
PETTIJOHN LSR HABITAT IMPROVEMENT AND FUELS REDUCTION PROJECT

PRELIMINARY PURPOSE AND NEED AND PROPOSED ACTION

Background

The Shasta-Trinity National Forest (STNF) is proposing a habitat improvement and fuels reduction project in the Clear Creek Late-Successional Reserve (LSR) located south of Trinity Lake near the communities of Lewiston and Weaverville, California. LSRs were established as part of the conservation strategy for species associated with late-successional and old-growth forest ecosystems and are managed to maintain and improve habitat conditions for these species. The Pettijohn LSR Habitat Improvement and Fuels Reduction Project (Pettijohn LSR Project) was developed to address continuing concerns about the viability of wildlife species associated with old-growth forest ecosystems, particularly the northern spotted owl (NSO), *Strix occidentalis caurina*.

The Clear Creek LSR (RC-334) is particularly important because it provides a link between two genetic subprovinces identified for the NSO. Clear Creek LSR is 83,798 acres and lies in portions of both the northern interior coast range and the Shasta-McCloud subprovinces of the Klamath physiographic province for NSO. The northern interior subprovince is arguably the most important in California due to its geographic location in the center of NSO range in California and because of its unfragmented habitat and resultant relatively high owl densities. The Shasta-McCloud subprovince supports low owl densities but includes the southeastern extent of the owl's range and provides a crucial area of genetic exchange with the California spotted owl subspecies, *Strix occidentalis occidentalis*, needed to maintain a diverse gene pool amongst the two subspecies.

Historic fire records show large fires in the Clear Creek LSR during 1917, 1934, 1985, and 1999; however records dating back to 1911 do not show any large fires within the Pettijohn LSR Project area. The current departure from historic fire return intervals and lack of large fires in the relatively recent past contribute to an elevated risk of stand-replacing wildfire in the project area.

The project is being proposed under the Healthy Forest Restoration Act of 2003 (HFRA), which contains provisions to expedite hazardous fuels reduction and forest restoration projects on federal lands that are at risk to wildland fire or insect and disease epidemics. The Pettijohn LSR Project is authorized under Section 102 (a) (5) (B) of HFRA and will be designed to provide enhanced protection from catastrophic wildfire for the threatened NSO and its habitat. A USDA Forest Service interdisciplinary team designed a preliminary proposed action. As part of public outreach and collaboration, the Forest has incorporated public input from initial HFRA meetings and information mailings to refine the preliminary proposed action. Further collaborative efforts in conjunction with National Environmental Policy Act (NEPA) processes may result in further modifications to this proposed action. If significant issues are raised that cannot be addressed by modifying the proposed action, the Forest would develop other action

alternatives. The Forest plans to prepare an Environmental Impact Statement in accordance with the NEPA and other relevant Federal and State laws and regulations, including HFRA.

Project Location

The proposed project is located within the Stuart Fork and Trinity Reservoir 5th field watersheds,¹ near Trinity and Lewiston Lakes. Activities are proposed within the Trinity River Management Unit and the Trinity Unit of the Shasta-Trinity National Recreation Area, on the STNF. The proposed project is in Trinity County, California roughly five miles northeast of the communities of Weaverville and Lewiston. Legal locations are sections 5-9, 16-21, 28, 32, and 33 in T34N, R8W; sections 4-8, 17, and 18 in T33N, R8W; and sections 1, 2, 9, 10, 12, 13, and 24 in T34N, R9W (Mt. Diablo Meridian). Unless otherwise specified, these sections are referred to collectively as the ‘project area.’

The proposed project is included in the Trinity County Community Wildfire Protection Plan (2005) and wildland urban interface² (WUI) boundaries have been identified around communities near the proposed project. The proposed project area is partially within and directly adjacent to the boundary for the Lewiston WUI, and several miles east of the boundary for the Weaverville WUI. As part of the National Fire Plan, Federal agencies conduct fuels reduction in and around WUI to reduce the risk of catastrophic wildfire to people, communities, and natural resources while restoring forest ecosystems to more closely match their historical characteristics.³

Spatial Scales

Three primary spatial scales were considered during identification of the purpose and need and preliminary proposed action.

- 1) **The Clear Creek LSR** is 83,798 acres in size and was allocated by the Forest Plan to be managed to protect and enhance conditions of late-successional and old-growth forest ecosystems. The Forest completed an LSR Assessment for the Clear Creek LSR in 1997 with updates in 2000, 2001, and 2008. The LSR assessment identifies general current conditions, general desired conditions, and management recommendations that would move the LSR toward desired conditions.
- 2) **The Pettijohn fireshed** area, also called the project area, was identified as a landscape where existing features and conditions would give fire fighters a good chance of keeping exterior wildfire from entering; or conversely interior wildfire from exiting the area. The boundary of the roughly 21,500 acre fireshed is formed by the defensible land features of Trinity and Lewiston Lakes to the north, northeast and east; the Trinity River to the south; County Road 204 along Rush Creek to the west; then State Highway 3 to the west and northwest which ties back in with Trinity Lake at Slate Creek. The Pettijohn fireshed area provides a reasonable scale at which to address the concern of wildfire spread into and within the LSR.

