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I. INTRODUCTION

PURPOSE

Forest Service Manual 2672.42 specifies that a biological evaluation (BE) and a biological assessment (BA) be prepared to determine if a project may affect any USDA Forest Service (USFS or Forest Service) sensitive (FSS) species and US Fish and Wildlife Service (USFWS) threatened, endangered, or proposed (TEP) species and their designated or proposed critical habitat. This BE/BA is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C. 1536 (c)). The purpose of this BE/BA is to review the Forest Projects Plan (Phase 1), (FPP or Proposed Project) in sufficient detail to determine to what extent the proposed project may affect any threatened, endangered, proposed, and sensitive (TEPS) plant species in the Project area.

The FPP is a large, 25,671-acre landscape-level forest stand and wildlife habitat improvement and protection project located on Forest Service lands, primarily within the Upper Mokelumne River Watershed (**Map 1**). The FPP is designed to help prevent high-intensity, large-scale wildfires, improve forest conditions, and protect important wildlife habitat and other resources. The Proposed Project analyzed in this document encompasses Phase 1 of a two-phased approach. Phase 1 proposes non-commercial actions to reduce forest ladder fuels and implement other forest management activities on the Eldorado National Forest (ENF)'s Amador Ranger District.

LOCATION

The FPP comprises 25,671 acres entirely within National Forest System lands administered by the ENF on the Amador Ranger District between approximately 2,700 and 8,000 feet above mean sea level (msl) within:

- T7N, R13E, Sec. 2, 13, 24, Mount Diablo base and meridian (MDB&M) within the U.S. Geological Service (USGS) 7.5-minute West Point Quadrangle
- T7N, R14E, Sec. 1, 3, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, MDB&M within the USGS 7.5-minute Devils Nose Quadrangle
- T7N, R15E, Sec. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 16, 17, 18, MDB&M within the USGS 7.5-minute Garnet Hill Quadrangle
- T7N, R16E, Sec. 5, 6, MDB&M within the USGS 7.5-minute Calaveras Dome Quadrangle
- T8N, R13E, Sec. 35, 36, MDB&M within the USGS 7.5-minute Omo Ranch Quadrangle
- T8N, R14E, Sec. 13, 14, 20, 21, 22, 23, 24, 25, 28, 29, 30, 36, MDB&M within the USGS 7.5-minute Caldor Quadrangle
- T8N, R15E, Sec. 1, 2, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, MDB&M within the USGS 7.5-minute Peddler Hill Quadrangle
- T8N, R16E, Sec. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, MDB&M within the USGS 7.5-minute Bear River Reservoir Quadrangle
- T9N, R15E, Sec. 36, MDB&M within the USGS 7.5-minute Peddler Hill Quadrangle
- T9N, R16E, Sec. 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, MDB&M within the USGS 7.5-minute Bear River Reservoir Quadrangle
- T9N, R17E, Sec. 7, 18, 31, MDB&M within the USGS 7.5-minute Bear River Reservoir Quadrangle

FPP treatment areas fall within areas administered by three counties (Amador, El Dorado, and Calaveras counties).

Treatments are not proposed on private lands, nor in designated wilderness areas, proposed wilderness areas, inventoried roadless areas, or research natural areas. The FPP is located outside of, and complements, several

other recent NEPA planning projects: Scottiago Fuels Reduction Project, Scottiago Forest Health Project, Panther Fuels Reduction Project, View 88 Fuels Reduction Project, Power Fire Reforestation, and the Power Fire Pre-Commercial Thin Project.

Eighty-four percent of the FPP is within the Wildland Urban Interface (WUI), including the WUI defense zone (32 percent of the FPP area) and the WUI threat zone (52 percent). The FPP is within 5 miles of four U.S. Census defined populated areas (i.e., Buckhorn, Pioneer, Red Corral, and West Point). Approximately 17 percent of the FPP is located within lands identified by the Amador-Calaveras Consensus Group (ACCG) as having very high or high wildfire risk.

SPECIES

ESA LISTED PLANT SPECIES

The USFWS Information for Planning and Consultation (IPaC) database was queried on July 25, 2022 to identify threatened, endangered, or proposed listed species that could occur, or be affected by Proposed Project (Appendix A). Currently the only TEP plant species expected to occur on the ENF are *Packera layneae* and *Pinus albicaulis*. No TEP plant species appear on the USFWS IPaC list. The Proposed Project does not support suitable habitat for *Packera layneae* or *Pinus albicaulis*. Therefore, ESA-listed plant species are not addressed furthering in this document

FOREST SERVICE SENSITIVE PLANT SPECIES

There are known occurrences of *Botrychium crenulatum*, *B. minganense*, *B. montanum*, *Calochortus clavatus* var. *avius*, *Peltigera gowardii*, *Lewisia kelloggii* ssp. *hutchisonii*, and *L. kelloggii* ssp. *kelloggii* within the Analysis Area. In addition, potential habitat for the following species is known to occur in the Analysis Area:

1. *Botrychium ascendens*
2. *Botrychium paradoxum*
3. *Botrychium lunaria*
4. *Botrychium pedunculosum*
5. *Bruchia bolanderi*
6. *Cypripedium montanum*
7. *Dendrocollybia racemose*
8. *Diplacus pulchellus*
9. *Ophioglossum pusillum*
10. *Phaeocollybia olivacea*

Forest Projects Plan (FPP), Phase 1

Eldorado National Forest -- Amador Ranger District

Map 1. Project Area



Legend

- Aspen Restoration
 - Aspen Restoration, Prescribed Burning
 - Hand Thinning Only
 - Mechanical Fuels Reduction
 - Mechanical Fuels Reduction, Prescribed Burning
 - Prescribed Burning
 - National Forest
 - Non-National Forest
 - HUC12 subwatershed
 - Perennial stream
 - Intermittent stream
 - Waterbody
 - Highway
- Scale: 1:150,000
- 0 1.25 2.5 5 Miles
- LANDMARK ENVIRONMENTAL**
Supporting clients through environmental compliance and planning.
Date: Expired: 7/6/2022 12:01 PM

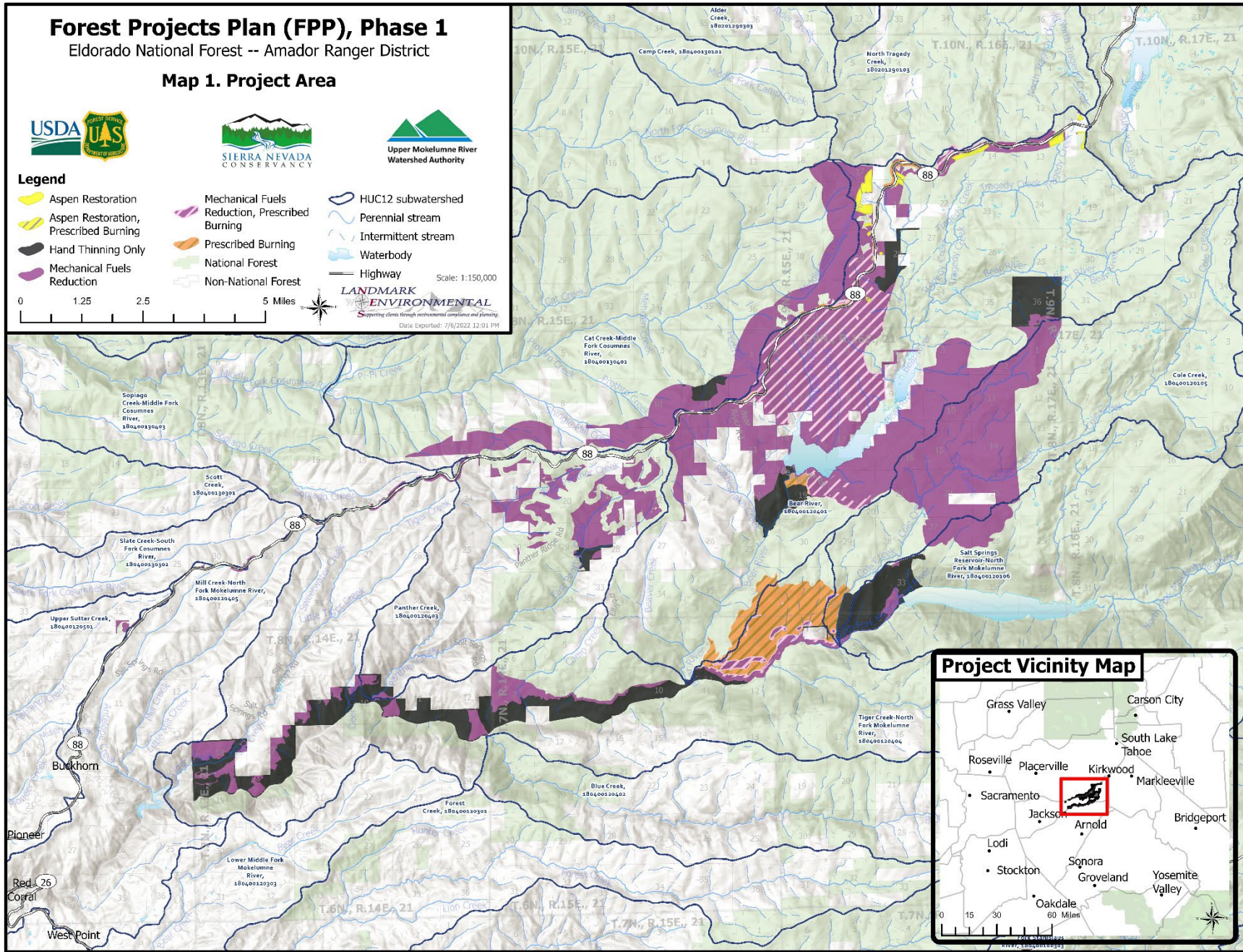


Table 1 lists all TEPS plant taxa from the ENF. No other TEPS plant taxa have known occurrences or potential habitat on the ENF. Taxa that do not have potential habitat in the project area are not further analyzed in this document. Botanical surveys conducted for the proposed project focused on species with potential habitat. Botanists searched for these habitats (e.g., meadow) as well as for the Sensitive taxa.

Table 1. Potential Habitat in the Proposed Forest Projects Plan (Phase 1) Project for TEPS plant taxa known or suspected to occur on the Eldorado National Forest (Elevation 2,700 – 8,000 feet).

Species	Status ¹	On ENF ²	Known in Project Area	Suitable Habitat in Project Area	Rationale For Potential Habitat Determination
Three-bracted onion (<i>Allium tribracteatum</i>)	S	P	No	Yes	Grows on open ridges with gravelly lahar soils (lava cap communities) in chaparral and lower & upper montane coniferous forests from ~ 3,300 to 10,000 feet in elevation.
El Dorado manzanita (<i>Arctostaphylos nissenana</i>)	S	K	No	No	Grows on highly acidic slate and shale soils and is often associated with closed-cone conifer forest from about 1,400 to 3,600 feet.
Big-scale balsamroot (<i>Balsamorhiza macrolepis</i> var.)	S	P	No	No	Grows in chaparral, vernal moist meadows & grasslands, grasslands within oak woodland, and ponderosa pine forest below 4,600 feet.
Upswept moonwort (<i>Botrychium ascendens</i>)	S	P	No	Yes	Grows in lower montane coniferous forest, meadows, and seeps from 4,900 to over 7,500 feet in elevation.
Scalloped moonwort (<i>Botrychium crenulatum</i>)	S	K	Yes	Yes	Grows in fens, lower montane coniferous forest, meadows, seeps, and freshwater marshes from 4,900 feet to 10,500 feet in elevation.
Common moonwort (<i>Botrychium lunaria</i>)	S	P	No	Yes	Grows in meadows, seeps, subalpine and upper montane coniferous forest from 7,450 feet to over 11,000 feet in elevation.
Mingan moonwort (<i>Botrychium minganense</i>)	S	K	Yes	Yes	Grows in fens, lower and upper montane coniferous forest, meadows, and seeps from 4,900 to 6,750 feet.
Mountain moonwort (<i>Botrychium montanum</i>)	S	K	Yes	Yes	Grows in lower and upper montane coniferous forest, meadows, and seeps from 4,900 feet to 7,000 feet in elevation.
Paradox moonwort (<i>Botrychium paradoxum</i>)	S	K	No	Yes	Grows in lower and upper montane coniferous forest, meadows, and seeps from 4,900 feet to 7,000 feet in elevation.
Stalked moonwort (<i>Botrychium pedunculosum</i>)	S	P	No	Yes	Grows in lower and upper montane coniferous forest, meadows, and seeps from 4,900 feet to 7,000 feet in elevation.

Species	Status ¹	On ENF ²	Known in Project Area	Suitable Habitat in Project Area	Rationale For Potential Habitat Determination
<i>Bolander's bruchia</i> (<i>Bruchia bolanderi</i>)	S	K	No	Yes	Grows in meadows and fens in montane and subalpine communities from about 5,500 to 9,000 feet. Grows in ephemeral habitats such as erosional ditches or small streamlets through wet meadows.
<i>Pleasant Valley mariposa lily</i> (<i>Calochortus clavatus</i> var. <i>avius</i>)	S	K	Yes	Yes	Grows in openings in mixed conifer & ponderosa pine forest, usually on ridgetops and south-facing slopes from 2,500 to 5,600 feet.
<i>Mountain lady's slipper</i> (<i>Cypripedium montanum</i>)	S	P (K on inholding)	No	Yes	Grows in moist areas and upland sites with northerly aspects, loamy soils and shade, from 3,500 to 5,700 feet (generally <5,000 ft).
<i>Branched collybia</i> (<i>Dendrocollybia racemosa</i>)	S	K	No	Yes	Grows on remains of decayed mushrooms or occasionally in duff/leaf litter, in mid-mature to old-growth stands of mixed hardwood-conifer forests. Evidence of timber harvest at some extant occurrences.
<i>Yellow-lip pansy monkeyflower</i> (<i>Diplacus pulchellus</i>)	S	K	No	Yes	Habitat is vernal wet to moist sites which are open and flat or slightly sloping. Typically found on lava caps but soils can be clay, volcanic, or granitic. Grows from 2,200 to 6,400 feet.
<i>Tahoe draba</i> (<i>Draba asterophora</i> var. <i>asterophora</i>)	S	H	No	No	Restricted to rocky ledges and talus slopes in subalpine and alpine habitats above 8,200 feet.
<i>Cup Lake draba</i> (<i>Draba asterophora</i> var. <i>macrocarpa</i>)	S	K	No	No	Restricted to sandy slopes, rocky ledges, and talus slopes in subalpine and alpine habitats above 8,200 ft.
<i>Tripod buckwheat</i> (<i>Eriogonum tripodum</i>)	S	K	No	No	Grows on serpentine soils in foothill and cismontane woodlands below 5,300 feet.
<i>Blandow's bog-moss</i> (<i>Helodium blandowii</i>)	S	P	No	No	Grows in wet meadows, fens, & seeps in subalpine coniferous forest and alpine lakes from 6,100 to 9,000 feet.
<i>Parry's horkelia</i> (<i>Horkelia parryi</i>)	S	K	No	No	Grows on stony, disturbed, slightly acidic soils in open chaparral and cismontane woodland below 3,400 feet.
<i>Hutchison's lewisia</i> (<i>Lewisia kelloggii</i> ssp. <i>hutchisonii</i>)	S	K	Yes	Yes	Grows in openings in upper montane coniferous forest, often on slate soils and on soils that are sandy granitic to erosive volcanic from 4,800 to 7,000 feet.
<i>Kellogg's lewisia</i> (<i>Lewisia kelloggii</i> ssp. <i>kelloggii</i>)	S	K	Yes	Yes	Grows on granitic and volcanic balds from about 5,000 to 8,000 feet.

Species	Status ¹	On ENF ²	Known in Project Area	Suitable Habitat in Project Area	Rationale For Potential Habitat Determination
<i>Long-petaled lewisia</i> (<i>Lewisia longipetala</i>)	S	K	No	No	Restricted to subalpine & alpine slopes or basins with deep snow accumulations, above 8,200 feet.
<i>Saw-toothed lewisia</i> (<i>Lewisia serrata</i>)	S	K	No	No	Restricted to steep, nearly vertical cliffs in inner gorges of perennial streams and rarely near seeps and intermittent streams. Grows between 2,800 and 4,800 feet in the American River watershed.
<i>Broad-nerved hump-moss</i> (<i>Meesia uliginosa</i>)	S	P	No	No	Grows in permanently wet, primarily spring-fed meadows and fens in montane to subalpine coniferous forest from 4,200 to 9,200 feet.
<i>Elongate copper moss</i> (<i>Mielichhoferia elongata</i>)	S	P	No	No	Grows on metamorphic, sedimentary, limestone, and serpentine rock outcrops that often contain copper or other heavy metals and that are seasonally moist or less commonly on moist soil. ponderosa pine. Grows from sea level to 3,550 feet.
<i>Yellow bur navarretia</i> (<i>Navarretia prolifera</i> ssp. <i>lutea</i>)	S	K	No	No	Grows in openings in or adjacent to mixed conifer forest or cismontane woodland on rocky ridgelines, saddles, or eroding ephemeral drainages from 2,300 to 5,000 feet.
<i>Adder's tongue</i> (<i>Ophioglossum pusillum</i>)	S	P	No	Yes	Grows in moist habitat including wet meadows and roadside ditches.
<i>Layne's ragwort</i> (<i>Packera layneae</i>)	T, S	K	No	No	Grows on rocky, gabbroic or serpentinitic soils in chaparral and cismontane woodland below 3,000 feet.
<i>Veined water lichen</i> (<i>Peltigera gowardii</i>)	S	K	Yes	Yes	Grows on rocks in cold, unpolluted spring-fed streams without marked seasonal fluctuation. Submerged most of year. Peak flows must not scour the rocks & gravels where this species attaches.
<i>Stebbins' phacelia</i> (<i>Phacelia stebbinsii</i>)	S	K	No	No	Grows on dry, open, rocky sites (bedrock outcrops, rubble or talus) on ledges or moderate to steep slopes and on damp, mossy inner gorges from 2,000 to 6,800 feet.
<i>Olive phaeocollybia</i> (<i>Phaeocollybia olivacea</i>)	S	P (K on inholding)	No	Yes	Conifer and hardwood forests where it grows in the humus layer. Logging disturbance, when present, is not intense (e.g. clear-cut or patch-cut).

