BIOLOGICAL ASSESSMENT

for

Threatened, Endangered and Proposed AquaticSpecies

and

BIOLOLGICAL EVALUATION

for

Forest Service Sensitive Aquatic Species

GIBSONVILLE HEALTHYFOREST RESTORATIONPROJECT

PROJECT LOCATION

Plumas County, California

Feather River Ranger District

Plumas National Forest

June 2016

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Summary

The Biological Assessment (BA) is prepared to determine the effects of proposed projects on species listed by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service as Endangered, Threatened or Proposed for listing. It is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (19 U.S.C. 1536 {c}), 50 CFR 402, and standards established in Forest Service Manual (FSM) direction (FSM 2672.42).

The Biological Evaluation (BE) provides a process to review all Forest Service planned, funded, executed, or permitted programs and activities for possible effects on regionally listed Forest Service Sensitive species (FSM 2672.42). This document combines the BA and BE for fish and wildlife (including invertebrates, amphibians, reptiles, birds, and mammals).

SPECIES NOT CARRIED FORWARD

Although the following species are found on the Feather River Ranger District of the Plumas National Forest, there is no known habitat and/or no observations and/or out of the elevational range for the following species within the Gibsonville Project area; therefore they will not be discussed further in this document: **California red-legged frog and Hardhead minnow.**

The following species are found on the Plumas National Forest and there is potentially suitable habitat within the Gibsonville Project. However, based on the limited habitat available due to the elevational, and/or no detections from surveys, and/or that proposed treatments would not impact habitat:therefore they will not be discussed further in this document:**Western pond turtle.**

SPECIES CARRIED FORWARD

Alternative A (No Action)

***Endangered species* with *a May Affect, Likely to Adversely Affect*:**It is my determination that the proposed project may affect, likely adversely affect the**Sierra Nevada yellow-legged frog,** in the planning area.Potential adverse effects are due to continued reduction in quality and quantity of aquatic, riparian and aspen habitat, and potential loss of habitat due to wildfire.

***Forest Sensitive Species with a May Effect*:**It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viabilityfor the**Foothill yellow-legged frog**in the planning area.

Alternatives B (proposed action) and C (California spotted owl alternative)

***Endangered species* with *a May Affect, Likely to Adversely Affect*:**It is my determination that the proposed project may affect, likely adversely affect the **Sierra Nevada yellow-legged frog** in the planning area. Potential adverse effects are due to the proposed non-mechanical beneficial treatments within the 82 ft suitable habitat zone.

***Forest Sensitive Species with a May Effect*:**It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viabilityfor the**Foothill yellow-legged frog**in the planning area.

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1. INTRODUCTION

Management of species habitat, and maintenance of a diversity of animal communities, is an important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on National Forest System (NFS) lands are planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species, proposed, candidate or lead to a trend toward listing or loss of viability of Forest Service Sensitive, specified in the 1982 Planning Rule (36 CFR 219).

The purpose of this Biological Assessment and Biological Evaluation (BA/BE) is to review the proposed United States. Forest Service (USFS) action in sufficient detail to determine if the proposed action, GibsonvilleHealthy Forest Restoration Project (here on out referred to as the Gibsonville Project), will result in a trend toward federal listing of Candidate and Forest Service Sensitive species, to document effects on Proposed species in order to determine if conferencing is required, and to document effects on Threatened and Endangered species to determine if consultation is required.The following **Table 1** lists Threatened, Endangered, Proposed, Candidate species and species of Concern, for which habitat availability and suitability was considered for this project:

Table 1. Threatened, Endangered, Proposed, Candidate and Forest Service Sensitive wildlife species that potentially occur on the Plumas National Forest.

Species Common and (Scientific Name)	Species Status*	Habitat or Ecosystem Component	Analysis Category**
Amphibians			
California Red-legged Frog (*Rana draytonii*)	USFWS=T, CDFG=SSC	Riverine and Lacustrine	1
Foothill yellow-legged frog *(Rana boylii)*	**USFS=S, CDFG=SSC**	**Riverine and Lacustrine**	**3**
Sierra Nevada Yellow-legged Frog (*Rana sierrae*)	**USFWS=P, USFS=S CDFG=SSC**	**Riverine and Lacustrine**	**3**
Reptiles			
Western Pond Turtle (*Actymeys mararota*)	USFS:S, DFG:SSC	Riverine and Lacustrine	2
Fish			
Hardhead minnow (*Mylopharodon conocephalus*)	USFS=S, CDFG=SSC	Riverine and Lacustrine	1

*__USFWS:__ **FE** =Federal Endangered, **FT** = Federal Threatened, **FP** = Federal Proposed, **FC** = Federal Candidate, **BCC** = Birds of Conservation Concern, **SOI** = Species of Interest.
USFS: S = U.S. Forest Service - Sensitive, **MIS** = U.S. Forest Service – Management Indicator Species,
Note: Sensitive Species identified for analysis are those included on a proposed updated USFS Region 5 update with an implementation date of July 3, 2013. Projects with NEPA decisions after this date are required to use this updated list.
DFG: SE = State Endangered, **ST** = State Threatened, **DFG : FP** = State Fully Protected, **DFG : SSC** = State Species of Special Concern,

** **Category 1:** Species whose habitat is not in or adjacent to the aquatic or terrestrial wildlife analysis areas and would not be affected by the project.
Category 2: Species whose habitat is in or adjacent to the aquatic or terrestrial wildlife analysis areas, but would not be either directly or indirectly affected by the project.
Category 3: Species whose habitat would be either directly or indirectly affected by the project.

Biological Assessment (BA) is prepared to determine the effects of proposed projects on species listed by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service as Endangered, Threatened or Proposed for listing. It is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (19 U.S.C. 1536 {c}), 50 CFR 402, and standards established in Forest Service Manual (FSM) direction (FSM 2672.42).

Biological Evaluation (BE) provides a process to review all Forest Service planned, funded, executed, or permitted programs and activities for possible effects on regionally listed Forest Service Sensitive species (FSM 2672.42). This document combines the BA and BE for fish and wildlife (including invertebrates, amphibians, reptiles, birds, and mammals).

1.1 Threatened and Endangered species

Those species listed under the federal Endangered Species Act. Threatened species are likely to become Endangered throughout all or a significant portion of their range (16 United States Code [USC] 1532).

The following species are found on the Feather River Ranger District on the Plumas National Forest and/or there is suitable habitat within the Gibsonville Project analysis area.Effects to these species as a result of implementing the proposed Gibsonville Project are analyzed and discussed below:**Sierra Nevada yellow-legged frog.**

Proposed Critical Habitat for the SNYLF is found on the Feather River Ranger District on the Plumas National Forest, however, there is no proposed Critical Habitat within the Gibsonville Project analysis area.Effects to Critical Habitat as a result of implementing the proposed Gibsonville Project are not analyzed and discussed below:**Proposed Critical Habitat.**

1.2 Proposed species

A Proposed species is any species that is proposed in the Federal Register to be listed as a Threatened or Endangered species under the Endangered Species Act (50 Code of Federal Regulations [CFR] 402.03).

1.3 Candidate species

Those species identified as a "candidate" for listing as a Proposed species. The U.S. Fish and Wildlife Service recently changed its policy on Candidate species—the term "Candidate" now strictly refers to species for which the service has enough information on file to warrant or propose listing as Endangered or Threatened.

1.4 Forest Service Sensitive species

Those species, generally federal Candidates for listing or Species of Concern, that have been designated by the Forest Service as needing special management attention because of viability concerns. The Forest Service manages for these species to ensure they will not require listing as Threatened or Endangered.

Although the following species are found on the Feather River Ranger District of the Plumas National Forest, there is no known habitat and/or no observations and/or out of the elevational range for the following species within the Gibsonville Project area; therefore they will not be discussed further in this document:**California red-legged frog and Hardhead minnow.**

The following species are found on the Plumas National Forest and there is potentially suitable habitat within the Gibsonville Project. However, based on the limited habitat available due to the elevational, and/or no detections from surveys, and/or that proposed treatments would not impact habitat: therefore they will not be discussed further in this document: **Western pond turtle.**

> The Western pond turtlewas omitted from further discussion because although there is potentially suitable habitat within the analysis area, it is on private land. Proposed treatments are far enough away from potentially occupied habitat that affects are not expected.

The following species are found on the Feather River Ranger District on the Plumas National Forest and/or there is suitable habitat within the Gibsonville Project analysis area.Effects to these species as a

result of implementing the proposed Gibsonville Project are analyzed and discussed below:**Foothill yellow-legged frog.**

Several Threatened and Endangered (T&E) species identified in the list of T&E species provided by the "Federal Endangered and Threatened Species that may be affected by Projects in the Plumas National Forest", accessed via USFWS web page http://www.fws.gov/sacramento/ES_Species/Lists/es_species_lists-overview.htm. The following have been eliminated from further analysis based onlack of species distribution, and/or no occurrences and/or no habitat.

