Management Indicator Species Report
for the
Last Chance Fuels Reduction Project
2003

Placerville Ranger District
Eldorado National Forest
El Dorado County

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I. Introduction

Management indicator species (MIS) are used in environmental analysis to represent a large group of vertebrates that have similar habitat requirements, thereby addressing habitats that are most important to the viability of wildlife populations and diversity. In addition, management indicator species are used to show environmental conditions and trends for wildlife and fish, especially in regards to the recovery of threatened and endangered species, the maintenance of population viability in vertebrates, and the production of game and special interest species to meet recreational demands (USDA Forest Service, 1989).

II. Management Direction

The Eldorado National Forest Land and Resource Management Plan (USDA 1989) states the need to "maintain medium to high quality [capability] habitat according to the habitat capability models for management indicator species and habitat quality for special habitats" (Management Practice #35, Eldorado National Forest LRMP, 1989). Medium capability is defined as a condition that will support viable populations of most species associated with the habitat type (USDA 1981). High capability will provide recruitment above the viable population level, thus leading to higher densities, extension of the range, or colonization of unoccupied habitat (USDA 1981). In addition to this management practice, Management Practices 41 (Early/Mid Successional Stage Management), 44 (Snag and Down Log Management), and 45 (Hardwood Management) provide specific guidelines for the management of some indicator species.

Sensitive MIS species (American peregrine falcon, American bald eagle, willow flycatcher, northern goshawk and California spotted owl) are addressed separately in the Last Chance Fuels Reduction Project Biological Assessment and Evaluation for terrestrial wildlife species. The following table lists the nonsensitive management indicator species for the Eldorado National Forest and the vegetational types, successional stages, and/or special habitat components represented by the individual species.

Management Indicator Species and Represented Habitats

Species	Habitat Represented	Available Habitat Potentially Affected by Project
Mule Deer	Riparian, Meadows, Edges, Hardwoods, Early/Mid Successional Habitats	All types with exception of meadows and riparian that will have RCOs and BMPs applied
Black Bear	Downed Logs, Riparian, Meadows, Hardwoods, Ponderosa Pine, Red Fir, Lodgepole Pine, Early to Late Successional Habitats	All types with exception of red fir and lodgepole pine. These species occur at higher elevations outside the project boundary
Mountain Quail	Edge, Brush, Early/Mid Successional Habitats	All types
Cavity Nesting Birds	Old Growth, Snags, Hardwoods, Ponderosa Pine, Mixed Conifer, Red Fir, Lodgepole Pine, Late Successional Habitats	All types with exception of red fir and lodgepole pine. These species occur at higher elevations outside the project boundary
Trout	Riparian and Aquatic	All perennial streams

III. Description of Proposed Alternatives

For a description of the No Action and Proposed Action alternatives, refer to the Last Chance Fuels Reduction Project Environmental Assessment (USDA 2003c).

IV. Existing Environment

The project area is located south and east of the town of Grizzly Flat, south of the Grizzly/Caldor Road, along and north of the Caldor Railroad Grade to the intersection with road number 9N61. Habitat within the proposed project area is comprised primarily of the mixed conifer vegetation type (Zeiner et al. 1988). The over- and understory tree canopies contain ponderosa pine, white fir, sugar pine, incense cedar, and black oak. The shrub level contains manzanita and mountain whitethorn, Sierra chinquapin, and deerbrush. Riparian areas contain alder, willow, maple and/or hazelnut.

Mechanical treatment and prescribed burning in the proposed project area falls within five watersheds due to activities primarily occurring along ridgetops. Included in this analysis are the Clear Creek (2869 acres – 1801 FS and 1068 private acres), Dogtown Creek (6835 acres – 6233 FS acres and 602 private acres), Lower Lower Middle Fork Cosumnes (2513 acres – 1175 FS acres and 1338 private acres), Lower Steely Fork Cosumnes River (6966 acres – 2005 FS acres and 4961 private acres) and Upper Steely Fork Cosumnes River watersheds (7029 acres – 6860 FS acres and 169 private acres). Elevation ranges from approximately 3,200 feet to 5,000 feet above sea level. The project units occur within the legal location of T.9N., R13E., sections 15, 16, 19-22, 29 and 30, primarily in portions of Lower Steely and Clear Creek watersheds.

Due to the complexity of the five watersheds intermingled with private land (residences, private timber) only the project area is used for indirect and direct effects analysis for this document; however, cumulative effects will be addressed as part of the larger landscape. Habitat capabilities for all of the species analyzed in this report were taken from Verner and Boss (1980) and Ziener et al. (1990).

MULE DEER

The analysis area for the proposed project falls within the range of the Grizzly Flat Deer Herd. No identified critical fawning habitat was mapped by California Department of Fish and Game (CDFG) for this herd. Habitat falling under winter and summer range as well as transition range is shown for the deer herd across their range in the following table (USDA 2003d). Transition range is comprised of intermediate range, migration corridors, and holding areas. Intermediate range occurs between winter and summer ranges, whereas holding areas are locations where large numbers of deer gather and “hold” up prior to migrating to either winter or summer range.

Grizzly Flat Deer Herd Range Acres

Location	Winter	Summer	Intermediate	Total
Acres	101,600	131,500	99,500	332,600
% of Total	30%	40%	30%	100%

A breakdown of herd range acreage across land ownership was completed for the Grizzly Flat Deer Herd Plan and is shown in the table below (CDFG 1983).

Grizzly Flat Deer Herd Range Acres Land Ownership

Ownership	Total	% of Total Range Acres
Forest Service	219,300	66%
BLM	1,000	1%
Private	113,300	34%

The Placerville Ranger District manages the herd and its habitat under the Eldorado National Forest Land and Resource Management Plan (ENF 1989) and the Grizzly Flat Deer Herd Management Plan (CDFG 1983). These plans have identified specific management strategies to provide for a viable mule deer population on the Forest. Strategies include the identification of winter and summer ranges, fawning areas, and migration corridors in addition to recommendations for vegetation management that emphasize suitable forage and cover components.

In a 1998 Report to the Fish and Game Commission, deer populations in California were estimated by Deer Assessment Units (DAUs). Deer populations in California peaked in the late 1950's to 1960's but are now at a lower level due largely to long-term declines in habitat quality throughout the state. It is believed deer populations have been increasing in D9 and the south central coast, and stable in D1, D7, D8 and D10.

Declines have occurred in northeastern Sierra and the eastside Sierra. The sharpest declines are in northeastern California (CDFG 1998). The central Sierra is comprised of DAUs D3, D4, D5, and D6, with D5 overlapping the Last Chance Project area. All of these DUAs have been experiencing population declines as well. Deer populations in D5 were estimated to have been at 120,000 in 1990, and since have declined to between 50,000 and 90,000 in 1996 primarily due to habitat decline.

The main habitat issues affecting deer within DAU D5, including the Eldorado National Forest, include forestry practices, lack of habitat disturbance that favors early successional communities, and over utilization of livestock on key summer range habitats. The limited use of fire to create early successional habitat, and the use of herbicides and tree planting on burned areas following fire, are also important factors affecting deer populations within D5 (CDFG 1998). Localized factors affecting the Grizzly Flat deer population include urbanization and loss of winter range, especially critical winter grounds due to development and increase in agricultural activities primarily conversion to vineyards. An increase in the human population also has increased traffic flow resulting in direct mortality through vehicle collision particularly during summer and winter migration. Chronic wasting disease has not been identified as a management concern for this herd as of this date. Livestock grazing allotments have been inactive on Forest land within the watersheds and currently do not provide competition with deer for available forage. Livestock compete for forage in rural areas on private pastureland, primarily in the winter range.

The Last Chance Fuels Reduction Project overlaps both critical and basic winter range for the Grizzly Flat deer herd as well as transitional range, including holding areas, intermediate range and migration corridors. Due to the low elevation, summer and critical summer range occur outside the project analysis area.

Hardwoods often provide high quality forage for deer (acorn mast) and provide thermal cover to protect deer from temperature extremes during summer and winter. In addition to acorn mast, forbs and young shrubs also provide high quality forage. The Eldorado LRMP makes specific recommendations for providing at least 10 square feet of hardwoods per acre where suitable site conditions exist within deer range, transitional range, and migration corridors. Analysis for critical winter range habitat capability is the same as for winter range. The primary difference is

that hardwood management requirements are different for critical winter range. Within critical winter range, 15 to 20 percent of the area on slopes and ridgetops should be stocked with oaks older than 80 years; crown cover should be 70 percent, and basal area should be 36 square feet per acre. Within a migration corridor, hardwoods should be managed with 20% of the area >80 years old and 80% of the area <80 years old. In holding areas, hardwoods should be managed with openings ¼ to 1 acre in size; 70% of the area should be >80 years and 30% of the area should be <80 years (USDA 1989).

Deer require two types of cover within their seasonal ranges: thermal cover and hiding cover. Depending on a site's vegetative structure, some areas may provide for both types of cover, while other areas may provide only one type. Thermal cover is typically comprised of a dense young to mature overstory (M3N, M3G, M4N, and M4G timber strata), although landscape geography will also influence the quality of the thermal insulation. Hiding cover is vegetation that provides cover from terrestrial predators. Examples of hiding cover include thickets of young conifers, dense riparian vegetation, and high brush fields. Hiding cover can be especially important near browse and fawning areas.

The quality of habitat in transitional range is often influenced by the proximity to water sources at any given location and the average escape cover patch (a good indicator of how much edge is present). Habitat requirements for winter range are similar to those for summer/transitional range; the primary differences being that higher cover to forage ratios are required in winter, and road density replaces distance to water as a factor for determining suitability.

The capability ranges for each of the suitability factors (cover to forage ratio, the average distance to water, road density, and the average escape cover patch size) have been summarized below for winter and transitional ranges.

Habitat Capability Factors for Mule Deer within Winter Range

Factor	High Capability	Medium Capability	Low Capability
Escape cover patch size	40 acres	30-50 acres	<30 or>50 acres
Cover:Forage ratio	55:45 to 65:35	35:65 to 54:46 or 66:34 to 90:10	Remainder
Road densities	0-2.5 mi/sq.	2.5-3 mi/sq	3.0+ mi/sq

Habitat Capability Factors for Mule Deer within Transition (Intermediate) Range

Factor	High Capability	Medium Capability	Low Capability
Distance to water	<.5 miles	0.5-0.8 miles	>0.8 miles
Escape patch cover size	40 acres	30-50 acres	<30 and >50 acres
Cover:Forage ratio	50/50	20/80 to 75/25	Remainder

The above factors have been analyzed for each of the affected watersheds to come up with an overall capability rating for each watershed for mule deer. This information has been summarized in the tables below.