Species	Status ¹	On ENF ²	Known in Project Area	Suitable Habitat in Project Area	Rationale For Potential Habitat Determination
<i>Whitebark pine (Pinus albicaulis)</i>	C, S	K	No	No	Whitebark pine typically occurs on cold and windy high elevation sites in western north America (7,000–12,000 feet). While the Proposed Project includes areas above 7,000 feet, it does not support suitable subalpine habitat for this species; and these habitats are not targeted for treatment. The closest recorded occurrences are located approximately 4 miles east of the FPP.
<i>Sierra blue grass (Poa sierrae)</i>	S	K	No	No	Grows in lower montane coniferous forest on steep, shady, moist slopes from 1,200 feet to 3,800 feet.

¹S = Forest Service Sensitive; T = Threatened under the ESA; C = Candidate for Listing under the ESA

²K=Known to occur in the Project area and P=Potential to occur to occur in the Project area.

II. CONSULTATION TO DATE

No formal or informal consultation with the USFWS has been conducted since TEP plant species or potential habitat does not exist in or near the Analysis Area.

III. CURRENT MANAGEMENT DIRECTION

Current management direction on desired future conditions for federally threatened, endangered, proposed and candidate species in the ENF can be found in the following documents, filed at the District Office:

- Executive Order 13112
- Endangered Species Act (ESA);
- Forest Service Manual (FSM) and Handbooks (FSM/FSH 2670);
- ENF Land and Resource Management Plan (LRMP) (1989);
- National Forest Management Act (NFMA);
- National Environmental Policy Act (NEPA);
- Regional Forester policy and management direction.

ENDANGERED SPECIES ACT

The purpose of the ESA is to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved and to provide for the conservation of such endangered species and threatened species. The ESA directs federal agencies to ensure that actions authorized, funded, or carried out by these agencies are not likely to jeopardize the continued existence of threatened or endangered species, or result in the destruction or adverse modification of their critical habitats (ESA Section 7(a)(2)).

EXECUTIVE ORDERS

Executive Order 13112 of February 3, 1999 documents Presidential direction to affected federal agencies to “...identify actions subject to the availability of appropriations... encourage planning and action at local, State, and regional ecosystem-based levels... and prepare and issue Invasive Species Management Plans.... to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive (plant) species cause.”

FOREST SERVICE MANUAL

Forest Service Manual direction (FSM 2672.1 and FSM 2672.43) requires that activities be reviewed for potential effects on rare species and outlines policy, objectives and procedures.

The Forest Service Manual (FSM 2670) (USFS 2005) also directs national forests to assist states in achieving conservation goals for endemic species; complete biological evaluations of programs and activities; avoid and minimize impacts to species with viability concerns; analyze the significance of adverse effects on populations or habitat; and coordinate with states and USFWS. The Forest Service Manual (2670.15) further defines sensitive species as those plant species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trend in numbers, density or habitat capability that would reduce a species distribution.

FSM 2670.32 states to “avoid or minimize impacts to species whose viability has been identified as a concern.” “A [viable] population...has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range within the planning area” (FSM 2670.5). If impacts cannot be avoided then the Forest must analyze the significance of the potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. Impacts may be allowed but the decision must not result in a trend toward federal listing.

FSM 2670.22 directs national forests to “maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.” To comply with this direction, Forests are encouraged to track and evaluate effects to additional species that may be of concern even though they are not currently listed as FSS. Such plant species are referred to as Special Interest or watch list species.

Forest Service Manual 2900 (USDA Forest Service 2011) contains national direction for noxious weed management. Specific policies included in FSM 2900 include:

- Determine the risk of introducing, establishing, or spreading invasive species associated with any Proposed Project, as an integral component of project planning and analysis, and where necessary provide for alternatives or mitigation measures to reduce or eliminate that risk prior to project approval.
- Ensure that all Forest Service management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on the National Forest System, or to adjacent areas. Integrate visitor use strategies with invasive species management activities on aquatic and terrestrial areas of the National Forest System. At no time are invasive species to be promoted or used in site restoration or re-vegetation work, watershed rehabilitation projects, planted for bio-fuels production, or other management activities on national forests and grasslands.
- Use contract and permit clauses to require that the activities of contractors and permittees are conducted to prevent and control the introduction, establishment, and spread of aquatic and terrestrial invasive

species. For example, where determined to be appropriate, use agreement clauses to require contractors or permittees to meet Forest Service-approved vehicle and equipment cleaning requirements/standards prior to using the vehicle or equipment in the National Forest System.

LAND AND RESOURCE MANAGEMENT PLAN

SENSITIVE PLANTS

In the ENF LRMP (USFS 1989), under Management Practice 49, the General Direction is to "provide for protection and habitat needs of sensitive plants so that Forest activities would not jeopardize the continued existence of such species". It is reiterated several times in the LRMP that "sensitive plants will be managed to ensure that species do not become threatened or endangered because of Forest Service actions". Under the Issue Resolution for Fish and Wildlife on page 2-15, the LRMP states that "sensitive plants are protected as if they are threatened and endangered species".

SPECIAL INTEREST AREAS

Management Emphasis: "Manage the areas principally for their recreation use substantially in their natural condition. Preserve the integrity of the special interest features for which the areas were established."

SIERRA NEVADA FOREST PLAN AMENDMENT (SNFPA)

The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following direction applicable to motorized travel management and TES plants:

- Bog and Fen Habitat (SNFPA ROD page 65, S&G #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles.
- Sensitive Plant Surveys (Corrected Errata, April 19, 2005): Conduct field surveys for TEPS plant species early enough in project planning process that the project can be designed to conserve or enhance TEPS plants and their habitat. Conduct surveys according to procedures outlined in the Forest Service Handbook (FSH 2609.25.11). If additional field surveys are to be conducted as part of project implementation, survey results must be documented in the project file. (Management Standard & Guideline 125). The standards and guidelines provide direction for conducting field surveys, minimizing or eliminating direct and indirect impacts from management activities, and adherence to the Regional Native Plant Policy (USFS 2004).

ENF FOREST SENSITIVE PLANT PROGRAM

The main goal of the ENF Forest Sensitive Plant Program is to maintain viable populations of FSS plant species. Conversely, the goal of the ENF Weeds Program is to eradicate or control the spread of noxious and other non-native invasive plants on these federal lands, and thus prevent or minimize impacts to other resources.

The current condition of FSS plant species on the ENF reflects the effects of past and present management activities. Presently there is not enough evidence to suggest whether FSS plant populations and/or ranges are increasing, decreasing, or stable. Monitoring of occurrences, which detects decreases or increases from year to year, may merely reflect normal variation in individual numbers as a response to annual climatic changes. There is also considerable uncertainty regarding future changes in local climatic patterns. Given the lack of data needed to

take a proactive management approach to FSS plant species, the best available interim management approach is to minimize impacts to known occurrences of FSS plant species while allowing expansion into suitable unoccupied habitat. This strategy would also maximize the diversity of habitat and microsite conditions (slope, aspect, elevation, etc) for FSS plants on the ENF which may be important in face of future climate change. While much is unknown about the potential long-term effects of a warming and/or drying climate on FSS plant species, in the near term, maintaining habitat diversity across the species range may be the best means to manage for species which could require unique microsites to persist under future climatic conditions.

IV. PROJECT DESCRIPTION

PURPOSE AND NEED

The past decade has brought major environmental changes in the Sierra Nevada, including unprecedented drought, bark beetle and other insect outbreaks, large high-intensity wildfires, and associated tree mortality. While ecosystems of the Sierra Nevada have evolved to be well-adapted to fire, the recent increases in the size, frequency, and intensity of fires have resulted in ecosystem transitions, changes in hydrology, and associated effects to sediment and nutrient fate and transport. These dramatic shifts have reduced habitat quality and quantity for FSS species and pose a significant risk to natural biodiversity (North et al. 2021).

The purpose of the FPP is to improve the quality and resiliency of wildlife habitat quality by:

1. Protecting wildlife habitat, aspen stands, forest resources and developed communities within the Wildland Urban Interface (WUI) and beyond from potential severe wildfire effects.

As a result of decades of fire suppression and lack of recent management, aspen stands and conifer forests in the Project area have an abundance of dense small diameter trees, thick undergrowth and a high density of surface fuels. These conditions, together with periodic drought and a warming climate, weaken mature trees and create a higher potential for uncharacteristically severe, stand-replacing wildland fire leading to higher mortality of vegetation, damage to wildlife habitat, and severe impacts on special status species that rely on these habitats, soils, and watershed values. Further, wildland fire results in the destruction of homes and property; and risk of safe egress/ingress. Action is needed to improve timber stand conditions in order to protect wildlife habitat, reduce fire severity and to make the stands more resilient to wildfire. The Project area incorporates late seral/old forest ecosystems, aquatic ecosystems, and aspen stands and areas in close proximity to private property, summer tract homes, recreational facilities, and important infrastructure which are at risk in the event of a large fire occurring in the area. Removing dense understory trees, shrubs, and surface vegetative debris reduces fuel loading, fuel continuity, competition for limited resources (water, sunlight, nutrients), and increases the ability for the public to evacuate unharmed and for fire-fighting assets to directly suppress fire in a safe and efficient manner.

The proposed treatments would be implemented across the landscape including within Protected Activity Centers (PACs) which have traditionally been excluded from these types of fuel treatments both inside and outside the WUI areas. The proposed treatments within PACs would contribute toward meeting fuels objectives for PAC protection, maintain habitat structure and function (SNFPA Record of Decision (ROD) p. 60), and are expected to enhance old forest stand habitat by supporting the health and growth of larger trees.

2. Strategically placing treatments which complement and extend continuity of existing forest and fuel treatments to create a fire resilient landscape.

There is a need to strategically place fuel reduction treatments that are effective, connect past treatments and complement planned and completed treatments on adjacent NFS and private lands. The Forest Service has

completed NEPA planning and is currently implementing thinning treatments on nearby NFS lands including Scottiigo Fuels Reduction Project, Scottiigo Forest Health Project, Panther Fuels Reduction Project, and the Power Fire Pre-Commercial Thin Project. Forest Service partners are in the process of completing surface fuel reduction and prescribed fire readiness treatments within portions of the View 88 Project. The proposed activities would complement and extend the efficacy of this collective work, particularly within the WUI surrounding portions of the Proposed Project area.

3. Strategically placing treatments to prepare the landscape for prescribed burning and improve the safety and efficacy of wildfire suppression efforts.

There is a need to strategically place fuel reduction treatments to facilitate prescribed burning. The current surface fuel loading and ladder fuels in this area create hazards to communities and firefighters. These hazards can be reduced through widespread reduction of surface and ladder fuels, tree thinning and prescribed burning. As demonstrated in the recent Caldor Fire, these treatments would facilitate fire suppression tactical operations in the event of a wildfire. The Forest Service is implementing ongoing prescribed fire treatments on nearby NFS lands and the proposed activities would complement and extend the efficacy of this work.

EXISTING CONDITION

Lands proposed for treatment under the FPP are dense with trees (varying size), shrubs, and surface fuels and therefore at risk of loss to wildfire. Treatment areas were strategically placed within the WUI, and in locations that connect to past and future treatment areas on both public and adjacent private lands. The dominant forest types within the proposed project landscape are Sierran mixed conifer (27 percent), predominately in the lower elevations (< 6,000 ft), and red fir (26 percent), predominantly in the higher elevations (> 6,000 ft). The dominant seral stage within the Proposed Project area is mid-seral closed (56 percent of the FPP area), followed by late-seral closed (11 percent) and mid-seral open (11 percent). Based on 2019 LiDAR returns, 66 percent of the Proposed Project area has \geq 50 percent canopy cover.

Mature wildlife forest habitat (e.g., conifer/mixed conifer/hardwood forest types, greater than 24 inches diameter at breast height [dbh], greater than or equal to 40 percent canopy) makes up 11 percent of the Proposed Project area, and immature wildlife forest habitat (e.g., conifer/mixed conifer/hardwood forest types, 11–24 inches dbh, less than 40 percent canopy) makes up 49 percent of the Proposed Project area (USDA 2019).

Seventeen percent of the FPP falls within areas identified as high- risk to high-valued resources and assets, and according to a USFS R5 analysis, 6 percent of the FPP has stand densities considered to be at high risk to mortality from drought, insects, disease, and wildfire (USDA 2021(b)). According to fire modeling inputs used in the ACCG 2020 wildfire risk assessment, 6 percent of the FPP falls within areas predicted to have high-intensity wildfire.

Riparian woodlands composed of deciduous trees and shrubs can be found along perennial and some intermittent watercourses. The predominant forest types within the FPP landscape are further described below.

SIERRAN MIXED CONIFER

Sierran mixed conifer is predominantly found in the lower elevations of the FPP with stands at varying density and age. Stands with residual larger trees commonly have dense understories of shrubs and small-diameter trees (**Figure 1a**). Some stands were managed in the past through timber harvest, prescribed burning, and other activities; however, in many of these areas, the elapsed time since management has resulted in development of significant understory of small trees (**Figure 1b**). Relatively dense pole-sized stands with a moderate shrub understory are found in many locations (**Figure 1c**). There are also areas with limited tree cover and dense understories of shrubs such as dogwood, deer brush, white thorn, and whiteleaf manzanita (**Figure 1d**).

Figure 1. Existing condition of Sierran mixed conifer habitats in proposed treatment areas.



Figure 1a: Example of dense stand of multi-storied/multi-aged trees with no recent understory treatment.



Figure 1b: Example of dense stand selectively harvested in the past where there has been no treatment of the understory in recent years.



Figure 1c: Example of pole-sized mixed conifer stand naturally regenerated after past timber harvest



Figure 1d: Example of areas with sparse tree overstory with dense shrub understories

RED FIR

Red fir (26 percent) is the predominant forest type in the higher elevations (> 6,000 ft). These stands are characterized by high density, regeneration of understory and overstocked stands (USFS 2011) with sometimes large components of dead material. Refer to **Figure 2** for a representative photograph of a red fir stand in the FPP.



Figure 2. Existing condition of red fir habitats in proposed treatment area.

ASPEN

Aspen stands within the Proposed Project area have been compromised by fire suppression and conifer encroachment, which, over time, has resulted in fewer and smaller stands comprised of a single age-class of trees. **Figure 3** below illustrates an aspen monitoring stand on the Amador Ranger District with encroaching conifers (young lodgepole pine and red fir).



Figure 3. Existing condition of aspen stand in the proposed treatment area.

DESIRED CONDITION

The goal of the FPP treatments is to reduce understory ladder and surface fuels to ameliorate wildfire behavior and facilitate the future application of prescribed fire. Stands would be less overcrowded, and have fewer small trees, lower surface fuels, and higher canopy base height (**Figure 4**). Hardwoods would be retained and managed consistent with SNFPA guidelines and direction (SNFPA Record of Decision, p. 53) shrubs and ground cover would be retained in canopy openings to the extent that there is minimal connectivity to overstory trees. In the event of a wildfire, flame lengths, and fire intensity would be reduced; crown fire potential would be lessened; suppression effectiveness would be increased; and firefighter safety would be improved.



Figure 4. Example of a forest stand following fuels treatment (mastication).

METHODS

Table 2 below lists the maximum extent (in terms of acres) of each type of treatment proposed under the Proposed Project. A more detailed description of each treatment is in the text following the table. A preliminary list of general management requirements and project-specific ‘Design Criteria,’ are also described below and would be required during Proposed Project implementation.

The Proposed Project includes four categories of treatments:

1. Mechanical Fuels Reduction (treatments of surface and ladder fuels);
2. Hand Thinning (brush and small trees),
3. Prescribed Burning; and
4. Aspen Restoration.

Table 2. Proposed Treatment Activities.

Type of Treatment	Description	Treatment Details	Maximum Extent
TREATMENT ACTIVITIES			
Mechanical Fuels Reduction	Mastication, chipping/grinding or crushing ladder and surface fuels. Equipment typically consists of larger horsepower, low ground pressure track laying equipment, similar in some cases to excavators or tractors.	Mastication/pruning only treatments will be implemented on 14,537 acres. An additional Prescribed burning will be implemented within 4,715 acres following mechanical treatments.	19,252 acres
Hand Thinning Brush and Small Trees	Cutting, bucking, lopping, scattering and/or piling of smaller trees (< 10 inches dbh) ^b and brush using chainsaws.	Hand thinning treatments will be utilized wherever mechanical fuels reduction treatments are determined to not be suitable based on field reconnaissance.	4,337 acres
Prescribed Burning	Burning involves ground based or aerial ignition methods to reduce understory fuels.	Fire lines will be constructed where needed to contain the fire. Natural barriers and roads would be utilized as fire containment lines wherever possible. Prescribed burning only treatment will be implemented on 1,888 acres. 4,715 acres will	6,625 acres

Type of Treatment	Description	Treatment Details	Maximum Extent
		be mechanically treated prior to prescribed burning; and 22 acres of prescribed burning will be implemented as part of aspen restoration.	
Aspen Restoration	Remove encroaching conifers and shrubs to reestablish the historic aspen stand edge, enhance stand function, increase the diversity of age classes, and promote aspen growth	Aspen restoration only will be implemented on 172 acres; an additional 22 acres will be treated with prescribed burns as well.	194 acres
SUPPLEMENTAL ACTIVITIES/TREATMENTS			
Pruning	Pruning tree limbs would occur in conjunction with mechanical fuels reduction and hand thinning.	This involves severing all limbs on live trees up to a height of 8 to 12 feet on the bole, while retaining a minimum of 50 percent but not to exceed 50 percent of total tree height.	TBD
Hazard Tree Felling and Removal	Weak and high- risk trees of all sizes (both dead and unstable live trees) identified as an imminent hazard will be felled and may be removed.	Only hazard trees that pose a risk to project activities would be removed. Hazard trees will be identified and assessed using the 2012 Region 5 Hazard Tree Guidelines for Forest Service.	TBD

The most cost efficient and effective treatment or combination of treatments will be chosen for each area based on in-field verification of on-the-ground conditions, suitability, timing, equipment availability, and post-treatment results. Additionally, two supplemental activities/treatments (pruning and hazard tree felling and removal) may be undertaken at select locations where conditions warrant such supplemental activities.