- **California tiger salamander** *(Ambystoma californiense)*
- **Conservancy fairy shrimp** *(Branchinecta conservatio)*
- **Shasta crayfish** *(Pacifastacus fortis)*
- **Vernal pool fairy shrimp** *(Branchinecta lynchi)*
- **Vernal pool tadpole shrimp** *(Lepidurus packardi)*
- **Delta smelt** (*Hypomesus transpacificus*)
- **Lahontan cutthroat trout** (*Oncorhynchus clarki henshawi*)
- **Steelhead** (*Oncorhynchus (=Salmo) mykiss*)
- **Carson wandering skipper** *(Pseudocopaeodes eunus obscurus)*
- **Giant garter snake** *(Thamnophis gigas)*
- **Critical Habitat for Chinook Salmon***(Oncorhynchus (=Salmo) tshawytscha)*
- **Critical Habitat for Yellow-billed cuckoo** *(Coccyzus americanus)*
- **Critical Habitat for Steelhead**
- **Critical Habitat for Vernal pool species**

2. CONSULTATION TO DATE

The U.S.Fish and Wildlife Service (USFWS) species list for the Plumas National Forest was formally issued on January 31, 2008 (USFWS reference 1-1-03-SP-1810) and is since updated for projects by computer database (on file at District office). This list fulfills the requirements to provide a current species list pursuant to Section 7(c) of the Endangered Species Act, as amended (on file). Threatened, Endangered, Proposed and Candidate species with potential to occur in the project area were reviewed to determine any possible effects of the proposed Gibsonville Project. The **Sierra Nevada yellow-legged frog** is listed as Endangered by the U.S. Fish and Wildlife Service (April 2014 Vol. 72 No. 82) consultation will be initiated in the June 2016, Region 5 SNYLF Batch 5 USFWS Consultation process.

3. CURRENT MANAGEMENT DIRECTION

Management area specific and species-specific direction and prescriptions will be included in the species discussions below. Direction is also found under other areas (e.g., timber management) that directly or indirectly affect animal species and/or their habitats. Current management direction relevant to the proposed action as it affects Threatened, Endangered and Forest Service Sensitive species can be found in:

- Forest Service Manual and Handbooks (FSM/H 2670)
- National Forest Management Act (NFMA 1976)
- Endangered Species Act (ESA 1976)
- National Environmental Policy Act (NEPA 1969)

- Migratory Bird Treaty Act of 1918 as amended (MBTA)
- Plumas National Forest Land and Resource Plan (LRMP 1988)
- Plumas National Forest (FEIS/ROD for the LRMP 1988)
- Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement and Record of Decision (SNFPA FEIS/ROD 2001)
- Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement and Record of Decision (SNFPA FSEIS/ROD 2004)
- Regional Forester policy and management direction
- Species specific Recovery Plans which establish population goals for recovery of those species
- Species management plans, guides or conservation strategies

3.1 National Environmental Policy Act (NEPA 1969)

The National Environmental Policy Act (NEPA) is a United States environmental law that established policy (e.g. environmental effects of proposed federal actions) and the President's Council on Environmental Quality (CEQ).

3.2Endangered Species Act (ESA 1973)

The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a federal agency not be likely to jeopardize the continued existence of a threatened or endangered (TE) species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible federal agency to consult the USFWS and the National Marine Fisheries Service concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE species to ensure management activities are not be likely to jeopardize the continued existence of a TE species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. This assessment is documented in a Biological Assessment (BA) and is summarized or referenced in this Chapter.

3.3 National Forest Management Act (NFMA 1976)

National Forest Management Act (NFMA 1976) and Code of Federal Regulations (36, 40 & 50 CFR)The National Forest Management Act (NFMA 1976) includes direction to preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species, so that the diversity is at least as great as that which would be expected in a natural forest and the diversity of tree species is similar to that existing in the planning area (36 CFR 219.26 and 219.27). One of the key ways this direction is implemented is through the NFMA regulations concerning species viability, (36 CFR 219.19).

3.4Forest Service Manual and Handbooks (2670)

FSM/FSH 2670: Forest Service Sensitive (FSS) species are plant species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare animals do not become threatened or endangered and ensure their continued viability on national forests. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized or referenced in this Chapter.

FSM/FSH 2670.31: Places top priority on conservation and recovery of Endangered, Threatened, and Proposed species and their habitats through relevant National Forest System, State and Private Forestry,

and Research activities and programs. Avoid all adverse impacts on Threatened and Endangered species and their habitat except when it is possible to compensate adverse effect totally through alternatives identified in a biological opinion rendered by the U.S. Fish and Wildlife Service (USFWS); when an exemption has been granted under the act, or when the USFWS biological opinion recognizes an incidental taking. Initiate consultation or conference with the USFWS when the Forest Service determines that proposed activities may have an adverse effect on Threatened, Endangered, or Proposed Species or when Forest Service projects are for the specific benefit of a Threatened or Endangered species. Identify and prescribe measures to prevent adverse modification or destruction of critical habitat and other habitats essential for the conservation of Endangered, Threatened, and Proposed species. Protect individual organisms or populations from harm or harassment as appropriate.

FSM/FSH 2670.32: As part of the National Environmental Policy Act process, review programs and activities, through a biological evaluation, to determine their potential effect on sensitive species and avoid or minimize impacts to species whose viability has been identified as a concern. If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. Establish management objectives in cooperation with the States when a project on National Forest System lands may have a significant effect on sensitive species population numbers or distribution.

3.5Plumas National Forest-Land and Resource Management Forest Plan (1988)

The 1988 Plumas National Forest Land and Resource Management Plan (PNF LRMP, commonly referred to as the “Forest Plan”), as amended by the 2004 SNFPA final supplemental EIS Record of Decision, guides the proposed action and alternatives. The PNF LRMP provides Forest specific information on how TES species will be managed. These include forest wide goals and policies for Wildlife, Fish and Sensitive Plants (p. 4-4) and Riparian Areas (p. 4-7), Wildlife objectives (p. 4-14, 4-15, and 4-19), forest wide direction and standards and guidelines for Wildlife, Fish and Sensitive Plants (p. 4-29 through 4-32). Management Area specific and species-specific direction and prescriptions will be included in the species discussions below. Direction is also found under other areas (e.g., Timber management) that directly or indirectly affect animal species and/or their habitats. This direction is incorporated by reference. The PNF LRMP provides management guidelines that incorporate Regional direction for each species. Current TES and wildlife direction can be found in the PNF LRMP (USDA 1988), as amended by SNFPA FSEIS ROD (USDA 2004), for Wildlife, Fish, Riparian Ecosystems and riparian-dependent wildlife species.

3.6Sierra Nevada Forest Plan Amendment Final Supplemental EIS (2001 &2004)

In January 2004, the Regional Forester signed the SNFPA final supplemental EIS Record of Decision, which replaced the 2001 Record of Decision on the SNFPA final EIS.These documents provide a list of direction, and standards and guidelines that are a subset of all applicable Land and Resource Management Plan direction, and this project is being analyzed for consistency to all applicable Forest Plan standards and guidelines for terrestrial and aquatic wildlife, including Aquatic Management Strategy (AMS) Goals and Riparian Conservation Objectives (RCOs, USDA 2004).

3.7Rapid Landscape Analysisfor Little Grass Valley Reservoir, Lost Creek, Slate Creek, and Canyon Creek Watersheds (2013)

This landscape assessment is intended to consider existing conditions to identify resource management objectives, strategies, and/or actions that will achieve the desired conditions outlined in the forest plan for the subject watersheds. Desired conditions and action objectives/strategies/actions can be used in subsequent project-level environmental documents to establish the project purposes and needs.

3.7 Insect and Disease Evaluation of the Sacketts (Gibsonville) Project

On September 11, 2013, Danny Cluck, Forest Health Protection Entomologist, conducted a field evaluation of the Sackettts (Gibsonville) project. The objective of the visit was to evaluate current stand conditions, determine the impacts of forest insects and diseases on management objectives and discuss treatment alternatives (FHP Report – Sacketts 2014).

4. PROPOSED ACTION

The Forest Service proposes to reduce the risk of wildfire, to protect, restore, and enhance forest ecosystem components (i.e., streams, meadows, aspen areas) in the vicinity of Gibsonville, California. A combination of hazard tree removal, forest health, and fuels reduction treatments are proposed on **1,200** acres of Forest Service system lands. These actions are proposed to be implemented on the Feather River Ranger District of the Plumas National Forest.