Mule Deer Habitat Capability within Affected Watersheds

Proposed treatment units in the Last Chance Project Area overlap five watersheds. The units fall within both critical and winter range. Critical and basic winter range were combined in the following tables due to similarity in elements for determining habitat capability. No units fall within summer or transition range with the exception of under five acres in the Clear Creek Watershed (transition).

Clear Creek Watershed (Winter Range)

Factor	Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	Patch size is 3 acres
Cover:Forage ratio	Medium	Ratio is 88:12
Road densities	Low	Average road density is 4.24 mi/sq

Based on the analysis conducted above, the Clear Creek watershed was categorized as low habitat capability for mule deer in winter range.

Clear Creek Watershed (Transition Range)

Factor	*Capability Rating*	*Determining Factor for Rating*
Escape patch cover size	*Medium*	*20/80 to 75/25*
Cover:Forage ratio	*Low*	*<30 and >50 acres*
Distance to water	*Low*	*>0.8 miles*

Based on the analysis conducted above, the Clear Creek watershed was categorized as low habitat capability for mule deer in transitional range.
Rating is also low due to the small amount of transition range in the watershed.

Dogtown Creek Watershed (Winter Range)

Factor	Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	Average patch size is 7 acres
Cover:Forage ratio	Medium	Average ratio is 78:22
Road densities	Low	Average road density is 3.66 mi/sq

Based on the analysis conducted above, the Dogtown Creek watershed was categorized as low habitat capability for mule deer in winter range.

Dogtown Creek Watershed (Transition Range)

Factor	Capability Rating	Determining Factor for Rating
Escape patch cover size	Low	Patch size is currently at 7 acres
Cover:Forage ratio	Low	Ratio is currently at 78:22
Distance to water	High	Average distance to water is <.5 mile

Based on the analysis conducted above, the Dogtown Creek watershed was categorized as medium habitat capability for mule deer in transitional range.

Lower Lower Middle Fork Watershed (Winter Range)

Factor	Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	Patch size was at 6 acres
Cover:Forage ratio	Medium	Ratio was at 53:47
Road Densities	Low	Average road density was 3.56 mi/sq

Based on the analysis conducted above, Lower Lower Middle Fork watershed was categorized as low habitat capability for mule deer in winter range.

Lower Steely Watershed (Winter Range)

Factor	Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	<30 or>50 acres
Cover:Forage ratio	Low	Remainder
Road densities	Low	3.0+ mi/sq

Based on the analysis conducted above, the Lower Steely watershed was categorized as low habitat capability for mule deer in winter range.

This watershed is primarily private land contributing to the low capability rating for this watershed.

Upper Steely Fork Watershed (Winter Range)

Factor	Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	Average patch size was 7 acres
Cover:Forage Ratio	Medium	Average is 83:17
Road Densities	Low	5.02 mi/sq

Based on the analysis conducted above, the Upper Steely Fork watershed was categorized as medium habitat capability for mule deer in winter range.

Upper Steely Fork Watershed (Transition Range)

Factor	Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	Average patch size is 7 acres
Cover:Forage Ratio	Low	Average ratio is 83:17
Distance to Water	High	Average distance to water is .3 miles

Based on the analysis conducted above, the Upper Steely Fork watershed was categorized as medium habitat capability for mule deer in transitional range.

BLACK BEAR

The Placerville Ranger District manages black bear and their habitat under the Eldorado National Forest Land and Resource Management Plan (USDA 1989) and the Black Bear Management Plan (CDFG 1998). These plans have identified specific management strategies to provide for a viable black bear population in the state and on the Forest. The Black Bear Management Plan (1998) estimates that statewide the black bear population is between 17,000 and 23,000, with 38% of the population inhabiting the Sierra Nevada mountains where populations are less dense, averaging between 0.5 and 1.0 bears per square mile. This habitat in the Sierras can be categorized as high (17%), medium (16%) and low (5%) depending on the habitat attributes available in a particular landscape.

Four attributes are used in determining habitat capability for black bear: road density, average distance to water, and the relative abundance of large diameter logs. Mixed conifer and montane hardwood support higher bear numbers from the food, cover, and water they provide versus that of other habitat types. Preferred vegetation types vary with the season as the habitat needs of black bear change. Though bears occupy a range of habitats, they are densest in forested areas with a variety of seral stages. Diversity in both horizontal and vertical structure and vegetation

types provide a variety of food sources, enabling greater survival of bears, especially reproductive success of females (CDFG 1998).

High road densities adversely affect black bear movement by creating openings in cover areas and increasing hunter access. Large diameter logs are used by black bear for denning, and in some cases, foraging (grubs, ants, bees, and fungi). The capability ranges for each factor for black bear are summarized below. Specific surveys for down logs were not conducted over all watersheds but in selected areas as part of the past 1998 Ridgerunner Forest Health Project. Averages for these surveys are used as reference points for each of the watersheds in the table below.

Habitat Capability Factors for Black Bear

Factor	High Capability	Medium Capability	Low Capability
Winter vegetation	Conifer, north slope	Conifer/oak mix	Oak/brush
Spring vegetation	Meadow/riparian with conifer edge	Conifer/oak with grass understory	Brushfields with hardwoods
Summer vegetation	Meadow/riparian within conifer	Conifer/brush	Oak/grassland with brush
Fall vegetation	Mixed conifer with manzanita/oaks/huckleberry	Mixed conifer w/riparian/brush	Brushfields
Road density	<0.5 mile per square mile	0.5-5.0 miles per square mile	>5.0 miles per square mile
Distance to open water	<0.25 mile	.25-.5 mile	>0.5 mile
Downed log densities	15-30 logs per acre >20” diameter	10-20 logs per acre, 20” diameter	<10 logs per acre >20” diameter

Based on an aerial photo analysis, GIS, and field verification, the affected watersheds contain the following capabilities for each of the habitat factors.

Black Bear Habitat Capability within Affected Watersheds

Clear Creek Watershed

Factor	Capability Rating	Determining Factor for Rating
Winter vegetation	High	Mixed conifer, north slope abundant
Spring vegetation	High	Riparian with conifer edge abundant
Summer vegetation	High	Riparian/conifer edge abundant
Fall vegetation	High	Mixed conifer/shrubs abundant
Road density	Medium	4.24 mi/sq
Distance to open water	High	<.25 mile
Downed log densities	Low	<10 logs per acre >20” dbh

Based on the above analysis, the Clear Creek watershed was categorized as high habitat capability for black bear.

Dogtown Creek Watershed

Factor	Capability Rating	Determining Factor for Rating
Winter vegetation	High	North slope, mixed conifer
Spring vegetation	High	Riparian with conifer
Summer vegetation	High	Riparian with conifer
Fall vegetation	Medium	Conifer/shrubs
Road density	Medium	3.66 mi/sq
Distance to open water	High	Average is <.25 mile
Downed log densities	Low	<10 logs per acre >20" dbh

Based on the above analysis, the Dogtown Creek watershed was categorized as high habitat capability for black bear.

Lower Lower Middle Fork Watershed

Factor	Capability Rating	Determining Factor for Rating
Winter vegetation	High	Conifer, north slopes
Spring vegetation	High	Riparian with conifer edge
Summer vegetation	High	Riparian/conifer
Fall vegetation	High	Mixed conifer/shrubs
Road density	Medium	3.56 mi/sq
Distance to open water	High	Average is 0.2 mile
Downed log densities	Low	<10 logs per acre > 20" in diameter

Based on the above analysis, the Lower Lower Middle Fork watershed was categorized as high habitat capability for black bear.

Lower Steely Watershed

Factor	Capability Rating	Determining Factor for Rating
Winter vegetation	High	Conifer, north slopes
Spring vegetation	High	Riparian with conifer edge
Summer vegetation	High	Riparian with conifer edge
Fall vegetation	Medium	Mixed conifer/brushfields
Road density	Low	5.13 mi/sq
Distance to open water	High	Average is .2 miles
Downed log densities	Low	2.5 logs per acre >20" dbh

Based on the above analysis, the Lower Steely watershed was categorized as medium habitat capability for black bear.

Upper Steely Fork Watershed

Factor	Capability Rating	Determining Factor for Rating
Winter vegetation	High	Conifer, north slopes
Spring vegetation	High	Riparian with conifer edge
Summer vegetation	High	Riparian/conifer
Fall vegetation	Medium	Conifer/shrubs
Road density	Medium	5.02 mi/sq.
Distance to open water	High	>0.5 mile
Downed log densities	Low	2.5 logs per acre >20" dbh

Based on the above analysis, the Upper Steely Fork watershed was categorized as high habitat capability for black bear.

MOUNTAIN QUAIL

Habitat attributes important to mountain quail include early to mid seral stages within preferred vegetation types, the average distance to water, and the presence of brush fields and oak stands. Brush fields provide mountain quail with both nesting and foraging habitat. Mountain quail prefer brushfields that are in a mosaic pattern, as they provide forage in openings and cover in vegetation. Oak mast is an important food item for quail, especially in the fall and winter. Factors that can decrease habitat capability include excessive grazing by livestock and continuous patches of a single vegetation type (i.e., a lack of edge).

Habitat Capability Factors for Mountain Quail

Factor	High Capability	Medium Capability	Low Capability
Vegetation	Young stands of mixed conifer/pine/oak	Young stands of red fir/lodgepole	Mature stands of oak/mixed conifer/pine
Average distance to Water	Less than .25 mile	Between .25 and .5 mile	Greater than .5 mile
Brushfields	Brush fields with 10 to 30 foot openings	Brush fields with 5-10 or 30-100 foot openings	Brush fields with <5 or >100 foot openings
Oaks	At least 10 square feet per acre	Densities between 5 and 10 square feet per acre	Less than 5 square feet per acre

The capability of habitat factors within the analysis area have been summarized below.