Actions include thinning brush and small trees, removing ladder fuels, pruning residual trees, and removing or compacting the arrangement of surface fuels in order to prepare the landscape for wildfire resilience and prescribed burning. These are simple, cost efficient, and effective fire hazard reduction techniques that will increase the annual acreage of fuels reduction treatments and enable more intensive treatments in key areas. The FPP would also utilize prescribed burning as an initial treatment where site conditions allow.

Mechanical Fuels Reduction

Mechanically reduce live shrubs and small trees generally up to 10 inches dbh. Larger live trees may be masticated where necessary to facilitate machinery movement within the stand. Masticate dead trees up to 16 inches dbh, or larger where necessary to abate an imminent safety hazard. Refer to **Figure 5** for photographs of typical mastication equipment. Mechanical fuels reduction treatments within the prescribed fire treatment areas will only occur where required field surveys have been conducted.

Figure 5. Examples of masticators to be used as part of the Project.



Figure 5a: Example of a boom-type masticator.



Figure 5b: Example of a front-mounted masticator.

- Mechanical fuels reduction would be applied:
 - to slopes less than or equal to 40 percent where feasible;
 - within 0.25 mile of road centerline;
 - where hand treatments are not required or specified;
 - within California spotted owl and northern goshawk Protected Activity Centers (PACs), or portions thereof, that are located within WUI Defense and Threat Zones. Note that all areas within 500 feet of the activity center (nest tree) will be treated by hand, consistent with SNFPA (SNFPA ROD, p.60, #72 and #73);
- No live trees shall be cut that are larger than 10 inches dbh and meet minimum merchantable timber specifications (i.e., would produce at least a 10-foot straight log with 6-inch diameter inside bark at the small end. Lodgepole pine is not considered merchantable for this Proposed Project). Exceptions will be made if such removal is necessary to facilitate machinery movement within the stand.
- On slopes of greater than 40 percent, a tethered mastication system may be implemented where feasible and in accordance with soils standards following site specific review and recommendation by a Forest Service soil specialist. Tethered systems consist of a cable winch mounted on a piece of equipment. The winch system either mounts to the working equipment or it is mounted to another piece of equipment, like a dozer, that also acts as the anchor. When mounted to the working equipment, the winch line is anchored to an anchor point, such as a stump or the base of a standing tree, somewhere on the slope. The mechanical influence of the winch is used for enhanced traction and mobility on steep slopes (often called “traction assist”) or for safety on steep slopes (preventing machine sliding and overturning and reducing soil disturbance).
- Ground fuels will be treated through grinding, machine crushing, or chipping.
- In areas adjacent to roads, a “reach-in and grab” mastication system may be utilized. This system keeps the masticator on the road while the arm reaches off the road to remove or masticate adjacent vegetation and ladder fuels.

Hand Thinning (Brush and Small Trees)

Hand thinning may occur where other treatments are not feasible or where this activity will not conflict with other resource concerns/restrictions.

- Brush and live trees up to 10 inches dbh and dead trees up to 16 inches dbh will be hand-thinned in areas where mechanical fuels reduction treatments are unsuited or prohibited. Larger dead trees may also be removed, if necessary to abate an imminent safety hazard.
- Hand thinning within California spotted owl and northern goshawk PACS outside of the WUI and surrounding activity centers within WUI would target select conifer trees less than 6 inches dbh prior to implementing prescribed fire (SNFPA ROD, p. 60, #74). Outside the WUI, stand-altering activities would be limited to reducing surface and ladder fuels through prescribed fire treatments.
- In forested stands with overstory trees 11 inches dbh and greater, prescribed fire treatments will be designed to promote average flame length of 4 feet or less. Hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh), may be conducted prior to burning as needed to protect important elements of owl habitat.
- Hand thinning may be followed by chipping, lopping and scattering, and/or prescribed burning.

Prescribed Burning

- Implement prescribed burning using ground based or aerial ignition methods to reduce understory fuels. Prescribed understory fire would be prioritized in strategic locations to reduce the risk of large fires within treatment areas and on the surrounding landscape. Prescribed understory burning may take place following mastication or hand thinning, or as a stand-alone treatment.
- Construct hand or machine fire lines where needed to contain the fire. Natural barriers and roads would be utilized as fire containment lines where possible.
- Machine fire lines will only be constructed in areas where adequate Arch surveys have been completed prior to signing this decision.

Aspen Restoration

- Aspen stands will be defined in consultation with the USFS.
- Remove encroaching conifers generally less than 12 inches dbh and shrubs to reestablish the historic aspen stand edge, enhance stand function, increase the diversity of age classes, and promote aspen growth.
- Treatments for aspen may extend beyond the current perimeter of an aspen stand up to (1) 1.5 times the height of aspen trees in the stand (the maximum extent of lateral aspen roots), (2) the distance required to prevent remaining, adjacent conifers from shading the aspen stand and suppressing aspen regeneration, or (3) up to 100 feet (to conduct treatments or process treatment by-products), whichever is greater.
- Utilize hand thinning, ground based mechanical equipment (e.g., masticator, feller buncher, skidder), chipping, lopping and scattering, and/or prescribed burning.
- Mechanical fuels reduction treatments would be applied to stands on slopes generally less than or equal to 40 percent and hand thinning would be applied on slopes generally greater than 40 percent; removing trees generally less than 12 inches dbh.

Supplemental Activities/Treatments

Pruning

Residual trees may be pruned to raise the base height to live crown and to reduce the risk of wildfire or prescribed fire moving into the crowns. Pruning involves severing all limbs on live trees up to a height of 8 feet to 12 feet on the bole, while retaining a minimum of 50 percent but not to exceed 50 percent of total tree height.

Hazard Tree Felling and Removal

Weak and high- risk trees of all sizes (both dead and unstable live trees) identified as an imminent hazard to the implementation of FPP activities will be felled and may be removed. Hazard trees will be identified and assessed using the 2012 Region 5 Hazard Tree Guidelines for Forest Service.

ANTICIPATED TIMING AND EXTENT OF PROPOSED ACTIVITIES

Under Phase 1 of the FPP:

- Between approximately 500 to 2,000 acres of hand treatments and 500 to 2,000 acres of mechanical fuels reduction treatments could be implemented on an annual basis over the next 5 to 6 years and repeated for 10 to 15 years or more, depending on fuel conditions and funding.
- Approximately 10,000 acres or more may be treated with prescribed fire in the next 5 to 6 years.

The actual number of acres treated will largely depend upon the Forest Service and its' partners' staffing and financial capacities.

DESIGN CRITERIA

At the project level the ENF will implement the following Design Criteria relevant to the protection of aquatic resources to avoid or minimize impacts to CRLF or its habitat.

Table 3. Forest Projects Plan (Phase 1) Project-Specific Design Criteria.

Design Criteria ID	Proposed Design Criteria
DC 1	<p>All applicable standards and guidelines described in the Eldorado National Forest Land and Resource Management Plan (USFS 1989), as amended by the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) (USFS 2004) would be followed during project implementation.</p> <p>Mechanical and fuels prescriptions have been designed to be consistent with Forest-wide management standards and guidelines (SNFPA Record of Decision 2004, pages A-49 to A-59), as well as land allocation standards and guidelines for California spotted owl and Northern Goshawk Protected Activity Centers (SNFPA Record of Decision 2004, pages A-59 to A-61), and Riparian Conservation Area RCAs^a and Critical Aquatic Refuges (SNFPA Record of Decision 2004, pages A-62 to A-66).</p> <p>This Proposed Project also incorporates the National Best Management Practices (BMPs) for Water Quality Management on National Forest System Lands (USFS 2012). In addition, there are other applicable, standard policies, and guidelines included in various Forest Service Handbooks, laws, and regulations that would be adhered to throughout implementation of the Proposed Project.</p>

Design Criteria ID	Proposed Design Criteria								
DC 2	All Proposed Project activities would be consistent with Riparian Conservation Objectives (RCO) described in the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (USFS 2004a). and the U.S Fish and Wildlife Service Conservation Measures from the programmatic BO on three federally listed amphibian species, the Sierra Nevada yellow-legged frog, the Northern Distinct Population Segment of the mountain yellow-legged frog, and the Yosemite toad (USFWS 2014).								
DC 3	If federally listed Threatened, Endangered, or Forest Service Sensitive (TES) botanical, aquatic, or terrestrial species are detected during work, operations would cease in that area and the appropriate Forest Service biologist would be informed immediately to determine appropriate actions to take. Before restarting activities, USFWS would be consulted to ensure that measures adequately protect the species.								
DC 6	Storage of fuel or other toxic materials and maintenance of equipment would not occur RCAs ^a .								
DC 7	The table below defines boundaries where mechanical operations are prohibited for the protection of aquatic resources and applies to features identified on map and those found in the field during treatment. Unmapped feature will be treated as Special Aquatic Features ^a .								
	<table border="1"> <thead> <tr> <th data-bbox="350 888 602 957">Aquatic Feature Type</th> <th data-bbox="602 888 1382 957">Require Exclusion Zone/Other Criteria</th> </tr> </thead> <tbody> <tr> <td data-bbox="350 957 602 1047">Perennial and Intermittent Streams</td> <td data-bbox="602 957 1382 1047">No ground-based equipment within 50 feet of the edge of the stream channel. Equipment is allowed to reach into the equipment exclusion zone to masticate vegetation.</td> </tr> <tr> <td data-bbox="350 1047 602 1104">Ephemeral Streams and Draws</td> <td data-bbox="602 1047 1382 1104">No ground-based equipment within 15 feet of the edge of the stream channel or bottom of the draw.</td> </tr> <tr> <td data-bbox="350 1104 602 1163">Special Aquatic Features^a</td> <td data-bbox="602 1104 1382 1163">No ground-based equipment within 50 feet of the edge of the wet area or riparian vegetation, whichever is greater.</td> </tr> </tbody> </table>	Aquatic Feature Type	Require Exclusion Zone/Other Criteria	Perennial and Intermittent Streams	No ground-based equipment within 50 feet of the edge of the stream channel. Equipment is allowed to reach into the equipment exclusion zone to masticate vegetation.	Ephemeral Streams and Draws	No ground-based equipment within 15 feet of the edge of the stream channel or bottom of the draw.	Special Aquatic Features ^a	No ground-based equipment within 50 feet of the edge of the wet area or riparian vegetation, whichever is greater.
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Special Aquatic Features ^a	No ground-based equipment within 50 feet of the edge of the wet area or riparian vegetation, whichever is greater.								
DC 9	If mechanical falling/skidding equipment is used: No new landings would be created in the RCA. Reuse of existing landings within the RCA would be allowed where creation of a new landing is likely to result in more resource damage than use of the existing landing within the RCA.								
DC 10	If mechanical falling/skidding equipment is used: Any skid trails or landings within RCAs would be repaired to restore soil infiltration capacity and soil cover to reduce erosion and may include practices such as, reshaping to restore natural surface flow patterns, installation of drainage control features, decompaction, placement of organic material, and seeding on disturbed soil surfaces. Slash would be added to any skid trails while operations are occurring to facilitate incorporation into the substrate and help stabilize soil.								
DC 11	Ground cover will be maintained at least at 70 percent within 50 to 100 feet from the edge of the stream channel. If the existing ground cover is less than 70 percent, then the existing ground cover will be maintained. Tops, limbs, and small trees within the mechanical exclusion zone can be lopped and scattered to meet ground cover criteria.								
DC 12	At a minimum, an annual review of burning treatment plans will occur with a Forest Service aquatic biologist, terrestrial biologist, and botanist to ensure conditions for Threatened, Endangered or FSS species have not changed and to ensure consistency with USFWS consultation determinations.								

Design Criteria ID	Proposed Design Criteria
DC 13	<p>Ignition of prescribed fires would not occur within 50 feet of any perennial or intermittent stream or Special Aquatic Feature. The ignition exclusion zone would be measured from the edge of the channel or high-water mark of the Special Aquatic Feature or the adjacent riparian vegetation, if present.</p> <ol style="list-style-type: none"> a. Fire would be allowed to back into the exclusion zone b. Ignition may occur within the exclusion zones if it is deemed necessary to maintain control of a prescribed burn or to control burn severity.
DC 14	<p>Prescribed fire containment lines would be rehabilitated to prevent transport of water and sediment to nearby aquatic systems prior to the onset of winter weather or large summer storms.</p>
DC 15	<p>No burn piles shall be placed within meadows, fens, springs, or draws, or within 50 feet from the edge of perennial or intermittent stream channels or riparian vegetation, whichever is greater.</p>
DC 18	<p>Botanical surveys will be conducted for Forest Service Sensitive and for Federally listed or proposed plant species prior to project implementation unless recent surveys (within 5 years) have been conducted. Surveys would be conducted by qualified individuals and adhere to Forest Service standards for botanical surveys as defined by FSH 2609.26. Sensitive plant occurrences will be flagged for avoidance. Site-specific mitigations to avoid impacts to un-surveyed sensitive plant habitat will be approved by Forest Service botanist prior to implementation of project activities. Measures may include flag and avoid, LOPs, hand fell and leave, or remove by reach-in only. Hand thinning and prescribed fire within plant protection areas may occur at the recommendation of the Forest Service botanist.</p>
DC 19	<p>Watch list species encountered during surveys for TEPS plant species will be noted. Protection measures would be developed and approved by the District Ranger for any watch list plant that may qualify as a Forest Service Sensitive species.</p>
DC 20	<p>Burning operations within TEPS plant populations would be designed to produce a low intensity fire. No ignition within occupied habitat would occur unless required to moderate fire intensity.</p>
DC 21	<p>Lava cap plant communities will be protected from motorized equipment and vehicles. All project related equipment and vehicles shall remain on existing road corridors within lava caps; including no parking off road, heavy equipment travel, etc.</p>
DC 22	<p>Where TEPS plant populations occur within or adjacent to thinning units, actions will be taken to limit OHV activity including: scattering materials, placing barricade rock, and/or leaving strategic patches of vegetation to discourage vehicles from driving off designated routes into sensitive plant habitat.</p>
DC 23	<p>Riparian vegetation associated with perennial, ephemeral streams, and other special aquatic features will be avoided during project implementation.</p>

Design Criteria ID	Proposed Design Criteria
DC 29	Invasive plant surveys will be conducted prior to project implementation unless recent surveys (within 5 years) have been conducted. Known invasive plant sites will be flagged prior to implementation and will be avoided as much as possible by conducting all project work outside of flagged exclusion areas. If project activities cannot be completely avoided within flagged infestations, risk minimization strategies shall be employed, such as working in the infested area last, working in infested areas when propagules are not viable, limiting the number of people or equipment within the infestation, and cleaning mechanical and hand equipment, clothing, boots, etc., before moving to other un-infested National Forest System lands.
DC 30	Post-implementation invasive plant surveys shall also be conducted in areas of ground disturbing activities. If found, newly detected or expanding ENF Priority 1 or 2 invasive plants shall be treated in accordance with the design features of the Forest-Wide Treatment of Invasive Plants Project (ENF 2013).
DC 31	All off-road equipment shall be cleaned to ensure it is free of soil, seeds, vegetative matter or other debris before entering National Forest System lands to prevent the introduction or spread of invasive plants. Equipment will be inspected before initial entry and any subsequent re-entries onto the project area. If determined necessary during the inspection, cleaning shall occur at a vehicle washing station or agreed upon cleaning location before the equipment enters or re-enters the project area.
DC 32	Known invasive plant sites in the project area will be flagged prior to implementation and the spread of occurrences will be avoided as much as possible by conducting all project work outside of flagged exclusion areas. If project activities cannot be completely avoided within flagged infestations, risk minimization strategies shall be employed such as working in the infested area last, working in infested areas when propagules are not viable, limiting the number of people or equipment within the infestation, and cleaning mechanical and hand equipment, clothing, boots, etc., before moving to other un-infested National Forest System lands. These areas will be identified on project maps.
DC 50	Downed logs greater than 16 inches in diameter (small end diameter) will be retained during mechanical fuels treatments (i.e., mastication) to the extent practicable.

^aThe Riparian Conservation Area (RCA) is defined as 300 feet on each side of perennial streams and from the edge of special aquatic features (lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs), and 150 feet from each side intermittent and ephemeral streams. For streams, the RCA is measured from the bank full edge of the stream.

V. EXISTING ENVIRONMENT

GENERAL HABITAT DESCRIPTION

Lands proposed for treatment under the FPP are dense with trees of varying size, shrubs, and surface fuels and therefore at risk of loss to wildfire. The dominant forest types within the proposed project landscape are Sierran mixed conifer (27 percent), predominately in the lower elevations (< 6,000 ft), and red fir (26 percent), predominantly in the higher elevations (> 6,000 ft). The dominant seral stage within the Proposed Project area is mid-seral closed (56 percent of the FPP area), followed by late-seral closed (11 percent) and mid-seral open (11 percent). Based on 2019 LiDAR returns, 66 percent of the Proposed Project area has ≥ 50 percent canopy cover.

Mature wildlife forest habitat (e.g., conifer/mixed conifer/hardwood forest types, greater than 24 inches diameter at breast height [dbh], greater than or equal to 40 percent canopy) makes up 11 percent of the Proposed Project area, and immature wildlife forest habitat (e.g., conifer/mixed conifer/hardwood forest types, 11–24 inches dbh, less than 40 percent canopy) makes up 49 percent of the Proposed Project area (USDA 2019).