4.1 Project Location

The project area is located approximately 6-8 miles northeast of La Porte, CA, in and around the historic townsite of Gibsonville. County Road 511 (Quincy-La Porte Road) traverses the project area.The legal description of the project area is portions of Mount Diablo Meridian, California; T22N, R9E, Sections 25, 35 and 36; and T22 N, R10E, Sections 17, 19, 20, 29 and 30.Refer to **Figure 1,** vicinity map.

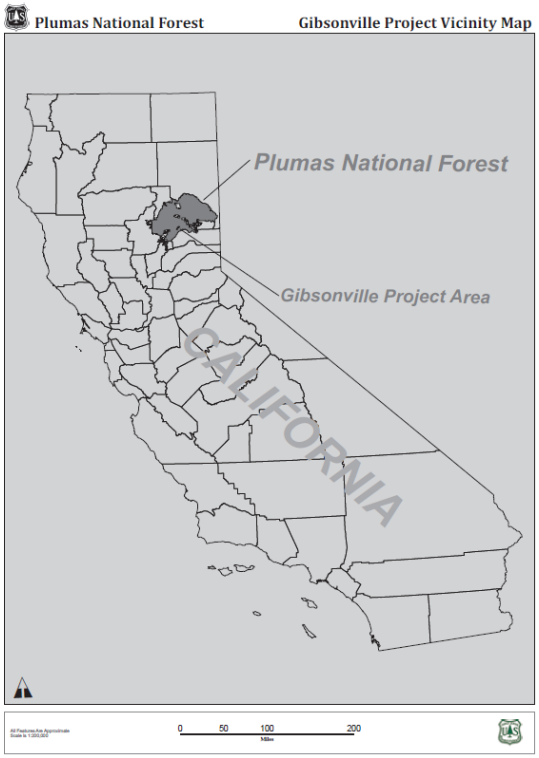

Figure 1. Gibsonville Project vicinity map.

4.2 Purpose and Need

The Healthy Forests Restoration Act (HFRA) of 2003 authorizes the Forest Service to implement hazardous fuel reduction projects to reduce wildfire risk to at-risk public lands; to enhance efforts to protect watersheds and address threats to forest health, including catastrophic wildfire, across the landscape; and to protect, restore, and enhance forest ecosystem components, to promote the recovery of threatened and endangered species, improve biological diversity, and enhance productivity and carbon sequestration.

The purpose of the project is to retain and restore the ecological resilience of NFS lands, while providing for a broad range of services to humans and other organisms. Ecological resiliency refers to all stages of forest development. Not only the ecosystem's ability to absorb small drivers and stressors (disturbances like wildfire, insects and diseases) and prevent them from amplifying into larger ones, but also its capacity to recover afterwards.Specific purposes of the project are to:

- Remove hazard trees along roadways and from within the Gibsonville townsite to make these areas safer and increase roadside viewing distances for motorists, local residents, recreationists and other forest users;
- Thin vegetation to increase visibility and protect the Gibsonville townsite;
- Thin vegetation to release aspen from conifer suppression;
- Thin vegetation to restore meadow potential zones;
- Reduce ground, ladder and crown fuels by thinning trees and brush, thereby decreasing the likelihood of a severe wildfire spreading to private lands and structures or into California spotted owl and/or goshawk habitat;
- Utilize removed material – timber and smaller trees – to create an economic benefit locally and generate partial funding for the required noncommercial thinning and burning fuel treatments;
- Remove invasive plants from the project area.

4.3 Project Design Features

This project will comply with the directions, and standards and guidelines within the Plumas National Forest LRMP as amended by the 2004 SNFPA FSEIS and ROD. In addition to measures included in the project description, the following resource protection measures are included as part of the proposed project design. Implementation of the following Resource Protection Measures would meet Forest Service Management Direction and are incorporated in the proposed action. Refer topages 36-48 of the 2004 SNFPA ROD for a complete list of the management direction for Desired Conditions, which are statements describing a common vision for a specific land area such as "California Spotted Owl Protected Activity Centers". Refer topages 49-66 of the 2004 SNFPA ROD for a complete list of the management direction for Standard and Guidelineswhich apply to all land allocations such as "Habitat Connectivity for Old Forest Associated Species".

C and B Provisions/Clauses

All standard contract practices would be applied (timber sale contract B-provisions) as would some additional C-provisions and site specific prescription recommendations.

- Recommended mitigations associated with vegetation management would be designed to reduce logging damage to residual trees, reduce fuels, and reduce opportunities for infection of trees by fungal disease or insect attack. Recommended mitigations include: 1) minimizing logging in the spring when bark is loose and trees are more susceptible to logging wounds; 2) removal of small trees damaged beyond repair in harvesting operations, particularly in thinning units; 3) no chainsaw

thinning in plantations from January through July to minimize bark beetles (*Ips* spp.) attack. 4) no removal of specially identified trees (e.g. marked survey trees, superior genetics trees, and/or proven rust.

- **C6.24-B6.24** Protection of Habitat of Threatened and Endangered Species (TEPS) Species (10/78): Location of areas needing special measures for protection of animals (or plants) as Threatened, Endangered, Proposed or Species under the ESA of 1973 and R5 Sensitive Species are shown on map and or discussed in this document. If protection measures prove inadequate, if other such areas are discovered, or if new species are listed on the Endangered Species List, FS may either cancel under **C8.2** or unilaterally modify this contract to provide additional protection regardless of when such facts become known. Discovery of such areas by either party shall be promptly reported to the other party.
- **CT6.313** Limited Operating Period (1/84): Except when agreed otherwise, Purchaser's operations shall be "limited" as described within this document.
    - If new species are listed or a T&ES is discovered within an area in which they may be adversely affected by activities, protection measures such as LOPs will be implemented as recommended by a qualified biologist, as appropriate for the species. The dates and reason for delaying harvest should be included in **C6.313** Limited Operating (1/84), or other language that is appropriate for the type of contract.
- **C6.7 – C6.705** Logs not meeting utilization standards shall be used to meet the Land and Resource Management Plan as amended requirements. Logs should be evenly distributed within the units (stands) to the extent possible.

Best Management Practices

BMPs are used in most all Forest Service management activities and their effectiveness is important for various reasons. The BMP Evaluation Program (USDA Forest Service 2002 and 2012) was developed to reduce the risk to water quality degradation by assessing the implementation and effectiveness of BMPs. The objective of BMPs is to protect water related beneficial uses from nonpoint source containments. Results from the BMP Evaluation Program are used to assess direct and indirect effects of water quality for the proposed action. Proper application of BMPs minimizes erosion, such as rilling, and sediment delivery to nearby streams. The BMP Evaluation Program rates two components: the effectiveness of the BMPs and whether or not BMPs were properly implemented. The recent Region 5 amendment to the Forest Service Handbook for water quality management indicates Forests should strive to achieve BMP effectiveness rates of 90% to 95% (USDA Forest Service 2011). The Region 5 amendment states that BMP monitoring frequency may be reduced for evaluation protocols that rate at least 95% effective for 5 consecutive years. Additionally, the Handbook amendment states that the Forest Service will work with the California State Water Resource Control Board to revise and improve particular BMPs if effectiveness rates are less than 90%.

The Plumas National Forest Report for the Best Management Practices Evaluation Program 2010-2012 report found that 93.8 percent were rated as effective between 2010 and 2012. From 2007-2012 the report found that 90.5 percent were effective. From 2010-2012 the timber associated BMPs for implementation were rated as 100 percent and for 2007-2012 they were rated as 98.1 percent (USDA Forest Service 2013). Standard practice on Plumas NF has been to visit all sites where a BMP evaluation indicated substandard effectiveness, correct the practice on the ground at that location, and consider how the practice may be improved during implementation of future projects.

- BMP evaluations conducted on the Plumas National Forest for activities that are pertinent to the proposed project are evaluations T01, T02, T04, E08, E09, E11 and F25 as indicated in **Table 2**. Refer to **Appendix A**for additional supporting BMPs.

Table 2. Best Management Practicesfor Timber Activities.

BMPEP Onsite Evaluation Protocols	BMP subjects Evaluated
T01: Streamside Management Zones (SMZs)	• Stream Management Zone (SMZ) Designation • Stream Course and Aquatic Protection • Slash Treatment in Sensitive Areas
T02: Skid Trails	• Tractor Skidding Design • Erosion Control on Skid Trails
T04: Landings	• Log Landing Location • Log Landing Erosion Control
E08: Road Surface, Drainage & Slope Protection	• Erosion Control Plan • Stabilization of Road Slope Surfaces and Spoil Disposal Areas • Road Slope Stabilization Construction Practices • Control of Drainage • Construction of Stable Embankments • Maintenance of Roads • Road Surface Treatments to Prevent Loss of Materials
E09: Stream Crossings	• General Guidelines for Location and Design of Roads • Stabilization of Road Slope Surfaces and Spoil Disposal Areas • Road Slope Stabilization Construction Practices • Control of Road Drainage • Construction of Stable Embankments (Fills) • Stabilization of Road Slope Surfaces and Spoil Disposal Areas
E11: Control of Sidecast Material	• Control of Sidecast Material During Construction & Maintenance
F25: Prescribed Fire	• Consideration of Water Quality in Formulating Fire Prescriptions • Protection of Water Quality from Prescribed Burning Effects

- Review of the roads survey data of the Gibsonville project identifies the following five stream crossings where **culverts** need to be replaced or reused and set properly where the outlet drop is close to zero feet. Refer to **Table 3**.

