvest & SPC)	0 Acres	203 Acres (SPC Only)	1370 Acres (Harvest & SPC)
Other Wood Products ♥	0	69 MBF	14 MBF	0 MBF	100 MBF
New Roads	0	17.7 Miles	17.0 Miles	2.2 Miles	22.2 Miles

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PROJECT	ALT 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Undesirable Small Tree Removal	0	2,570 Acres	1,790 Acres	0 Acres	3,810 Acres
Hand Line needed for Prescribed Burn	0	37.6 Miles	28 Miles	0 Miles	57.1 Miles
Machine Line needed for Prescribed Burn	0	11.6 Miles	8.5 Miles	0 Miles	20.6 Miles
Prescribed Burn Associated with Mech. Treatment	0	2,550 Acres	1,800 Acres	0 Acres	3,830 Acres
Hand Pile and Burn Associated with Timber Sale	0	1,250 Acres	940 Acres	0 Acres	1,320 Acres
Sub-Soil	0	190 Acres	190 Acres	0 Acres	270 Acres
Competing Vegetation Control	0	900 Acres	740 Acres ▲	0 Acres	1,320 Acres
Conifer Plant	0	1,930 Acres	1,440 Acres	0 Acres	2,840 Acres
Pocket Gopher Control	0	1,690 Acres	1,200 Acres ▲	0 Acres	2,600 Acres
Ungulate Browse Control	0	1,690 Acres	1,200 Acres	0 Acres	2,600 Acres
Yard Tops	0	5,370 Acres	4,730 Acres	0 Acres	5,640 Acres
Reserve Tree Protection ♦	0	20,230 Trees	15,520 Trees	0 Trees	29,540 Trees
Prescribed Fire ◀	0	23,750 Acres	19,190 Acres	19,160 Acres	24,770 Acres
Roadless Prescribed Fire	0	1500 Acres	720 Acres	720 Acres	1500 Acres
Total Upland Acres Treated ◇	0	22,010 Acres	18,850 Acres	19,950 Acres	23,000 Acres
Aspen Stands					
Conifer Treatment	0	25 Sites	25 Sites	25 Sites	25 Sites
Associated Volume	0	35.5 MBF	0 MBF	0 MBF	35.5 MBF
Hand Pile and Burn	0	25 Sites	25 Sites	25 Sites	25 Sites
Buck & Pole Fence	0	13 Sites @ 19 Acres	13 Sites @ 19 Acres	13 Sites @ 19 Acres	13 Sites @ 19 Acres
Plastic Fence	0	12 Sites @ 11 Acres	12 Sites @ 11 Acres	12 Sites @ 11 Acres	12 Sites @ 11 Acres
Noxious Weeds					
Manual Treatment	0	4 Sites @ 0.4 Acres	10 Sites @ 1.9 Acres	10 Sites @ 1.9 Acres	4 Sites @ 0.4 Acres
Chemical Treatment	0	6 Sites @ 1.5 Acres	0 Sites	0 Sites	6 Sites @ 1.5 Acres
Treat Quarry Sites	0	Treat 15 Sites Chemically @ 42 Acres	Treat 15 Sites Manually @ 42 Acres	Treat 15 Sites Manually @ 42 Acres	Treat 15 Sites Chemically @ 42 Acres
Roads					
Total Road Miles	267	219 Miles	218 Miles	202 Miles	228 Miles
Total Road Density	3.5 mi/sq.mi	2.8 mi/sq.mi.	2.8 mi/sq.mi	2.6 mi/sq.mi	2.9 mi/sq.mi
Reconstructed Roads	0	165 Miles	165 Miles	165 Miles	171 Miles
Decommissioned Roads	0	67 Miles	67 Miles	67 Miles	62 Miles
RHCA Decommissioned Roads	0	23.9 Miles	23.9 Miles	23.9 Miles	23.5 Miles
RHCA Reconstructed Roads	0	23.2 Miles	23.2 Miles	23.2 Miles	24.7 Miles
Trails and Trailheads					
Decommissioned Trails	0	1.7 Miles	1.7 Miles	1.7 Miles	1.7 Miles
Reconstructed Trails	0	8.3 Miles	8.3 Miles	0 Miles	8.3 Miles
Constructed Trails	0	2.3 Miles	2.3 Miles	2.3 Miles	7.9 Miles
New Trail Heads	0	2	2	0	2
Removed Trail Heads	0	4	4	4	4
Dispersed Camp Sites					
New Dispersed Camp Areas	0	3	3	3	3
Improved Dispersed Camp Areas	0	2	2	2	2
Removed Dispersed Camp Areas	0	3	3	3	3