Mountain Quail Habitat Capability within Affected Watersheds

Clear Creek Watershed

Factor	Capability Rating	Determining Factor for Rating
Vegetation	Medium	Mature stands of conifer/oak abundant as is brush/oak
Average distance to water	High	<.5 mile
Brushfields	Medium	Between 5-10 feet openings or 30-100 feet openings
Oaks	Medium	Densities are between 5-10 square feet per acre

Based on the above analysis, the Clear Creek watershed currently was categorized as medium habitat capability for mountain quail.

Dogtown Creek Watershed

Factor	Capability Rating	Determining Factor for Rating
Vegetation	Low	Mature stands of conifer/oak
Average distance to water	High	<.5 mile
Brushfields	Medium	Between 5-10 feet openings or 30-100 feet openings
Oaks	Medium	Densities are between 5-10 square feet per acre

Based on the above analysis, the Dogtown Creek watershed currently was categorized as medium habitat capability for mountain quail.

Lower Lower Middle Fork Watershed

Factor	Capability Rating	Determining Factor for Rating
Vegetation	Low	Mature stands of conifer/oak
Average distance to water	High	.2 mile
Brushfields	Medium	Gaps between 5-10 feet openings or 30-100 feet openings
Oaks	Medium	Densities are between 5-10 square feet per acre

Based on the above analysis, the Lower Lower Middle Fork watershed was categorized as medium habitat capability for mountain quail.

Lower Steely Watershed

Factor	Capability Rating	Determining Factor for Rating
Vegetation	High	Young stands of conifer/oak abundant
Average distance to water	High	.2 miles
Brushfields	High	Between 5-10 feet openings or 30-100 feet openings
Oaks	Medium	Densities between 5-10 square feet per acre

Based on the above analysis, the Lower Steely watershed currently was categorized as medium habitat capability for mountain quail.

Upper Steely Fork Watershed

Factor	Capability Rating	Determining Factor for Rating
Vegetation	High	Young stands of conifer/oak abundant
Average Distance to Water	High	.2 miles
Brushfields	High	Between 5-10 feet openings or 30-100 feet openings
Oaks	Medium	Densities between 5-10 square feet per acre

Based on the above analysis, the Upper Steely Fork watershed was categorized as high habitat capability for mountain quail.

CAVITY NESTING BIRDS

The most important habitat attribute for these indicator species (pileated woodpecker, mountain bluebird, mountain chickadee, and red-breasted nuthatch) is overall snag densities within suitable habitat types (Sierran mixed conifer, ponderosa pine, black oak woodland, red fir, and lodgepole pine mix). Snags are used by cavity nesting birds for nesting and in some cases foraging (especially for woodpecker species). Hard snags (class III) are preferred by most cavity nesting birds as they provide better cavities for nesting than those found in softer snags.

Habitat Capability Factors for Cavity Nesting Birds

Factor	High Capability	Medium Capability	Low Capability
Snag density	>5 per acre (>15 inches dbh)	5 to 1.5 per acre (>15 inches dbh)	<1.5 per acre (>15 inches dbh)
Predominant snag stage*	Class III snags	Class IV-V snags	Class VI snags

**Snag stage definitions were taken from Thomas (1979).*

Based on stand exam and snag surveys the affected watersheds have the following attributes:

Clear Creek Watershed

Factor	Capability Rating	Determining Factor for Rating
Snag density	Medium	1.7
Predominant snag stage*	High	Class II and III

Based on the above analysis, the Clear Creek watershed was categorized as medium habitat capability for cavity nesting birds.

Dogtown Creek Watershed

Factor	Capability Rating	Determining Factor for Rating
Snag density	Low	*1.7*
Predominant snag stage*	High	*Class II and III*

Based on the above analysis, the Dogtown Creek watershed was categorized as medium habitat capability for cavity nesting birds.

Lower Lower Middle Fork Watershed

Factor	Capability Rating	Determining Factor for Rating
Snag density	Medium	1.7
Predominant snag stage*	High	Class II and III

Based on the above analysis, the Lower Lower Middle Fork watershed was categorized as medium habitat capability for cavity nesting birds.

Lower Steely Watershed

Factor	Capability Rating	Determining Factor for Rating
Snag density	Medium	1.7 per acre
Predominant snag stage*	High	Class II and III

Based on the above analysis, the Lower Steely watershed was categorized as medium habitat capability for cavity nesting birds.

Upper Steely Fork Watershed

Factor	Capability Rating	Determining Factor for Rating
Snag density	Medium	1.7
Predominant snag stage*	High	Class II and III

Based on the above analysis, the Upper Steely Fork watershed was categorized as medium habitat capability for cavity nesting birds.

TROUT

The Eldorado National Forest Land and Resource Management Plan (USDA 1989) designates aquatic management indicator species as being all species of trout. Both rainbow and brown trout live in the project streams as determined from past surveys (Table 1). The perennial streams below the project units with trout are Clear Creek, Dogtown Creek, and Steely Fork Cosumnes River. There are approximately 4.5 miles of perennial streams that have trout with project activities nearby; all units on perennial streams have 300-foot RCA buffers. The units above Dogtown Creek are in the upper part of the ephemeral drainages, much greater than 300 feet from the perennial stream where trout reside. Rainbow trout have historically been moved, transplanted, and stocked in many streams and lakes of the Sierra Nevada throughout the 20th century. Although many streams have naturally reproducing trout, it is unknown to what extent the existing naturally reproducing trout are of native genetic stock, unaffected by hatchery introductions. The Sierra Nevada Forest Plan Amendment Record of Decision (2001) emphasizes native species, such as rainbow trout, for primary consideration with management activities.

Populations in the creeks and rivers appeared to be healthy at the time of the surveys. Dogtown Creek was especially noted as being a high quality fishery for trout.

Table 1. Past fish surveys in perennial streams in the project area

Stream Name	Year of Survey	Fish observed
Steely Fork Cosumnes River	1974 - USFS (Somes/Vath)	Rainbow and brown trout
Clear Creek	1979 – USFS (Henry) 1993 – USFS (Johnson)	Brown trout
Dogtown Creek	1974 – USFS (Somes/Vath) 1993 – USFS (Gecy)	Rainbow and brown trout

V. Effects of Project Alternatives

MULE DEER

Direct, Indirect and, Cumulative Effects – No Action

No direct or indirect effects to mule deer from project activities would occur under this alternative. Cumulative effects through the continued buildup of fuels and the succession of preferred habitats, would continue to occur under this alternative. Habitat capability wouldn't improve under this alternative as brush fields and oaks will not be rejuvenated by prescribed fire. Current conditions, in which shade-intolerant species are making up the understory, will continue at the expense of oak regeneration and openings for forb and shrub establishment that would be provided by thinning and burning under the alternative.

Past and future projects involving habitat alteration as well as acres treated per watershed are shown in the Appendix - Cumulative Effects for the Last Chance Fuels Reduction Project.

Areas along roads and ridgetops are experiencing black oak declines. Existing black oaks will continue to be reduced through both legal and illegal woodcutting. Opportunities to move watersheds to a higher capability rating for deer by improving oak stands and brush will not occur. Closure of roads will not be addressed under this alternative and therefore areas will still be accessible for oak removal. Road density has continued to decrease in the watersheds through decommissioning or closures and have contributed to an improvement for this component in

regards to deer winter and transition range. At this time, past closures have not been significant enough to alter currently average road densities, though will aid with future work under any potential projects that may evolve in future planning. An increase in unauthorized Off-highway vehicle (OHV) trails will increase disturbance to deer in the area as well as increase potential poaching pressures on the species. This situation is evident along ridgetops in which increased illegal OHV activities continue, including unauthorized OHV trail density within watersheds. These activities disturb deer and degrade wintering habitat.

Current habitat capabilities can be expected to decline under this alternative based on increased public need for wood products for heating their homes, and illegal wood theft that targets both small and large black oak. Potential loss of stands from fire (loss of security cover), competition with conifers, increased decadence of brushfields, a decrease in mast, and an ongoing increase in road or trail density will also contribute to the decline of habitat under this alternative. Several of these factors were mentioned previously under existing conditions for DUA 5. It can be assumed that lack of treatment to reverse habitat decline will not improve current population levels for the Grizzly Flat deer herd within DUA 5. The alternative will not affect viability nor lead to a trend towards listing due to the small acreage of the area in the project in relation to the herd's overall range. In addition, treatments to improve deer habitat across the watersheds are planned or ongoing as shown in the appendix and will aid in improving habitat quality across winter and transition range.

Direct and Indirect and Cumulative Effects – Proposed Action

Mule deer will be temporarily displaced from portions of the sale area during the project, primarily during harvest and prescribed burning activities. Displaced mule deer are more prone to predation and reduced vigor. The greatest time of disturbance would be during October through April, when deer are on their wintering grounds and relying on fat reserves for winter survival. The limited operating period (LOP) from October 1 through April 30, as needed depending on current seasonal weather conditions, will reduce disturbance to deer on their winter range (especially critical winter range) from project activities, under the proposed alternative. An exception to this LOP (March 31 versus April 30) will be for the west end of the project area to accommodate burning conditions to treat decadent brush fields, to create browseways, improve forage and move towards improving the winter habitat capability rating for these watersheds for deer. If adverse winter conditions, during the year(s) of the planned burn(s) cause deer to remain in these areas past March 31, the LOP timeframe will be re-evaluated by the wildlife biologist to assess if the standard LOP is needed to avoid disturbance to deer. The same holds true in releasing the LOP or shortening it should weather conditions enable deer to migrate early to their transition and/or summer range.

Though late-seral stands provide thermal cover, they contain limited available forage. An emphasis on late-seral habitat as well as fire suppression has resulted in the succession of early-seral habitat, the decadence of existing brushfields, and decreased oak woodlands through competition with conifers. An area important to the Grizzly Flat deer herd, characteristic of this is Plummer Ridge between 4,500 and 6,500 feet (CDFG 1983). This alternative will provide openings through thinning and understory burning along ridgetops especially in areas of overlap with the defense and threat zones, enabling an increase in shrubs, forbs and black oak production. Prescribed burning will also contribute to this as well as rejuvenating decadent and dense brushfields, especially in areas not slated for mechanical treatment. An increase in forage on wintering grounds will also increase the chances of herd survival, especially that of fawns. A decrease in fawn survival across the Sierras, can be contributed in part to lack of quality forage on wintering grounds (CDFG 1998).