  Table 3. Stream crossing that require new or reset culverts.

Road ID	Stream Type	Outlet Drop (ft.)
22N96Y	Intermittent	1
22N01X	Perennial	2
22N01X	Perennial	3
9M21	Ephemeral	1

- Haul routes should have additional **dips** before the implementation of the project. Critical dips are dips located adjacent to a culvert stream crossing that in the event of overtopping the flow is diverted back to the stream channel instead of going down the road prims to into another dip, ditch relieve culvert, or stream crossing. These will be identified by the District Hydrologist prior to project implementation.
- No new **landings** within 300 ft of perennial streams and 150 ft of intermittent streams.
- Follow **PNF Water Drafting Guidelines**.Water drafting sites and specifications must be approved prior to use.

Limited Operating Periods

Limited Operating Periods (LOPs) are designed to reduce potential harm and or harassment to aquatic and semi-aquatic organisms during critical seasons, primarily nesting and their offspring seasons, when animals are most vulnerable to activities could result in failed nesting attempts. If management objectives cannot be met by implementing the LOPs identified, a wildlife biologist will be consulted to determine more specific areas and kind of activities that may be pursued. The biologist may recommend removing an LOP, if new information arises.

S&GL #75-79 and 88: Alternatives would be implemented in compliance with all rules and regulations governing land management activities, including the use of appropriate LOPS identified in **Table 4**. Limited Operating Periods are listed in the 2004 SNFPA ROD, pages A-54, A-58, A-60, A-61 and A-62.

Table 4. Limited Operating Periods by Species and Location.

Species	Location	Limited Operating Period
Sierra Nevada yellow-legged frog	Within 82 feet of perennial or intermittent streams and within proposed Critical habitat	April 1 through October 31
Foothill yellow-legged frog	Within 82 feet of perennial or intermittent streams	October 15 -April 15

PROTECTION MEASURE:
Sierra Nevada Yellow-legged frog: Limited Operating Period of activity between June (or when BMPs are met) through October 31st (or first wetting rains which is continual for 72 hours) applies toall activities within 82 feet of perennial or intermittent streams which includes HCPB and riparian, meadow or aspen restoration. The LOP does not apply to mechanical activities such as VDT, mastication, roadside Hazard Tree and biomass or underburning because those activities should not be occurring within the 82 ft EEZ. Any deviation must be approved by the District Biologist.

Riparian Conservation Area (RCA)

The project area where treatments are proposed supports biological processes, maintains its level of biological productivity. The ecological concerns for this project are the lack of fire and the effects of past logging practices. Both practices have created an imbalance, causing an overabundance of ladder fuels (small trees) and detritus duff (e.g. leaves, braches, bark and stems) and an abundance of even-aged stands.

PROTECTION MEASURE: The Feather River Aquatic and Hydrology department identified riparian areas with moderate to heavy concentrations of fine to small fuels. Fuels reduction treatments are proposed to be implemented within the RCA's. RCA's buffers are identified in **Table 5** by treatment type and the allowable treatment with its associated horizontal buffer. Seethe Gibsonville Project –Wildlife BEBA 2016, and Silvicultureand Hydrology Reports 2016 for details on types of treatments. The 2004 Framework guidelines include meeting sixRiparian Conservation Objectives (RCOs). To describe how this project's proposed timber harvest and fuel treatments meet these objectives, an RCO analysis is provided in **Appendix B**.

Table 5. Treatment Riparian Conservation Area (RCA) buffers for the Gibsonville Project, including additional conservation measures for the SNYLF.

Treatment Type	Ephemeral and Intermittent Streams*	Perennial	Springs	Meadow
Variable Density Thinning (VDT)	Equipment exclusion zone**		Within stream buffers or as identified.	To meadow edge.
	75 ft. buffer.	150 ft. buffer.		
Aspen Release	10 ft. buffer.= no treatment		Within stream buffers or as identified.	To meadow edge.
Mastication	Equipment exclusion zone.		Within stream buffers or as identified.	To meadow edge. Minimize the amount of slash into meadow.
	50 ft. buffer	75 ft. buffer.		
Roadside Hazard	Equipment exclusion zone.		Within stream buffers or as identified.	N/A
	75 ft. buffer.	150 ft. buffer.		
Biomass Removal	*Biomass removal is a possible secondary treatment for VDT, Mastication or Roadside Hazard. *Apply similar buffers. For example VDT buffer for perennial streams is 150 ft. *Equipment exclusion zone within these buffers.		Within stream buffers or as identified.	To meadow edge.
HandCut HandPile Burn	*May hand cut up to 10" DBH within entire riparian allocation area. *Piles should be at least 25 ft. from the edge of stream bank or spring. *Piles may be ignited independent of an underburn. *Directional light piles so critters within pile may escape.			To meadow edge.
Meadow Restoration	*May hand cut up to 16 inches in DBH within entire riparian allocation area regardless the type of stream or if it's a spring. The hand cutting limits also applies to treatment within meadows. *Piles should be at least 25 ft. from the edge of stream bank or spring. It's fine to pile within meadows. Burn piles may be ignited independent of an underburn. *Do not remove riparian vegetation.			
Riparian Restoration	*May hand cut up to 16 inches in DBH within entire riparian allocation area regard less the type of stream or if it's a spring. The hand cutting limits also applies to treatment within meadows. *Piles should be at least 25 ft. from the edge of stream bank or spring. It's fine to pile within meadows. Burn piles may be ignited independent of an underburn. *Meadow&Riparian: May hand cut conifers up to 16 inches in DBH inside and out to 75ft from edge will be felled. May pile within meadow. *Do not remove riparian vegetation.			
Underburn	*Underburn will be allowed within the RCAs. *Fire will be ignited no closer than 150 ft. away from any stream, spring, and meadow allowed to back into these features under the ideal conditions for underburning.			
Additional required "Conservation Measures" for the Sierra Nevada yellow-legged frog.				
Aspen Release	*Endline Out Material within **82 ft**. for all perennial or intermittent streams with or without EEZ buffer.			
VDT	*Equipment Exclusion Zone = **82 ft** buffer for all perennial or intermittent streams.			
Mastication	*Equipment Exclusion Zone = **82 ft** buffer for all perennial or intermittent streams.			
Roadside Hazard	*Fell and leave any hazard trees with **82 ft** of perennial or intermittent streams. *Directionally fell trees away from streams and do not endline or drag through streams.			
Underburn	*Fire Exclusion Zone = **82 ft** buffer for all perennial or intermittent streams. *Monitor and actively prevent entry within 82 ft exclusion buffer. *DO NOT construct handline within 82 ft of perennial or intermittent streams.			

*Incudes Alder but go with whatever is greater. **EEZ= Equipment Exclusion Zone.

Hardwoods

S&GL#23: During mechanical vegetation treatments, prescribed fire, and salvage operations, retain all large hardwoods (≥ 12 inch dbh) on the westside except where: (1) they pose an immediate threat to human life or property or (2) losses of large trees are incurred due to prescribed or wildland fires.

> **PROTECTION MEASURE**: Retain all hardwoods, ≥ 10 inch dbh,where feasible.

Large Trees

S&GL#6: Design projects to retain all live trees ≥30 inches dbh, exceptions allowed for safety and/or operability. Minimize impacts to ≥30 inch trees as much as practicable.

> **PROTECTION MEASURE**: Protect and retain large trees≥ 30 inches dbh. During harvest activities ensure that fuels are clear from around large trees without damaging the tree. Prior to underburning, fuels loads would be removed or reduced around large trees which could be lost due to underburn activities.

Snags

S&GL#11: Use snags larger than 15 inches dbh to meet this guideline. Snags should be clumped and distributed irregularly across the treatment units. Consider leaving fewer snags strategically located in treatment areas within the WUI and DFPZs. While some snags will be lost due to hazard removal or use of prescribed fire, consider these potential losses during project planning to achieve desired snag retention levels.