¹ Watershed is defined as a drainage basin or extent of land where water from rain or snow melt drains downhill into a body of water such as a river, lake, reservoir, or ocean. On the Shasta-Trinity National Forest, 5th field watersheds encompass an average of 112,000 acres.

² Federal Register Vol. 66, No. 3, Thursday, January 4, 2001

³ More information on the National Fire Plan is available online at <http://www.forestsandrangelands.gov/NFP/overview.shtml>

- 3) **The analysis area** refers to the minimum area analyzed for effects occurring as a result of the proposed action or other alternatives. Each resource area may have different spatial bounding in order to fully identify direct, indirect, or cumulative effects.

Purpose of and Need for Action

An interdisciplinary planning team identified the purpose and need for the Pettijohn LSR Project by comparing existing conditions with desired conditions as described in the Forest Plan. The team reviewed and incorporated management recommendations from the Clear Creek LSR Assessment (1997) and updates. The Upper Trinity River Watershed Analysis (2005)⁴ is a landscape-scale evaluation that provides additional baseline information used to identify the purpose and need and develop the preliminary proposed action. As part of preliminary planning, an interdisciplinary team completed the Roads Analysis Process for the proposed project area and identified road segments where decommissioning would be appropriate and consistent with multiple use objectives.

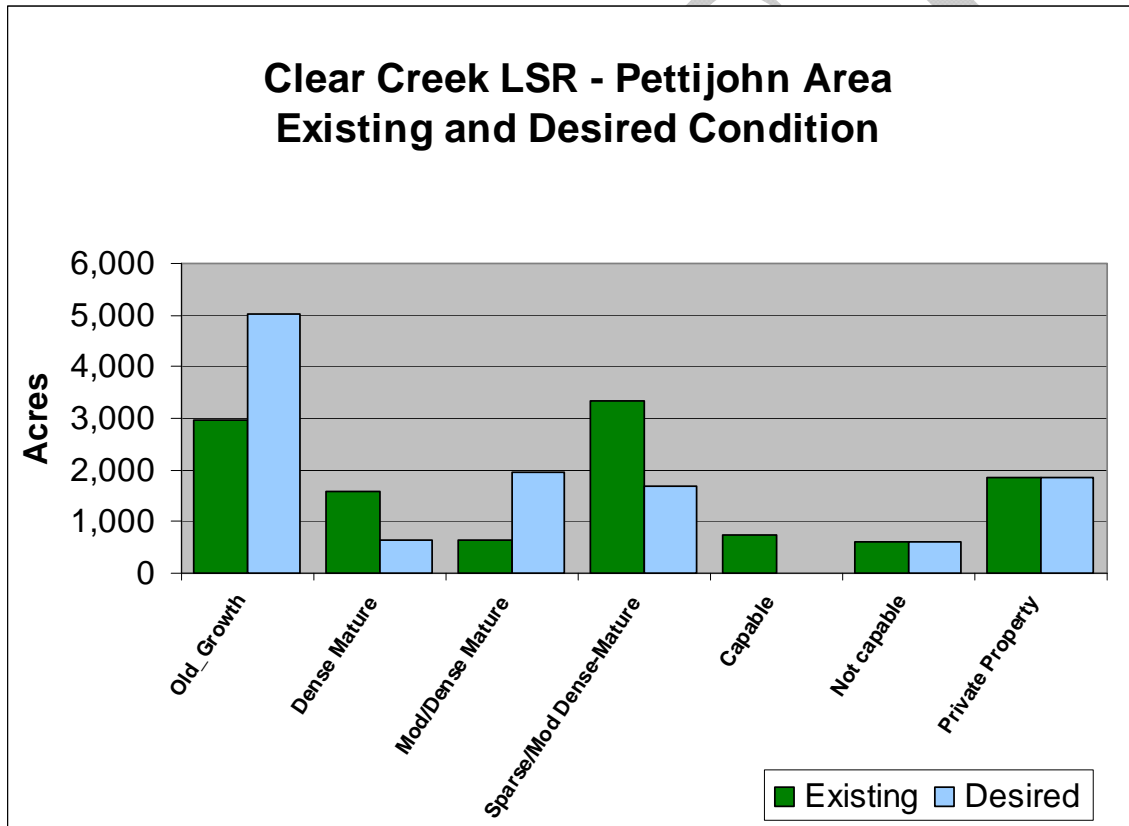


Figure 1. Estimated current conditions versus desired habitat conditions (acres) within the project area based upon stand-level capability to provide old-growth habitat characteristics projected out roughly 50 years.

The preliminary proposed action was developed in response to two, basic interrelated needs identified after comparing general existing conditions with desired conditions for the Clear Creek LSR:

⁴ Available at <http://www.fs.fed.us/r5/shastatrinity/publications/watershed-analysis.shtml>

- 1) Current landscape fuels conditions in the Clear Creek LSR are conducive to the rapid spread of fire and reduced fire suppression effectiveness. There is a high probability that a fire start within or adjacent to the proposed project area would result in the loss of existing and developing old-growth habitat in the Clear Creek LSR. Utilizing prescribed fire as a management tool to maintain lowered fuel loading is currently not safe or feasible.
- 2) The Clear Creek LSR is currently dominated by mature (approximately 80 to 110 years old) conifer forest and includes less than the desired amount of old-growth habitat.

