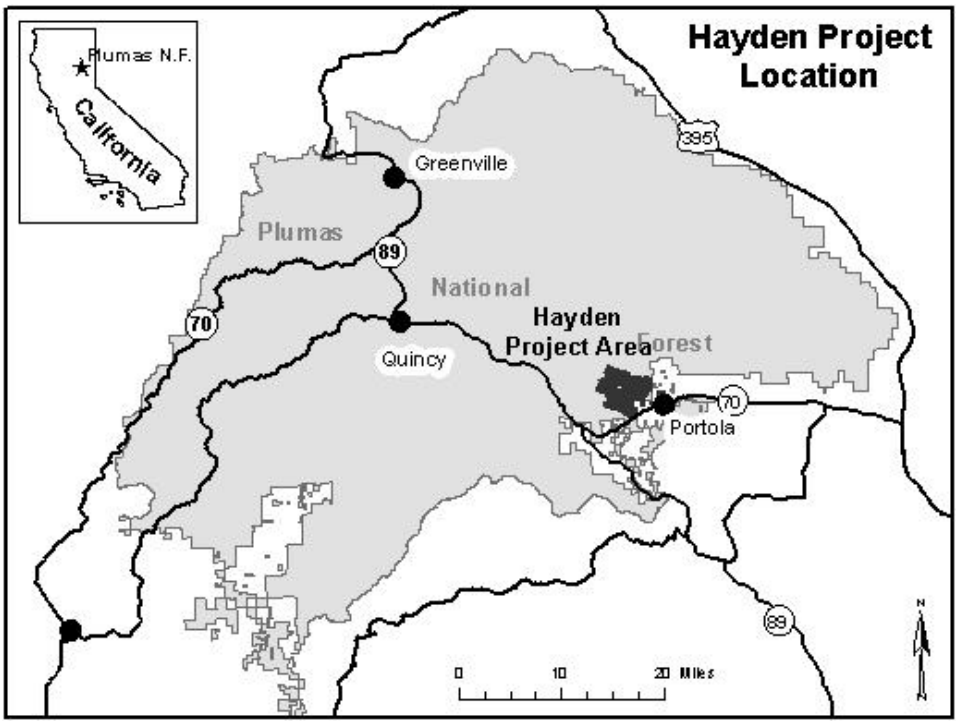
Hayden Project

The USDA Forest Service, Plumas National Forest (PNF), Beckwourth Ranger District (BKRD) proposes to reduce fuel loading within the Wildland Urban Interface surrounding the communities of Portola, Delleker, Mabie, Lake Davis Highlands and surrounding stands. In addition to reducing wildfire risk stands would be treated to promote healthy, diverse, fire-resilient forest structures, contribute to the economic health and stability of local rural communities in the northern Sierra Nevada, and provide necessary road access needed to meet project objectives while reducing transportation system effects. The Hayden Project is proposing treatments on approximately 4,583 acres. Treatment activities include mechanical thinning, grapple piling, mastication, hand thinning and underburning. Temporary road construction, reconstruction, decommissioning and obliteration also are proposed. These actions are part of a broader resource management program, under the authority of the 1988 Plumas National Forest Land and Resource Management Plan (LRMP), as amended by the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) SEIS and ROD (USFS PNF 1988, USFS PSW 2004).

The Hayden Project area was previously treated under the Humbug Project (insert year) which was planned under the 2001 Sierra Nevada Framework. The 2001 standards and guidelines had tree diameter and land allocation restrictions which limited the effectiveness of fuel treatments previously implemented within the project area. In addition to prior treatments within the project area not meeting current desired conditions for fuels, past management activities and fire suppression have led to overstocked stands in poor forest health. Recent high-severity wildfires have led to safety concerns in surrounding communities located in the Wildland Urban Interface. In 2005, the Fire Safe Council identified the communities of Delleker, Portola, Mabie and Lake Davis Highlands as communities in the Threat zone. The Forest Service has designed the Hayden Project to move the landscape towards a more ecologically resilient landscape while reducing wildfire risk around local communities.