- Determine snag retention levels on an individual basis. Design projects to sustain across the landscape a generally continuous supply of snags and live decadent trees suitable for cavity nesting wildlife. Retain some mid and large diameter live trees that are currently in decline, have substantial wood defect, or have desirable characteristics (teakettle branches, large diameter broken top, large cavities in the bole) to serve as future replacement snags and to provide nesting structure.
- When determining snag retention levels, consider land allocation, desired condition, landscape position, and site conditions (such as riparian areas and ridgetops) avoiding uniform distribution across large areas. During project-level planning, consider the following guidelines for large-snag retention:
- In westside mixed conifer and ponderosa pine types, four of the largest snags per acre.
- In the red fir forest type, six of the largest snags per acre.
- In westside hardwood ecosystems, four of the largest snags per acre (hardwood or conifer).
    - Where standing live hardwood trees lack dead branches, six of the largest snags per acre to supplement wildlife needs for dead material.

> **PROTECTION MEASURE**: Retain existing snags, where feasible. During harvest activities ensure that fuels are clear from around snags. Prior to underburning, fuels loads would be removed or reduced around snags which could be lost due to underburn activities.

Down Wood

S&GL#10: Determine down woody material retention levels on an individual project basis. Within Westside vegetation types, generally retain an average over the treatment unit of 10-15 tons of large down wood per acre. Emphasize retention of wood that is in the earliest stages of decay. Consider the effects of follow-up prescribed fire in achieving desired retention levels of down wood.

PROTECTION MEASURE: Do**not** Yard Unmerchantable Material (YUM) logs 20 inches diameter and 10 feet length, or larger, but leave the cull logs to meet the large down wood standard, where feasible. Retain snags for recruitment, where feasible and not a safety concern.

5.DESCRIPTION OF ALTERNATIVES

This chapter describes and compares the no action alternative, Alternative Aand two action alternatives, Alternative B (proposed action) andAlternative C.

5.1 Alternative A - No Action

While this alternative takes no action at this time, on-going activities such as routine road maintenance, fire suppression, and recreation may still occur in this area. This alternative serves as a baseline against which to compare the action alternative. Under Alternative A, no fuels treatments, forest health or restoration treatments would be implemented to accomplish the purpose and need. The intent and the desired condition set forth in the 1988 Plumas National Forest Land and Resource Management Plan (PNF LRMP) (USDA 1988), as amended by the Sierra Nevada Forest Plan Amendment (SNFPA) FSEIS and ROD (USDA 2004a,USDA 2004b), would not be achieved. While no costs would be incurred with the “no” action alternative, hazard tree removal, no fuels reduction, or economic benefit would be extended to the rural communities as a result of this project.

5.2 Alternative B - Proposed Action

This alternative seeks 1) to protect, enhance and restore riparian, meadows, aspen areas and spotted owl and goshawk protected activity centers and territories; 2) remove hazard trees and reduce fuel ladders along roads, thereby increasing firefighter and transportation safety; 3) enhance forest health, increase tree vigor, reduce tree mortality and susceptibly to insect, disease and drought by reducing tree densities; 4) and provide some economic benefit utilizing sawlogs and biomass.

Proposed treatments would include a combination of variable density thinning, thinning from below, biomass removal, mastication, hand thinning, and prescribed fire. Alternative B is designed to the fullest extent possible incorporating the General Technical Report GTR-220 (North et al. 2009) and GTR-237 (North et al. 2012) and fulfills land management direction and the standards and guidelines for the 2004 SNFPA ROD land allocations (USDA 2004).The Forest Service would use specific treatment methods to achieve the desired results for the project. The following list briefly describes the treatment methods proposed:

Mechanical Thinning (timber removal): Removal of saw-timber sized trees (10 - 29.9 inches diameter breast height (dbh)) to thin the stand and remove ladder and canopy fuels. The goal is to increase ground-to-crown height, increase spacing between trees, and increase the spacing between tree crowns. Approximately 40 percent canopy cover would be retained on average over all treatment units, with a 30% canopy cover target near roads transitioning to 50% canopy approximately 200 feet from roads. The purpose of the 30% canopy cover standard near roads is to create safer conditions for firefighters to establish a fireline there. A fire will generally “lay down” to a ground fire when the flames cannot move from treetop to treetop.

Removal of conifers less than 30 inches DBH by individual tree selection using variable density thinning (VDT) in areas beyond the 200-feet road corridor buffer, aspen stands, meadow potential zones, and the Gibsonville town site resulting in 40 percent average canopy cover. Roadside thinning would be thinning from below to remove small and medium sized trees first and generally retaining the largest healthiest trees. VDT is a compilation of various thinning treatment elements: a) structural thinning and b) radial release of fire-resilient legacy trees.

Removal of conifers by individual tree selection within aspen stands including sawlogs 10 inches in diameter at breast height (DBH) and greater, as well as biomass conifers 3 inches to 9.9 inches DBH. Select ponderosa and Jeffrey pine trees greater than 30 inches DBH will be retained for wildlife purposes, structure, and species diversity as well as retention of exceptionally large conifers for aesthetic value. Species such as lodgepole pine and white fir will not be retained because of their vigor in encroaching meadows as well as the prolific seeding that is common for white fir.

The priority for thinning would be the removal of the smaller, suppressed, and intermediate-crown class trees (10-16 inches DBH), and removal of some co-dominant and dominant trees with crowns underneath and adjacent to healthy large trees. The preferred species for residual trees in this are shade-intolerant species where they exist. In order of preference, the shade-intolerant species are ponderosa pine, Jeffrey pine, black oak, sugar pine, Douglas-fir, incense-cedar, and true fir.

Mechanical thinning generally utilizes wheeled or tracked processing machines that cut, buck and limb trees onsite. Often, a separate machine carries or drags the logs to the landing area where they are stacked and stored for transport to a mill.

Hazard Tree Removal: Removal of trees deemed hazardous or dangerous based on Forest Services handbook standards for identifying such trees. This is generally done within two tree heights, or approximately 200 feet, from roads or structures.

Mastication: Removal of woody shrubs and trees using mechanical ground-based equipment to grind harvest residue or thin small trees. Shrubs and trees less than 10 inches DBH would be masticated, unless the trees are needed for the desired spacing. Most masticated trees would be less than 6 inches DBH.

Hand cut and pile (hand pile): Removal of shrubs and trees up to 10 inches DBH by manually cutting using chainsaws. These ground and ladder fuels are removed from beneath overstory trees, and/or aggregations of small-diameter conifers or plantation trees. The spacing of residual conifers and black oaks would be generally 18-24 feet to allow retention of the healthiest, largest, and tallest conifers and black oaks and to avoid creating openings where future regrowth would be likely.

Biomass Removal: Removal of surface and ladder fuels (trees 3.0 - 9.9 inches) following the guidelines stated above for mechanical thinning. Many ladder fuels fall into this size range. Biomass removal allows the option for these trees to be sold for small log uses rather than cut, piled and burned on site.

Under burning and pile burning: The cut trees, shrubs, and existing slash would be manually piled and burned. Under burning is prescribed ground fire designed to reduce fuels on the ground.

Sporax Treatment: To prevent the spread of Heterobasidion (occidentale or irregulare) root disease, the use of sodium tetraborate decahydrate (a fungicide treatment) is proposed for use in areas with evidence of root rot. As a simple rule, Heterobasidion irregulare can kill ponderosa pine, Jeffrey pine, sugar pine, Coulter pine, incense-cedar, western juniper, and pinyon pine, while H. occidentale can kill true firs, hemlock, Douglas-fir, and giant sequoia. Sporax treatments would be applied to stumps of trees 14 inches in diameter and greater where they are within 200 feet of striking roads and other main travel routes. All stumps would be treated the same day or within 24 hours of cutting to maximize incorporation of the product into the stump while the stump is still moist. Sporax is typically applied at a rate of one pound per 50 square feet of stump surface. The application of Sporax will not be allowed within any riparian conservation areas (RCA) or streamside management zones (SMZs). Also see Gibsonville-Silviculture Report 2016, Appendix E, F and G, for the number of acres that would be treated with sporax, the evaluation of human and ecological risk, and the herbicide/pesticide safety spill plan.

5.2 Alternative C – California Spotted Owl

This alternative was developed to analyze an alternative consistent with the *Draft Interim Recommendations for the Management of California Spotted Owl Habitat on National Forest System Lands 29 May 2015*. The recommended conservation measures provided in that document are based on the findings of the draft Conservation Assessment (May 2015), and represent a first approximation of actions available for consideration in the interim period between the development of the Conservation Assessment and implementation of a Conservation Strategy for the owl. These recommendations constitute a suite of measures that individually hold promise and support in scientific literature pertaining to owls and forest ecology, but they have not been field tested as a composite set of conservation measures. Thus, we cannot offer any certainty in terms of their benefits, only the potential for benefits based on the best available science in the form of the draft Conservation Assessment. Final interim recommendations may be issued once the draft Conservation Assessment is reviewed and finalized. The bulk of the work of reconciling the challenges that face the conservation of old forest ecosystems in the Sierra Nevada will fall to the Conservation Strategy.