Existing and Desired Conditions

Attachment B contains recent photos taken in the proposed project area showing existing conditions and desired conditions.

Amount of old-growth habitat

Old-growth forest in the Pettijohn portion of the Clear Creek LSR accounts for approximately 2,960 acres, or 32% of the land capable of producing late-successional forest. Mature forest accounts for approximately 33% of the capable land. The Clear Creek LSR, including the Pettijohn portion, is dominated by mature (80 to 110 year old) conifer stands that have become overcrowded with tightly spaced trees that do not yet provide old-growth habitat. Dense stand conditions contribute to reduced tree health (including existing scattered large/old conifers) and growth. Crown and foliage development is limited because not enough room and site resources, such as water and nutrients, are available for the large number of trees. As the density in stands has increased, tree crown size has become smaller with less leaf or needle area to carry on photosynthesis; this has caused physiological stress to trees and is retarding the development of old-growth habitat conditions such as large fire-resistant conifers (that also provide future large snags and logs) and viable hardwoods. Reducing competition (through the reduction in the number of trees per ac) can create a more hospitable growing condition for the trees left on-site and accelerate the development of old-growth habitat conditions. The Clear Creek LSR Assessment identifies thinning overstocked young to mature conifer stands as the highest priority for managing forests within the LSR.

Coordinated analyses conducted by the Forest Service and the U.S. Fish and Wildlife Service concluded that current habitat conditions in Clear Creek LSR are insufficient to maintain the 20 pairs of breeding owls it is designed to provide to fulfill its role in the owl conservation strategy.⁵

⁵ Roberts, Lynn, Wolcott, Kelly et al., 2001. "Final Northwest Forest Plan Northern Spotted Owl Baseline Analysis Documentation." A collaborative project of the USFWS and the USFS, known as the 'Blue Book', Finalized, May 31, 2001.

Table 1. Age class, stand structure, and connectivity targets for the Clear Creek LSR, relatively proportioned for the Pettijohn LSR Project Area.

Age Class / Structural Attribute	Existing Condition: estimated acres	Desired Condition Estimated acres
Old-growth	3000	5,000
Dense Mature	1,700	700
Moderately Dense Mature	700	2,000
Sparse, Moderately Dense Mature	3,300	1,800
Northern spotted owl habitat connectivity	Poorly connected at south end of Clear Creek LSR	Promote more extensive old-growth and increased connectivity across the LSR

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Table 2. Proposed Clear Creek LSR Existing and Desired Conditions⁶

Old-growth attribute (% on the landscape)	Existing Condition (17-43%)	Desired Condition
Relative connectivity	Current conditions are adequate at the LSR-scale but inadequate at a local-scale due to intensively managed inholdings and past even-aged harvesting on STNF land.	Expected to improve based on proposed treatments.
Recruitment Potential	Poor recruitment due to long-term fire exclusion	Promote/sustain growth of existing mature trees, and reduce large-tree mortality by ~50% in the mature stands
Mature, Dense Stands	Excessive due to long-term fire exclusion	No less than 1/3 of stands
Sustainability Potential	Poor due to long-term fire exclusion	Improve ability to contain large stand-replacing fires via treatments in seed/sap, pole, and mature stands and post-treatment prescribed burning
Untreated Old-growth and mature stands	Existing Condition	Desired Condition
Risk of stand-replacement fire	High risk	Reduced risk of landscape level stand-replacement fire through fuel reduction treatments
Old-growth stands	Meets high level of function for the NSO	Meets high level of function for the NSO
Mature stands	Progressing towards old-growth (at high risk of fire/insects/disease)	Progressing towards old-growth (reduced risk of fire/insects/disease)

⁶ Clear Creek Late Successional Reserve Management Assessment (pp.11-33)

Table 3. Project Scale Existing and Desired Conditions

Thinning Units	Existing Condition	Desired Condition
Canopy closure	70 to 90+ %	40 to 60% after treatment; 70+ % within 25 years
Understory - fuel ladder	dense understory of 2 to14 inch DBH size class dominated by shade-tolerant species (white fir)	moderately dense understory dominated by hardwoods such as oak and madrone
Dead and down fuels (tons/acre)	14 tons/acre	6 to 8 tons/acres
Crown base height (distance from ground to tree branches)	4 to 6 feet	25 feet ±
Flame height - expected	greater than 8 feet	less than 4 feet
Fuel Management Zone (FMZ)	Existing Condition	Desired Condition
Roadside FMZ <u>300 ft. wide FMZ</u> 150 feet each side of road	dense understory of 2 to14 inch DBH size class dominated by shade-tolerant species (white fir); mod/dense hazardous snags	mod/dense understory dominated by hardwoods (oak/madrone); no potentially hazardous snags
Expanded FMZ <u>600-1200 ft. wide</u> 300-600 ft. each side of road (includes interior roadside FMZ)	same as roadside FMZ	same as roadside FMZ
Dead and down fuels (tons/acre) (roadside and expanded FMZs)	14 tons/acre	6 to 8 tons/acres
Understory trees (roadside and expanded FMZs)	high density understory of 2 to 14 inch DBH size class	20 foot spacing of trees \leq 11 in. DBH, all potentially hazardous snags removed within 150 ft of road; retain all trees $>$ 11 in.
Brush Fuel Management Zones	areas dominated by decadent woody brush that rapidly carries fire	areas dominated by new-growth brush that does not carry fire
Flame height (all FMZs)	greater than 8 feet	less than 4 feet
Fire Return Interval	Existing Condition	Desired Condition
Project Area	100+ years	4 to 24 years