The project area is located northeast of the communities of Delleker and Portola within the Beckwourth Ranger District of the Plumas National Forest, Plumas County; the legal description is T 22 N., R13 E, Sections 4, 5, 31-33, 36, T23 N. R12E, Sections 26, T. 23 N, R. 13 E, Sections 13, 16 - 22, 24, 25, 27, 29, 30, 34: Mount Diablo Meridian (**Error! Reference source not found.**).



Purpose and Need

Purpose and Need 1: Strategically Reduce Fuel Loads

Objective: Modify surface, ladder and canopy fuels in order to reduce the size, severity and intensity of potential wildfire in the project area and surrounding communities, as well as promoting a fire-resilient ecosystem.

Need for Action

The proposed project area was previously treated under the Humbug Project in 2002, which was designed under the 2001 Sierra Nevada Forest Plan Amendment. The treatments did not sufficiently reduce fuel loads within the Wildland Urban Interface (WUI) and the General Forest due to tree diameter restrictions and left large amounts of land not meeting current fuels standards and guides. Forest stand conditions consist of moderate to high amounts of surface, ladder and canopy fuels. Existing surface fuel loading across much of the project area would produce flame lengths exceeding recommendations (4-foot flame length). The existing live-crown-base heights are considerably lower than the minimum needed to isolate tree canopies from surface fire activity. Such low crown separation coupled with high tree densities increase the probability of torching individual trees and subsequent crown fire behavior across stands. The combination of high surface fuel loading, low live-crown-base heights and low crown separation would easily allow a wildfire burning under 90th percentile fire weather to transition from the surface to the forest canopy resulting in rapid large fire growth and moderate to high burn severity and high tree mortality. This would preclude safe and efficient ground based direct attack by wildland firefighters.

Desired Conditions

The desired condition for the WUI and General Forest stands would be:

- Reduced surface fuel concentrations to approximately 5 tons per acre (0-1,000 hour fuels (1-4 inches in size)), to reduce predicted flame lengths (< 4 feet); increase fireline production rates for suppression forces, and decrease rate of spread (2004 SNFPA ROD, pg 34).
- Canopy fuels arranged such that the fuel continuity is broken both horizontally and vertically. Horizontal separation of crowns should be sufficient to reduce the potential for crown fire initiation and spread. Vertical separation of the surface and crown fuels, referred to as canopy base height (15-25 feet), would be sufficient to prevent surface fire from igniting the tree crowns subsequently decreasing the likelihood of torching and crown fire initiation (2004 SNFPA ROD, pg 34).
- Decreased potential fire intensity and severity thereby decreasing tree mortality (2004 SNFPA ROD, pg 34).

Measures of effective fuels reduction include: canopy base height (feet), surface fuels (tons per acre), flame length (feet), percent tree mortality (%).

Purpose and Need 2: Improve forest health and fire resiliency

Objective: Improve structural diversity and promote regeneration of shade intolerant and fire resilient tree species to create a healthy, diverse and fire-resilient forest over the project area.

Need for Action

The absence of a natural fire regime and past management practices have left the Hayden project area with less structural complexity, greater uniformity in age-classes, and increased densities of shade-tolerant tree species (e.g., white fir and incense cedar) relative to historical forest structure. The Hayden Project is located within the transition zone between mixed conifer and eastside pine forest types. Stands are overly dense and exhibit high mortality rates due to insect and disease infestations (Cluck 2012). Fire exclusion in the transition zone has allowed conifer species composition to shift to favor shade-tolerant species. These species have become considerably more abundant and now grow in larger quantities than they did historically, creating dense even-aged stands which are prone to high severity stand replacing fire. Undesirable existing stand conditions also may perpetuate this shift in conifer species compositions as higher densities of shade-tolerate species. These compete for limited water, sunlight, and nutrients with shade-tolerant species. Conifers with limited resources often suffer from a lack of vigor and growth, which can increase susceptibility to infestation from insects and diseases.

Desired Conditions

The desired conditions for forest health and fire resiliency would be:

- Increased growth rates of shade-intolerant species by reducing stand densities of intermediate size and suppressed trees, leaving residual stands composed of mostly fire-resilient tree species (i.e. ponderosa, Jeffrey and sugar pine, and Douglas-fir).
- uneven-aged, multi-storied stands dominated by large, fire-resilient trees.
- Increased regeneration of fire-resilient tree species.
- low density stands with open gaps of sparse canopy cover that promote the establishment and growth of fire-adapted and shade-intolerant species including ponderosa pine and sugar pine, which would contribute to landscape heterogeneity and native plant species diversity.