Interim Recommendations (IR) for the California Spotted Owl (CSO) include a 300 acre Protected Activity Center (PAC), a 1,000 acre Territory (which includes the 300 acre PAC) and a 4,400 acre Home Range. This is similar to the current guidelines for the owl with the following changes:

- designation of a minimum canopy cover of 70% or greater for the 300 acre PAC habitat:
    - ✓ an increase over the 60-70% minimum.
- designation of a 1,000 acre Territory with a desired condition of a minimum of:
    - 400 acres of high quality nesting/roosting habitat, at 70% or greater canopy cover, ideally in the vicinity of the 300 ac PAC,
        - ✓ an increase of 100 acres over current guideline.
    - 600 acres of high quality habitat with a minimum of a 50% canopy cover,
        - ✓ current guideline allows a 40% canopy cover based on limited exceptions.

Alternative C would have the same goals and objectives as listed in Alternative B above, but with a greater emphasis on retaining minimum habitat suitability with the CSO territories (previously known as Home Range Core Areas).Proposed treatments would be similar to Alternative B and would include a combination of variable density thinning, thinning from below, biomass removal, mastication, hand thinning, and prescribed fire. However, there would be a reduction of 116 acres of variable density thinning and more acres of hand cutting and piling and no treatment areas. Alternative C is designed to the fullest extent possible incorporating the General Technical Report GTR-220 (North et al. 2009) and GTR-237 (North et al. 2012) and fulfills land management direction and the standards and guidelines for the 2004 SNFPA ROD land allocations (USDA 2004).

6. SCOPE OF THE ANALYSIS

The scope of analysis in determining the environmental consequences (i.e., direct, indirect, and cumulative effects) for each of the alternatives can also be narrowed down in scope to a geographic boundary (i.e., a Forest, a Ranger District, a management area, a timber compartment, a watershed, a sub-watershed, project area, etc.) and a temporal (i.e., 1 year, 10 years, 100 years, etc.) boundary. Each resource area (i.e., aquatics, botanical, hydrological, timber, wildlife, etc.) may have different geographical and temporal boundaries.

6.1 Geographic Boundary

The GibsonvilleProject is situated around Little Grass Valley Reservoir and north of the town of LaPorte, California. The analysis area is comprised of areas, which maintain and encompass the species habitats. The terrestrial and aquatic wildlife analysis area (refer to **Figure 2**)used for determining direct, indirect and cumulative effects to theSierra Nevada Yellow-legged frog and Foothill yellow-legged frog totals **5,330**acres. These acres include **3,952** acres of National Forest System land and **1,378** acres of private land. Elevations within the project boundary range from **4,900 to 6,400 feet**. Refer to **Table 6** for the number of FS to private acres within the wildlife analysis area.

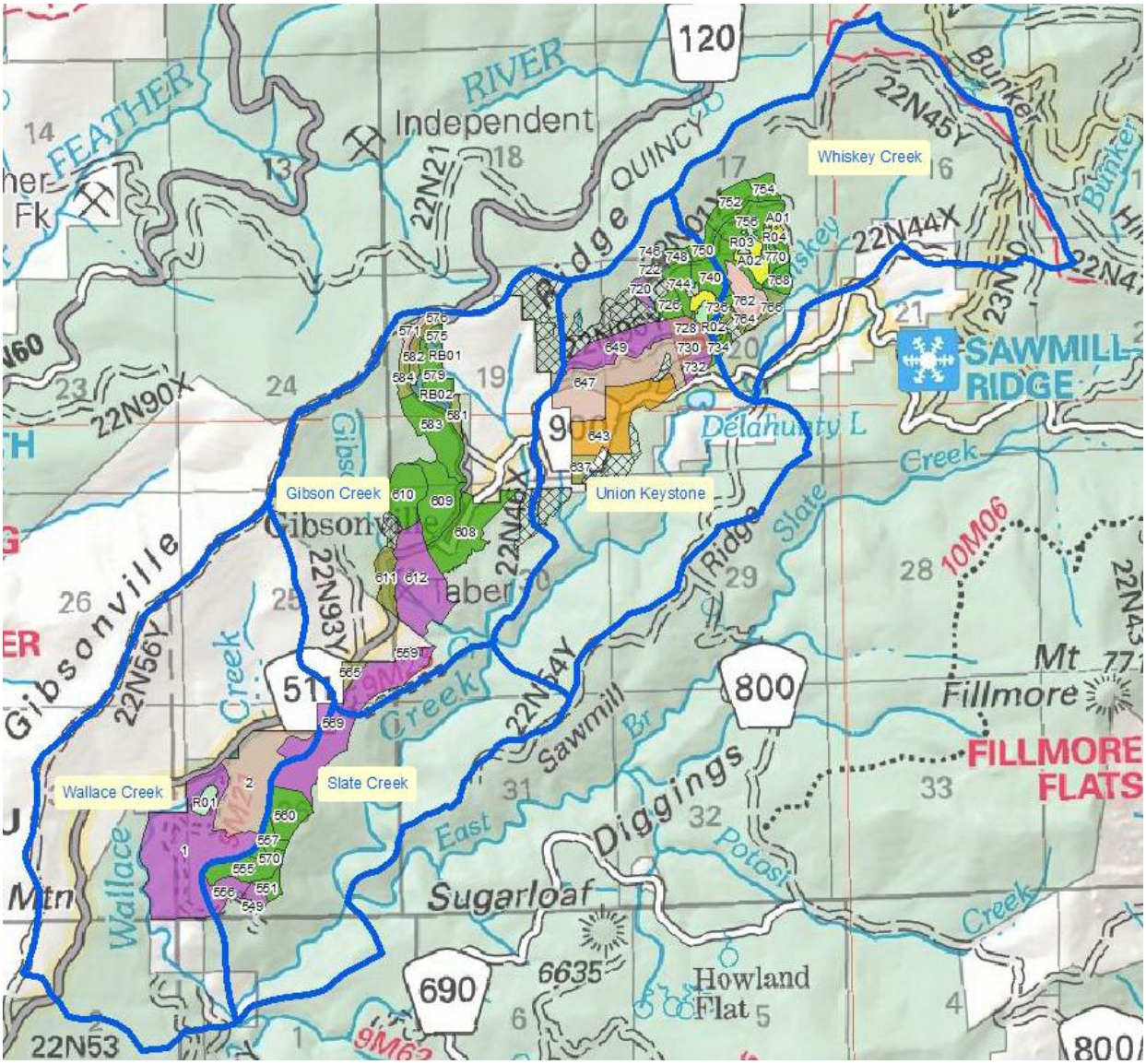

Figure 2. Gibsonville Project –aquatic and terrestrial wildlife analysis area (blue outline of 5 subwatersheds).

Table 6. Shows the acres of Forest Service and Private within the wildlife analysis area.

Subwatershed	ACRES		
	Private	**Forest Service**	**Total**
Whiskey Creek (1)	65	950	1,016
Union Keystone (2)	123	931	1,053
Gibson Creek (3)	347	842	1,189
Wallace Creek (4)	827	485	1,312
Slate Creek (5)	16	744	760
	1,378	**3,952**	**5,330**

The direct and indirect effects analysis area for wildlife species analyzed was the **1,200** acres proposed for treatment under the Gibsonville Project.These effects are caused by the action and occur at the same time, or later in time or further removed in distance.The cumulative effects analysis area, **5,330** acres, for terrestrial and aquatic wildlife species analyzed was chosen based on the project treatment locations, the amount, location and intensity of treatments, survey requirements and the natural topography. If the analysis area is too large, relative to the proposed action size and intensity, the effects can be diluted and thereby not meaningful. Relative to the broad ranging species discussed in this document, their breeding, nesting, foraging and home ranges can vary in extent depending on the species. The cumulative effects analysis area includes past, present, and reasonably foreseeable future projects occurring within the Gibsonville Project wildlife analysis area. Past actions that occurred in and around the proposed Gibsonville Project treatments, such as timber sales and fuel reduction projects on Forest Service and on private lands were included. Limitations of the analysis include future activities on private land. Past activities are considered part of the existing condition and are discussed in the “Existing Condition” section for each resource.

6.2 Time Frame

The time frame for determining cumulative effects depends on the length of time past effects continue on into the future. This will vary widely between species because some wildlife, such as the California spotted owl, require large territories (home range areas) with mature, multi-canopy forests and diverse habitat components such as snags and large woody material while others species such as the Townsend’s big-eared bat, require smaller home range areas and simpler habitats such as mine shafts/bridges/buildings with riparian foraging habitat. Consequently, the analysis timeframe will vary for each species and will be dependent in part on past actions where species are located or there is suitable habitat. Generally, from the broadest perspective the timeframe for past cumulative effects on the terrestrial wildlife analysis area is approximately 20 years. In contrast, effects of mid- to late-nineteenth century hydraulic mining on the aquatic environment continue to be apparent, and the timeframe for cumulative effects on aquatic species is significantly longer.