Fire hazard

The exclusion of naturally-occurring wildfire over the past 100-150 years has led to a marked accumulation of live and dead fuels in the project area. Conifer stands proposed for thinning are currently overly-dense with many small trees in the understory layer that can act as fuel ladders, allowing fire to move quickly from the forest floor into the upper canopy layer. Fuels sampling conducted within the project area in 2005 found an average of 14 tons per acre of dead and down fuels, and substantial ladder fuels.

Preliminary Proposed Action

The project includes specific resource protection measures defined in Attachment A.

Objectives

The preliminary proposed action was designed to address the following management objectives:

- Reduce fuels: reduce fuel loading within developing old-growth habitat and strategic locations for fire management to levels that improve the likelihood that wildfire would be non-lethal to dominant and co-dominant trees in existing and developing old-growth habitat.
- Fire fighter safety: provide for increased fire fighter safety and effectiveness during future wildfires;
- Old-growth habitat improvement: accelerate the development of old-growth habitat conditions.

Fuel Management Zones (FMZs)

A network of FMZs⁷ is proposed to support the effectiveness and safety of future fire suppression, and/or prescribed fire. These FMZs were designed to achieve the first two management objectives listed above by providing a potential point of control for future fire occurrence. These linear FMZs range from about 300 feet wide (roadside) to approximately 600 or 1,200 feet wide (expanded) and are centered along approximately 36 miles of strategically located roads at the perimeter of the fireshed and within the Clear Creek LSR. Within overstocked stands adjacent to the identified roads within FMZ, small diameter understory (fuel ladder) trees (≤ 11 " diameter at breast height (DBH)) would be reduced to roughly a 20 foot spacing and live and dead hazardous trees could pose a danger to fire fighters would be removed. The perimeter FMZs tie in with roadside fuels projects already completed along State Highway 3 and County Road 204.

Roadside FMZs	1,054 acres (approximately 18 miles)
<u>Expanded FMZs</u>	<u>941 acres</u> (approximately 18 miles)
TOTAL FMZ	1,995 acres (approximately 36 road miles)

⁷ Fuel Management Zones are areas where fuels are altered in order to enhance the usability of a geographical feature such as a ridge or road, for prescribed or wildland fire use, or suppression activities.

Table 4. Proposed Actions and Estimated Acres by Land Allocation

Action	Total Acres	Activity Fuels	Land Allocation	Land Allocation	Land Allocation
			LSR	Riparian⁸	Matrix
Thin from Below (Tractor)	860	Whole tree yarding, grapple pile/burn concentrations outside RR	802	58	0
Thin from Below (Cable)	120	Whole tree yarding, hand line and burn concentrations outside RR	104	16	0
Thin from Below (Helicopter)	175	Whole tree yarding, hand line and burn concentrations outside RR	153	22	0
Thinning from Below TOTAL ⁹	1,155¹⁰		1059	96	0
FMZ Roadside	1,054	Mastication, handpile/burn concentrations outside RR	696	215	143
FMZ Expanded	941	Mastication, handpile/burn concentrations outside RR	791	150	0
FMZ TOTAL	1,995		1483	365	147
Rx Burn Brush	101	Na	75	26	0
Hand Fuels Reduction	11	At Rest Stop: Hand trim/pile and burn outside RR	0	8	11
TOTAL ACRES TREATED	3,262		2605	495	162
Landings	Acres	Number			
	0.2 to 0.5 ac. each for a total of 8-20 acres maximum	39 landings 100 x 100 ft to 100 x 200 ft. max (all inside thinning units)	Max use of existing landings	No new landings	Max use of existing landings
Road Decom	MILES	Road numbers			
	2.3	FS roads 34N85 and 34N34Y			
Road Construction	MILES	Road numbers			
	0	No new road construction is proposed			

⁸ Riparian Reserves overlay all other land allocations.

⁹ In the Thin from Below acres the existing 70 to 90+ percent canopy closure would be thinned to roughly 40 to 60 percent; leaving all dominant and codominant conifers, all large snags/logs, and all viable hardwoods.

¹⁰ In the Thin from Below acres there are 149 acres that overlap roadside Fuel Management Zones (FMZs). In these overlapping acres, hazard trees that could pose a danger to fire fighters would be removed in addition to the thinning from below prescription.

Thinning from below

The proposed thinning targets overly dense conifer stands and is designed to accelerate the development of desired old-growth characteristics (objective #3, old-growth habitat improvement). The thinning was also designed to decrease fuel levels to reduce the risk of losing these and adjacent stands to crown fires (objective #1, reduce fuels). The largest and healthiest trees, including trees with large cavities and other types of deformities (decadence) and viable hardwoods, would be retained. A sufficient number of trees would be removed to maintain or increase growth rates of the mature trees, reduce competition for the largest/oldest trees prolonging their persistence in the stands, and remove fuel ladders to a level where ground fires are less likely to climb to the upper canopy. Trees marked for removal will start with the smallest least-healthy conifers progressively including larger trees until the existing 70 to 90+ percent canopy cover is reduced to approximately 40 to 60 percent to make more water, nutrients, sunlight and growing space available to the remaining trees (conifers as well as hardwoods). Approximately 123 acres of Riparian Reserve (RR) are included in proposed thinning units, within RR the canopy would not be reduced below 60 percent.