Seventeen percent of the FPP falls within areas identified as high- risk to high-valued resources and assets, and according to a USFS R5 analysis, 6 percent of the FPP has stand densities considered to be at high risk to mortality from drought, insects, disease, and wildfire (USDA 2021(b)). According to fire modeling inputs used in the ACCG 2020 wildfire risk assessment, 6 percent of the FPP falls within areas predicted to have high-intensity wildfire.

Riparian woodlands composed of deciduous trees and shrubs can be found along perennial and some intermittent watercourses. Aspen forests are also present. In California, aspen habitats are typically confined to areas of above average soil moisture, such as stream banks, meadows, springs, and subsurface water sources (Sheppard et al 2006).

Two fens have been previously identified in the Analysis Area. One (the Onion Valley fen) is located within an area proposed for mechanical fuels treatment. A fen is defined as an ecosystem with hydric soils and an accumulation of peat in the uppermost layer (approximately 1 meter [3.3 feet]). Compared to other habitats, fens support a disproportionately large number of rare vascular and nonvascular plant species in the Sierra Nevada, underscoring the importance of these habitats for regional biological diversity.

A review of ENF data indicates that 71 distinct lava cap habitats totaling approximately 320 acres have been previously identified in the Analysis Area. Approximately 78 acres of lava cap habitat lies within areas proposed for treatment. Lava caps are unique habitats that are typically on ridgetops formed by pre-historic volcanic mudflows (Mehrten formation), defined by sparse tree and shrubs and generally dominated by slow growing shrub and forb species such as *Eriogonum prattenianum* var. *prattenianum*, *Toxicoscordion venenosus*, *Erythranthe bicolor*, *Limnanthes alba*, *Allium obtusum*, *Sanicula tuberosa*, and *Triteleia ixioides*. Lava caps are characterized by a higher level of plant diversity than much of the surrounding landscape and also provide suitable habitat for FSS plants including Pleasant Valley mariposa lily and Kellogg's lewisia.

PREVIOUS SURVEYS AND KNOWN FOREST SERVICE SENSITIVE PLANT OCCURRENCES

The following information is based on ENF botanical survey data for 2008 through 2021. Approximately 8,859 acres of the total 25,671 acres proposed for treatment has been previously surveyed for FSS plants (approximately 35 percent). Of this, approximately 1,381 acres have been surveyed in the past 5 years (i.e., since 2017). Refer to **Map 5** for the location of recent (2017 to 2021) botanical surveys in the Project Area. Note that Map 5 portrays survey areas as both a polygon showing the full extent of survey and a centroid (dot) at the center of the survey area. Because survey areas are small in relation to the scale of the map, the polygon is generally smaller than and not visible beyond the centroid.

Seven FSS plant species have been identified in the immediate vicinity of the FPP (i.e., within 200 feet of proposed treatment area): *Botrychium crenulatum*, *B. minganense*, *B. montanum*, *Calochortus clavatus* var. *avius*, *Peltigera gowardii*, *Lewisia kelloggii* ssp. *hutchisonii*, and *L. kelloggii* ssp. *kelloggii*. Refer to **Table 4** for a list of FSS plant population known to occur within 200 feet of the FPP, date of most recent survey, and whether the population overlaps with a proposed treatment area. **Map 6** provides the location of FSS plants populations within the Project Area.

Table 4. Special-Status Plant Populations in or Adjacent to (within 200 feet of) Proposed FPP Treatments.

Species (Population ID)	Date of Most Recent Survey	X = Population Overlaps with Proposed Treatment Area
<i>Botrychium crenulatum</i>		
BOCR_003-01	9/24/2015	X
BOCR_004-01	7/20/2016	
BOCR_004-02	7/20/2016	
BOCR_012-01	8/8/2017	X
BOCR_013-01	8/8/2017	X
BOCR_020-01	7/30/2019	X
<i>Botrychium minganense</i>		
BOMI_006-01	7/16/2019	
BOMI_006-02	8/19/2016	
BOMI_008-01	8/25/2016	X
BOMI_009-01	8/25/2016	X
BOMI_009-02	8/25/2016	X
BOMI_009-03	8/25/2016	X
BOMI_009-04	8/25/2016	X
BOMI_009-05	8/25/2016	X
BOMI_021-01	8/8/2017	X
BOMI_034-01	7/30/2019	X
<i>Botrychium montanum</i>		
BOMO_006-01	9/21/2015	X
BOMO_007-01	8/19/2016	
BOMO_007-02	8/19/2016	
BOMO_017-01	7/19/2019	X
<i>Calochortus clavatus var. avius</i>		
CACLA_004-01	6/23/2021	
CACLA_027-01	6/12/1995	X
CACLA_027-02	7/28/2020	X
CACLA_028-01	7/29/2020	
CACLA_028-02	7/29/2020	
CACLA_043-01	8/14/2019	X
CACLA_043-02	6/12/2015	X
CACLA_050-01	4/25/2018	X
CACLA_058-01	5/23/2018	X
CACLA_058-02	5/23/2018	X
CACLA_061-01	5/1/2006	X
CACLA_066-02	5/2/2001	X
CACLA_146-01	6/10/2015	
CACLA_147-01	6/15/2015	X
CACLA_149-01	6/24/2021	X
<i>Peltigera gowardii</i>		
HYVE7_011-01	8/18/2009	X
HYVE7_017-01	10/24/2013	X
HYVE7_018-01	8/17/2015	X
HYVE7_018-02	8/17/2015	X
HYVE7_018-03	8/17/2015	X
HYVE7_019-01	7/30/2015	X
HYVE7_025-01	6/16/2021	X
HYVE7_025-02	6/16/2021	

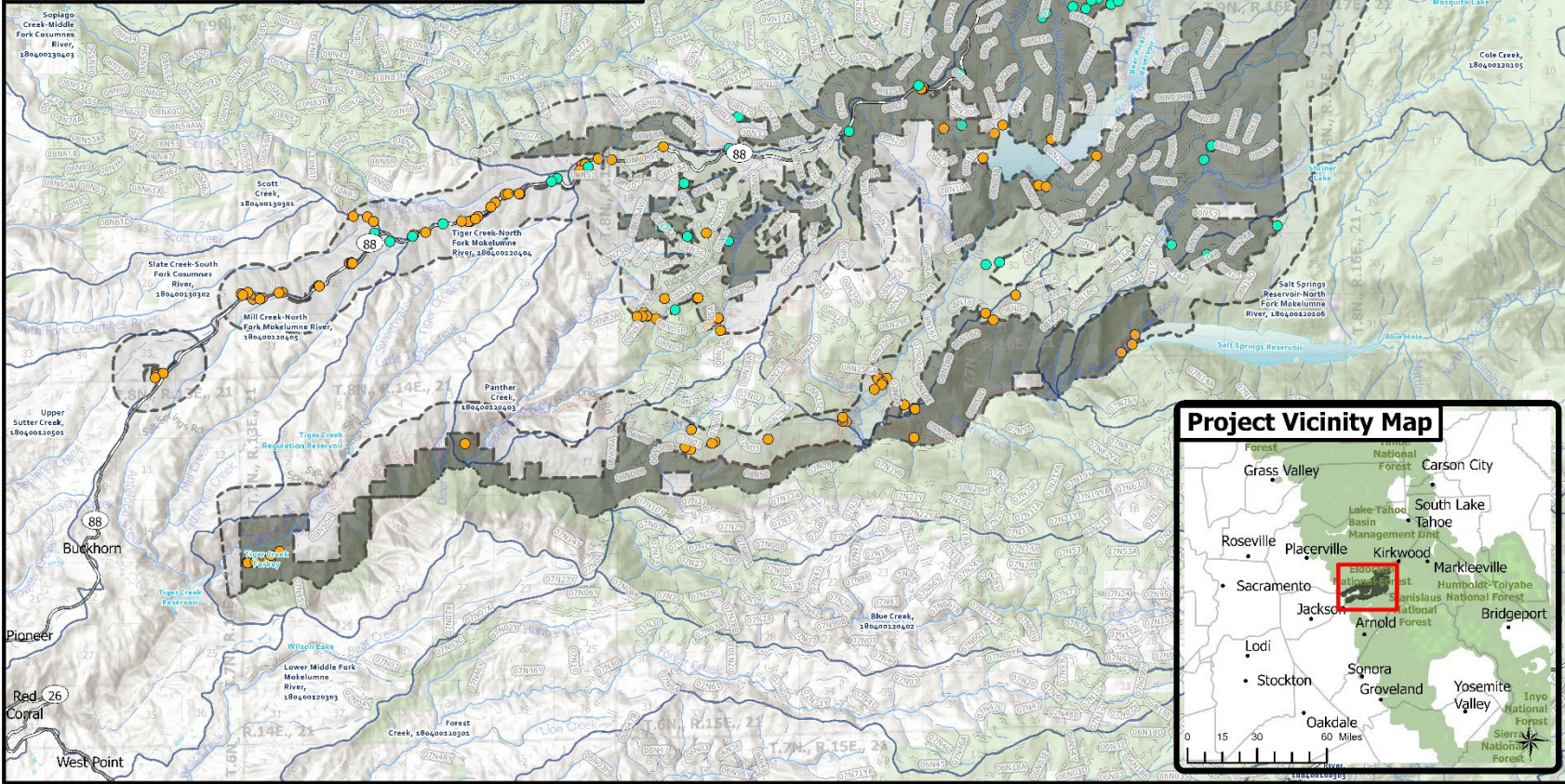
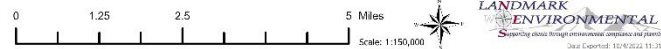
Species (Population ID)	Date of Most Recent Survey	X = Population Overlaps with Proposed Treatment Area
<i>Lewisia kelloggii (no subspecies noted)</i>		
LEKE_058-01	6/24/2020	X
<i>Lewisia kelloggii ssp. hutchisonii</i>		
LEKE_013-01	5/19/2017	
LEKE_014-01	5/13/2021	X
LEKEH_024-01	6/3/2016	
LEKEH_025-01	6/8/2021	X
LEKEH_027-02	6/25/2016	
LEKEH_034-01	6/1/2018	X
LEKEH_041-01	6/25/2016	X
LEKEH_044-01	6/2/2017	X
LEKEH_045-01	6/22/2017	X
LEKEH_045-02	5/17/2018	X
LEKEH_045-03	6/22/2017	X
LEKEH_045-04	5/17/2018	X
LEKEH_045-05	6/21/2019	X
LEKEH_045-06	6/21/2019	X
LEKEH_045-07	6/21/2019	
LEKEH_050-01	6/21/2019	X
LEKEH_050-02	6/21/2019	X
LEKEH_051-01	6/8/2021	X
LEKEH_051-02	6/8/2021	X
LEKEH_052-01	6/8/2021	X
LEKEH_058-02	6/4/2020	X
LEKEH_058-03	6/5/2020	X
<i>Lewisia kelloggii ssp. kelloggii</i>		
LEKE_009-01	6/3/2021	
LEKE_020-01	7/6/2021	X
LEKE_020-02	6/8/2021	X
LEKE_021-01	7/1/2011	X

Forest Projects Plan (FPP), Phase 1
 Eldorado National Forest -- Amador Ranger District
Map 2. Location of Recent Sensitive & Invasive Plant Surveys (2017-2021) in the FPP Phase 1 Analysis Area.



Legend

- Analysis Extent
- Treatment Area
- Sensitive Plant Surveys
- Invasive Plant Surveys
- National Forest
- Non-National Forest
- HUC12 Subwatershed
- Perennial Stream
- Intermittent Stream
- Waterbody
- Highway
- Township & Section



Forest Projects Plan (FPP), Phase 1

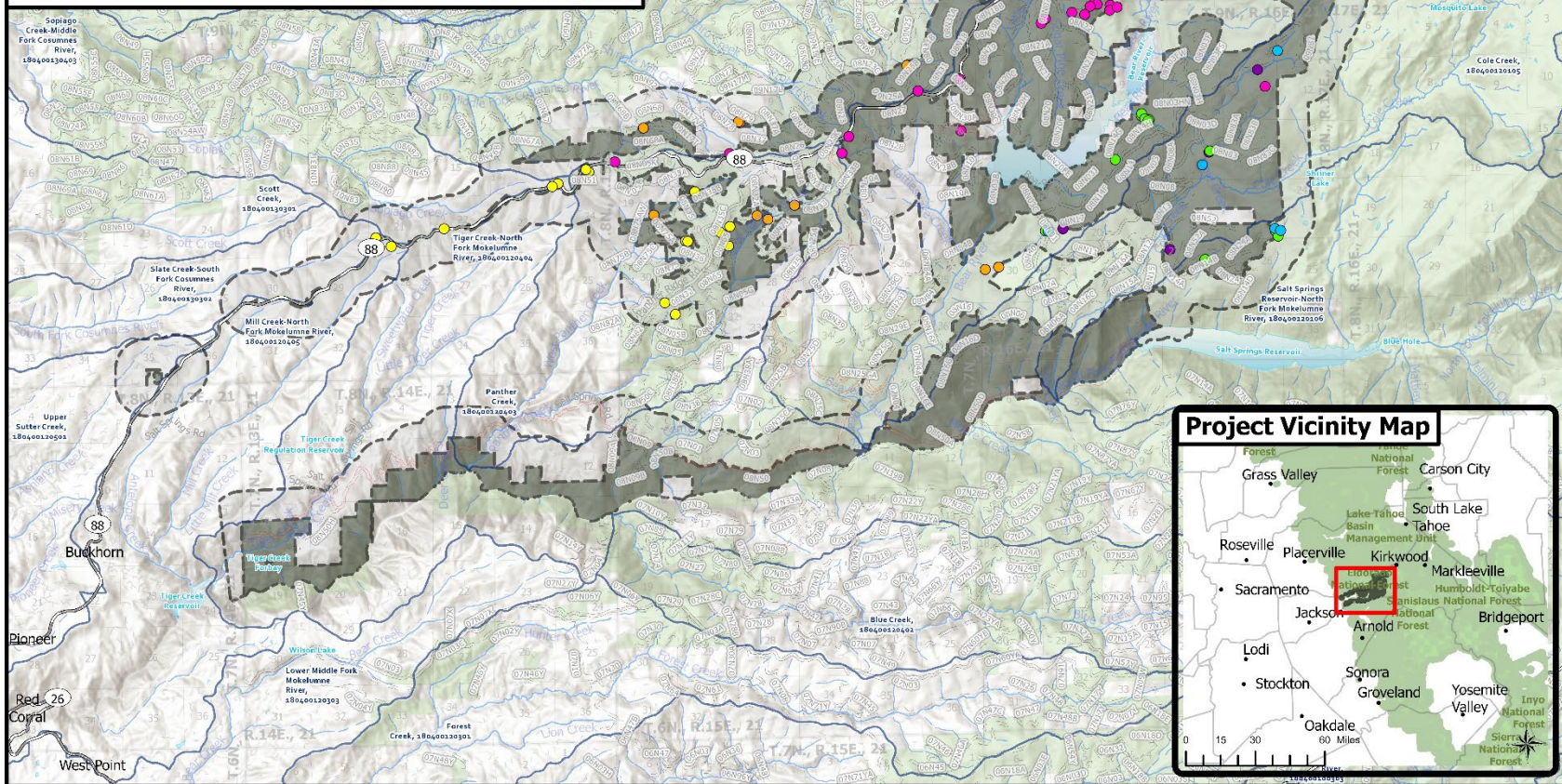
Eldorado National Forest -- Amador Ranger District

Map 3. Location of Sensitive Plant Species in the FPP Phase 1 Analysis Area.



Legend

- Analysis Extent
- Treatment Area
- Sensitive Plant Species**
 - clubhair mariposa lily
 - hydrothyrilla lichen
 - Kellogg's lewisia
 - Mingan moonwort
 - mountain moonwort
 - scalloped moonwort
- National Forest
- Non-National Forest
- HUC12 Subwatershed
- Perennial Stream
- Intermittent Stream
- Waterbody
- Highway
- Township & Section



FOREST SERVICE SENSITIVE PLANT SPECIES

Provided below is life history information for FSS species that are known to occur or for which appropriate habitat is present in the Project area.

THREE-BRACTED ONION (ALLIUM TRIBRACTEATUM)

Three-bracted onion is known only from 36 occurrences in Calaveras and Tuolumne counties, and only found in the Stanislaus National Forest. It occurs on thin volcanic soils along the ridges near Crandall Peak and along Highway 108 in Tuolumne County. Since adding the species to the ENF sensitive plant list in 2006 the onion has not been found on the forest. One occurrence has been confirmed on rhyolite on private land near Wilseyville in Calaveras County. This indicates a larger range than was previously known and that this species may occur on the ENF. Populations range in size from 5 to approximately 10,000 individuals.

Three-bracted onion is found in lower and upper montane coniferous forests on gravelly lahar (volcanic mud flow soils, often referred to as "lava caps"). This habitat is open and very vulnerable to disturbance. Threats to three-bracted onion include disturbance from roads, OHV trails, timber landings, skid trails, Helitack base construction, garbage dumps, underground utility lines, utility pole maintenance, and camping locations.

MOONWORTS (BOTRYCHIUM SPP.)

Botrychium species are widely distributed in North America and elsewhere. In California they occur infrequently in a variety of moist habitats throughout the Sierra Nevada and other portions of the state. Most moonwort species show a marked affinity for neutral substrates with high mineral content, especially soils developed on limestone bedrock or otherwise containing high calcium content. High elevation habitats suitably moist and cool are abundant throughout the Sierra Nevada and northern California mountains, but these mountains are mostly composed of granites, volcanics, and crustal basalts not rich in soluble calcium. However, leaf litter from incense cedar may favorably modify soils for some moonworts.

Documentation of population numbers and distribution patterns are incomplete largely because members of this genus are difficult to distinguish, and very uncommon and sporadic in distribution (Wagner and Wagner, 1993). These species appear sensitive to activities such as grazing, trampling, logging, and recreational activities such as OHV use.