PROJECT	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
NOTE: ♦ Would not be implemented if heavy equipment is needed to improve structures ♣ Plus work associated with instream structure projects MMBF = Million Board Feet BF = Board Feet CCF = Cubic Board Feet ♥ Other wood products may include post & poles, firewood, chips, etc. from tractor ground only. An estimate of 2,000 BF per acre was used ♦ Is an average and doesn't necessarily include all reserved wildlife trees ◀ Includes prescribed fire in and out of harvest units ◇ Includes harvest not Associated with Timber Harvest, and Prescribed Fire acreage outside the mechanically treated units. ▲ No herbicides or rodenticides to be used in Alt.3 only hand methods & trapping					

2.7.2 Aquatic Project Comparisons—Equivalent Roded Area (ERA)

The results of the ERA model are shown for each subwatershed in the following tables. The ERA model represents the disturbance on soils and vegetation in regard to sediment and runoff, which has a direct correlation to the health of fish habitat. The Threshold of Concern (TOC) is also displayed and varies by subwatershed. The TOC is calculated for each subwatershed from interpretations of the Malheur National Forest's Soil Resource Inventory (SRI) based on surface erosion hazard, compaction hazard, water infiltration rates in wetted soil, and amount of vegetation. Subsequently, these factors also have direct influence on the conditions of fish habitat. The consequences greater than the TOC are interpreted as increasing the risk of causing potential significant adverse effects. However, it must be considered that these numbers are not absolutes but become a "red flag" as an indicator of potential concern.

Table 69—ERA: Davis/Placer Subwatershed (TOC = 16)

	2002	2004	2008	2012
Alternative 1 (No Action)	4.7	4.5	4.2	3.9
Alternative 2 (Recommended Action)	8.8	8.2	7.4	6.7
Alternative 3	8.1	7.6	6.9	6.2
Alternative 4	4.7	4.4	4.1	3.8
Alternative 5	9.1	8.5	7.8	7.0

Table 70—ERA: Vinegar Subwatershed (TOC = 14)

	2002	2004	2008	2012
Alternative 1 (No Action)	6.8	6.5	5.8	5.1
Alternative 2 (Recommended Action)	10.5	9.7	8.6	7.5
Alternative 3	10.4	9.6	8.5	7.5
Alternative 4	6.8	6.4	5.7	5.0
Alternative 5	12.2	11.3	10.1	8.9

Table 71—ERA: Vincent Subwatershed (TOC = 14)

	2002	2004	2008	2012
Alternative 1 (No Action)	7.6	7.2	6.4	5.7
Alternative 2 (Recommended Action)	14.4	13.5	11.9	10.4
Alternative 3	13.9	12.9	11.5	10.0
Alternative 4	7.6	7.2	6.4	5.7
Alternative 5	16.5	15.4	13.8	12.1

Table 72— ERA: Little Boulder/Deerhorn Subwatershed (TOC = 14)

	2002	2004	2008	2012
Alternative 1 (No Action)	6.9	6.5	5.9	5.3
Alternative 2 (Recommended Action)	9.6	8.9	8.0	7.2
Alternative 3	8.7	8.1	7.3	6.5
Alternative 4	6.9	6.4	5.8	5.2
Alternative 5	10.2	9.5	8.6	7.6

Table 73—ERA: Tincup/Little Butte Subwatershed (TOC = 12)

	2002	2004	2008	2012
Alternative 1 (No Action)	4.3	4.1	3.9	3.7
Alternative 2 (Recommended Action)	8.2	7.6	6.9	6.2
Alternative 3	6.6	6.2	5.7	5.1
Alternative 4	4.3	3.9	3.7	3.4
Alternative 5	8.8	8.3	7.6	6.8

Table 74— ERA: Butte Subwatershed (TOC = 12)

	2002	2004	2008	2012
Alternative 1 (No Action)	5.1	4.9	4.5	4.2
Alternative 2 (Recommended Action)	6.9	6.4	5.8	5.2
Alternative 3	6.5	6.0	5.5	4.9
Alternative 4	5.1	4.8	4.4	4.0
Alternative 5	7.2	6.7	6.1	5.5

Table 75— ERA: Granite Boulder Subwatershed (TOC = 18)

	2002	2004	2008	2012
Alternative 1 (No Action)	7.6	7.2	6.5	5.7
Alternative 2 (Recommended Action)	7.7	7.1	6.3	5.5
Alternative 3	7.7	7.1	6.3	5.5
Alternative 4	7.6	7.1	6.3	5.5
Alternative 5	7.7	7.1	6.3	5.5

2.7.3 Vegetation Project Comparisons

Harvest Treatments

The following table displays the percent of the total forest stands needing management per prescription per to restore resiliency and sustainability through mechanical treatment. Areas not included are Dedicated Old Growth, RHCA's, Scenic Area, and Wildlife emphasis.