Biological legacies such as large/old green trees and other old-growth structural components (large snags, logs, viable hardwoods, etc.) would be retained within each harvest unit to provide these important habitat components as the stand develops. Stands within 150 feet of roads identified as FMZ are included in proposed thinning units. To improve effectiveness of FMZs (objective #2, fire fighter safety), the preliminary proposed action includes removing hazard trees within portions of thinning units directly adjacent to FMZ networks (about 149 acres of the total 1,155 acres proposed for thinning).

The interdisciplinary team used the following definition of NSO habitat to establish the desired stand level conditions, and to develop silvicultural prescriptions that would further maintain existing and developing old-growth habitat and accelerate the development of old-growth characteristics. Key concepts and habitat components for NSO habitat are underlined below.

Northern Spotted Owl (old-growth) Habitat Definition:

Thomas et al. (1990)¹¹ and the U.S. Fish and Wildlife Service (1990)¹² determined that the northern spotted owl is strongly associated with conifer stands that include the following characteristics: a multi-layered, multi-species (including hardwoods) canopy dominated by large overstory trees (a complex vertical structure); moderate to high canopy closure; a high incidence of trees with large cavities and other types of deformities (decadence); numerous large snags; an abundance of large dead wood on the ground (logs); and open space within and below the upper canopy for spotted owls to fly.

Following are the key attributes of NSO or old-growth habitat that the preliminary proposed action is designed to address:

¹¹ Thomas, J.W., E.D. Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner, 1990. A Conservation Strategy for the Northern Spotted Owl. Interagency scientific committee to address the conservation of the northern spotted owl.

¹² USDI - Fish and Wildlife Service, 1990. The 1990 status review: northern spotted owl: *Strix occidentalis caurina*. Report to the U.S. Fish and Wildlife Service, Portland, Oregon. 95 pages.

- **Decadence** – This key attribute is addressed by maintaining the largest/oldest overstory trees that typically have a high incidence of large cavities, broken tops, decay, and other types of deformities, as well as maintaining existing large snags and logs. Broken tops, decay, snags, and logs are considered signs of decadence. Additionally, the increased growth rate of the remaining conifers will provide for future recruitment of large snags (and logs).
- **Vertical Structure** – The preliminary proposed action maintains the largest/oldest dominant and codominant trees (temporarily reducing vertical structure). However, retaining both dominant and codominant and healthy intermediate trees during thinning would promote the long-term recruitment of dense, multi-storied stands conducive to NSO nesting conditions.
- **Moderate to Dense Canopy** – The preliminary proposed action was designed to strike a balance between short-term negative impacts and long-term benefits to canopy closure. A temporary reduction in canopy closure is unavoidable because making more site resources available to accelerate the development of a canopy dominated by large trees necessitates providing physical space into which trees can grow. With too light of thinning, the remaining trees won't have space to grow large. With too heavy of thinning, the trees may not grow/recover enough to provide the desired overall canopy closure.

25 Tractor Thinning Units totaling	860 acres
12 Cable Thinning Units totaling	120 acres
10 Helicopter Thinning Units totaling	<u>175 acres</u>
Total Thinning Units	1,155 acres

Landings

Up to an estimated maximum 39 temporary landings would be constructed, each measuring roughly 100x100 feet to 100x200 feet, and existing landings in the project area may be reused whenever possible. Landings are critical for handling and storing the substantial amount of woody material that is produced by the removal of large numbers of relatively small diameter trees and dead fuel. For the preliminary proposed action, landing locations were estimated based upon intensive field reviews, topography, stand conditions and experience with landing location requirements. The project proposes a higher number of small landings versus fewer large landings because this allows for strategically placing landings to avoid or minimize impacts to the largest/oldest trees and minimizes the ground disturbing effects of dragging logs long distances. No trees greater than 24 inches DBH would be cut for landings. New landings will not be constructed within Riparian Reserves (RR). Landings that currently exist in RR will be reused where reuse constitutes less ground disturbance and maintains the riparian values over new construction.

Fuel Reduction in High Human Use Areas (in addition to the road-based FMZs)

Two areas at the edge of the fireshed have been identified as having elevated risk for wildfire-related impacts due to relatively high fuel loading coupled with high human use. Human caused fire starts in these areas are likely to result in the loss of existing and developing old-growth habitat within the LSR. The preliminary proposed action includes prescribed burning of dense brush surrounding a popular fishing access area at the east edge of the fireshed area, and hand thinning/piling/burning around a public rest area at the west edge of the fireshed area along State Highway 3. Treatment of these areas would augment the effectiveness of the FMZ network (in support of objective #1, reduce fuels and objective #2, fire fighter safety).