Measurement Indicators: Decreased risk of tree mortality (stand density index (SDI), stand basal area (BA), increased tree growth (tree ring width), tree species composition (Forest Vegetation Simulator (FVS)) modeling and trees per acre (TPA) count), tree stand structure (FVS modeling – quadratic mean diameter (QMD), BA, TPA, and canopy cover), insect and disease risk (FVS modeling of risk).

Purpose and Need 3: The 2004 SNFPA ROD directs national forests in the Sierra Nevada to develop projects that make sense from an ecological and economic perspective (USDA 2004b, page 34).

Objective: Address multiple integrated resource objectives in a cost-efficient manner to maximize effectiveness while actively restoring fire-adapted ecosystems (USDA 2004b, page 31 and page 34, 2).

Need for Action

The Forest Service has a role to play in providing a wood supply for local industry and sustaining a part of the employment base in local rural communities while addressing resource objectives (USDA 2004b, page 4, ¶3). A portion of the local economy is dependent on forest products and services and manufacturing of forest products. In order to accomplish ecological objectives, there is a need to retain industry infrastructure by generating wood by-products from treatments. In some cases, these wood by-products would also help to offset the cost of projects. (USDA 2004b, page 4, ¶3)

Desired Conditions

Treatments would be cost efficient to maximize number of acres that can be treated under a limited budget (USDA 2004b, page 34, 3). Revenues from the sale of commercial forest products may be obtained from some treatments. This increases the likelihood of accomplishing the projected acres of treatment, an essential first step in achieving the desired reductions in acres burned. Where consistent with desired conditions, treatments are designed to be economically efficient and meet multiple objectives (USDA 2004b, page 35, ¶5).

The desired condition is to contribute toward the needs of wood manufacturing industries in local rural communities which allow for public managers to continue managing overstocked stands on the Plumas National Forest.

Measurement Indicators: Total number of acres treated, Total Cost, Volume of forest products (Sawlogs or biomass), Number of jobs created or sustained

Purpose and Need 4: Provide road access needed to meet project objectives while reducing transportation system effects on Natural Resources

Objective: Provide an effective and operable road system to meet project objectives while reducing effects on natural resources.

Need for Action

Roads play a vital role in providing access for resource management, Wildland fire suppression, and public access for recreation use. However, unneeded and poorly located roads can impact water quality, disrupt the flow of water and fragment forest habitats.

In the Hayden Project area, some roads are narrow and unimproved, making access difficult for commercial logging trucks and chip vans. Other roads within the Project area require repairs as their current condition contributes to erosion and resultant stream channel sedimentation. Roads located near riparian conservation areas (RCAs) can produce increased peak flows and decrease channel stability. Proposed decommissioning and/or obliteration of roads in the project area will both reduce sediment loading and the loss of hydrologic function within RCAs, and improve overall watershed health.. The interdisciplinary process for identifying road system needs and roads with resource damage includes a roads analysis consistent with legal requirements (36 CFR 212 Subpart A – Administration of the Forest Transportation System, 16 U.S.C. 551, 23, U.S.C. 205).

Desired Conditions

The desired conditions for providing the road access needed to meet project objectives while reducing transportation system effects on natural resources would be:

- Access provided for resource management by Forest Service personnel.
- Access for wildland fire suppression.
- Public access for recreation purposes.
- Decreased number of roads that are causing resource damage.

Measurement Indicators: Miles of improved road, restored hydrologic function (acres).

Proposed Action

The Proposed Action was designed to meet the Purpose and Need discussed above: 1) strategically reduce fuel loads, 2) increase forest health and fire resiliency, 3) contribute to the economic health and stability of local rural communities, and 4) provide road access needed to

meet project objectives while reducing transportation system effects on resources in the project area. The Proposed Action treatment includes mechanical thinning, grapple piling, mastication, hand thinning, and underburning (Table 1).

In addition to project specific design features and mitigations described with each alternative, the District would implement standard operating procedures (SOPs). SOPs represent standard mitigations intended to minimize potential for adverse resource effects.

Table 1. Summary of actions proposed in the Hayden Project area.