Table 76— Percent of Priority Forest Stands Being Mechanically Treated

TREATMENT	ALT. 1 Identified Needs ♣	ALT. 2 Recommende d Action	ALT. 3	ALT. 4	ALT. 5
Commercial Thin	9,249 acres	75%	57%	0	79%
Pre-commercial Thin	3,345 acres	93%	79%	82%	93%
Shelterwood/Commercial Thin	9,322 acres	18%	13%	0	28%
Understory Removal	1,614 acres	54%	34%	0	75%
TOTAL ♣	23,530 acres	50%	38%	13%	52%
NOTE: ♣ ALT. 1 identifies the priority areas needing treatment based on existing forest stand structure, composition, and density. NOTE: ♣ Weighted Average per Alternative					

Effects Of Treatments On Crown Fire Hazards

The following table demonstrates the expected results of the mechanical treatments on crown fire hazards by Potential Vegetation Group of Dry, Moist, Lodgepole, and Cold Forest Types.

Table 77 -Percent Hazard Remaining

CROWN HAZARD	ALT. 1 EXISTING	ALT. 2	ALT. 3	ALT. 4	ALT. 5
DRY FOREST					
High	66%	44%	50%	61%	40%
MOIST FOREST					
High	60%	55%	56%	59%	54%
LODGEPOLE PINE					
High	98%	No Change	No Change	No Change	No Change
COLD FOREST					
High	84%	No Change	No Change	No Change	No Change
NOTE: Crown hazards were determined by using stand densities based on the following assumptions: * For the Dry Forest and Moist Forest Type's, the stands indicated for treatment plus dense stands that were not recommended for treatment due to other resource objectives such as Dedicated Old Growth stands. However, information was not available on all stands and these stands were not put in the high level. Therefore, the crown fire hazard may be underestimated. * For the Lodgepole Pine and Cold Forest Type's, the stand initiation stage was rated as low. All other stages were rated as high due to the high densities of the stands based on field observations and aerial photo interpretations.					

Reduced Ground and Ladder Fuels

This next table displays amount of acres recommended for prescribed fire and the percentage of the analysis area it effects. Prescribed fire is designed to reduce ground and ladder fuels to lower chance of fire climbing into overstory crowns. The biggest difference among the alternatives is in Alt. 4, which does not propose any prescribed fire in Little Butte or Deerhorn drainages due to lack of safe access for fire control personnel and lack of fire control points. The majority of these acres occur on the lower elevation Dry Forest Types.

Table 78—Recommended Acres for Prescribed Fire outside mechanically treated units

ALT. 1 NO ACTION		ALT. 2 RECOMMENDED ACTION		ALT. 3		ALT. 4		ALT. 5	
Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
0	0	11,370	23	10,640	22	17,230	35	10,780	22

Balancing Old Structure Forests

One of the emphasis items in this project is the need to balance old structure characteristics in variability and sustainability for wildlife habitat needs, forest visitor intrinsic values, and products. The following table displays the existing percent of forest stands in the Old Forest Single Strata (OFSS⁴⁵) and Old Forest Multi-Strata (OFMS) under Alternative 1 and the expected change from Alternative 1 in about 125 years from implementation. These projections include only the recommended treated areas and consider that no additional treatments or large events such as an uncharacteristically severe wildfire would occur. The alternatives change due to natural growth is not shown, only the net change directly due to treatment is shown. These figures represent all treatment areas with about 90% located in the Dry Forest category (predominately ponderosa pine and larch).

Table 79—Percent Change in OFSS and OFMS in about 125 Years

FOREST STAND STRUCTURE	RANGE OF VARIATION	ALT. 1 EXISTING	ALT. 2	ALT. 3	ALT. 4	ALT. 5
OFSS	30-55%	2%	+20%	+15%	0	+24%
OFMS	5-15%	17%	-2%	-1%	0	-2%

Chemical Treatment

This next table compares the number of acres recommended for treatment under both the Malheur National Forest *Weed Environmental Assessment*(Decision 2000) and this project with the maximum acres allowable for the herbicide glyphosate. “Allowable acres” refers to the number of acres within a subwatershed that could be treated with glyphosate at a rate of 2 pounds per acre and still show no observable effects on aquatic species within the watershed. The *Southeast Galena Restoration Project* proposes a rate of 1 pound per acre, which reduces potential impacts.