Benefits from thinning and burning as described for the winter range, will also occur on the transition range. The transition range is important during mild winters by helping to relieve pressure and length of stay on smaller winter ranges. In the spring it provides good quality forbs and browse of high nutritional value important for pregnant does following concentration on winter areas. Increased forage on transitional ranges, especially migration corridors and holding areas, will help increase the probability of survival for first year fawns, pregnant does and their new offspring for the season. Burning of decadent brushfields will also improve patch size by increasing edge within the fields.

Mastication of brushfields and young stands will reduce forage in the short term, however, the majority of brush being treated is decadent and provides limited forage value. If masticated vegetation is left as a layer on the forest floor, it has the potential to impact forage in the long term by preventing new forage from establishing. It is estimated that a one foot layer of material may take 30 years to decompose dependent on the shrub species (Grimm 2002). Material that is piled and burned will enable forage to return within a year by opening up the forest floor and removing competing vegetation.

The prescriptions under this alternative provide a beneficial effect on mule deer within the watersheds entered. Increases in habitat capability will primarily come from altering the brush component in dense brushfields and within the understory of harvest units. The current patch size will be enhanced through created browseways, edges and openings which will increase this factor in the short term.

Many important browse species used by deer either resprout or reseed following a fire. Fire suppression has resulted in a high percentage of browse species becoming decadent and/or suppressed by overstory conifers. In these areas, browse has become limited and/or declining in nutrient value, resulting in reduced carrying capacity in the area for deer. This has become evident throughout the analysis area, especially along the ridgetops and in the wildland urban interface by having the average escape cover patch size decrease, there will be a beneficial effect on the deer herd by reducing the amount of distance needed to access suitable forage areas outside of cover patches. The thinning of stands to less canopy will alter the cover:forage ratio to improve forage in the understory and in brushfields to a more favorable balance of cover:forage ratio. Effects of an increased forage base will generally last 10 to 25 years in harvest units. Small openings which are not replanted will be able to support forage species substantially longer than this, especially in oak is allowed to establish itself in the clearings.

The changes in cover are offset by an increase in forage on the wintering range. An increase in diameter of existing oaks as well as the recruitment of new oaks will provide an increase in both canopy and forage from the oak component in both the harvest and burn units. It is estimated that habitat capability will increase because of these factors in the analysis area.

Historic management activities in the analysis area have degraded mule deer habitat, largely through the suppression of fire. Management preferences towards late-seral habitat have resulted in “old growth” habitat in key deer ranges resulting in limited forage for deer. In addition, encroachment of conifers in oak stands, brushfields and openings to the benefit of late-seral species has adversely impacted deer forage.

Brushfields that exist on poor sites, plantations, and other openings are decadent, uniform and are limited in size diversity and openings for browseways. This density also inhibits new growth of young shrubs, forbs and grass that are utilized as forage by deer. Planned prescribed burns will target dense and decadent brushfields which will aid in creating browseways and rejuvenating shrubs and forbs.

An increase in fuelwood use and collection has put increasing pressure on the existing oak component in the analysis area. Areas easily accessible from roads have experienced the loss of both small live and dead oak from legal woodcutters (often mistake dormant oak as dead) and the loss of large diameter mast producing oak from illegal woodcutting activities in favor of conifer species. These activities, especially in the 4,000 to 5,000 foot elevation range, adversely affect mast production, an important forage item for deer. Planned road closures will aid in reducing illegal human take of oak.

Road systems have increased road access to the winter range, increasing recreational use by the public. This has resulted in increased levels of road kills, increased disturbance levels in winter range and an increased potential for illegal kill (poaching) both in and out of the hunting season. Additional recreation activities such as camping, shooting, illegal off highway vehicle use and dumpsites have also resulted in disturbance factors and displacement of deer. The potential loss of security screening along main roads for public visual enhancement may result in increased disturbance for deer as well as illegal take.

Current habitat capabilities can be expected to increase under this alternative based on reduction of potential loss of stands from fire (loss of security cover), reduction of competition with conifers, increased nutritional content of brushfields, increase in mast, and an ongoing decrease in road or trail density. Several of these factors were mentioned previously under existing conditions for DUA 5. It can be assumed that lack of treatment to reverse habitat decline will not improve current population levels for deer herd within this DUA, primarily the Grizzly Flat Deer Herd. It will not however, affect viability nor lead to a trend towards listing due to the small acreage of the area in the project in relation to the herd's overall range. In addition, treatments to improve deer habitat across the watersheds are planned or ongoing as shown in the appendix.

Clear Creek Watershed (Winter Range)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	Low	~198 acres treated
Cover:Forage ratio	Medium	Medium	~198 acres treated
Road densities	Low	Low	No significant change

Based on the analysis conducted above for the Clear Creek watershed, the watershed will maintain low habitat capability for mule deer in winter range, primarily based on the small acreage treated. This acreage will aid in enhancing current conditions for deer however, and will aid with potential future efforts in increasing habitat capability in the watershed.

Clear Creek Watershed (Transition Range)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Distance to water	Medium	Medium	No change
Escape cover patch size	Low	Low	<5 acres treated
Cover:Forage Ratio	Low	Low	<5 acres treated

Based on the analysis conducted above for the Clear Creek watershed, the watershed would maintain low habitat capability for mule deer in transition range based on the small acreage treated in the project.

Dogtown Creek Watershed (Winter Range)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	Low	23 acres treated
Cover:Forage ratio	Medium	Medium	23 acres treated
Road densities	Low	Low	No change

Based on the analysis conducted above for the Dogtown Creek watershed, the watershed would maintain low habitat capability for mule deer in winter range based on the small acreage treated in the project.

Dogtown Creek Watershed (Transition Range)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Distance to water	Low	Low	No change
Escape cover patch size	Low	Low	No treatment
Cover:Forage Ratio	High	High	No treatment

Based on the analysis conducted above for the Dogtown Creek watershed, the watershed would maintain low habitat capability for mule deer in transition range based on no treatment occurring within transition range.

Lower Lower Middle Fork Watershed (Winter Range)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	Low	49 acres treated
Cover:Forage Ratio	Medium	Medium	49 acres treated
Road Densities	Low	Low	No change

Based on the analysis conducted above for the Lower Lower Middle Fork watershed, the watershed will maintain low habitat capability for mule deer in winter range based on the small acreage treated in the project.

Lower Steely Watershed (Winter Range)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating*	Determining Factor for Rating
Escape cover patch size	Low	Low	Private land
Cover:Forage ratio	Low	Low	Private land
Road densities	Low	Low	Private land

Based on the analysis conducted above for the Lower Steely watershed, the watershed will maintain low habitat capability for mule deer in winter range primarily based on the large amount of private land within the watershed. Acreage within the watershed treated under the project however is expected to increase in all regards with planned road closures, thinning, burning and mastication. Approximately 1,391 acres will be treated within this portion of the watershed. Locally habitat capabilities will increase but on average the entire watershed will maintain a current rating of low.

Upper Steely Fork Watershed (Winter Range)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Escape cover patch size	Low	Low	108 acre treated
Cover:Forage ratio	Medium	Medium	108 acres treated
Road densities	Low	Low	No change

Based on the analysis conducted above for the Upper Steely Fork watershed, the watershed will maintain low habitat capability for deer in winter range due to the small acreage treated in the project.

Upper Steely Fork Watershed (Transition Range)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Distance to water	Low	Low	No treatment
Escape cover patch size	Low	Low	No treatment
Cover:Forage Ratio	High	High	No treatment

Based on the analysis conducted above for the Upper Steely Fork watershed, the watershed will maintain low capability habitat for deer in transition range.

BLACK BEAR

Direct, Indirect and Cumulative Effects – No Action

No direct or indirect effects to black bear from project activities would occur under this alternative. Cumulative effects through the continued buildup of fuels and increased risk to habitat loss due to stand replacing fires, as well as the succession of preferred habitats, would continue to occur. Habitat capability wouldn't increase under this alternative, as brush fields and oaks will not be rejuvenated by prescribed fire. Current conditions in which shade-intolerant species make up the understory will continue at the expense of oak regeneration. Openings for forb and shrub re-establishment that would be provided by thinning and burning under the action alternative would not occur at this time.

Reduced vigor of selected conifer species and black oak would continue due to thickets and an increase of shade-tolerant species (white fir and incense cedar). Reduced vigor delays growth and may limit the number of large diameter trees that exists in a stand and that serve as recruitment snags and in the case of oaks, mast production. These snags would then serve as recruitment down logs for denning habitat and foraging substrate for black bear. Existing snags, down logs, and black oak will continue to be reduced through both legal and illegal woodcutting. Increased use of roads by the public as well as creation of new unauthorized off highway vehicle trails will increase disturbance to bear in the area as well as increase potential poaching pressures on the species.

Lack of treatment in current plantations will delay and, in some cases (seedlings) prevent, growth of existing trees due to competition from brush and from overstocked stands. Effects would be similar to that described under reduced vigor. Current habitat capabilities can be expected to decline under this alternative based on increased public need for wood products for home heating and illegal wood theft that targets large diameter snags, logs and live black oaks. Potential loss of stands from fire, increased decadence of brushfields, decrease in mast, and a potential increase in road or trail density will also contribute to the decline of habitat under this alternative. Cumulative effects would be similar to those described for deer. It can be assumed that lack of treatment to reverse habitat decline will not improve current population levels for black bear within the project area. It will not however, affect viability nor lead to a trend towards listing due to the small acreage of the area in the project in relation to available habitat within the watersheds. In addition, treatments to improve black bear habitat across the watersheds are planned or ongoing as shown in the appendix.

Direct, Indirect, and Cumulative Effects – Proposed Action

Black bear would be temporarily displaced from portions of the sale area due to disturbance related to harvest and prescribed burning activities. Displaced bears are more prone to hunting pressure and competitive interactions with other black bears.

Manual treatments in the understory would improve habitat capability in the long-term by improving stand vigor, resulting in increased growth of existing trees. As a result faster recruitment of large diameter snags and down logs will occur, as well as black oak, resulting in improvements in both potential den and foraging sites. Removal of competing brush species as forage will be compensated in part by the release of oaks (oaks are not targeted for removal in the project area) and grasses in the understory. Prescribed burning will enable decadent brush to be rejuvenated and provide a food source for black bear in the form of berries.