Prescribed Burning (brush)	101 acres
Hand Fuels (rest stop)	11 acres

Road Decommissioning

The Roads Analysis Process (RAP) completed for the Pettijohn LSR Project area identified 2.3 miles of little-used roads that are having negative effects on fish and water quality, or are disproportionately difficult to maintain. The project includes decommissioning of Forest Service roads 34N85 and 34N34Y shown in the project map. Decommissioning entails removing culverts, ripping and out-sloping road surfaces, and closure. The goal is to control surface runoff, erosion, and mass failure while making the road unavailable for future use. Decommissioning includes specific resource protection measures (detailed in Attachment A), and the condition of decommissioned roads is monitored long-term through Best Management Practices effectiveness monitoring. There is no new road construction proposed.

Road Decommissioning	2.3 miles
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Management Direction

National Forest Management Direction

National Forest management is guided by various laws, regulations, and policies that provide the framework for all levels of planning. These higher-order documents are incorporated by reference and can be obtained from Forest Service offices or on the web. Direction which guides the project analysis includes: The Multiple-Use Sustained Yield Act of 1960; the National Forest Management Act of 1976 (NFMA); the National Environmental Policy Act of 1969 (NEPA); the National Historic Preservation Act of 1979; the Endangered Species Act of 1973; and the Record of Decision (ROD) for the Final Environmental Impact Statement for the Shasta-Trinity National Forest, 1995 which includes the 1994 ROD for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the NSO (a.k.a. the Northwest Forest Plan) and Standards and Guidelines for Management of Habitat for Late-Successional and Old Growth Forest Related Species Within the Range of the NSO.

Shasta-Trinity NF Forest Land and Resource Management Plan (Forest Plan)

The proposed Pettijohn LSR Project is within two management areas: the Management Area 7, Weaverville/Lewiston Unit and Management Area 8 – National Recreation Area, Trinity Unit. The Forest Plan contains general management direction for these areas on pages 4-107 to 4-109 and pages 4-113 to 4-115. The Clear Creek LSR overlays 46% of the project area: 21% within management area 7 and 25% within management area 8. The Clear Creek LSR is managed to protect and enhance late-successional forest ecosystems. Forest stands in LSR are managed to maintain health and diversity components through the use of prescribed fire and thinning from below.¹³ General management direction for the Clear Creek LSR lands is found on pages 4-37 to 4-44 of the Forest Plan. Silvicultural activities aimed at reducing risk (potential loss due to wildfire) shall focus on younger stands in LSR.¹⁴ Clear Creek LSR management objectives are to accelerate development of late-successional conditions, while making the future stand less susceptible to disturbance events.

The Forest Plan designates RR on lands adjacent to permanent and intermittent/ ephemeral water bodies. This designation overlays the other land allocations, including LSR; RR are afforded the most protection during management actions as directed in the Forest Plan. Direction for management of RR is found in the Forest Plan, pages 4-53 to 4-60. Generally, the area within 300 feet from both sides of high water level applies to perennial streams, and 150 feet for intermittent/ephemeral streams.¹⁵ Management activities may occur in RR when they are in support of, or do not adversely affect, the maintenance of riparian-dependent resources (i.e., fish, wildlife, water). Forest Plan objectives for RR include providing functional aquatic habitat and connecting travel corridors for terrestrial wildlife, particularly for late-successional habitat dependent species. RR management prescriptions emphasize retention and/or enhancement of old-growth vegetation.¹⁶

¹³ Forest Plan, page 4-166

¹⁴ Forest Plan, page 4-37

¹⁵ RR within the project area is identified, as directed in the Forest Plan, and marked on the ground before project implementation.

¹⁶ Forest Plan, page 4-59

Attachment A – Resource Protection Measures

The following protective measures are designed to reduce or eliminate potential project effects.

Wildlife

- Limited Operating Periods (LOPs) will be implemented to avoid direct adverse impacts to the northern spotted owl. From February 1 through July 10, all noise- and smoke-generating activities will be prohibited **within** ¼ mile of suitable nesting/roosting habitat (all project units potentially affected). In addition, all vegetation removal/cutting/burning **within** suitable nesting/roosting habitat will be prohibited from February 1 through September 15 (all units *except* 2, 3, 4, 5, 6, 8 and 18 would be affected). Currently annual surveys for northern spotted owl are being conducted in the project area to determine occupancy. The owl LOPs may be lifted if year-of-action surveys, using currently accepted protocols, indicate specific areas are not occupied by breeding owls, and with the mutual agreement of U.S. Fish and Wildlife Service and the Forest Service.
- Retain existing large (>19 inches diameter at breast height) snags and down logs within thinning units. Snags felled for safety reasons would be left on site as logs.
- Maintain an average of 5 tons of logs per acre with a preference to have 4 to 6 logs per acre at the largest available diameter.
- Protect and retain viable hardwood trees during harvest and fuels hazard reduction treatment activities.
- All activity is prohibited within 250 feet from known Townsend's, big-eared, and/or Pallid bat roost sites (caves, mines, and mine adits). See wildlife resource protection map in project record for known roost sites.
- Loud and continuous noise disturbance is prohibited from February 1 through August 15 within ¼ mile of active goshawk nest sites. Year-of-action surveys will be conducted to determine goshawk occupancy in the project area, and LOPs will be imposed to protect breeding goshawks.