⁴⁵ See stand structure definitions page 17

Table 80—Acres of Chemical Treatment Action Alternatives

Chemical Treatment	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<i>Glyphosate/Hexazinone</i> Competing Vegetation	897	0	0	1318
<i>Glyphosate:</i> Noxious Weeds	1.5 (1.3 in RHCAs)	0	0	1.5 (1.3 in RHCAs)
<i>Strychnine/aluminum phosphide:</i> Gopher Control	1689	0	0	2865

Roadless Treatments

The following table displays roadless acres recommended for treatment by both mechanical and prescribed fire. Mechanical includes harvest and pre-commercial thins. Alternatives 3 and 4 do not propose harvest treatments within these designated roadless areas.

Table 81—Acres of Treatment in Roadless Area (LRMP Schedule C) Action Alternatives

ITEM	DIXIE-BUTTE				GREENHORN			
	Alt.2	Alt.3	Alt.4	Alt.5	Alt.2	Alt.3	Alt.4	Alt.5
Commercial & Pre-commercial Thin (HTH/SPC)	232	0	0	514	0	0	0	0
Commercial Thin (HTH)	530	0	0	577	0	0	0	0
Understory Removal (HUR)	108	0	0	167	0	0	0	0
Pre-commercial Thin (SPC)	0	0	173	0	0	0	0	0
Prescribed Fire	496	296	254	496	716	716	716	716

2.7.4 Infrastructure Project Comparisons

Total Transportation System Miles

This table displays the total transportation system as if recommended decommissioned roads are implemented. These totals include both closed and open roads reflecting possible issue over threatened and endangered fish and their habitats.

Table 82— Total Transportation System Miles

ITEM	ALT. 1NO ACTION	ALT. 2 RECOMMENDED ACTION	ALT. 3	ALT. 4	ALT. 5
Miles	267	219	218	202	228
% Change from Alt. 1	NA	-18%	-18%	-24%	-15%
NA = Not Applicable					

Open Road Density

The following displays the % change in open roads. This responds to road maintenance concerns of available dollars to keep our transportation in a safe and stable condition and that of wildlife harassment concerns. Alternative 5 reflects one of the public issues of closing too many roads for the forest user access.

Table 83—Total Open Transportation System Miles

ITEM	ALT. 1 NO ACTION	ALT. 2 RECOMMENDED ACTION	ALT. 3	ALT. 4	ALT. 5
Miles	132	91	91	89	164
% Change from Alt. 1	NA	-31%	-31%	-33%	+24%
NA = Not Applicable					

Decommissioned Miles

The next table lays out the recommended decommissioned transportation system miles. These roads have been identified as no longer needed in the long-term transportation needs for management activities and would be hydrologically stabilized with the intent to improve hydrologic function and enhance fish and wildlife habitat.

Table 84 Total Decommissioned Miles & Miles within RHCAs

ITEM	ALT. 1 NO ACTION	ALT. 2RECOMMENDED ACTION	ALT. 3	ALT. 4	ALT. 5
Total Decommissioned Miles	0	67	67	67	62
Decommissioned Miles within RHCAs	0	23.9	23.9	23.9	23.5

New Roads

New roads are recommended across the action alternatives; however, some of these miles are recommended due to resource concerns of fish and wildlife habitat. The majority of these road relocations are recommended in order to eliminate road locations within RHCAs.

Table 85—Total New Roads and Relocated Miles

ITEM	ALT. 1NO ACTION	ALT. 2RECOMMENDED ACTION	ALT. 3	ALT. 4	ALT. 5
New Miles	0	12.2	11.6	2.2	14.6
Relocated Miles	0	5.5	5.5	2.2	7.0

2.7.5 Economics

The following table estimates a comparison of alternatives and possible revue from timber sales if they were to be implemented. Market values are subject to change and these should be seen as estimates only.

Table 86—Present Net Value Comparison

	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Benefits	\$0	\$4.1 million	\$3.4 million	\$0	\$5.6 million
Costs	\$0	\$8.1 million	\$6.1 million	\$3.8 million	\$9.3 million
Present Net Value	\$0	-\$4.0 million	-\$2.7 million	-\$3.8 million	-\$3.7 million
Per cent change	0%	0%	+32%	+5%	+7%