Thinning prescription will follow Sierra Nevada Framework guidelines and no trees over 30” dbh will be harvested. Thinning and burning will aid in the recruitment of new oaks, shrubs and forbs, and increased vigor of existing brushfields by reducing conifer thickets and competition. This will increase the forage potential of the area for black bear.

Due to existing low levels of large dead trees, snags will not be intentionally dropped unless they pose a hazard to project activities. Down logs are not planned for removal but may be lost during prescribed burning or mastication efforts. Framework guidelines direct that in westside vegetation types, beginning with the largest down logs, sequentially retain pieces of down wood until at least 10 to 20 tons per acre. Do not retain pieces smaller than 12 inches diameter at midpoint to meet this standard (USDA 2001). When a decision between two down logs of comparable size is needed, first priority for retention will be for hollow logs. Both solid and hollow logs will attract carpenter ants, a food source for black bear on the forest, however, hollow logs enable bears and potential prey species to shelter, raise young, and/or cache food. Logs large enough to provide denning sites should be left in place if possible. Smaller diameter logs that could serve as a foraging substrate may be moved if necessary to another portion of the stand to enable equipment to maneuver through the area. This is not expected to alter foraging as the log will still be within the stand and still maintain its function unless it is completely crushed, which is not typical of thinning harvest operations. Down log loss during mastication efforts is expected to be low, however, flagging and avoiding logs as well as selected brush patches will enable retention of down woody material and can be considered during contract layout.

General effects from prescribed burning based on past observations from fuels treatment in similar vegetation are an increase in hard snags, decrease in soft snags, and a reduction in down woody debris. Live tree loss due to surface/ladder fuels interaction with upper canopy layers will result in the recruitment of some hard snags in the proposed project area. For detailed descriptions of fuels and anticipated fire activity refer to the fuels section in the Last Chance Fuels Reduction Project.

This recruitment of snags may come from tree mortality as a direct result of burning or indirectly from pathogens or other stress induced factors resulting from the burn. However, most snag recruitment generally occurs among the smaller diameter sizes and the less fire tolerant tree species such as white fir and incense cedar. Because they are less resistant to smoldering, soft snags may be consumed during the course of burning. The lack of snags in later decay classes may reduce the availability of shelter and forage for some species. Some of these snags may not be completely consumed by fire, but rather fall over and become downed logs. The extent of this effect will depend on individual site conditions.

The consumption levels of large down woody debris will be dependent on duff and large fuel moisture levels present at the time the project activities are implemented. Loss of large diameter logs will have an adverse effect on black bear due to the loss of down logs as dens and foraging substrate. Implementation of burning, primarily in the spring when moisture content is higher, will reduce the loss of down woody debris. Based on data collected in similar habitat types, white fir downed logs will be reduced the most, while pine and Douglas-fir logs the least. The retention of large cull logs (20” dbh by 10’ length) in down log deficit areas may help mitigate the potential

loss of existing logs in the area from prescribed burning and is recommended for this project in areas where it will not interfere with fuelbreak objectives.

Black bear habitat capability is expected to remain the same based on existing road density and human disturbance levels (including wood cutting of logs, snags and oaks). Though levels of forage may increase in the short term and potential increases in large diameter snags and down logs in the long term, it will not be enough to raise the habitat capability ratings for the watersheds. Cumulative effects in terms of degradation of habitat, including road density, conifer removal, forage increase and activities on private land have similar effects to black bear as mentioned for mule deer under this alternative. It can be assumed that treatments to reverse habitat decline will improve current population levels for black bear within the project area. In addition, treatments to improve black bear habitat across the watersheds are planned or ongoing as shown in the appendix. The alternative will not affect viability nor lead to a trend towards listing due to beneficial effects of increased forage, road closures and reduction of stand replacing wildfires.

Clear Creek Watershed
(2869 acres – 1801 FS acres and 1068 Private acres)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Winter vegetation	High	High	198 acres treated
Spring vegetation	High	High	“ “
Summer vegetation	High	High	“ “
Fall vegetation	High	High	“ “
Downed log densities	Low	Low	“ “
Road density	Medium	Medium	No significant change
Distance to open water	High	High	No change

Based on the above analysis for the Clear Creek watershed, the watershed will maintain high capability habitat for black bear based on the small acreage treated.

Dogtown Creek Watershed
(6835 acres – 6233 FS acres and 602 Private acres)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Winter vegetation	High	High	23 acres treated
Spring vegetation	High	High	“ “
Summer vegetation	High	High	“ “
Fall vegetation	Medium	Medium	“ “
Downed log densities	Low	Low	“ “
Road density	Medium	Medium	No change
Distance to open water	High	High	No change

Based on the above analysis for the Dogtown Creek watershed, the watershed will maintain high capability habitat for black bear based on the small acreage treated.

Lower Lower Middle Fork Watershed
(2513 acres – 1175 FS acres and 1338 Private acres)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Winter vegetation	High	High	49 acres treated
Spring vegetation	High	High	“ “
Summer vegetation	High	High	“ “
Fall vegetation	High	High	“ “
Downed log densities	Low	Low	“ “
Road density	Medium	Medium	No change
Distance to open water	High	High	No change

Based on the above analysis for the Lower Lower Middle Fork watershed, the watershed will maintain high capability habitat for black bear based on the small acreage treated.

Lower Steely Watershed
(6966 acres – 2005 FS acres and 4961 Private acres)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Winter vegetation	High	High	Private land
Spring vegetation	High	High	“ “
Summer vegetation	High	High	“ “
Fall vegetation	Medium	Medium	“ “
Downed log densities	Low	Low	“ “
Road density	Low	Low	“ “
Distance to open water	High	High	No change

Based on the above analysis for the Lower Steely watershed, the watershed will maintain high capability habitat for black bear based on the large percentage of private land in the watershed. Within the project, approximately 1,391 acres will be enhanced through forage production and future large diameter trees.

Upper Steely Fork Watershed
(7029 acres – 6860 FS acres and 169 Private acres)

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Winter vegetation	High	High	108 acres treated
Spring vegetation	High	High	“ “
Summer vegetation	High	High	“ “
Fall vegetation	Medium	Medium	“ “
Downed log densities	Low	Low	“ “
Road density	Medium	Medium	No change
Distance to open water	High	High	No change

Based on the above analysis for the Upper Steely Fork watershed, the watershed will maintain high capability habitat for black bear, based on the small acreage treated in the project.

MOUNTAIN QUAIL

Direct, Indirect, and Cumulative Effects – No Action

No direct or indirect effects from project activities would occur under this alternative. Cumulative effects through the continued buildup of fuels and increased risk to habitat loss due to stand replacing fires, as well as the succession of preferred habitats, would continue to occur under this

alternative. Habitat capability wouldn't increase in harvest units as brush fields and oaks would not be rejuvenated by prescribed fire.

Current conditions in which shade intolerant species are making up the understory will continue at the expense of oak regeneration. Openings for forb and shrub establishment that would be provided by thinning and burning would not occur at this time. Current habitat capabilities would continue in the short term and decline in the long term if no other projects occur in the project areas that would benefit brush and oaks for mountain quail habitat. Cumulative effects as described for black bear and deer are applicable also for the mountain quail. Though habitat will not be treated, mountain quail will not have a reduction in population on a watershed level but may have adverse effects on a localized level. Regardless, it is unlikely this alternative will contribute to the population decline of the species or lead towards federal listing.

Direct, Indirect, and Cumulative Effects – Proposed Action

Mountain quail would be temporarily displaced from portions of the sale area due to disturbance related to harvest activities. Displaced quail are more prone to predation and reduced reproductive success. The adverse consequences of temporary displacement are small compared to the beneficial effects of increased foraging habitat quality. The effects of fire suppression in the project area have caused preferred habitats for the mountain quail to become decadent or succeed into later seral stages, reducing the amount of available forage. This alternative would increase the production of preferred forage species while lowering the risk of habitat loss through fire, by thinning out the understory, opening up the canopy and creating openings for shrub species to become established.

The removal of competing understory conifers through thinning will move stands into mature forest sooner, reducing the habitat capability for quail in these areas in the long term. In the short term, forage and cover in the form of brush and dense stands of young trees will be removed, reducing both forage and cover until these components return in these stands (3-5 years). Prescribed burning when applied in a mosaic pattern in brush fields will help maintain nesting habitat as well as increase both foraging habitat and additional nesting habitat in the project area. Repeat fire intervals will also help maintain or increase the quality of mountain quail habitat along ridgetops in the area. Increased vigor of black oak will increase forage for quail.

Current habitat conditions can be expected to increase under this alternative based on increased forage production from thinning and burning and increased protection and production of black oak. In the short term (post-treatment), the expected increase would not be substantial to raise the habitat capability. The increase in shrubs, seedlings and brush will provide enhanced foraging and shelter for quail in the area. This alternative will have short-term beneficial effect on mountain quail habitat capability in the watershed but not enough to increase the current habitat capability. Habitat capabilities in the next 5 to 15 years have the potential to reach high in the long term, from the opening up of canopies and the resulting rejuvenation of brush, forbs, grasses and increase in oaks. No oaks are planned for removal and loss of oak density from damaged trees should be minimal.

Effects to mountain quail are similar to that described for deer particularly in terms of habitat improvement. The adverse consequences of temporary displacement are slight compared to the beneficial effects of increased foraging habitat quality. Fire suppression and plantation management strategies in the analysis area has caused preferred habitats for mountain quail to become decadent or succeed into later seral stages, reducing the amount of available forage. This alternative will increase the production of preferred forage species. Restoration and decommissioning of roads will also enable forbs and other vegetation to occupy these areas, increasing forage in small openings. It can be assumed that treatments to reverse habitat decline will improve current population levels for mountain quail within the project area. In addition,

treatments to improve habitat across the watersheds are planned or ongoing as shown in the appendix. The alternative will not affect viability nor lead to a trend towards listing due to beneficial effects of increased forage, especially hardwoods, forbs and shrubs.

Clear Creek Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Vegetation	Medium	Medium	198 acres treated
Brushfields	Medium	Medium	“ “
Oaks	Medium	Medium	“ “
Average distance to water	High	High	No change

Based on the above analysis for the Clear Creek watershed, the watershed will maintain medium capability habitat for mountain quail based on the small acreage treated.