Actions	Acres (approximate)
WUI	
Mechanical thinning	1,987
Grapple pile/ Mastication	121
Hand thin with underburn	468
Underburn	443
Aspen/Cottonwood	13
Total WUI	3,023
General Forest	
Mechanical thinning	1,134
Grapple pile/ Mastication	399
Hand Thin	28
Total General Forest	1,560
Grand Total	4,583

Reduce fuel loads and improve forest health and fire resiliency,

Mechanical Thinning in WUI and General Forest units

Mechanical thinning treatments would include the use of ground-based logging systems on 1,987 acres in WUI units and 1,134 acres in General Forest units (Table 1). Ground-based logging equipment can treat up to 35% slope. In general, mechanical thinning would occur on slopes up to 35%, however 69 acres will go up to 45% slope in order to examine the effects of logging on steeper slopes. In general, ground-based logging equipment would remove trees under approximately 20 inches dbh using whole tree yarding. Trees ranging from 20 to 29.9 inches dbh may be hand felled, bucked to log lengths, limbed, topped, and skidded to the landing. No trees $\geq$30 inches dbh would be removed except in unavoidable cases for operability and safety.

Variable Density Thinning

Variable density thinning is a compilation of various thinning treatment elements: a) structural thinning b) radial release of fire-resilient legacy trees and c) wildlife structural diversity patches. Each of these elements is described below in more detail. A percentage of smaller trees would be left for diversity, structure, and to provide for the next generation of forest. This combination of activities would promote heterogeneity (a mixture of tree sizes) within a stand and across the landscape, as well as increase structural diversity (a mixture of dense pockets of trees (skips) and

openings with little to no trees (gaps)) that provides a variety of wildlife habitat elements, while creating a fire-resilient stand. The variable density thinning action (structural thinning and radial release) would be applied to all units. Canopy cover and basal area would be highly variable across treatment units, but would follow the Standards and Guidelines in the 1988 LRMP, as amended by 2004 SNFPA ROD. Wildlife structural diversity patches would be established in control areas where no treatment would occur. Wildlife diversity patches would be located in areas that provide habitat elements for wildlife species.

Table 2. Design criteria for mechanical thinning (variable density thinning) actions under the Proposed Action.

Criterion	Design

Standards for Mechanical Thinning in WUI and General Forest Stands	• Mixed Conifer Stands
	  • Retain 40% of existing Basal Area
	  • Avoid reducing canopy cover by more than 30%
	• Eastside Pine Stands
	  • Retain 30% of existing Basal Area
	  • No canopy cover restrictions

Structural Thinning Prescription	• Healthy fire-resilient tree species (ponderosa pine, Jeffery pine, sugar pine, and Douglas-fir) within all size classes would be preferentially retained. • Thinning would occur through all size classes up to 29.9" dbh to improve stand level heterogeneity. • Basal area would vary across the stand due to the creation of "clumps" and "gaps." Residual basal area densities would vary by ecosystem type (eastside pine, mixed conifer, true fir). • Removal of trees ≥ 30" dbh would not occur, except in unavoidable cases regarding operability and safety due to Occupational Safety and Health Administration (OSHA) regulations. In such instances Forest Service Representative must approve their removal.

Radial Thinning Prescription	• Selection of fire-resilient legacy trees for retention would include the following attributes:
	  • Species preference in order of importance: Jeffery pine, ponderosa pine, sugar pine, Douglas-fir and incense cedar
	  • Trees over 24" dbh would be selected for retention when available
	• Radial thinning distance would vary depending on physical and site attributes such as slope, aspect and soil moisture holding capacity.
	• Trees retained can be either individual trees and/or clumps of trees.

Wildlife Structural Diversity Patches	• Areas would be retained that have the following characteristics:
	  • multi-layer canopies (greater than 2 layers)
	  • all-aged stand
	  • higher percent canopy cover compared to adjacent areas
	  • snags and large woody debris, where available
	  • vertical and horizontal structural continuity and diversity
	• Control Areas (areas where no treatment occurs) such as RCAs, equipment exclusion zones, cultural resource sites and botanical areas, would be evaluated for retention characteristics.