Seven species of moonworts are listed as FSS species. They were listed as a group because 1) most species in this genus are rare in California; 2) individual species are very difficult to distinguish from each other; and 3) all have similar habitat preferences (wet or moist soils such as in meadows and fens or along the edges of lakes and streams). From the CNPS online inventory (CNPS, 2022):

1. Upswept moonwort (*Botrychium ascendens*): lower montane coniferous forest, meadows, seeps, 4,900 to over 7,500 feet
2. Scalloped moonwort (*Botrychium crenulatum*): Fens, lower montane coniferous forest, meadows, seeps, freshwater marshes, 4,900 to over 10,500 feet
3. Common moonwort (*Botrychium lunaria*): Meadows, seeps, subalpine and upper montane coniferous forest, 7,450 to over 11,000 feet
4. Mingan moonwort (*Botrychium minganense*): Fens, lower and upper montane coniferous forest, 4,900 to 6,750 feet.
5. Mountain moonwort (*Botrychium montanum*): Lower and upper montane coniferous forest, meadows, seeps, 4,900 to 7,000 feet.
6. Paradox moonwort (*Botrychium paradoxum*): Lower and upper montane coniferous forest and meadows.

7. Stalked moonwort (*Botrychium pedunculosum*): Lower and upper montane coniferous forest and meadow.

Threats to moonworts are defined as actions that alter existing site characteristics, including actions that would change the microclimate, canopy coverage, hydrology, or mycorrhizal association on a site from the regime that has supported a given population. Potential actions that could alter site condition include timber harvest, firewood cutting, fire suppression, road widening and maintenance activities, livestock grazing, invasive plant establishment, herbicide use, and recreational activity (camping and off-road vehicle driving).

BOLANDER'S BRUCHIA (BRUCHIA BOLANDERI)

Bolander's bruchia moss grows in meadows and fens in montane and subalpine communities from about 5,500 to 9,000 feet. This species grows in ephemeral habitats such as erosional ditches or small streamlets through wet meadows. Possible threats to this species include fuel reduction projects, trampling, and recreational activities. This species is not listed under the state or federal endangered species act. California Native Plant Society considers this plant to have limited distribution and is considered fairly threatened in California (CNPS 4.2).

PLEASANT VALLEY MARIPOSA LILY (CALOCHORTUS CLAVATUS VAR. AVIUS)

Pleasant Valley mariposa lily (Jepson Flora Project, 2022; USDA FS, 2004b) is known almost exclusively from El Dorado and Amador counties in the area between Union Valley Reservoir and the North Fork of the Mokelumne River, with exceptions in Calaveras and Mariposa Counties. One hundred thirty nine occurrences have been documented within a roughly 420 square-mile area. Of the 120 occurrences wholly or partly on NFS land, ten are believed to have been extirpated. Population size ranges from a few plants into the thousands. This species is only known from ENF and private land, no other National Forest have found occurrences.

The elevation of known occurrences ranges from 900 to 5,800 feet; however, *Calochortus clavatus var. avius* is most often found on gravelly lahar and openings in mixed-conifer on south-facing canyon slopes, spurs, and ridges in sparse stands of conifers, oaks, and manzanita and/or bear clover (*Chamaebatia foliolosa*) in mixed-conifer and ponderosa pine forests between 2,500 to 5,700 feet. The openings typically have rocky soils, with rocks and cobbles apparent at the surface. Plants often are found at the edge of openings, adjacent to or within shrubs. Aggregates of occurrences are found along east-west trending ridges that possess numerous south-facing spurs.

Plants of this perennial bulb may remain dormant in some years, or plants may emerge vegetatively but then enter dormancy without flowering. Post-fire numbers within occurrences may increase but the majority of plants are suppressed adults that are released rather than new plants (Walker, pers. comm., 2011). Populations do not readily expand. Seedlings that have been observed (e.g., post-fire) generally do not become established or reappear in subsequent years (Taylor, pers. comm., 2011).

Threats include OHV activities, road/highway construction and expansion, fire line construction, and residential and agricultural development at lower elevations.

MOUNTAIN LADY'S SLIPPER (CYPRIPEDIUM MONTANUM)

Mountain lady's slipper is an uncommon orchid in California. It grows from Alaska to California and east to Montana. In California, it reaches as far south as Santa Cruz County along the coast and Madera County in the Sierra Nevada. The species is known from the Stanislaus and Plumas NF, but has not been documented on the Tahoe NF. On the ENF, one occurrence is located on a private land inholding within the Amador Ranger District.

Mountain lady's slipper grows in both moist and dry conditions at elevations between 600 and 6,700 feet, although less common above 4,800 feet. It grows in moist sites near streams or sometimes near the edge of small seeps but also in relatively dry conditions on hillsides in mixed conifer forests. The one population within the ENF is on a private inholding and has northwest and northeast aspects and is located at an elevation of 5,200 feet. Potential habitat is extensive across the ENF and in the proposed project area. Surveys for this species have been ongoing since 1998 on the ENF yet no occurrences have been found on the Forest.

High intensity fires are one of the greatest threats to mountain lady's slippers. This threat ranked highest in the statewide threat analysis (R5 Conservation assessment) and is supported by research and literature. Mountain lady's slippers are intolerant to fires that burn through the litter layer above mineral soil. The species may tolerate less intense fires that do not eliminate the duff layer and leave the forest canopy fully or partially intact. Heavy fuel loads may pose a threat to many populations by increasing the risk of intense fire. Large scale fires could result in significant negative effects to multiple populations of these species.

In addition to fire, mechanical disturbance, timber harvest, and construction of fire lines could threaten occurrences of mountain lady's slipper orchid. Disturbances that affect the duff and litter layer or the structure of the upper soil horizons may, in turn, affect the rhizomes of these species. Activities that remove the forest canopy may also affect plants and populations. Such mechanical disturbances ranked second statewide in the threat analysis, and include timber harvest activities, construction of fire lines, culvert relocation, and other ground disturbing activities. A high ranking of this disturbance is consistent with information on the species responses to rhizome disturbance and forest canopy removal.

BRANCHED COLLYBIA (*DENDROCOLLYBIA RACEMOSA*)

Branched collybia occurs in Clallam, Jefferson, King, Okanogan, Pierce, Snohomish, and Thurston counties in Washington, in Clackamas, Douglas, Jackson, Josephine and Land counties in Oregon, and in California in Del Norte, Humboldt, Trinity, Siskiyou, Mendocino, Marin, Napa, (Castellano et al. 2003), Placer, Nevada, Tuolumne, and Yuba Counties. Occurrences are very patchy and dependent on the presence of the intended host (decayed mushrooms) within forested areas.

In general, this fungus is solitary or occurs in small groups growing from a grain-like sclerotium on the decayed remains of other mushrooms, or in duff of mixed hardwood-conifer woods; fruiting from late fall to mid-winter. *Dendrocollybia racemosa* is mycoparasitic and fruits after rapidly digesting its host; it also develops protective sclerotia that are assumed to enable it to lie dormant for long periods. Presumably, this species is vulnerable to removal of the host mushroom and substrate prior to fruiting or sclerotia formation, to removal or destruction of the sclerotia within the litter and mushroom residue, and to destruction of the habitat that fosters growth of the intended host. It is also presumably vulnerable to alteration of the microhabitat and microclimate regimes, incidental catastrophic events and logging activities that would displace the protective sclerotia and/or host mushroom population. Habitat information from 2011 occurrences indicated an affiliation with Douglas-fir forests with California hazel as an associated species. Stand age ranged from mid-mature to old-growth; timber harvest was evident in three of the six occurrences.

YELLOW-LIP PANSY MONKEYFLOWER (*DIPLACUS PULCHELLUS*)

Habitat for this annual plant is vernal wet to moist sites which are open and flat or slightly sloping. The plant is typically found on lava caps but soils can be clay, volcanic, or granitic. It sometimes grows in disturbed areas within lavacaps. Its elevation range is 2,200 to 6,400 feet. The only known occurrence of this species on the ENF was discovered in the Scottiago project area in 2016. This species is threatened by vehicles, logging, non-native plants, and grazing, and potentially threatened by development.

KELLOGG'S AND HUTCHISON'S LEWISIA (*LEWISIA KELLOGGII* SSP. *KELLOGGII* AND SSP. *HUTCHISONII*)

Kellogg's and Hutchison's lewisia were added to the ENF FSS plant list in 2006 after researchers separated the species from those plants occurring in Idaho from plants occurring in California (Wilson et al. 2005). The plants in Idaho have been renamed as *Lewisia sacajaweanana*. The change makes *L. k. ssp. kelloggii* and *L. k. ssp. hutchisonii* endemic to California.

There are approximately 56 occurrences on five National Forests in California; Eldorado, Lassen, Plumas, Stanislaus, and Tahoe (CNDDDB 2015). This plant is endemic to Butte, Siskiyou, Sierra, Plumas, Nevada, El Dorado and Amador Counties in California (CNPS 2015). Site elevations range from 5,100 to 7,000 feet. The northern most occurrences are known from the Lassen NF recorded by Dempster and Janeway but the number of plants was not clearly noted. The largest occurrence on the ENF (5,000 plus plants) is one of the most southern sites, located in the vicinity of Mokelumne Wilderness area (ENF, 2015a). Additional *Lewisia kelloggii* occurrences are also known on the ENF. How many of these are *ssp. hutchisonii* and how many are *ssp. kelloggii* needs to be determined during future field work. For the purposes of this analysis this subspecies determination is not of great consequence as both subspecies are R5 designated as FSS.

Kellogg's and Hutchison's lewisia usually occur on ridgetops or relatively flat open areas with widely spaced trees in partial to full sun; elevations range from 5,100 to 7,000 feet. Most soils are reported to be excessively drained sandy granitic to erosive volcanic with granitic boulders. Kellogg's and Hutchison's lewisia are spring ephemeral perennial herb, thus the survey window for the species is restricted to June and July when the plants produce fleshy leaves and flowers. After flowering the succulent portion of the pedicel shrinks down, pulling the flower below ground level. This feature of the plant's biology limits the survey window for Kellogg's and Hutchison's Lewisia to the summer months when the plant is flowering.

Threats include road maintenance, fuel reduction projects, and significant risk from off-highway vehicles since they travel easily across the flat, open habitat of where Kellogg's lewisia often occurs. Other potential threats include camping; hiking and other activities that compact soil and/or trample plants. Native plant gathering for traditional uses may affect some populations. Plants are most susceptible to impact from trampling during the spring months before the plant becomes dormant. During dormancy the plant can tolerate some disturbance as it is under the soil surface and relatively protected from trampling and other direct impacts.

ADDER'S TONGUE (*OPHIOGLOSSUM PUSILLUM*)

CNPS inventory notes only four occurrences in California in El Dorado, Lake, Mendocino, and Siskiyou counties (2015). On the ENF the one known occurrence was recorded on SPI lands near Loon Lake (ENF, 2015a). *Ophioglossum pusillum* is known to occur in wet seeps and springs, meadows, and edges of ponds (3,700-6,200 feet). Like the *Botrychium* species, this cryptic fern is likely to be easily overlooked in wet meadows and other potential habitat. Threats include grazing, trampling, logging, and recreational activities such as OHV use.

VEINED WATER LICHEN (*PELTIGERA GOWARDII*)

Peltigera gowardii is the western equivalent of *Peltigera hydrothyria* (Lendemer and O'Brien 2011). It is considered a western North America endemic extending from central/northern California northward to Oregon, Washington, and British Columbia with disjunct populations in Idaho and southern Alaska. It is considered rare throughout its western range (McCune et al. 2006 IN: Lendemer and O'Brien 2011). Veined water lichen is infrequently reported. Where populations occur, the number of individuals are generally few. Surveys for this species have been conducted in support of projects on the ENF since 2006 when this lichen was added to the ENF FSS plant list. In 2008 multiple populations of *Peltigera hydrothyria* were discovered on the ENF growing within the stream channel of Cat, Anderson, and Mehrten creeks (tributaries to the Middle Fork of the Cosumnes River).

Additional populations were found in 2009 in Dark Canyon Creek, tributaries to Cat Creek and two unnamed tributaries to the North Fork Cosumnes River. There are currently 17 known occurrences on the ENF. Across California there are 80 known occurrences across the Plumas, Eldorado, Stanislaus, Mendocino, Six Rivers, Klamath, Inyo, Sierra, Sequoia and LTBMU (R5 USFS, 2010).

Within the Sierra Nevada, this species is found in cold, unpolluted streams (or in the spray zone) in mixed conifer forests between 2,500 and 8,000 ft. It grows on rock (usually large rocks and bedrock); in shade (McCune et al. 2006, Glavich 2009 IN: Lendemmer and O'Brien 2011). The water is very clear and peak flows are not of the intensity that would lead to scouring. According to the 2010 R5 Conservation Assessment, *P. hydrothyria* is known almost exclusively from streams with little sedimentation or scouring. During high water events, scouring might occur from gravel and rock movement, or even from sediment abrasion. The thin, gelatinous thallus of *P. hydrothyria* is presumably quickly abraded or completely removed from substrates during such events. Sedimentation may also be detrimental to *P. hydrothyria* colonies by physically covering thalli, reducing photosynthesis. Watershed-disturbing activities leading to sedimentation at, and above occurrence sites can threaten populations. The streamlets have a rich aquatic bryophyte flora and are rarely more than 8 inches deep with little seasonal variation in water levels.

Threats include any management activity that would kill plants, change the shade component of the habitat, or reduce/damage water quality/clear water. *P. hydrothyria* populations are known to correspond to habitat characteristics outside of the stream channel, including canopy cover (shading) and presence of old growth forest. The relevant characteristics of old growth forests are uncertain and may overlap the canopy cover relationship in that they both tend to increase shading. Management activities that affect forest structure around known occurrences, particularly when altering the shading of the stream, could be detrimental to *P. hydrothyria* populations. Wildfire may be a localized threat to *P. hydrothyria* populations in multiple ways. Wildfire may directly impact canopy cover shading populations, may increase sedimentation through removal of vegetation and reduction of duff, may increase nutrient runoff, and may even alter watershed hydrology.

Global climate change is expected to warm air temperatures in California, which could subsequently warm water temperatures and impact habitat for the aquatic lichen. Additionally, snow-pack in the Sierra Nevada is expected to decrease, which could allow stream water temperatures to increase and reduce stream flows rapidly during summers. Given the current trajectory of air temperatures, stream temperatures are likely rising throughout the Sierra and if the trend continues, *P. hydrothyria* could be significantly impacted at a regional scale (USDA R5, 2010).

Aquatic noxious weeds of concern for aquatic veined lichen on the ENF include Didymo (*Didymosphenia geminate*), parrots feather (*Myriophyllum aquaticum*), hydrilla (*Hydrilla verticillata*), and Eurasian milfoil (*Myriophyllum spicatum*). Of particular concern for veined aquatic lichen is the potential invasion of occupied streams by Didymo. Didymo has been noted in a number of rivers in the Sierra Nevada including the Feather River, the South Fork of the American River, and the Rubicon River and is generally spread by anglers. The spread of this invasive algae would likely be detrimental to veined aquatic lichen since the algae covers rocks and streambeds where the lichen is known to occur.

OLIVE PHAEOCOLLYBIA (*PHAEOCOLLYBIA OLIVACEA*)

Olive phaeocollybia is a mushroom that inhabits conifer and hardwood forests, where individuals are found scattered or in arcs in the humus layer (Castellano et al. 2003). The species is endemic to the western United States from the central Oregon coast south to Santa Cruz County (Castellano et al. 2003). The cap is uniformly olive and between 40 to 110 millimeters (1.6 to 4.3 inches) in diameter; and the stem is up to 200 millimeters (7.9

inches) long (Castellano et al. 2003). Threats include disturbance from intense logging (e.g., clear-cut or patch-cut).

SPECIAL INTEREST PLANTS AND PLANT COMMUNITIES

Refer to **Appendix A**, for information on Special Interest Species (watch list species) and plant communities within the FPP.

NOXIOUS WEEDS

Refer to **Appendix B** for the Noxious Weed Risk Assessment for the Proposed Project. Implementation of Design Criteria DC 29, DC 30, DC 31, and DC 32 should minimize the likelihood of project activities enhancing or spreading invasive species into the proposed project area.

VI. EFFECTS ANALYSIS

ANALYSIS AREA DEFINED

This analysis addresses activities and actions associated within the FPP on the ENF. The cumulative effects for botany are bound in time by the first botany records on the ENF (early 1980's) and cover all proposed activities that are likely to occur in the Project area during the next 5 years. The spatial extent of the analysis includes all known and potential occurrences found within the area of the proposed project.

DIRECT AND INDIRECT EFFECTS FOR KNOWN FOREST SERVICE SENSITIVE PLANTS

Under the FPP, various methods would be utilized to restore wildlife habitats within approximately 25,671 acres, including mechanical fuels reduction, hand thinning, prescribed burning, and aspen restoration. A number of known FSS plant populations are located in areas where mechanical fuels reduction, hand thinning, and prescribed burning will occur. There are no known populations of FSS plants in areas where aspen restoration will occur. However, aspen stands are biologically diverse, and sensitive plants may potentially be present in areas proposed for restoration. Provided below is a discussion of discussion of potential effects to FSS plants resulting from implementation of mechanical fuels reduction, hand thinning, prescribed burning, and aspen restoration.

MECHANICAL FUELS REDUCTION, HAND THINNING, AND ASSOCIATED ACTIVITIES

The FPP includes mechanical fuels reduction and hand thinning treatments and associated activities within approximately 19,252 acres. Mechanical fuels reduction would include mastication, chipping/grinding or crushing ladder and surface fuels using larger horsepower, low ground pressure track laying equipment. Hand thinning may occur in areas where use of mechanical equipment is not allowed or is not feasible (e.g., on steep slopes or in riparian exclusion areas). Pruning and hazard tree removal would also be implemented, as needed. **Table 5** provides a list of FSS plant populations that are present in areas where mechanical fuels reduction and hand thinning activities would be implemented.