Dogtown Creek Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Vegetation	Low	Low	23 acres treated
Brushfields	Medium	Medium	“ “
Oaks	Medium	Medium	“ “
Average Distance to Water	High	High	No Change

Based on the above analysis for the Dogtown Creek watershed, the watershed will maintain medium capability habitat for mountain quail based on the small acreage treated.

Lower Lower Middle Fork Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Vegetation	Low	Low	49 acres treated
Brushfields	Medium	Medium	“ “
Oaks	Medium	Medium	“ “
Average Distance to Water	High	High	No change

Based on the above analysis for the Lower Lower Middle Fork Cosumnes watershed, the watershed will maintain medium capability habitat for mountain quail based on the small acreage treated.

Lower Steely Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Vegetation	High	Medium	Private land
Brushfields	High	High	“ “
Oaks	Medium	Medium	“ “
Average Distance to Water	High	High	No change

Based on the analysis conducted above for the Lower Steely watershed, the watershed will maintain high capability habitat capability mountain quail primarily based on the large amount of private land within the watershed. Acreage within the watershed treated under the project however is expected to increase in all regards with planned road closures, thinning, burning and mastication. Approximately 1,391 acres will be treated within this portion of the watershed. Locally habitat capabilities will increase but on average the entire watershed will maintain a current rating of low.

Upper Steely Fork Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Vegetation	High	High	108 acres treated
Brushfields	High	High	“ “
Oaks	Medium	Medium	“ “
Average distance to water	High	High	No change

Based on the above analysis for the Upper Steely watershed, the watershed will maintain high capability habitat for mountain quail based on the small acreage treated.

CAVITY NESTING BIRDS

Direct, Indirect, and Cumulative Effects – No Action

No direct or indirect effects would occur under this alternative. Cumulative effects through the continued build-up of fuels and increased risk to habitat loss due to stand replacing fires would continue to occur. Reduced vigor of selected conifer species and black oak would continue due to thickets and an increase of shade-tolerant species (white fir and incense cedar). Reduced vigor delays growth and may limit the number of large diameter trees that exists in a stand and that serve as recruitment snags for cavity nesting birds.

Cumulative effects to cavity nesting birds in terms of threats to snags and black oak are similar to that described for black bear and deer. Current habitat capabilities can be expected to decline under this alternative based on increased public need for wood products for heating their homes and illegal wood theft that targets large diameter snags, logs and live black oaks. It can be assumed that lack of treatment to reverse habitat decline will not improve current population levels for cavity nesters within the project area. It will not however, affect viability nor lead to a trend towards listing due to the small acreage of the area in the project in relation to available habitat within the watersheds. In addition, treatments to improve habitat across the watersheds are planned or ongoing as shown in the appendix.

Direct, Indirect, and Cumulative Effects – Proposed Action

Thinning prescriptions will follow Framework guidelines. No trees over 30” dbh will be harvested and snags will not be intentionally dropped unless they pose a hazard to safety or operations. Minimum snag retention is 15” dbh, the lower limit usually utilized by cavity dependent species. Thermal cover for snags should be maintained as primarily suppressed understory trees will be removed, leaving the overstory to still provide favorable microclimate conditions around individual snags. Thinning and burning objectives will also favor the retention of existing black oaks and recruitment of new oaks by reducing conifer thickets and competition. The increase in black oaks will provide alternate cavity sites for cavity dependent species. Cavities are provided through decay and branch snap-off. The larger oaks will also provide a substrate for cavities when they become snags. In the long term, snags will be created through increased vigor of the stands and the resultant recruitment of future large diameter snags and down logs.

For cavity nesting birds that glean insects off vegetation, there will be a short-term loss of forage in the immediate area from loss of shrub species and some decayed snags and logs from prescribed fire. However, opening of the stands and the development of new shrubs, grass and forbs will increase and diversify the insect prey in the area. In addition, some conifers will exhibit mortality from the prescribed burn and attract beetles and other wood boring insects that cavity nesters, primarily woodpeckers, chickadees and nuthatches forage on. In addition, adjoining habitat will continue to provide forage opportunities for cavity nesters within their home ranges.

Effects from prescribed burning to snags and downed logs are similar to those described previously for the black bear.

Snag levels currently contribute medium habitat capability for cavity nesters and even with protection of habitat elements during thinning and burning, it is not anticipated that numbers will increase or changes in such an amount to change it from existing capability in the short term due to the existing low levels of large snags, ongoing legal and illegal woodcutting of snags, and the continued maintenance of roads primarily removal of hazard trees. Cumulative effects to cavity nesting birds are similar to those described for the black bear in terms of impacts to snags and down logs. It can be assumed that treatments to reverse habitat decline will improve current population levels for cavity nesters within the project area. In addition, treatments to improve habitat across the watersheds are planned or ongoing as shown in the appendix. The alternative will not affect viability nor lead to a trend towards listing for cavity nesters due to beneficial effects of increased forage, road closures and reduction of stand replacing wildfires.

Cavity Nesting Birds Habitat Capability within Affected Watersheds

Clear Creek Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Snag density	Medium	Medium	198 acre treated
Predominant snag stage*	High	High	“ “

Based on the above analysis, the Clear Creek watershed will maintain medium habitat capability for cavity nesting birds based on the small amount of area treated in the watershed.

Dogtown Creek Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Snag density	Low	Low	23 acres treated
Predominant snag stage*	High	High	“ “

Based on the above analysis, the Dogtown Creek watershed will maintain medium habitat capability for cavity nesting birds based on the small amount of area treated in the watershed.

Lower Lower Middle Fork Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Snag Density	Medium	Medium	49 acres treated
Predominant Snag Stage*	High	High	“ “

Based on the above analysis, the Lower Lower Middle Fork watershed will maintain medium habitat capability for cavity nesting birds based on the small amount of area treated in the watershed.

Lower Steely Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Snag density	Medium	Medium	Private land
Predominant snag stage*	High	High	“ “

Based on the analysis conducted above for the Lower Steely watershed, the watershed will maintain medium habitat capability for cavity nesting birds primarily based on the large amount of private land

within the watershed. Acreage within the watershed treated under the project however is expected to increase in all regards with planned road closures, thinning, burning and mastication. Approximately 1,391 acres will be treated within this portion of the watershed. Locally habitat capabilities will increase but on average the entire watershed will maintain a current rating of low.

Upper Steely Fork Watershed

Factor	Pre-Project Capability Rating	Post-Project Capability Rating	Determining Factor for Rating
Snag Density	Medium	Medium	108 acres treated
Predominant Snag Stage*	High	High	" "

Based on the above analysis, the Lower Steely watershed will potentially have medium habitat capability for cavity nesting birds.

RAINBOW TROUT

Habitat quality by capability level for rainbow trout is further defined in USDA (1981) by the following factors: stream depth, stream width, water velocity, water temperature, percent stream shaded, riparian vegetation, instream cover, streambed sediments, pool/riffle ratio, spawning site availability, and channel stability. The aquatic insects category was omitted because the capability results would not accurately represent the condition of the stream.

Direct and Indirect Effects - No Action

There would be no direct or indirect impacts to rainbow and brown trout as a result of the no action alternative. The existing tree and shrub canopy would continue to provide native ground cover to prevent soil erosion. Trees would continue to grow at their present slower rate, with some being shaded and nourished by competing trees and shrubs. The amount of trout habitat would not change.

Cumulative Effects

No action would cause no additional cumulative effects besides those actions which occurred or are planned. For a description of other Forest Service actions or planned actions in the areas of this project, refer to the CWE supplements for each watershed (USDA 2003) in project file.

Direct and Indirect Effects - Proposed Action

There are approximately 4.5 miles of perennial streams where rainbow and/or brown trout reside and project activities occur within the vicinity of the project units. Actions proposed by this Last Chance Fuels Reduction Project that may be a concern for trout are: sediment effect to spawning gravels and filling pool habitat by under burning, road obliteration, and waterhole reconstruction.

Understory Thinning and Mastication

Approximately 2 miles of perennial stream have understory thinning and mastication activities above them, all with at least a 300-foot RCA buffer. Wide perennial streamside buffers and guidelines in the project description using Best Management Practices for heavy equipment would prevent sediment introduction to the stream, as sediment may have the potential to affect trout spawning gravels and fill pools. The BMPs provide slope limitations to further minimize the possibility of eroding soil. Tractor piling would not occur in the RCA's.

Existing water holes and other sites, such as ponds, lakes, or streams, used for water drafting would be inspected by a fisheries biologist or hydrologist for existing fish and flow levels prior to use. A Forest Service approved screen covered drafting box, or other device to create a low entry velocity (RCO #4, SNFP ROD p. A-56), would be used while drafting to minimize removal of aquatic species from aquatic habitats.

Underburning and Pile Burning

Ignition for underburning would not occur within the 300-foot RCA. Fire would be allowed to backburn down slope into the RCA and eventually extinguish in the cooler microclimate there. Approximately four miles of perennial stream would have backburning. Under-burning prescription parameters would ensure a cool and controlled flame length less than 4 feet. Several years of best management practices monitoring on prescribed fire projects indicate that ground cover objectives are being met and prescribed fires have been under control. Hand lines may be constructed in the RCA, but only to control the fire, and would be covered with debris and needle cast to prevent erosion after use. These measures protect the stream course by preventing the worse case scenarios: filling a stream with sediment from rills and gullies coming down off bare soil, or a wildfire caused by a buildup of ground fuels which would greatly alter a riparian stream course.

Piles would be burned outside of the 300 foot buffer from the perennial streams. Therefore, there would not be any effects to trout from pile burning.

Hand Pruning

This hand work of pruning trees would occur outside of the 300 foot buffer of the RCAs. The riparian effects from a tree canopy normally do not extend more than 300 feet, therefore there would not be any effects to trout with this treatment.