Botany

- Sensitive or endemic plant populations will be flagged, and identified as a “controlled area,” and excluded from treatment.
- Serpentine and chert outcrops will be flagged and excluded from treatment to protect sensitive plant populations and habitat.
- Contract Provision C6.35 [Equipment Cleaning 7/01] or most recent version of this contract provision would be incorporated into the timber sale contract as a protection measure to

prevent the spread of invasive weeds.¹⁷ This provision requires the Purchaser to certify that all equipment is free of noxious weed seed prior to entering the assessment area.

Streamcourse Protection Zones

- All streamcourse protection zones would be flagged and/or signed within proposed treatment units, and identified as "Protect Streamcourse" on Sale Area Map.
- There will be no mechanical entry or harvesting within 50 feet of the high-water mark, or within the inner gorge (no mechanized equipment on slopes over 35%), or as otherwise designated on the ground for streamcourse protection zones, except at approved designated crossings.
- Within designated stream course protection zones, skid trail crossings shall not exceed 20% grade, and shall be located so as to minimize ground and vegetative disturbance.
- There will be no primary fire ignition within streamcourse protection zones. Provide for minimal-intensity prescribed fire conditions to attain desired prescription burn treatment objectives. Hand cut, hand pile and burn piles where feasible in lieu of broadcast burning within streamcourse protection areas. As a general rule, burn piles should not be larger than four feet high and six feet in diameter, on average. Project prescribed burning shall be implemented consistent with the programmatic fisheries biological assessment for the Forest prescribed fire program.¹⁸
- Area of disturbance will be confined to the stream crossing and associated road prism. New crossing structures will be designed to accommodate unobstructed passage of stormflows. Fill and sediment will be removed from streambed to expose native substrates. Duration of disturbance will be less than two weeks at each site.

Fuels

- Use of prescribed fire is to conform with Forest Service, California Air Resources Board, and North Coast Unified Air Quality Management District guidelines.
- Post-treatment total soil ground cover shall range from 51-70%, when available. Provide for a minimum of 50% of the ground cover as fine organic matter, of generally less than three-inches in size, if available. Ground cover is defined as any combination of duff mat, litter, fine organic materials (less than three-inch diameter), coarse organic materials (greater than three-inch diameter), live vegetation in contact with the soil, and rock fragments (greater than ¾-inch diameter). Fuel reduction activities should retain 30-50% of the existing duff mat.

¹⁷ A copy of the complete text of the contract provision can be obtained at the Weaverville Ranger District or on the web at http://www.fs.fed.us/invasivespecies/documents/FS_WeedBMP_2001.pdf.

¹⁸ The programmatic fisheries BA for the Forest prescribed fire program, and associated letter of concurrence from NMFS, were prepared in 1998 and are available from Forest Headquarters upon request.

Timber Harvest Operations

- The aquatic period of operation (APOO) is from May 15 to October 15. No ground disturbing activities¹⁹ will occur from **October 16 through May 15**. No new work will begin after October 14. Work may proceed after October 15 with Forest Service Line Officer approval, informed by fishery biologist and hydrologist evaluation. This will only occur if dry weather is forecasted. Typically this situation occurs when a project is not complete and more damage may occur by leaving it unfinished. Erosion control measures will be implemented on or before October 15, or in the event of substantial precipitation events during the summer. If there is approval to work beyond October 15, erosion control measures will be in place at the end of each workday.
- Ground disturbing activities will only occur when soils are dry down to 8 inches in depth, or soil conditions are such that the operations will not result in compaction or accelerated soil erosion. Ground disturbing activities will not occur during wet weather conditions within the APOO without the consent and approval by a Forest Service earth scientist prior to the initiation of activities.
- Where soils with severe compaction hazard have been identified, ground-based mechanical equipment will only operate when the soils are dry down to 8 inches from June 1 through September 30, inclusive and without exception (see *Shasta-Trinity Wet Weather Soil Compaction Hazard Ratings* for restrictions). *Units affected: 990 through 999, and 88.*
- Mechanical skidding equipment is generally restricted to slopes less than 35%. When slopes are >35% and <45% mechanical skidding equipment is restricted to slash covered primary skid trails.
- Minimize soil erosion by water-barring all skid trails, mulching with straw or fine slash (achieve 75%+ cover) the last 50 feet of all skid trails where they enter main roads.
- Skid trails, temporary roads and landings will be located and constructed without removing any trees 24 inches or greater DBH.
- Short-Term Need Landings Post-use Mitigation: Rip with winged sub-soiler to a depth of 18 inches, mulch at a rate of 1.5 tons/acre, and seed with native grass at a rate of 50 lbs/ac all short-term need landings and primary skid-trails (the last 200 feet to the landing).
- Long-Term Need Landings Post-use Mitigation: Scarify to a depth of 6 inches, and mulch (rice straw or wood chips) at a rate of 2 tons/acre.
- Landings should be constructed to adequately drain with crowned landings and directed drainage with catchments (rock armoring and/or silt fences with straw bales may be used as necessary). All new landing fill slopes and road fill slopes (>100 square feet) would be mulched initially, and the mulch would be maintained throughout the life of the project.