Table 5. Forest Service Sensitive Plant Populations Present in Proposed FPP Treatment Areas.

Species (Population ID)	Proposed Treatment Type			
	Mechanical Fuels Reduction	Hand Thinning	Prescribed Burning	Aspen Restoration
<i>Botrychium crenulatum</i>				
BOCR_003-01	X			

Species (Population ID)	Proposed Treatment Type			
	Mechanical Fuels Reduction	Hand Thinning	Prescribed Burning	Aspen Restoration
BOCR_012-01	X			
BOCR_013-01	X			
BOCR_020-01	X			
<i>Botrychium minganense</i>				
BOMI_008-01	X			
BOMI_009-01	X			
BOMI_009-02	X			
BOMI_009-03	X			
BOMI_009-04	X			
BOMI_009-05	X			
BOMI_021-01	X			
BOMI_034-01	X			
<i>Botrychium montanum</i>				
BOMO_006-01	X			
BOMO_017-01	X			
<i>Calochortus clavatus var. avius</i>				
CACLA_027-01	X			
CACLA_027-02	X			
CACLA_043-01	X			
CACLA_043-02	X			
CACLA_050-01	X			
CACLA_058-01	X			
CACLA_058-02	X			
CACLA_061-01	X			
CACLA_066-02	X			
CACLA_147-01	X			
CACLA_149-01	X			
<i>Peltigera gowardii</i>				
HYVE7_011-01	X			
HYVE7_017-01		X		
HYVE7_018-01	X			
HYVE7_018-02	X			
HYVE7_018-03	X			
HYVE7_019-01	X			
HYVE7_025-01	X			
<i>Lewisia kelloggii</i>				
LEKE_058-01	X			
<i>Lewisia kelloggii ssp. hutchisonii</i>				
LEKE_014-01	X		X	
LEKEH_025-01			X	
LEKEH_034-01	X			
LEKEH_041-01	X			
LEKEH_044-01	X			
LEKEH_045-01	X		X	
LEKEH_045-02	X		X	
LEKEH_045-03	X		X	
LEKEH_045-04	X		X	
LEKEH_045-05	X		X	
LEKEH_045-06	X		X	

Species (Population ID)	Proposed Treatment Type			
	Mechanical Fuels Reduction	Hand Thinning	Prescribed Burning	Aspen Restoration
LEKEH_050-01	X		X	
LEKEH_050-02	X		X	
LEKEH_051-01	X		X	
LEKEH_051-02	X		X	
LEKEH_052-01	X			
LEKEH_058-02	X			
LEKEH_058-03	X			
<i>Lewisia kelloggii ssp. kelloggii</i>				
LEKE_020-01	X		X	
LEKE_020-02	X		X	
LEKE_021-01	X		X	

Impacts to FSS terrestrial plants (e.g., *Botrychium* species, *Calochortus clavatus* var. *avius*, and the *Lewisia* species) could occur if mechanical equipment damage or uproot sensitive plants, compact soil, or alter overstory conditions. Plants could also be damaged by trampling or felling of trees in hand thinning areas. FSS aquatic plants (i.e., *Peltigera gowardii*) could potentially be adversely impacted by reductions in canopy cover or degradation of water quality (increased erosions and sedimentation).

The following Design Criteria will be implemented to avoid direct effects to all FSS plants (both terrestrial and aquatic) in the vicinity of proposed mechanical fuels treatments:

- **DC 18** Botanical surveys will be conducted for FSS and for federally listed or proposed plant species prior to project implementation unless recent surveys (within 5 years) have been conducted. Surveys would be conducted by qualified individuals and adhere to Forest Service standards for botanical surveys as defined by FSH 2609.26. Sensitive plant occurrences will be flagged for avoidance. Site-specific mitigations to avoid impacts to un-surveyed Sensitive plant habitat will be approved by Forest Service botanist prior to implementation of project activities. Mitigations may include flag and avoid, LOPs, hand fell and leave, or remove by reach-in only. Hand thinning and prescribed fire within plant protection areas may occur at the recommendation of the Forest Service botanist.
- **DC 3** If TEPS botanical, aquatic, or terrestrial species are detected during work, operations would cease in that area and the appropriate biologist would be informed immediately to determine appropriate actions to take. Before restarting activities, consultation may need to be initiated with USFWS for listed species.
- **DC 22** Where TEPS plant populations occur within or adjacent to thinning units, actions will be taken to limit OHV activity including: scattering materials, placing barricade rock, and/or leaving strategic patches of vegetation to discourage vehicles from driving off designated routes into sensitive plant habitat.

Both *Calochortus clavatus* var. *avius* and the *Lewisia* species are known to occur on lava caps. Implementation of **DC 21**, which excludes use of motorized equipment and vehicles within lava caps, may therefore further protect these species.

Peltigera gowardii populations are known to occur in proposed treatment areas in the Panther Creek watershed (East and West Panther Creek) and in the Cat Creek-Middle Fork Cosumnes River watershed (including in Horse Canyon Creek and Prospect Creek). According to the Region 5 Conservation Assessment for Veined Aquatic Lichen (2010), the lichen is generally associated with high canopy cover and old growth forest conditions, suggesting that removing canopy near occupied channels would be detrimental. Overall, the proposed treatments are focused on removal of understory trees and ladder fuels and would generally retain the canopy provided by mature trees greater than 10 inches dbh and snags greater than 16 inches dbh. Pruning would be limited to removal of limbs up

to a height of 8 to 12 feet on the bole, while retaining a minimum of 50 percent, but not to exceed 50 percent of total tree height. Larger hazard trees may be removed, but only where they pose an immediate risk to Proposed Project activities. These activities would not result in measurable changes in canopy.

Peltigera gowardii may also be affected by an increase in sediment delivery into the creek, which could reduce habitat quality as well as destroy the lichen's delicate thallus. The potential for sediment-related water quality effects would be minimized through implementation of *National Best Management Practices for Water Quality Management on National Forest System Lands* (USFS 2012) (**DC 1**) and consistent with RCOs described in the SNFPA (USFS 2004a) (**DC 2**). **DC 7** defines exclusion zones where mechanical operations are prohibited for the protection of aquatic resources. Specifically, ground-based mechanical treatments would be excluded within 50 feet from the edge of a perennial or intermittent stream channels.

In addition, ground cover will be maintained at least at 70 percent within 50 to 100 feet of the edge of the stream channel (**DC 11**). If the existing ground cover is less than 70 percent, then the existing ground cover will be maintained. Tops, limbs, and small trees within the mechanical exclusion zone can be lopped and scattered to meet ground cover criteria. **DC 9** states that no new landings would be created in the RCA. Reuse of existing landings within the RCA would be allowed where creation of a new landing is likely to result in more resource damage than use of the existing landing within the RCA. Any skid trails or landings within RCAs would be repaired to restore soil infiltration capacity and soil cover to reduce erosion and may include practices such as, reshaping to restore natural surface flow patterns, installation of drainage control features, decompaction, placement of organic material, and seeding on disturbed soil surfaces. Slash would be added to any skid trails while operations are occurring to facilitate incorporation into the substrate and help stabilize soil (**DC 10**).

Implementation of **DC 7** also requires mechanical exclusions within 50 feet of special aquatic features. This would protect habitat for FSS plants, such as *Botrychium* species, that are associated with moist habitats (e.g., wet meadow and fens).

PRESCRIBED BURNING AND ASSOCIATED ACTIVITIES

The FPP includes prescribed burning within approximately 6,625 acres (including approximately 4,715 acres that will also be mechanically thinned). Burning of piles may also occur. In general, prescribed burning has limited impacts on plant species that are adapted to growing on a landscape that have been historically shaped by periodic wildfire. While burning activities are relatively benign, the preparatory work associated with burning, such as construction of fire lines, does involve some risk to terrestrial FSS plants. Fire-line construction can directly impact terrestrial FSS plant occurrences by potentially uprooting, crushing, or altering habitat condition (canopy closure, microsite hydrology, covering plants, etc.) if fire-line is constructed through an occurrence.

As shown in **Table 5**, there are 15 populations of *Lewisia* (both the Hutchinson's and the Kellogg's subspecies) that are located in areas where prescribed burns would occur (and all except one are in areas that will also be mechanically treated). These *Lewisia* populations are found primarily in the Bear River and the Cat Creek-Middle Fork Consumnes River HUC 12 watersheds (one is in the North Tragedy Creek watershed), all in gravelly openings in forest or shrub habitats or on lava caps. Several general Design Criteria described previously would protect these known populations. **DC 18** requires botanical surveys in areas that have not been surveyed in the past 5 years. All species would be flagged for avoidance, and other protective measures may be implemented, as well, if determined necessary by the Forest Service botanist. **DC 3** imposes a stop-work if sensitive plants are discovered during implementation of the Project. The following Design Criteria specific to prescribed burning would further protect *Lewisia* populations:

- **DC 12** At a minimum, an annual review of burning treatment plans will occur with a Forest Service aquatic biologist, terrestrial biologist, and botanist to ensure conditions for TEPS species have not changed.

- **DC 20** Burning operations within TEPS plant populations would be designed to produce a low intensity fire. No ignition within occupied habitat would occur unless required to moderate fire intensity.

Since fire-line construction can occur several years after completion of thinning and other treatments, DC 12 would require ongoing annual consultation with the Forest Service botanist for burning treatment plans, including any associated fire line construction. When laying out future burn units, fire-line construction will be developed to avoid direct impacts to FSS plant occurrences. Other burn-related activities that may impact FSS plants include creating hand piles prior to burning or felling hazard trees into FSS plant occurrences. Since FSS plant occurrences will be flagged for avoidance (**DC 18**), this is not expected to be a concern within the project area.

ASPEN RESTORATION

Aspen forests are biodiversity hotspots, second only to riparian habitats (Shepperd et al. 2001, Western Aspen Alliance 2019), and, while typically a minor habitat component, they may contribute disproportionately to overall landscape diversity (Kuhn et al., 2011, Martin and Maron 2012, Kouki et al., 2014, Rogers 2017). Kuhn et al. (2011), in a field study to determine the relative contributions of aspen, meadow, and conifer communities to local and landscape level species diversity in the Sierra Nevada, found that aspen stands supported more plant species overall and more unique plant species than either meadow or conifer communities.

Aspen stands within the Project Area have been compromised by fire suppression and conifer encroachment, which, over time, has resulted in fewer and smaller stands comprised of a single age-class of trees. The FPP includes restoration of approximately 194 acres of aspen habitat located along Highway 88 above approximately 7,000 feet msl (**Map 1**). Restoration activities will consist of using mechanical equipment (40 percent slopes or less) or hand thinning (greater than 40 percent slopes) to remove encroaching conifers and shrubs to reestablish the historic aspen stand edge, enhance stand function, increase diversity of age classes, and promote aspen growth. Twenty-two of the 194 acres will also be treated with prescribed burns. Treatments for aspen may extend beyond the current perimeter of an aspen stand up to:

- 1.5 times the height of aspen trees in the stand (the maximum extent of lateral aspen roots), or
- The distance required to prevent remaining, adjacent conifers from shading the aspen stand and suppressing aspen regeneration, or
- Up to 100 feet (to conduct treatments or process treatment by-products), whichever is greater.

There are currently no recorded occurrences of FSS plants in the areas where aspen restoration is proposed; however, sensitive plants may potentially be present. While the objectives of aspen restoration differ from the other treatments proposed under the FPP, the methods utilized are similar. Therefore, impacts to FSS populations would be similar to those described previously for mechanical thinning, hand thinning, and prescribed fire.

Direct impacts would be minimized through implementation of **DC 18**, which requires botanical surveys in areas that have not been surveyed in the past 5 years. All species would be flagged for avoidance, and other protective measures may be implemented, as well, if determined necessary by the Forest Service botanist. **DC 3** imposes a stop-work if sensitive plants are discovered during implementation of the Project. **DC 12** requires an annual review of burning treatment plans by a Forest Service botanist to ensure conditions for TEPS species have not changed. Aspen habitats in California are typically found in areas with moist soil conditions. Therefore, to the extent that RCAs are present within the aspen habitats, **DC 1, 7, 9, 10, and 11** may minimize effects to and preserve soil conditions and cover within aspen habitats.

Removal of encroaching conifers and shrubs from aspen habitats may enhance habitat for herbaceous species, including, FSS plant species, that require open canopy and sunlight. These more open site conditions may

attenuate over time as aspen stand re-grow. In addition, soil disturbance, use of ground based equipment, and human and vehicular traffic in and out of restoration areas could potentially result in the introduction or spread of non-native plant species (NNIPs). Refer below for a description of Design Criteria that would be implemented to minimize the potential for the introduction or spread of NNIPs.

The FPP could potentially result in direct effects to FSS plant populations occurring in aspen stands proposed for restoration. Design Criteria are expected to minimize the potential for these effects. In addition, restoration of aspen may improve habitat conditions for sensitive plants and contribute to increased plant diversity in the Analysis Area.

NON-NATIVE INVASIVE PLANTS

Soil disturbances can provide opportunities for the introduction and proliferation of non-native invasive plant (NNIP) species. These species have the potential to quickly outcompete native plants including FSS plants for sunlight, water, and nutrients. NNIPs can also form dense monocultures which can alter habitat for native or sensitive plant species. Seeds of these species can be carried into sensitive plant areas on mechanical equipment, vehicles, and on workers boots and clothing. The magnitude of this impact is difficult to predict since it is contingent on the introduction of a noxious weed species into an area, an event which may or may not occur.

Based on a review of ENF data for 1991–2021, 16 species of NNIPs occur in the vicinity of the FPP (refer to **Appendix B**, NNIP Risk Assessment). In general, NNIP populations are relatively small, and widely scattered throughout the Project area.

These infestations could easily be spread during project activities including into Sensitive plant sites found in the project area. To limit the potential for spread, known priority infestations would be treated during implementation using methods described in the ENF Invasive Plant EA, including **DC 29, DC 30, DC 31, and DC 32**. This will reduce existing seed sources throughout the project area which is an important preventive measure when using mechanical equipment and prescribed fire to manipulate forest structure. Additional standard measures included in the proposed project such as excluding vehicle traffic from known infestations, equipment cleaning, and use of weed-free material will further limit the risk of invasive species spreading into the project area and impacting sensitive plant occurrences. While the risk of invasion cannot be fully eliminated, these measures are expected to greatly limit the potential introduction and spread of invasive species in the project area, thereby reducing the risk of invasive plants impacting known sensitive plant occurrences.

DIRECT AND INDIRECT EFFECTS FOR UNDISCOVERED PLANT POPULATIONS

Potential habitat for a number of TEPS plant species occurs in the Proposed Project area, but occurrences have not been identified during past surveys. If surveys inadvertently overlook sensitive plants, these individuals could be affected by Project activities (e.g., mechanical fuels reduction, hand thinning, aspen restoration, or prescribed burning). If new occurrences are found during Project implementation, the Forest Service botanist would be contacted and necessary measures developed to limit impacts to newly discovered sensitive plant species (**DC 18**).

Two new species of fungi were discovered on the ENF in 2015. Potential habitat for both species (*Phaeocollybia olivacea* and *Dendrocollybia racemosa*) occurs in the FPP, but surveys for these fungi have yet to occur. While surveys are effective when the fruiting body is visible, the extent to which a species occurs on the surface and a correlation with the abundance underground is unknown. When a survey does not find the fruiting body it could still be present at the site. Therefore, it is important to manage habitat to remain suitable for the fungi by:

- Retaining trees that are known fungi host species if possible (Douglas fir and hardwoods).

- Retain a component of the largest diameter trees distributed throughout the treated stand, which will help retain most diverse ectomycorrhizal species and will help retain the sensitive fungi, which are old growth associates.
- Retain shrub layer. Some of the more important shrubs to retain are *Arctostaphylos* species and *Salix* species, which are also hosts for ectomycorrhizal species.
- Retain standing and down coarse woody debris (**DC 50**). Scattered islands of down wood throughout a management unit, including many sizes ranging from twigs to large logs, as well as a variety of decay classes, is preferable to one size or decay class of down wood homogeneously covering the forest floor.

The FPP is expected to achieve many of the above recommendations and should maintain suitable habitat for fungi species, including R5 Sensitive fungi, but impacts to undetected populations is still plausible given the difficulty in detecting rare fungi.

CUMULATIVE EFFECTS

In order to understand the contribution of past actions to the cumulative effects of the Proposed Project, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects and is consistent with National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008).

Forest Service Activities: Adverse impacts to sensitive plants from recent activities have largely been minimized by the use of mitigation measures, mainly the use of avoidance. Ongoing and future management activities in the Project area would likely include road maintenance, hazard tree removal, and implementation of ongoing USFS projects in the area. It is anticipated that future impacts to sensitive plants would continue to be minimized through the use of avoidance for the above foreseeable actions. Avoidance or other means of mitigating impacts to sensitive plant occurrences is consistent with direction contained in in the ENF LMRP, which includes under Standard & Guideline 49 (p. 4-91), "provide for the protection and habitat needs of sensitive plants so that Forest activities would not jeopardize the continued existence of such species."

Climate change: Anthropogenic increases in temperatures and changes in precipitation are likely to impact both ecosystem structure and ecosystem processes (IPCC, 2007). Climate controls many ecosystem processes including species distribution and abundance, regeneration, vegetation productivity and growth, and disturbance all of which could affect FSS plant species on the ENF. While there is some uncertainty regarding the scale, rate, and direction of future climatic conditions in the western United States and the Sierra Nevada (North et al., 2009) some general observation regarding past changes and expected future changes are generally agreed upon.