Road obliteration and waterhole reconstruction

Six roads would be decommissioned and 2 waterholes would be reconstructed. This may involve ripping and re-contouring roads which lie primarily in the RCAs. The effects of this work may be a short duration of sedimentation resulting with less sedimentation long term. It is unlikely that the road decommissioning would increase sedimentation with the use of BMPs, waterbars, and weed-free straw when necessary to eliminate runoff during and after the heavy equipment work. The waterhole reconstruction and removal of the cement platform used for crossing the Steeley Fork Cosumnes may stir up fines and substrates in the water, causing turbid water quality for a short period of time immediately downstream. This turbidity, if excessive, could potentially cover spawning gravel and fill pool habitat for trout, but it is unlikely for this to occur from such a small area for a very short period of time. The end result of the restoration work would be to reduce the larger amounts of future turbidity and pollutant to the stream by vehicles crossing there, and to reduce sediment runoff by non-functioning waterholes.

Habitat Capability Factors for Rainbow Trout

Factor	High Capability	Medium Capability	Low Capability
Depth (ft)	> 2.5	1.1-2.5	0.5-1.0
Width (ft)	>8	4-8	<8
Velocity (fps)	2.0-2.4	0.8-1.6 or 2.5-3.3	<4
Temperature (degrees F, summer maximum)	55-57	51-54 or 58-65	<51 or >65
Percent stream shaded (between 1100-1600)	>60	45-60	<45
Riparian vegetation (% crown closure, including ground cover)	>80	50-80	<50
Instream cover (%)	>55	25-55	<25
Streambed sediments (% fines on a gravel/rubble substrate)	<15	15-25	>25
Pool/riffle ratio (% pools)	45-55	35-45 or 55-65	<35 or >65
Spawning site availability (% gravels 0.4-2.3" in riffle areas)	>80	30-80	15-30
Channel stability (% total linear distance stable)	>80	50-80	<50

The capability of habitat factors within the analysis area have been summarized below.

Rainbow Trout Habitat Capability within Affected Watersheds.

The following information was obtained from a 2002 habitat survey and based on professional judgement.

Clear Creek Watershed

Factor	Capability Rating	Determining Factor for Rating
Depth (ft)	Low	0.5-1.0
Width (ft)	High	>8
Velocity (fps)	Medium	0.8 to 1.6
Temperature (degrees F, summer maximum)	Low	>65
Percent stream shaded (between 1100-1600)	High	>60
Riparian vegetation (% crown closure, including ground cover)	High	>80
Instream cover (%)	Medium	25-55%
Streambed sediments (% fines on a gravel/rubble substrate)	Medium	15-25
Pool/riffle ratio (% pools)	Low	<35
Spawning site availability (% gravels 0.4-2.3" in riffle areas)	Medium	30-80
Channel stability (% total lineal distance stable)	Medium	50-80

Based on the above analysis, the Clear Creek watershed currently was categorized as medium habitat capability for rainbow trout.

The following information was taken from a 1994 Stream Condition Inventory survey in the Dogtown watershed.

Dogtown Creek Watershed

Factor	Capability Rating	Determining Factor for Rating
Depth (ft)	Low	0.5-1.0
Width (ft)	Medium	4-8
Velocity (fps)	Medium	0.8 to 1.6
Temperature (degrees F, summer maximum)	Medium	<65
Percent stream shaded (between 1100-1600)	High	>60
Riparian vegetation (% crown closure, including ground cover)	High	>80
Instream cover (%)	Medium	25-55%
Streambed sediments (% fines on a gravel/rubble substrate)	Low	>25
Pool/riffle ratio (% pools)	Medium	55-65
Spawning site availability (% gravels 0.4-2.3" in riffle areas)	Medium	30-80
Channel stability (% total lineal distance stable)	High	80

Based on the above analysis, the Dogtown Creek watershed currently was categorized as medium habitat capability for trout.

The following information was taken from a 1998 Stream Condition Inventory survey in the Lower Steely Fork watershed.

Lower Steely Watershed

Factor	Capability Rating	Determining Factor for Rating
Depth (ft)	Low	0.5-1.0
Width (ft)	High	>8
Velocity (fps)	Medium	0.8 to 1.6
Temperature (degrees F, summer maximum)	Medium	<65
Percent stream shaded (between 1100-1600)	High	>60
Riparian vegetation (% crown closure, including ground cover)	High	>80
Instream cover (%)	Medium	25-55%
Streambed sediments (% fines on a gravel/rubble substrate)	Low	>25
Pool/riffle ratio (% pools)	Medium	35-45
Spawning site availability (% gravels 0.4-2.3" in riffle areas)	Medium	30-80
Channel stability (% total lineal distance stable)	Medium	50-80

Based on the above analysis, the Lower Steely watershed currently was categorized as medium habitat capability for rainbow trout.

The following information was taken from a 1998 Stream Condition Inventory survey in the Upper Steely Fork watershed.

Upper Steely Fork Watershed

Factor	Capability Rating	Determining Factor for Rating
Depth (ft)	Low	0.5-1.0
Width (ft)	High	>8
Velocity (fps)	Medium	0.8 to 1.6
Temperature (degrees F, summer maximum)	Medium	<65
Percent stream shaded (between 1100-1600)	High	>60
Riparian vegetation (% crown closure, including ground cover)	High	>80
Instream cover (%)	Medium	25-55%
Streambed sediments (% fines on a gravel/rubble substrate)	High	<15
Pool/riffle ratio (% pools)	High	45-55
Spawning site availability (% gravels 0.4-2.3" in riffle areas)	Medium	30-80
Channel stability (% total lineal distance stable)	Medium	50-80

Based on the above analysis, the Upper Steely watershed currently was categorized as high habitat capability for rainbow trout.

Because of the 300-foot buffers on the perennial streams, the buffers placed on the intermittent and ephemeral tributaries, and the protection measures included in the project description, the pre and post project habitat capability is expected to remain unchanged.

Cumulative Effects

By following BMP guidelines (identified in USDA 2003a) and by applying RCA buffer widths in the areas proposed, negative cumulative effects are not expected as a result of actions taken by this project. By reducing the risk of a catastrophic wildfire and improving forest health, future cumulative effects on a large scale are being avoided. Restoration work to existing roads and waterholes would help enhance recovery of Steeley Fork Cosumnes River, reducing future cumulative effects.

Roads, including skid roads, are considered the principal cause of accelerated erosion in forests throughout the western United States (USDA 2001), and average road densities are high in the project area. Work to reduce roads is a step toward reducing cumulative effects. The original construction and existence of roads may have led to stream habitat degradation by sedimentation and easier access by the public. Dispersed recreation activities near some stream locations have compacted and denuded some streambanks, removing riparian vegetation and increasing the chances of sediment runoff. Easier access for the public also increases fishing pressure on the local trout populations. The level of use across the forest is expected to continue and increase over time as the human population continues to increase, although the goal of the ROD (USDA 2001) is to reduce the number of roads in RCAs.

For a description of other past project activities in the areas of this project, refer to the summary on Appendix A, which is taken from the more thorough historic hydrologic perspective of "CWE supplements for the Last Chance Fuels Reduction Project" (USDA 2003b) for five watersheds, also in the project file. Information on private land for these summaries was obtained by request letter dated October 21, 2002 to the Fresno office of California Department of Forestry.

The majority of activities in Table 6 of USDA (2003a) are USFS projects. During the last decade protective measures for streamside zones have become more and more restrictive. Isolated instances of project related sediment going to the streams may have occurred. Historically, prior

to the last decades, timber sales had smaller stream buffers, with trees being removed from the riparian corridor. These types of projects caused pools to fill with sediment, and spawning gravels to be covered with silt. On private land timber, harvest plans during the last decade have had smaller stream buffer requirements, with various sizes and intensity of activities and in some cases may result in fragmentation of habitat for many species. Sometimes these activities decrease and degrade the amount of aquatic suitable habitat, making National Forest lands under the Sierra Nevada Framework increasingly important for these species.

Future known projects to be implemented in 2003-2007 are the Plantation Protection Project, Ridgerunner Prescribed burning, Lincoln Log Rx burn, Simpson Prescribed Burn, and Clear Plantation Fuels Reduction, all USFS projects. These are also described in the cumulative watershed supplements for the project watersheds (USDA 2003). Any timber activities being planned are following the standards and guidelines established under the Sierra Nevada Forest Plan Amendment (USDA 2001). The effects of all of these sales in the project area would promote the growth of larger trees that may eventually contribute large down woody debris sooner. Stream buffers have been provided to assure prevention of sedimentation. With the fuels projects, backburning would occur down the RCA without ignition. Under cool burning conditions the flames die out in the riparian vegetation prior to affecting the stream corridor.

Summary

From pre-project to post-project, the condition of suitable habitat for trout may change as a result of the in stream work on the Steely Fork Cosumnes River of the cement pad removal, road obliteration and waterhole reconstruction. There may be a short-term sediment influx to the streams affected, with a long term gain of less sediment, and less intrusion by vehicle access. In the long-term the change would be beneficial. The mechanical and burn treatments have protective 300 foot RCA buffers on all perennial streams of the project, which would protect trout habitat from effects. Based on the above review, the potential for cumulative effects to trout from historic activities may have affected localized populations in a negative way. The most significant being effects from recreational fishing and road-related sediment. Past stocking most likely affected the genetic make-up of native trout populations. The introduction of brown trout affected the feeding availability and population dynamics of the native rainbow trout. Sedimentation from narrow or no stream buffers used with historic timber removal, both on private and USFS, probably contributed to degredation of stream condition affecting trout populations, but many of these effects are approaching recovery.

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Appendix A
Cumulative Effects Table
Last Chance Fuels Reduction Project

Information obtained from 2003 Cumulative Watershed Effects Reports

Clear Watershed

Past Activities

Mechanical Tree Harvest

Project	Year	Type	Acres
Ridgerunner	2001	Biomass Thin	347
Nelly	2000	Thin	139
Tie Die	1999	Thin	29
Nelly	1995	Salvage	3
Halfshot	1992	Heli. Salvage	50
Halfshot	1992	Overstory	23
Halfshot	1991	Clearcut	151
Halfshot	1991	Overstory	142
Plummer FB	1991	Thin/Savage	125
Plummer FB	1990	Clearcut	4
Insect Salvage	1990	Salvage	33
Insect Salvage	1989	Thin/Tree Select	167
Insect Salvage	1985	Clearcut	38
Leoni	1977	Tree Select	34
Caldor	1972	Tree Select	75

Site Preparation

Project	Year	Type	Acres
Ridgerunner	2002	YUM*	38
Tie Die	2000	Pile Burn	3
----	1992	Pile Burn	69
----	1992	Burn	190
----	1986	Burn	38

**YUM-Yard Unmerchantable Material*

Herbicides

Project	Year	Type	Acres
Ridgerunner	2000	Herbicides	261
----	1992	Herbicides	40
----	1991	Herbicides	8
----	1989	Grubbing	88
----	1988	Grubbing	88
----	1987	Grubbing	88

Grazing

Allotment	Acres In Watershed	Status	Allotment Plan Revision Schedule
Caldor	349	Inactive as of 1/1998	Not included in current schedule. Earliest to be included for analysis and potential active status would be 2010 or later.