¹⁹ Ground disturbing activities include yarding, fire line construction, machine piling, road reconstruction, and road maintenance activities.

Landings with slopes of less than 25% and greater than 0.5 acre should have natural, non-constructed designs with slash covered operating areas.

- Limit primary skid roads, trails, and landings to occupy no more than 15% of the treatment unit. The objective is to design a skidding pattern that best fits the terrain, and limits soil impact. Pre-designated skid trails, felling to the lead, and end lining are methods to be used to achieve this. Skid trails shall be outsloped, and not located in swales, where water barring is not possible or requires deep cuts. Re-use existing skid trails and landings whenever available and practical. (Best Management Practices 1-10, 1-12, 1-13, 1-16)

Transportation System

- Public safety during felling and/or removal operations will be afforded by warning signs, traffic control, and/or temporary closure to public travel.
- If hauling is approved to occur outside the APOO (due to dry conditions), the placement of aggregate base course may be required to provide a stable running surface and prevent rutting and potential erosion. Snow berms will be removed or drains installed to avoid channelization of melt water to minimize potential for damage to the road and to protect water quality. If the road surface is damaged, lost surface material shall be replaced, and damaged structures repaired. (Best Management Practices 2-23, 2-24 and 2-25.)
- Purchaser-utilized roads rutted or otherwise damaged by Purchaser operations shall be spot-rocked or otherwise suitably repaired. Drainage structures shall be protected or repaired as necessary. The road surface shall be outsloped, if possible, during maintenance operations. Road surfaces in areas crossing serpentic soils should be rocked to prevent roadbed deformation (rutting) during wet conditions.
- Wing subsoil to an estimated 18 inches in depth, mulch, or use available organic material to achieve 2 tons/acre, all temporary roads used in timber-harvest activities post-use. Prevent road runoff from draining onto skid trails and landings.
- Roads used for haul will be watered for dust abatement, or dust abated through application of a Contracting Officer²⁰-approved material.

Water Drafting

- Water drafting will occur in project area creeks. When drafting from coho salmon critical habitat, National Marine Fisheries Service (NMFS) water drafting specifications will be adhered to. NMFS developed water drafting specifications to minimize impacts to listed fishes. In order to protect coho salmon, the Operating Guidelines presented in the water drafting specifications will be adhered to as described below.

²⁰ Contracting Officer, or person of delegated authority.

Operating Guidelines

- Operations are restricted to one hour after sunrise to one hour before sunset.
- Pumping rate shall not exceed 350 gallons per hour.
- The pumping rate shall not exceed ten percent of the stream flow.
- Seek streams and pools where water is deep and flowing, as opposed to streams with low flow and small isolated pools.
- Pumping shall be terminated when the tank is full. The effect of single pumping operations, or multiple pumping operations at the same location shall not result in obvious draw-down of either upstream or downstream pools.
- Each pumping operation shall use a fish screen. The screen face should be oriented parallel to flow for best screening performance. The screen shall be designed and used that it can be submerged with at least one-screen-height-clearance above and below the screen.
- Operators shall keep a log on the truck containing the following information: Operator's Name, Date, Time, Pump Rate, Filling Time, Screen Cleaned (Y or N), Screen Condition, Comments. These guidelines should be included as instructions in a logbook with serially numbered pages. This assures each truck operator easy access to this information.

When drafting water **outside** of critical habitat, standards and guidelines found in the Shasta Trinity National Forest Plan section 18 k. (1) – (3) (page 4-25) will apply:

When watering roads for dust abatement, follow the following rules:

1. Allow drafting from fishery streams only where immediate downstream discharge is maintained at 1.5 cubic feet per second (CFS) or greater.
2. Allow drafting from ephemeral streams, intermittent streams, wetlands or constructed ponds provided that sufficient water quantity and quality remains to support associated wildlife species and riparian values.
3. Never allow drafting to remove more than 50 percent of any stream discharge or 75 percent of constructed pond water.

General Protection Measures

- To avoid direct effects on recorded archaeological sites, sites will be flagged and avoided following the protective measures outlined in the Region 5 Section 106 Programmatic Agreement. These sites will be identified in any contract related to this proposed project as controlled areas to be avoided.
- If additional threatened, endangered, or sensitive species, cultural resource sites, or any sensitive or watch list plant species are discovered within the assessment area, the appropriate protection actions will be taken. Contract Provision C/CT6.25#, or most recent version of this contract provision, would be incorporated into any contract relating to this proposed project.

Attachment B – Photos of Existing and Desired Conditions in the project area



Photograph #1 (*Existing Condition*) was taken in 2005 within thinning Unit #905 the Pettijohn LSR Project preliminary proposed action.



Photograph #2 Low fire mortality and accelerated development of old-growth habitat is expected in this stand. (The approximate 'Desired Condition' is in foreground, with the 'Existing Condition' in background) This photo was taken in 2005 within the Pettijohn LSR Project area along the Musser Hill Road (Forest Road 34N95) fuel break.

The foreground of the photo displays a timber stand with 40 trees per acre – similar to the expected condition of the thinned stands included within the Pettijohn LSR Project. The background of the photo has not been treated within the past 30+ years, resulting in a dense understory of trees which inhibits individual tree growth and serves to increase fire risk via ground and ladder fuels.