Climate change effects on precipitation and mean temperature have been difficult to predict with considerable variation between different models. According to Dettinger (2005), the most common prediction among the most recent models for California is temperature warming by about 9 degrees Fahrenheit by 2100, with precipitation remaining similar or slightly reduced compared to today. Most models agree that summers would be drier than they are currently, regardless of levels of annual precipitation. Current estimates of predicted climate change on vegetation patterns forecast that forest types and other vegetation dominated by woody plants in California would migrate to higher elevations as warmer temperatures make those areas suitable for colonization and survival (Lenihan et al. 2003). However, rare and uncommon species are expected to experience a number of barriers when adjusting to a rapidly changing climate because of the combination of a small number of occurrences, narrow elevational ranges, and requirements for specific soils types. Some of the FS Sensitive plant species (e.g., Pleasant Valley mariposa lily and the *Lewisia* species) with potential habitat in project area are restricted to limited areas within the forest. Plants confined to outcrops of special soils are generally expected to

have a far lower chance of successful migration to suitable new sites and thus far greater risks of extinction in the face of climate change, than plants that are soil generalists (Harrison 2009). Because of the uncertainty in scale, direction, and rate of future climate change, current management of sensitive species on the ENF would focus maintaining viable populations throughout the species known range.

VII. DETERMINATION SUMMARY

FEDERALLY LISTED SPECIES

The FPP will not affect *Packera layneae* or its habitat. Formal consultation with the USFWS pursuant to Section 7 of the Endangered Species Act is not required.

FEDERAL CANDIDATE SPECIES

While the Proposed Project includes areas above 7,000 feet, it does not support suitable subalpine habitat for *Pinus albicaulis*, and subalpine habitats are not targeted for treatment. The closest recorded occurrences of *Pinus albicaulis* are located approximately 4 miles east of the FPP. Therefore the FPP will not affect this species.

FOREST SERVICE SENSITIVE SPECIES

There is no potential habitat for *Arctostaphylos nissenana*, *Balsamorhiza macrolepis* var. *macrolepis*, *Draba asterophora* var. *asterophora*, *Draba asterophora* var. *macrocarpa*, *Eriogonum tripodum*, *Helodium blandowii*, *Horkelia parryi*, *Lewisia longipetala*, *Lewisia serrata*, *Navarretia prolifera* ssp. *lutea*, *Phacelia stebbinsii*, or *Poa sierrae*, in the project area. Therefore, the FPP would not affect these species.

Some suitable habitat for *Allium tribracteatum*, *Botrychium ascendens*, *Botrychium pedunculatum*, *Cypripedium montanum*, *Dendrocollybia racemosa*, *Ophioglossum pusillum* and *Phaeocollybia olivacea* occurs in the FPP, but no occurrences were found during past or recent surveys. Because past surveys cannot positively state the absence of a sensitive plant species; it is possible that the proposed project could affect undetected individuals in the project area. Therefore, the proposed project may affect undiscovered individuals but is not likely to result in a trend toward Federal listing or loss of viability for the 10 species listed above.

Occurrences of *Botrychium crenulatum*, *B. manganense*, *B. montanum*, *Calochortus clavatus* var. *avius*, *Peltigera gowardii*, *Lewisia kelloggii* ssp. *hutchisonii*, and *L. kelloggii* ssp. *kelloggii* occur in proposed treatment areas associated with the FPP. All occurrences will be flagged and avoided during project implementation. Because past surveys cannot positively state the absence of a sensitive plant species it is possible that the Proposed Project could affect undetected individuals of these seven species in area. Therefore, the FPP may affect undiscovered individuals but is not likely to result in a trend toward Federal listing or loss of viability for *Botrychium crenulatum*, *B. manganense*, *B. montanum*, *Calochortus clavatus* var. *avius*, *Peltigera gowardii*, *Lewisia kelloggii* ssp. *hutchisonii*, and *L. kelloggii* ssp. *kelloggii*.

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IX. APPENDIX A: BOTANY REPORT FOR SPECIAL INTEREST PLANTS

INTRODUCTION

PURPOSE: The purpose of the Botany Report is to describe effects on Special Interest (or watch list) plant species, special interest plant communities, and other botanical resources.

Special Interest Plant Species:

Table 2, below, provides a list of each Special Interest Plant, states whether suitable habitat is present, and whether the plant is known to occur. Based on a review of ENF botanical survey data, the following Special Interest plant species are known to occur in the FPP:

Sierra bolandra (*Bolandra californica*): Sierra bolandra occurs in rock crevices and on wet cliffs along streams. This species occurs in lower montane coniferous forest and upper montane coniferous forest habitats at elevations of 3,100 – 4,200 ft. This species is not listed under the state or federal endangered species act. Sierra bolandra is currently on the California Native Plant Society watch list and is not believed to be very endangered in California (CNPS list 4.3).

Yosemite moonwort (*Botrychium simplex*): Yosemite moonwort occurs in moist and wet meadow, seeps, fens, and streamside habitats about 6,000 ft in elevation. This species is not listed under the state or federal endangered species act. The California Native Plant Society considers this plant to be widespread and does not currently have a CNPS listing.

Bolander's bruchia moss (*Bruchia bolanderi*): Bolander's bruchia moss grows in meadows and fens in montane and subalpine communities from about 5,500 to 9,000 feet. This species grows in ephemeral habitats such as erosional ditches or small streamlets through wet meadows. Threats to this species include fuel reduction projects, trampling, and recreational activities. This species is not listed under the state or federal endangered species act. California Native Plant Society considers this plant to have limited distribution and is considered fairly threatened in California (CNPS 4.2).

Red Hills soaproot (*Chlorogalum grandiflorum*): Red Hills soaproot is a species that occurs in serpentine outcrops, open shrubby or woodland hills, chaparral, foothill woodland, and yellow pine forest habitats at elevations up to 3,150 ft. This species is known to be widespread in the western Georgetown District. This species is not listed under the state or federal endangered species act. The California Native Plant Society considers this species to be fairly threatened (CNPS 1B.2). Threats to this species include development, mining, road construction, and vehicles.

Cutleaf monkeyflower (*Erythranthe laciniatus*): Cutleaf monkeyflower can be found growing on decomposed granite in moist sandy places. This species occurs in chaparral, lower montane coniferous forest, and upper montane coniferous forest habitats at elevations above 3,100 ft. This species' known distribution in El Dorado County has been documented at Salt Springs Reservoir and Cole Creek Diversion. This species is not listed under the state or federal endangered species act. The California Native Plant Society considers this plant to be not very threatened (CNPS 4.3).

Coleman's Piperia (*Piperia colemanii*): Coleman's Piperia is a CNPS list 4.3 species of limited distribution in California. On the Eldorado NF there are five occurrences, primarily north of Highway 50. In 2016, five new occurrences were discovered in the Panther project area. Threats to Coleman's Piperia include ground disturbing activities, timber harvest, fuel reductions, road maintenance, and herbicide applications.

Special Interest Plant Communities

Two special interest plant communities, lava caps and fens, are present in the FPP. Each is briefly described below.

Lava Caps: Lava caps are unique habitats that are typically on ridgetops formed by pre-historic volcanic mudflows (Mehrten formation) (CNPS 2019), defined by sparse tree and shrubs and generally dominated slow growing shrubs and forb species such as *Eriogonum prattenianum* var. *prattenianum*, *Toxicoscordion venenosus*, *Erythranthe bicolor*, *Limnanthes alba*, *Allium obtusum*, *Sanicula tuberosa*, and *Triteleia ixioides*. Lava caps are characterized by a higher level of plant diversity than much of the surrounding landscape and provide suitable habitat for sensitive plants including Pleasant Valley mariposa lily and Kellogg’s lewisia.

A review of ENF data indicates that 71 distinct lava cap habitats totaling approximately 320 acres have been previously identified in the Analysis Area. Most of the populations were identified during field surveys conducted between 2016 to 2021; satellite imagery was also used to identify lava caps in 2016. The lava caps in the Analysis Area range between 0 and 79 acres, and most are 10 acres or smaller. Approximately 78 acres of lava cap habitat lies within areas proposed for treatment.

Table 1. Lava Cap Habitat in the Analysis Area and Proposed Treatment Areas

	Acres
Total Acres of Lava Cap Habitat in the Analysis Area	320
Acres of Lava Cap Habitat Located within Proposed Treatment Areas	78
Proposed Treatments:	
• Mechanical Fuels Reduction	77.6 ^a
• Hand Thinning	0.0
• Prescribed Burning	19.0 ^a
• Aspen Restoration	0.7

^a Includes 19 acres where mechanical fuels reduction will be followed by prescribed burning.

Fens: Fens are peat-forming wetlands that rely on groundwater input and require thousands of years to develop and cannot easily be restored once destroyed. Fens are also hotspots of biodiversity. They often are home to rare plants, insects, and small mammals. Larger animals like deer and livestock graze in this type of wetland. Fens are valuable to humans as well. They are important as sites of groundwater discharge and are good indicators of shallow aquifers. Vegetation in all wetlands plays an important role in recycling nutrients, trapping eroding soil, and filtering out polluting chemicals such as nitrates. In addition, fens figure prominently in nearly all scenarios of CO2-induced global change because they are a major sink for atmospheric carbon.

Two fens have been previously identified in the Analysis Area. One (the Onion Valley fen) is located within an area proposed for mechanical fuels treatment.

CURRENT MANAGEMENT DIRECTION

Special Interest Plant Species: A number of plant species do not meet all of the criteria to be included on the Regional Forester’s Sensitive Plant List but, are of sufficient concern that we need to consider them in the planning process. These include species that are locally rare – as opposed to declining throughout their range – are of public concern, occur as disjunct populations, are newly described taxa, or lack sufficient information on population size, threats, trend, or distribution.

Such species make an important contribution to forest biodiversity and are addressed as appropriate through the NEPA process. To better identify these species, forests have been encouraged to develop watch lists for these special interest species. These watch lists are dynamic and updated as the need arises to reflect changing conditions and new information.

Bog and Fen Habitat (SNFPA ROD page 65, S&G #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles.

Table 2. Watch list species with potential habitat in the Forest Projects Plan (Phase 1) (Elevation 2,700 – 8,000 ft)

Species	Common Name	CNPS Ranking	Habitat	Potential Habitat/Known in Project Area	Lower Elevation (ft)	Upper Elevation (ft)
<i>Allium sanbornii</i> var. <i>congdonii</i>	Congdon's onion	4.3	Serpentine outcrops	Yes/No	Up to 4,000	
<i>Allium sanbornii</i> var. <i>sanbornii</i>	Sanborn's onion	4.2	Serpentine outcrops	Yes/No	Up to 5,020	
<i>Astragalus austinae</i>	Austin's milkvetch	1B.3	Alpine boulder & rock field in subalpine coniferous forest.	Yes/No	7,600	8,825
<i>Astragalus whitneyi</i> var. <i>lenophyllus</i>	Whitney's milk-vetch	4.3	Alpine boulder & rock field in subalpine coniferous forest.	Yes/No	Above 4,900	
<i>Bolandra californica</i>	Sierra bolandra	4.3	Rock crevices and wet cliffs along streams.	Yes/Yes	3,100	4,200
<i>Botrychium simplex</i>	Yosemite moonwort	--	Moist and wet meadow, seeps, fens, and streamside habitats about 6,000 feet in elevation.	Yes/Yes	Above 5,000	
<i>Brasenia scheberi</i>	Watershield	2B.3	Marsh, swamp and wetland	Yes/No	Up to 7,200 ft	
<i>Calystegia vanzuukiae</i>	Van Zuuk's morning glory	1B.3	Serpentine outcrops	Yes/No	1,640	3,900
<i>Carex cyrtostachya</i>	arching sedge	1B.2	Narrow endemic from the western slope of the northern Sierra Nevada of California	Yes/No	2,000	4,460
<i>Carex davyi</i>	Davy's sedge	1B.3	Upper montane coniferous forest to subalpine coniferous forest; Dry often sparse meadows or rocky areas.	Yes/No	Above 4,500	

Species	Common Name	CNPS Ranking	Habitat	Potential Habitat/Known in Project Area	Lower Elevation (ft)	Upper Elevation (ft)
<i>Climacium dendroides</i>	tree climacium moss	2B.1	Occurs in occasionally flooded mineral soil, especially on lake and river margins	Yes/No	Above ~3,500 (limited information available)	
<i>Ceanothus fresnensis</i>	Fresno ceanothus	4.3	Cismontane woodland (openings), lower montane coniferous forest	Yes/No	3,650	6,900
<i>Chaenactis douglasii</i> var. <i>alpini</i>	Alpine Dusty Maidens	2B.3	Alpine boulder and rock field (granitic), Rocky or gravelly ridges, talus, fell-fields, crevices	No/No	Above 9,800	
<i>Chlorogalum grandiflorum</i>	Red Hills soapwort	1B.2	Serpentine outcrops, open shrubby or wooded hills; chaparral, foothill woodland, yellow pine forest	Yes/Yes	Up to 3,150	
<i>Clarkia biloba</i> ssp. <i>brandegeae</i>	Brandegee's clarkia	4.2	Foothill woodland, chaparral, cismontane woodland, lower montane coniferous forest. Often found growing in road cuts	Yes/No	Up to 3,000	
<i>Clarkia virgata</i>	Sierra clarkia	4.3	Foothill woodland, cismontane woodland, lower montane coniferous forest, yellow pine forest	Yes/No	2,460 to 5,675	
<i>Claytonia megarhiza</i>	Fell-fields claytonia	2B.3	Subalpine, alpine, gravel, talus, crevices, growing in crevices between	No/No	Above 8,500	
<i>Corallorhiza trifida</i>	northern coralroot; early coralroot	2B.1	Wet, open to shaded, generally coniferous forest. In California, under firs, in partial shade	Yes/No	4,500	5,600
<i>Collomia tenella</i>	Slender collomia	2B.2	Dry sandy bare areas.	Yes/No	5,570	8,530
<i>Drosera anglica</i>	English sundew	2B.3	Fens, meadows and seeps often with <i>Sphagnum</i>	Yes/No	4,250	6,500
<i>Drosera rotundifolia</i>	Round leaf sundew	--	Fens, meadows, and seeps often with <i>Sphagnum</i>	Yes/No	Up to 8,900	
<i>Dryopteris filix-mas</i>	male fern	2B.3	Upper montane coniferous forest (granitic, rocky); Granitic cliffs	Yes/No	Above 7,800	

Species	Common Name	CNPS Ranking	Habitat	Potential Habitat/Known in Project Area	Lower Elevation (ft)	Upper Elevation (ft)
<i>Eriophorum gracile</i>	cotton grass	4.3	Fens, springs, wet meadows	Yes/No	4,000	9,500
<i>Fritillaria eastwoodiae</i>	Butte County Fritillaria	3.2	Chaparral, Cismontane woodlan, Lower montane coniferous forest (openings), sometimes serpentine	Yes/No	Up to 4,900	
<i>Githopsis pulchella</i> ssp. <i>serpentinicola</i>	Serpentine bluecup	4.3	Cismontane woodland, serpentine or lone Formation soils	No/No	1,000	2,000
<i>Jensia yosemitana</i>	Yosemite tarweed	3.2	Spring-wet, sunny, sandy places, meadows	Yes/No	4000	7500
<i>Juncus digitatus</i>	Finger rush	1B.2	Lava caps	Yes/No	2,165	2,591
<i>Erythranthe laciniatus</i>	Cutleaf monkey flower	4.3	Growing on decomposed granite in moist sandy places.	Yes/Yes	Above 3,100	
<i>Myrica hartwegii</i>	Sierra sweet bay	4.3	Streambanks and other moist places in foothill and low montane forest	Yes/No	Up to 6,000	
<i>Orthotrichum holzingeri</i>	Holzinger's orthotrichum moss	1B.3	Usually on rock in and along streams, rarely on tree limbs.	Yes/No	2,345	6,000
<i>Perideridia bacigalupii</i>	Mother Lode yampah	4.2	Sites in which it occurs include open rocky areas, chaparral openings, slopes, and road cuts. Usually on serpentine	Yes/No	Up to 3,500	
<i>Piperia colemanii</i>	Coleman's rein orchid	4.3	Open conifer forest, scrub; often in sandy soils.	Yes/Yes	3,900	7,545
<i>Piperia leptopetala</i>	petaled rein orchid	4.3	Generally dry sites, scrub, woodland; Chaparral, foothill woodland, yellow pine forest, red fir forest.	Yes/No	1,100	7,300
<i>Potamogeton epihydrus</i>	Ribbonleaf pondweed	2B.2	Lakes and ponds	Yes/No	1,300	6,233

Species	Common Name	CNPS Ranking	Habitat	Potential Habitat/Known in Project Area	Lower Elevation (ft)	Upper Elevation (ft)
<i>Potamogeton praelongus</i>	White-stemmed pondweed	2B.3	Lakes and ponds	Yes/No	5,900	9,800
<i>Pseudostellaria sierrae</i>	Sierra starwort	4.2	Meadows, dry understory of mixed oak or conifer forest	Yes/No	4,000	7,200
<i>Rhynchospora alba</i>	white beaked-rush	2B.2	Wet meadows, fens, seeps, and marshes	Yes/No	Up to 6,700	
<i>Rhynchospora capitellata</i>	brownish beakrush	2B.2	Wet meadows, fens, seeps, and marshes	Yes/No	Up to 6,560	
<i>Sambucus nigra</i> <i>L. ssp. caerulea</i>	blue elderberry	--	Riparian areas; of concern below 3,000' as host plant for Threatened Valley Elderberry Longhorn Beetle	Yes/No	Up to 3,200	
<i>Sparganium natans</i>	small bur reed	4.3	Wetland-riparian, lake margins.	Yes/No	2,800	8,560
<i>Streptanthus longisiliquus</i>	long-fruited jewelflower	4.3	Mixed-conifer forest	Yes/No	2,500	5,000
<i>Taxus brevifolia</i>	Pacific yew	--	Mixed evergreen forest, Douglas-fir forest, yellow pine forest, red fir forest	Yes/No	Up to 4,600	
<i>Torreya californica</i>	California nutmeg	--	Mixed evergreen forest, Douglas-fir forest, yellow pine forest, red fir forest	Yes/No	Up to 3,000	
<i>Viburnum ellipticum</i>	oval-leaved viburnum	2B.3	Chaparral, cismontane woodland, Lower montane coniferous forest, chaparral, yellow-pine forest, generally north-facing slopes	No/No	Up to 4,500	
<i>Wyethia reticulata</i>	El Dorado County mules ear	1B.2	Stony red clay and gabbroic soils; often in openings in gabbro chaparral	Yes/No	Up to 2,060	
<i>Xerophyllum tenax</i>	Beargrass	--	Dry open slopes, ridges, montane conifer forest	Yes/No	Up to 7,500	

EXISTING ENVIRONMENT

Lands proposed for treatment under the FPP are dense with trees of varying size, shrubs, and surface fuels and therefore at risk of loss to wildfire. The dominant forest types within the proposed project landscape are Sierran mixed conifer (27 percent), predominately in the lower elevations (< 6,000 ft), and red fir (26 percent), predominately in the higher elevations (> 6,000 ft). The dominant seral stage within the Proposed Project area is mid-seral closed (56 percent of the FPP area), followed by late-seral closed (11 percent) and mid-seral open (11 percent). Based on 2019 LiDAR returns, 66 percent of the Proposed Project area has \geq 50 percent canopy cover.