7. ANALYSIS METHODS

Several methods provide the basis for understanding the nature and extent of wildlife resources within the analysis area, and the potential effects of proposed fuels reduction and vegetative treatments on this resource. Archival and literature sources have been reviewed and data from Forest Service wildlife resource records, maps and geographic information system (GIS) layers compiled to provide a historic overview of species status at a bio-regional geographic region, identify major localized use and natural disturbance events, and to provide information on previous field survey inventories, and to determine data confidence or accuracy.

7.1 Data Sources

Several types of data provided the basis for understanding the nature and extent of the potential effects of the proposed action.

- Archival and literature sources including prior terrestrial and aquatic species surveys, vegetation typing and stream mapping data from Forest Service resource records.
- GIS layers to build Habitat Suitability Models: species detections; vegetation; elevation contours; stream classification, slope and gradient; riparian or meadow vegetation, lake or ponds, and species detections.
- Site-specific target species surveys conducted in project area using FS approved protocols.
- Resource expert field reconnaissance and observations conducted in 2012 through 2016.

7.2 Protocols

Most recent site-specific wildlife surveys were conducted in2013 through 2016 using Region 5 Protocols, as available. Resource expert field reconnaissance and observations were also conducted.

Sierra Nevada and Foothill Yellow-legged Frogs: Fellers, G., and K. Freel, 1995. "A standardized protocol for surveying aquatic amphibians". Davis, CA. Tech. Report No. NPS/WRUC/NRTR 95-01. 117 pp.

7.3 California Wildlife Habitat Relationship (CWHR)

California Wildlife Habitat Relationship (CWHR)(Zeiner et al 1988) classifies existing vegetation types important to wildlife. This system was developed to recognize and logically categorize major vegetative complexes at a scale sufficient to predict wildlife habitat relationships. The CWHR system has three elements: (1) major tree-dominated vegetation associations, (2) tree size, and (3) canopy cover. Refer to **Table 7**.

Table 7. CWHR* tree size and density class crosswalk with seral stage and canopy closure condition.

CWHR Tree Size Categories				CWHR Density Class Categories			
CWHR Size Class	**Tree Sizes (average)**	**Description**	**Seral Stage**	**CWHR Density Class**	**Tree Canopy cover**	**Description**	**Canopy Conditions**
1	< 1" DBH	Seedlings, but definite forest habitat	Early Seral	n/a	< 10%		Open canopy Stands
2	1 -6 " DBH	Sapling		S	10 - 24%	Sparse	
3	6 -11"DBH	Pole-sized tree		P	25 - 39%	Open	
4	11–24" DBH	Small Tree	Mid-seral	M	40 - 60%	Moderate	Closed-canopy Stands
5	> 24" DBH	Medium/Large tree	Later Seral	D	> 60%	Dense	
6	> 24" DBH	Multilayered canopy with dense cover		n/a	> 60%		

The relative distribution of seral stages within the landscape is measured by using CWHR size class as a proxy for seral stage. Table 7 displays the CWHR tree size and density class categories. CWHR size class serves as an effective proxy for seral stage because it classifies forest vegetation by ranges of average tree

size which represent discrete developmental stages of tree growth. CWHR density class serves an effective proxy for open and closed-canopy conditions because it classifies canopy cover. In addition, this allows for a congruent analysis of effects on forest vegetation and wildlife habitat. Forest stands were aggregated by CWHR size class because the proposed treatments, stand structure, and effects of treatments on stand structure would not substantially vary by forest vegetation type (as classified by CWHR habitat type).

7.3Geographic Information System

A Geographic Information System (GIS) was used to analyze forest vegetation on the landscape scale for the analysis area. Forest-wide vegetation typing into California Wildlife Habitat Relationships (CWHR) classifications (Mayer and Laudenslayer 1988) was done for the Plumas-Lassen Administrative Study in 2002 (VESTRA Resources, Inc. 2002). The Herger-Feinstein Quincy Library Group (HFQLG) 2005 Vegetation Mapping Project mapped areas on the Plumas National Forest not covered by VESTRA. These data were combined in a GIS to provide a complete map of the existing vegetation within the analysis area. Then this information was updated and a new existing vegetation layer for Region 5 was created and then used in this analysis. All vegetation information is displayed using CWHR vegetation typing and serves as the baseline acres for analysis. The distribution of CWHR size class and density was analyzed relative to the stand-level effects modeled by CWHR size class.

7.4Common Stand Exams

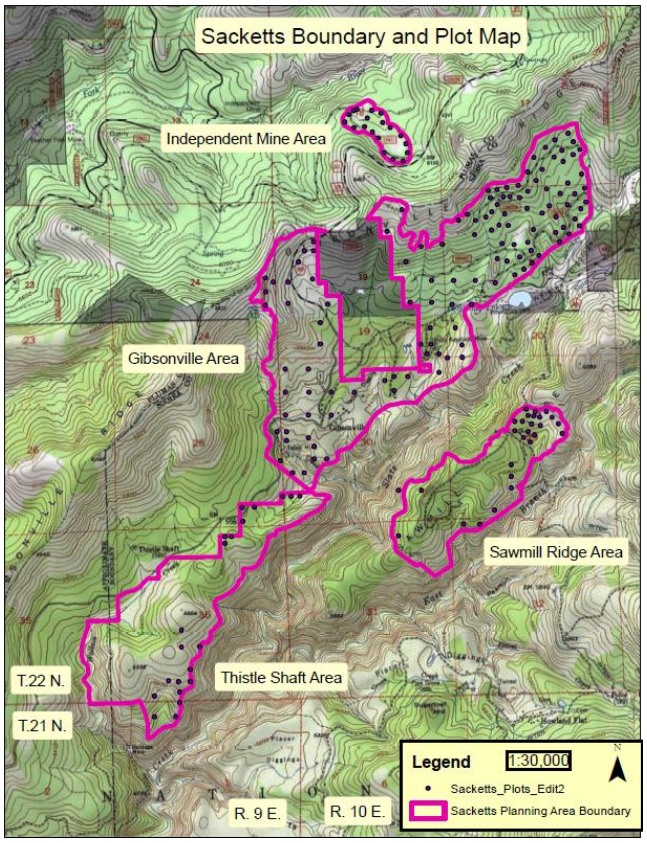

Figure 3: Common Stand Exams(Sacketts=Gibsonville)

Stands within the proposed Sacketts project area were inventoried in the summer of 2013 using the current Common Stand Exam User's Guide for the Pacific Southwest Region 2008. See **Figure 3**. The Sacketts project was later renamed Gibsonville, and the Independence and Sawmill Ridge areas were dropped. The Common Stand Exam system is used to collect data from a series of random points located within a number of stands with a possible need for treatment. Each sample point consists of nested plots: (1) A variable radius prism (30 BAF) plot to gather data on **large** (greater than 4.9 inches DBH) **live trees**. (2) A 1/100 acre fixed radius plot for live **saplings and seedlings**.(3) A variable radius prism (10 BAF) plot for **large snags** (greater than 14.9 inches DBH and greater than 19.9 feet tall). (4) A 80-foot transect for collecting **down woody material and down logs**.

7.5Indicators and Measures

Indicators include habitat components that typify the typical requirements for a species to thrive and sustain populations (e.g. canopy cover, tree size, and snags). Habitat requirements are defined as those providing nesting habitat and foraging opportunities with an adequate prey base that help maintain populations over-time. Habitat requirements vary widely by species, there are indicators of habitat structures and components that when altered can have a measurable effect on species. Refer to **Table 8** for the indicators and the associated measures used to evaluate effects to species for the proposed project.

Table 8. Aquatic and Wildlife Habitat Guide with Associated Species by Indicators and Measures.