Wildfire

Name	Year	Acres
----	1996	35
----	1996	5

Private Lands

Landowner	Year	Acres
Leoni Mdw	2000	90

Clear Watershed

Known Future Activities within Ten Years

Mechanical Tree Harvest

Project	Year	Type	Acres
Clear	2003	Thin	45

Site Preparation

Project	Year	Type	Acres
---	2003	Mastication	230
Ridgerunner	2007	Burn	78

Grazing

Allotment	Acres	Status	Allotment Plan Revision Schedule
Caldor	349	Inactive as of 1/1998	N/A. See past activities table.

Dogtown Watershed
Past Activities

Mechanical Tree Harvest

Project	Year	Type	Acres
Ridgerunner	2002	Thin/Biomass	310
Ridgerunner	2001	Thin	82
Tie Die	2001	Thin	70
Tie Die	2000	Thin	891
Capps	1999	Thin	30
LMF	1999	Thin	32
Road Hazard	1996	Ind. Tree Salvage	96
Salvage	1992	Salvage	66
Halfshot	1992	Heli. Salvage	1860
76	1991	Salvage	8
Insect Salvage	1991	Salvage	57
Insect Salvage	1990	Salvage	146
Insect Salvage	1989	Salvage	72
---	1988	Clear Cut	317
---	1987	Clear Cut/Thin	88
---	1985	Clear Cut	6
---	1984	Thin	19
Henry's	1980	Thin	25
Leoni	1980	Salvage	92
Insect Salvage	1978	Salvage	202
Caldor	1977	Thin	590
Ranger Station	1970	Thin	172
Caldor Fire Tank	1969	Thin	65

Site Preparation

Project	Year	Type	Acres
Tie Die	2002	Pile/Burn	155
---	2002	Masticate	53
---	2001	Masticate	327
---	1989	Burn	45
---	1988	Pile/Burn	355

Herbicides

Project	Year	Type	Acres
Ridgerunner	2001	Herbicide	28
---	1992	Herbicide	316
---	1993	Herbicide	88

Prescribed Burn

Project	Year	Type	Acres
Tie Die	2002	Underburn	54
Nelly	2002	Underburn	15
---	1995	Underburn	208
---	1996	Underburn	30

Grazing

Allotment	Acres In Watershed	Status	Allotment Plan Revision Schedule
Caldor	5353	Inactive as of 1/1998	Not included in current schedule. Earliest to be included for analysis and potential active status would be 2010 or later.
Cat Creek	178	Inactive as of 1/1998	Included in current schedule. Earliest to be included for analysis and potential active status would be 2006 or later.
Sopiago	17	Inactive	Included in current schedule. Analysis conducted in 2000, however was placed on inactive status.

Wildfire

Name	Year	Acres
Tie Die Rx Burn	2002	54
Nelly RX Burn	2002	15
Natural Fuels Burning	1995-2000	108
3rd Entry	1995	100
Low Intensity – No effects	1996	30
Prescribed Burn	1990	175
Prescribed Burn	1988	200
---	1926	125
---	1924	3100
---	1919	415

Private Lands

Landowner	Year	Acres
Leoni Mdw	2000	280

Dogtown Watershed

Known Future Activities within Ten Years

Mechanical Tree Harvest

Project	Year	Type	Acres
Clear	2003	Thin/Pile/Burn	18

Site Preparation

Project	Year	Type	Acres
Clear	2003	Mastication	77

Burning

Project	Year	Type	Acres
Simpson	2006	Burn	179
Ridgerunner	2005	Burn	128
Clear	2005	Burn	29

Grazing

Allotment	Acres	Status	Allotment Plan Revision Schedule
Caldor	349	Inactive as of 1/1998	N/A. See past activities table.
Cat Creek			Potentially 2006 or later.
Sopiago			Analysis Complete. Inactive

Lower Lower Middle Fork Watershed

Past Activities

Mechanical Tree Harvest

Project	Year	Type	Acres
Ridgerunner	2001	Thin	46
Insect Salvage	1991	Heli. Salvage	850
Insect Salvage	1989	Salvage	10

Site Preparation

Project	Year	Type	Acres
None	N/A	N/A	N/A

Herbicides

Project	Year	Type	Acres
Ridgerunner	2001	Herbicides	10

Grazing

Allotment	Acres In Watershed	Status	Allotment Plan Revision Schedule
None	N/A	N/A	N/ A

Wildfire

Name	Year	Acres
None	N/A	N/A

Private Lands

Landowner	Year	Acres
Wetsel-Oviatt	1997	125

Lower Lower Middle Fork

Known Future Activities within Ten Years

Mechanical Tree Harvest

Project	Year	Type	Acres
Clear	2003	Thin/Masticate	10

Site Preparation

Project	Year	Type	Acres
Ridgerunner	2007	Underburn	15
PPP	2003	Mastication	32
PPP	2007	Mastication	32
PPP	2005	Mastication	32

Grazing

Allotment	Acres	Status	Allotment Plan Revision Schedule
None	N/A	N/A	N/A

Lower Steely Watershed

Past Activities

Mechanical Tree Harvest

Project	Year	Type	Acres
Lincoln Log	1999	Harvest	40
Insect Salvage	1992	Salvage	37
Insect Salvage	1991	Salvage	80
---	1991	Clearcut	30
---	1991	Overstory	53
Insect Salvage	1990	Salvage	64
Insect Salvage	1989	Salvage	6
Insect Salvage	1988	Salvage	67
Insect Salvage	1979	Salvage	29
Insect Salvage	1978	Salvage	204
Leoni	1977	Overstory	76

Site Preparation

Project	Year	Type	Acres
Lincoln Log	1999	Pile/Burn	10
---	1992	Broadcast Burn	19
---	1992	Pile/Burn	33

Herbicides

Project	Year	Type	Acres
Ridgerunner	2000	Herbicides	33

Grazing

Allotment	Acres In Watershed	Status	Allotment Plan Revision Schedule
None	N/A	N/A	N/ A

Wildfire

Name	Year	Acres
Several Small on private <5 acres	1987-1997	Variable

Private Lands

Landowner	Year	Acres
Kozycz	1994	100
Tyler	1993	350

Lower Steely Watershed

Known Future Activities within Ten Years

Mechanical Tree Harvest

Project	Year	Type	Acres
Clear Creek	2003	Hand Thin/Pile/Burn	29

Site Preparation

Project	Year	Type	Acres
---	2005	Underburn	13
PPP	2003	Masticate/Herbicide	04
---	2003	Mastication	15
Lincoln Log	2003	Burn	12

Grazing

Allotment	Acres	Status	Allotment Plan Revision Schedule
N/A	N/A	N/A	N/A

Upper Steely Watershed
Past Activities

Mechanical Tree Harvest

Project	Year	Type	Acres
Ridgerunner	2002	Thin/Biomass	640
Ridgerunner	2001	Thin	172
2nd Fiddle	2001	Thin	25
Tid Die	1999	Thin	993
Lincoln Log	1999	Thin	141
Road Hazard	1995	Indv. Tree Salvage	210
Halfshot	1992	Heli. Salvage	100
Insect Salvage	1992	Salvage	231
Insect Salvage	1991	Salvage	115
Insect Salvage	1990	Salvage	162
Insect Salvage	1989	Salvage	238
Quick Webster	1987	Clear Cut	30
Steely	1987	Tree Select	94
Steely/Twin	1986	Clear Cut	51
Twin/Leoni/Steely	1986	Overstory	245
Twin	1985	Overstory	110
Twin	1985	Indv. Tree Select	494
Steely	1984	Clearcut	108
Steely	1984	Overstory	10
Gilbert	1979	Salvage	158

Site Preparation

Project	Year	Type	Acres
Tie Die	2002	Handcut/Pile/Burn	363
Steely Dog	2001	Chip/Crush	15
2nd Fiddle	2001	Pile/Burn	5
Lincoln Log	1999	Pile/Burn	3
Quick Webster	1989	Pile/Burn	21
Steely	1987	Pile/Burn	7
Steely	1987	Burn	33
Steely	1986	Pile/Burn	35
Steely/Twin	1986	Burn	73
Steely	1985	Pile/Burn	50
Steely	1985	Burn	16
Steely	1984	Burn	11

Upper Steely Watershed
Past Activities

Herbicides

Project	Year	Type	Acres
Ridgerunner	2001	Herbicides	39
Quick Webster/Steely	1992	Grubbing	25
Steely	1992	Herbicide	29
Quick Webster	1990	Grubbing	21
Steely	1988	Grubbing	33
Steely	1987	Grubbing	130
Twin	1987	Herbicides	10
Twin	1987	Grubbing	14

Grazing

Allotment	Acres In Watershed	Status	Allotment Plan Revision Schedule
Caldor	2158	Inactive	Not included in current schedule. Earliest to be included for analysis and potential active status would be 2010 or later
Steely Creek	3082	Inactive	Not included in current schedule. Earliest to be included for analysis and potential active status would be 2010 or later

Wildfire

Name	Year	Acres	Comments
---	1926	Unknown	Area Recovered

Private Lands

Landowner	Year	Acres
None		

Upper Steely Watershed
Known Future Activities within Ten Years

Mechanical Tree Harvest

Project	Year	Type	Acres
---	2003	Hand Thin	118

Site Preparation

Project	Year	Type	Acres
Lincoln Log	2003	Burn	53
PPP	2003	Mastication	149
Ridgerunner	2003	Grapple Pile/Burn	200

Grazing

Allotment	Acres In Watershed	Status	Allotment Plan Revision Schedule
Caldor	2158		N/A. See past activities table.
Steely Creek	3082		N/A. See past activities table.