Mature wildlife forest habitat (e.g., conifer/mixed conifer/hardwood forest types, greater than 24 inches diameter at breast height [dbh], greater than or equal to 40 percent canopy) makes up 11 percent of the Proposed Project area, and immature wildlife forest habitat (e.g., conifer/mixed conifer/hardwood forest types, 11–24 inches dbh, less than 40 percent canopy) makes up 49 percent of the Proposed Project area (USDA 2019).

Seventeen percent of the FPP falls within areas identified as high- risk to high-valued resources and assets, and according to a USFS R5 analysis, 6 percent of the FPP has stand densities considered to be at high risk to mortality from drought, insects, disease, and wildfire (USDA 2021(b)). According to fire modeling inputs used in the ACCG 2020 wildfire risk assessment, 6 percent of the FPP falls within areas predicted to have high-intensity wildfire.

Riparian woodlands composed of deciduous trees and shrubs can be found along perennial and some intermittent watercourses.

Two fens have been previously identified in the Analysis Area. One (the Onion Valley fen) is located within an area proposed for mechanical fuels treatment. A fen is defined as an ecosystem with hydric soils and an accumulation of peat in the uppermost layer (approximately 1 meter [3.3 feet]). Compared to other habitats, fens support a disproportionately large number of rare vascular and nonvascular plant species in the Sierra Nevada, underscoring the importance of these habitats for regional biological diversity.

A review of ENF data indicates that 71 distinct lava cap habitats totaling approximately 320 acres have been previously identified in the Analysis Area. Approximately 78 acres of lava cap habitat lies within areas proposed for treatment. Lava caps are unique habitats that are typically on ridgetops formed by pre-historic volcanic mudflows (Mehrten formation) (CNPS 2019), defined by sparse tree and shrubs and generally dominated slow growing shrubs and forb species such as *Eriogonum prattenianum* var. *prattenianum*, *Toxicoscordion venenosus*, *Erythranthe bicolor*, *Limnanthes alba*, *Allium obtusum*, *Sanicula tuberosa*, and *Triteleia ixioides*. Lava caps are characterized by a higher level of plant diversity than much of the surrounding landscape and also provide suitable habitat for sensitive plants including Pleasant Valley mariposa lily and Kellogg's lewisia.

DESIGN CRITERIA

Provided below is a select (but not exhaustive) list of Design Criteria incorporated into the FPP that would minimize the potential for effects to Special Interest plants and plant communities.

At a minimum, an annual review of burning treatment plans will occur with a Forest Aquatic Biologist, Terrestrial Biologist, and Botanist to ensure conditions for Threatened, Endangered or Sensitive species have not changed and to ensure consistency with FWS consultation determinations.

Watch list species encountered during surveys for Sensitive, Proposed, or Federally listed plant species will be noted. Protection measures would be developed and approved by the District Ranger for any watch list plant that may qualify as a Forest Service Sensitive species.

Burning operations within Sensitive, Proposed, or Federally listed plant populations would be designed to produce a low intensity fire. No ignition within occupied habitat would occur unless required to moderate fire intensity.

Lava cap plant communities will be protected from motorized equipment and vehicles. All project related equipment and vehicles shall remain on existing road corridors within lava caps; including no parking off road, heavy equipment travel, etc.

No burn piles shall be placed within meadows, fens, springs, or draws, or within 50 feet from the edge of perennial or intermittent stream channels or riparian vegetation, whichever is greater.

Riparian vegetation associated with perennial, ephemeral streams, and other special aquatic features will be avoided during project implementation.

The table below defines boundaries where mechanical operations are prohibited for the protection of aquatic resources and applies to features identified on map and those found in the field during treatment. Unmapped feature will be treated as Special Aquatic Features^a.

Aquatic Feature Type	Require Exclusion Zone/Other Criteria
Perennial and Intermittent Streams	No ground-based equipment within 50 feet of the edge of the stream channel. Equipment is allowed to reach into the equipment exclusion zone to masticate vegetation.
Ephemeral Streams and Draws	No ground-based equipment within 15 feet of the edge of the stream channel or bottom of the draw.
Special Aquatic Features ^a	No ground-based equipment within 50 feet of the edge of the wet area or riparian vegetation, whichever is greater.

EFFECTS

SPECIAL INTEREST (watch list) species: As described previously, six Special Interest plant species are known to occur in the proposed FPP treatment areas. All of the six plant species may potentially be affected by mechanical fuels reduction activities. In addition, Sierra bolandra and cutleaf monkey flower may also be affected by prescribed burning. Special Interest plants could, therefore, potentially be directly or indirectly affected by the Proposed Project. Design Criteria, including pre-Project surveys, flagging, and avoidance, would minimize the potential for effects to known populations.

If any new watchlist plant species are discovered in the project area, necessary actions would be considered to limit impacts from implementation of the FPP. Therefore, the FPP is not expected to cause cumulative effects for Special Interest plant species within the Proposed Project area.

LAVA CAPS: Lava cap communities occur throughout the project area. Impacts to lava cap communities from equipment staging, thinning activities, landing construction, and fire line construction will be avoided during Project implementation.

FENS: There is at least one fen that occurs within the Forest Projects Plan (Phase 1) Project Area. Fens and other special aquatic features would be protected by implemented of mechanical equipment and prescribed fire exclusion zones, and would thus be avoided during Project implementation.

MITIGATION

None required.

X. APPENDIX B: NOXIOUS WEED RISK ASSESSMENT

Five factors of weed spread were analyzed for the proposed Forest Projects Plan (Phase 1). Determinations of risk (High, Moderate, and Low) are summarized below along with the total risk of weed spread for the proposed project if suggested Design Criteria are implemented.

*If the proposed project includes all listed Design Criteria to reduce or eliminate the risks of introducing or spreading noxious weeds in the project area, then it is my determination that the risk of spreading noxious weeds in the project area is **Low**.*

Introduction: This assessment is in compliance with the Eldorado National Forest Land and Resource Management Plan (USFS ENF LRMP 1989), the Sierra Nevada Forest Plan Amendment (SNFPA) FSEIS and Record of Decision (ROD), Executive Order on Invasive Species (Executive Order 13112), and the direction in the Forest Service Manual section 2900, Noxious Weed Management (2012), which includes a policy statement calling for a risk assessment for noxious weeds to be completed for every project. The overriding principle stated in these documents is that the costs associated with preventing an infestation are much less than the costs of eliminating a population once it has expanded, and of dealing with the effects of a degraded plant community.

Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, or being nonnative or new to or not common to the United States or parts thereof (FSM 2900). In order to control noxious weeds, the US Forest Service has adopted an integrated weed management approach to reduce the spread of noxious weeds on to, and from National Forest System lands. The main objective of this integrated approach to weed management is to prevent the introduction and establishment of noxious weed infestations, and control (contain and suppress) existing noxious weed infestations on National Forest System lands (FSM 2900). In addition, when any ground disturbing action or activity is proposed, the federal agency is required to determine the risk of introducing or spreading noxious weeds associated with the proposed action (FSM 2900).

1. Noxious Weeds Present In or Near Project Area (Moderate)

In general, the FPP Phase 1 Project area is relatively free of priority invasive weeds. As summarized in Table 1, below, there are 16 species totaling approximately 51 acres in the xx-acre Project area. In general, NNIP populations are relatively small, and widely scattered throughout the Project area.

Table 1. Invasive Plants Present Within Forest Projects Plan (Phase 1) Treatment Area

Species (<i>Scientific name</i> , common name)	Number of Sites	Acres
Group 1 (Eradicate)		
<i>Aegilops cylindrica</i> , jointed goatgrass	6	1.3
<i>Centaurea diffusa</i> , diffuse (white) knapweed	2	0.3
<i>Centaurea stoebe</i> , spotted knapweed	4	0.1
<i>Euphorbia oblongata</i> , oblong spurge	1	0.3
<i>Lepidium latifolium</i> , tall whitetop	1	0.1
<i>Sorghum halepense</i> , Johnson grass	1	0.1
Group 2 (Control)		
<i>Centaurea melitensis</i> tocalote	3	0.1
<i>Centaurea solstitialis</i> , yellow starthistle	12	11
<i>Chondrilla juncea</i> , rush skeleton weed	3	0.2

Species (<i>Scientific name, common name</i>)	Number of Sites	Acres
<i>Elymus caput-medusae</i> , medusahead	18	7
Group 3 (Control)		
<i>Bromus tectorum</i> , cheat grass	1	1.3
<i>Cirsium vulgare</i> , bull thistle	1	0.2
<i>Hypericum perforatum</i> , Klamath weed	75	23
<i>Leucanthemum vulgare</i> , Oxeye daisy	1	0.5
<i>Melilotus albus</i> , white sweet clover	5	5
<i>Salsola tragus</i> , Russian thistle/tumbleweed	1	0.2

2. Habitat Vulnerability (Moderate)

The proposed action would thin and remove vegetation using mechanical fuels reduction, hand thinning, and prescribed burning methods. Lands proposed for treatment under the FPP are dense with trees (varying size), shrubs, and surface fuels. Intact conifer forests are largely resilient to invasion due to shading, competing understory vegetation, and groundcover. When openings or bare ground are created, annual grasses, bull thistle, mullein, and other non-native species can become established. However, these infestations rarely form dense monocultures and are eventually outcompeted by tree and shrub regeneration. Yellow starthistle (*Centaurea solstitialis*), brooms, perennial pepperweed (*Lepidium latifolium*) can also become established in these upland communities but are typically associated with disturbance or management practices which reduce understory vegetation and ground cover.

There are several sensitive vegetation communities, including lava cap, fens, and riparian communities, in the Project area. These communities are vulnerable to invasion by different suites of noxious weed species as described below:

Lava cap: A review of ENF data indicates that approximately 78 acres of lava cap habitat lies within areas proposed for treatment. Lava cap plant communities are vulnerable to noxious weed invasion if propagules are introduced. These plant communities are generally dominated by high diversity of herbs and shrubs adapted to growing on rocky and volcanic soils eroded from Mehrten formation mudflow. The limited canopy closure in many lava cap communities increases the vulnerability of these unique plant assemblages to invasion by noxious weed species adapted to growing in dry upland conditions such as yellow starthistle (*Centaurea solstitialis*), barbed goatgrass (*Aegilops triuncialis*), and medusahead (*Elymus caput-medusae*). Unfortunately, non-native annual grasses have already become established as a minor component of many lava cap plant communities on the forest.

Fens: The Onion Valley fen is located within an area proposed for mechanical fuels treatment. A fen is defined as an ecosystem with hydric soils and an accumulation of peat in the uppermost layer (approximately 1 meter [3.3 feet]). Compared to other habitats, fens support a disproportionately large number of rare vascular and nonvascular plant species in the Sierra Nevada, underscoring the importance of these habitats for regional biological diversity.

Riparian communities: Proposed project activities may occur in areas that contain or are adjacent to riparian areas. Riparian areas are susceptible to noxious weed invasion to riparian invaders, especially in areas that have been recently disturbed. Riparian areas on the Eldorado NF are particularly vulnerable to invasion by perennial pepperweed (*Lepidium latifolium*), Canada thistle (*Cirsium arvense*), oblong spurge (*Euphorbia oblongata*), and Himalayan blackberry (*Rubus armeniacus*).

3. Non-project Weed Vectors (Moderate)

Invasive plant introduction occurs when plant propagules are moved from one infestation (the “seed source”) to a new un-invaded habitat. In general, any activity that moves soil or plant parts from one location to another has the potential to facilitate weed introduction and invasion. In the project area, these activities may include (but are not limited to): road maintenance equipment; trail maintenance equipment (e.g., small dozers); logging equipment on private and Forest Service lands; hazard tree removal; Forest Service vehicles and workers; private vehicle and off-road vehicle usage; recreationists; and wildlife. Roads within the project area cross mixed land ownership that has a variety of uses.

Soil disturbances can provide opportunities for the introduction and proliferation of non-native invasive plant (NNIP) species. These species have the potential to quickly outcompete native plants including FSS plants for sunlight, water, and nutrients. NNIPs can also form dense monocultures which can alter habitat for native or sensitive plant species. Seeds of these species can be carried into sensitive plant areas on mechanical equipment, vehicles, and on workers boots and clothing. The magnitude of this impact is difficult to predict since it is contingent on the introduction of a noxious weed species into an area, an event which may or may not occur.

These infestations could easily be spread during project activities including into Sensitive plant sites found in the project area. To limit the potential for spread, known priority infestations would be treated during implementation using methods described in the ENF Invasive Plant EA and through implementation of Project-specific Design Criteria. The intent of these measures is to reduce existing seed sources throughout the project area which is an important preventive measure when using mechanical equipment and prescribed fire to manipulate forest structure. Additional standard measures included in the proposed FPP project area such as excluding vehicle traffic from known infestations, equipment cleaning, and use of weed-free material will further limit the risk of invasive species spreading into the project area and impacting sensitive plant occurrences. While the risk of invasion cannot be fully eliminated, these measures are expected to greatly limit the potential introduction and spread of invasive species in the project area, thereby reducing the risk of invasive plants impacting known sensitive plant occurrences.

4. Habitat Alteration Expected as Result of Projects (Moderate)

The proposed Project would result in some short-term habitat alteration due to mastication, prescribed fire, and hand thinning. These activities can temporarily increase the amount of light reaching the ground and, in some instances, the exposure of bare mineral soil. This is significant because seeds of potential and known NNIPs all require sunlight and contact with mineral soil for germination and growth, increasing the likelihood for germination following the treatments. However, these effects are expected to be limited in scope and will diminish as native understory species are able to reestablish into the recently disturbed areas.

Long-term habitat alterations associated with the Project are expected to be minimal. Thinning and subsequent prescribed burning within forested habitats will remove smaller trees from the stand while leaving mature conifers in the overstory.

5. Increased Vectors as a Result of Project Implementation (High)

The proposed project would *temporarily* increase potential weed vectors due to the increase in project related vehicle use (ground base harvesting equipment, masticator, equipment used for road reconstruction and maintenance, etc). Potential introduction of invasive may occur when equipment is first brought into the project area or if equipment travels or is used within existing infestations in the project area.

Management requirements have been incorporated into the project to reduce or eliminate the likelihood of most vector opportunities related to the proposed project (see **section 4**).

6. Mitigation Measures

The following mitigation measures (also referred to as Design Criteria) should be included in the Forest Planning Project. These mitigation measures have been designed to limit the potential introduction of new noxious weeds into the project area and limit the potential spread of existing priority invasive plant infestations.

Design Criteria ID	Proposed Design Criteria
DC 29	Invasive plant surveys will be conducted prior to project implementation unless recent surveys (within 5 years) have been conducted. Known invasive plant sites will be flagged prior to implementation and will be avoided as much as possible by conducting all project work outside of flagged exclusion areas. If project activities cannot be completely avoided within flagged infestations, risk minimization strategies shall be employed, such as working in the infested area last, working in infested areas when propagules are not viable, limiting the number of people or equipment within the infestation, and cleaning mechanical and hand equipment, clothing, boots, etc., before moving to other un-infested National Forest System lands.
DC 30	Post-implementation invasive plant surveys shall also be conducted in areas of ground disturbing activities. If found, newly detected or expanding ENF Priority 1 or 2 invasive plants shall be treated in accordance with the design features of the Forest-Wide Treatment of Invasive Plants Project (ENF 2013).
DC 31	All off-road equipment shall be cleaned to ensure it is free of soil, seeds, vegetative matter or other debris before entering National Forest System lands to prevent the introduction or spread of invasive plants. Equipment will be inspected before initial entry and any subsequent re-entries onto the project area. If determined necessary during the inspection, cleaning shall occur at a vehicle washing station or agreed upon cleaning location before the equipment enters or re-enters the project area.
DC 32	Known invasive plant sites in the project area will be flagged prior to implementation and the spread of occurrences will be avoided as much as possible by conducting all project work outside of flagged exclusion areas. If project activities cannot be completely avoided within flagged infestations, risk minimization strategies shall be employed such as working in the infested area last, working in infested areas when propagules are not viable, limiting the number of people or equipment within the infestation, and cleaning mechanical and hand equipment, clothing, boots, etc., before moving to other un-infested National Forest System lands. These areas will be identified on project maps.

7. Anticipated weed response to proposed action (Moderate)

The proposed Project will moderately increase the risk of NNIP species becoming established and spreading in the project area due to the removal of native vegetation, and the movement of vehicles and equipment in and out of the Treatment Units. The anticipated NNIP response to the proposed action is moderate if recommended Design Criteria are not included. With incorporation of Design Criteria, it is anticipated that the risk of spreading and/or introducing noxious weeds would be reduced to a low level within forested habitats.

This weed risk assessment is restricted to the project description in this Biological Evaluation. If activities are proposed that extend beyond the activities described in this document, then a new assessment would be required. This weed risk assessment is restricted to the project description in this Biological Evaluation. If activities are proposed that extend beyond the activities described in this document, then a new assessment would be required.