Follow-up Fuel Treatments	• Hand thinning, grapple piling, mastication and/or underburning may follow initial treatment if needed, to meet surface, ladder and canopy fuel-reduction objectives.
RCA treatments	• Equipment use within RCAs and SMZs is restricted by the

Criterion	Design
	equipment exclusion zones. Equipment exclusion zone widths, measured on each side of the stream from the edge of the active channel, vary depending upon the RCA and SMZ widths • for 150 ft wide RCA buffers, the equipment exclusion zone width is 50 ft on each side of the channel; • for 300 ft wide RCA buffers, the equipment exclusion zone width is 100 ft on each side of the channel; • and for SMZs, the equipment exclusion zone width is 25 ft on each side of the channel. • For seeps, springs, and meadows, the equipment exclusion zone width is 25 ft, measured from the wet perimeter of the soil of facultative wetland species edge, whichever is furthest.

Grapple Piling, Mastication, Hand Thinning and Underburning in WUI and General Forest units

Grapple piling, mastication, hand thinning and underburning would occur on 1,032 acres in WUI units and 427 acres in General Forest units. (Table 2).

Grapple piling is an effective treatment for high surface fuel loads on steep ground (up to 45% slope using tracked equipment). Grapple piling equipment generally involves a tracked excavator that can physically move dead and downed fuels and live brush. In addition to piling surface fuels, live and dead conifer trees <11.9" dbh would be felled by a sawyer and piled with the excavator. Dead and downed material and live brush also may be piled. An excavator would pile material in the treatment unit to subsequently be burned.

Mastication equipment does not remove material from the site, but rearranges the fuel configuration from ladder fuels to surface fuels. Mastication is a possible alternative, depending on terrain (up to 45% slope) and existing fuels situations. Mastication involves the chewing or grinding of vegetation and leaving wood chips (fuel depths would not exceed 6"). By leaving chips on site, there are no piles to burn and organic material eventually returns to the soil.

Hand thinning treatments would be required in order to limit tree mortality during underburn prescriptions. Trees <8" dbh that are considered ladder fuels would be felled, lopped and scattered. Units would then be underburned.

Table 3 displays the design elements for mechanical fuels treatments and underburning activities for the Proposed Action.

Table 3. Design elements for mechanical fuel treatments and underburning under the Proposed Action.

Criterion	Design
Grapple Piling with Hand Thinning	• Cut conifer trees <11.9"dbh and pile with mechanical equipment. • Pile dead and downed material and live brush. • Piles would be burned • Slopes up to 45% would be treated.
Mastication	• Brush and conifer trees <11.9" dbh would be treated. • Fuel depths would not exceed 6". • Slopes up to 45% would be treated.
Hand Thinning	• Conifer trees <8" dbh would be felled, lopped and scattered. • Units would be underburned.
Follow-up Fuel Treatments	• Grapple piles would be burned.

Criterion	Design
	• Except where prohibited, fire would be allowed to creep between piles to provide for a concurrent understory burn • All units would be evaluated for underburning post-treatment.
Underburn Prescription Only	• Stands that already meet desired conditions would be evaluated for underburn only.

Provide the road access needed to meet project objectives while reducing transportation system effects in the project area

The road-related work proposed with this project is in accord with the Plumas National Forest Public Motorized Travel Management Plan. In summary, a total of approximately 16.5-miles of system and non-system roads would be decommissioned, closed and/or obliterated; 14 miles of road reconstruction would facilitate fuels and silviculture activities and improve drainage features, and approximately 8 miles of temporary road would be constructed or reconstructed and subsequently restored.

Table 4 displays the design elements for road access under the Proposed Action.

Table 4. Design elements for road access under the Proposed Action.

Criterion	Design
Decommission/Obliteration	• Decommissioning/Obliteration may involve recontouring, subsoiling or abandonment. Abandonment is appropriate where the road has become completely overgrown with vegetation. Decommissioning/Obliteration may also involve removing drainage structures, restoring vegetative cover, blocking access or some combination of these treatments.
Maintenance	• Maintenance would consist of brushing, blading the road surface, improving drainage.
Reconstruction	• Reconstruction may involve the removal of all trees from within the road prism as well as brushing, blading the road surface, improving drainage and replacing/upgrading culverts where needed.
New Temporary Roads	• Temporary roads would be constructed for project work and subsequently restored when the fuels and vegetation management work is complete.