SPECIES	INDICATORS	MEASURES
Aquatic &Riparian Habitat Components and Structure (applies to all species)	Large Trees 30" dbh and greater	number
	Snags >4 per acre 15" dbh and greater	number
	Large Down Wood 10-15 tons per acre 10' length and 20" diameter	number
	Hardwoods Retain all hardwoods ≥ 12 inch dbh	number
	Road Density Desired condition of < 2 miles per square mile	miles
Sierra Nevada yellow-legged frog **Foothill yellow-legged frog**	Stream Health Stream crossings removed or improved Road improvements Miles of road decommissioned	number number miles
	RCA habitat improved habitat reduced	acres acres
	Suitable habitat within 82 ft of perennial &intermittent streamsImproved Reduced Critical Habitat Improved Reduced	acres acres acres acres
	Sedimentation Threshold Of Concern (TOC)	percent

7.5 Assumptions

The following are assumptions related to the proposed action:

- ***Assumption 1*:** The 2004 SNFPA FSEIS&ROD provides an analysis for wildlife and aquatic species. This document tiers to the SNFPA analysis and species determinations.
- ***Assumption 2*:** Analysis assumes occupancy unless project area has been surveyed to protocol and found to be absent of the species.
- ***Assumption 3*:** All project specific design featuressuch as standards and guidelines, standard operating procedures (SOPs) and mitigations would be fully adhered to and implemented, including the use of the appropriate Limited Operating Periods (LOPs).
- ***Assumption 4*:**Most activities proposed would be completed within five years.

- ***Assumption 5*:**All wildlife trees (nest trees, roosts, etc.) that are known inhabited would be retained unless they pose a safety hazard.
- ***Assumption 6*:**Proposed activities have the potential to affect Threatened, Endangered, Proposed or Forest Service Sensitive species, directly by the modification of habitat or by loss of habitat, but rarely from direct mortality (if nest tree is felled), or indirectly through habitat modification (e.g., changes to canopy cover, age class structure and species composition).
- ***Assumption 7*:**Treatments such prescribe burns, hand-cut pile then burn, or grapple pile and mastication have low impact on habitat suitability for wildlife, than would mechanical thinning or group selections.
- ***Assumption 8*:**Fragmentation at this scale would not obstruct a species movement across the landscape or reduce current populations due to separation.
- ***Assumption 9*:**Aquatic species spend all or significant portions of their life cycles either in or moving through stream and/or riparian habitats.
- ***Assumption 10*:**Aquatic habitats and associated stream systems can tolerate certain levels of land disturbance. However, widespread or intense land disturbances applied in sensitive areas such as RCAs can substantially impact the immediate area or downstream channel stability and water quality.

8. AFFECTED ENVIRONMENT and ENVIRONMENTAL EFFECTS

8.1 Introduction

The stated primary purpose and need (P&N) for the project is fuels reduction: to reduce the surface and ladder fuels by thinning, handcut/pile/burn, mastication and/or underburn. Refer to the GibsonvilleProject – Fire&Fuels Report 2016. Another P&N is forest health which addresses the loss of trees from root disease by thinning out trees, primarily fir, under 24" dbh and removal of dense fir pockets and to promote growth of pine trees which are underrepresented. There is also a P&N for restoration for watershed health which includes restoring hydrologic connectivity, aspen, aquatic and riparian habitat, and spotted owl and marten habitat. Refer to the Gibsonville Project –Wildlife BEBA 2016, and the Hydrology and Silviculture Reports 2016.

***Direct Effects*:** include immediate changes in habitat conditions and disturbance or harassment of individual animals, including direct mortality, during project activities.

***Indirect Effects*:** include changes that occur later in time, such as long-term changes in habitat structure, or changes in human uses within the project area. Indirect effects can also include effects to a species' prey base.

***Cumulative Effects*:** "The impact on the environment which results from the incremental impact of the action when added to other past, present, and foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively substantial actions taking place over a period of time" (40 CFR 1508.6).

For the affected species, effects are discussed in terms of the prescriptions proposed for each treatment type. Prescriptions for treatments are broken down into two groups for this effects analysis: 1) Mechanical which includes variable density thinning, roadside hazard tree, mastication, aspen release and biomass; and 2) Non-mechanical which includesHandcutting/handpiling/pile burning, underburning, riparian and meadow restoration (HCPB).

There is a description of the existing condition for each indicator, followed by a summary of the direct, indirect, and cumulative effects of the alternatives. Direct effects are likely to be limited to the project implementation phase. Indirect effects would last beyond the implementation period and occur within the temporal bound of the cumulative effects analysis. In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, 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. This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis, but relies on current environmental conditions as a proxy for the impacts of past actions.

8.2 Large Trees

The SNFPA FSEIS/ROD 2004 includes management direction for retention of large trees, 30 inches dbh and larger.The document discusses the importance of large tree retention for mature/old forest associated species. Large trees are an important habitat component for a multitude of mature/old forest and stream dependent species.

Affected Environment

Of the **3,952** acre analysis area (FS lands only) there are approximately**24 trees per acre**in the 4D/M stands and **19 trees per acre**in the 5D/M stands that are 30 inches dbh andlarger. Refer toGibsonville Silviculture Report 2016. These numbers were based on information collected during Common Stand Exams within the project area during summer 2015.Large trees are an important habitat component for a multitude of mature/old forest dependent species.It takes approximately 130 years to grow a 30”dbh tree in the Gibsonville Project area (Dunning and Reineke 1933). The District silviculturist, Dan Roskopf, believes that based on growing conditions this assumption applies to the Gibsonville analysis area.

Environmental Effects

No Action: Alternative A

DIRECT and INDIRECT EFFECTS: Under Alternative A, no trees 30 inches dbh and larger would be removed as no treatments would occur. In addition, the large trees, which provide future recruitment of snags and large down wood, would be retained.

Action Alternatives: Alternatives B and C

DIRECT and INDIRECT EFFECTS: In general, no trees 30 inches dbh and larger are proposed for removal, except for the 23 acres of aspen. In addition, trees 30 inches dbh and larger could be removed for operability and/or if they pose a safety hazard during project implementation. Under Alternative B, 1) it is expected that within the 115 acres of Roadside Hazard Tree Removal many trees identified for removal could be 30”dbh and larger; 2) within the 359 acres of VDT, it is expected that an unknown number could be felled for operability; 3) within the 23 acres of Aspen, it is expected that only a 10-15% canopy cover would be maintained of the larger ”wildlife” trees; 4) within the 181 acres of masticationit is expected that an unknown number could be felled for operability but less than for the mechanical thinning; and 5)within the 1.1.6 miles of new temporary road constructionit is expected that an unknown number could be felled. Few trees 30 inches dbh and larger, if any, are expected to be felled withinthe 377 acres of proposed riparian, meadow, handcut/pile/burnand underburn. The loss of large trees is directly related to the intensity of the action: Alternative B would have a greater effect than Alternative C due to 116 more acres of mechanical thinning for the VDTunits which under Alternative C would be handcut/pile/burn or no treatment. Alternative B includes greater harvesting but also an additional 3, ¾

acre, new landings and an additional 1.2 miles of temporary road construction over what is proposed for Alternative C. This could remove an unknown number of trees 30 inches dbh and larger.

CUMULATIVE EFFECTS: Across the landscape,the large tree standards and guidelines would be met.

8.3 Snags

The SNFPA FSEIS/ROD 2004 and HFQLG FEIS/R include management direction for retention of snags. Table 2 of the SNFPA ROD 2004 states "In westside mixed conifer and ponderosa pine types, retain four of the largest snags per acre, using snags larger than 15 inches dbh, clumped and distributed irregularly across the treatment units".

Affected Environment

Common Stand Exams for the Gibsonville project area show that the area consists on average of **11 snags per acre greater than 15"dbh**: 9.5 snags per acre between15-29" dbh and 1.5 snags per acre 30" dbh and larger.These numbers were based on information collected during Common Stand Exams within the project area during summer 2015. Snags are an important habitat component for a multitude of mature/old forest cavity dependent species.**Table 9** displays the current snag data (trees per acre) by diameter classes for the Gibsonville and Thistle Shaft locations. See Gibsonville Wildlife report about discussion on snags.Snags are an important habitat component for a multitude of mature/old forest cavity dependent species.

Table 9. Snag trees per acre by diameter classes and by location.

Location	0-15" DBH (Trees per acre)	15-30" DBH (Trees per acre)	>30" DBH (Trees per acre)	>15" DBH (Trees per acre)	0-99" DBH (Trees per acre)
Gibsonville	50.5	12.0	2.6	14.6	65.1
Thistle Shaft	34.9	7.0	0.5	7.4	42.3

Environmental Consequences

No Action: Alternative A

DIRECT and INDIRECT EFFECTS: Under Alternative A, no snags would be removed. Snag numbers would remain an average of 11 snags per acre for the proposed treatment area. In addition, there would not be a loss of large trees (see large tree discussion above) which are potential snag recruitment trees and future recruitment of large down wood. While maintaining the stand densities in the short-term, this competition could reduce the recruitment of large trees and future snags and large wood material for the long-term.

Action Alternatives: Alternatives B and C

DIRECT and INDIRECT EFFECTS: Post-treatment the snag numbers are expected to be lower but still meet the minimum standard of four snags per acre, on the landscape. However, snags may be felled for operability and/or safety hazards. It is estimated that half of the snags within the mechanical thin would be retained. Overall, snags would be retained along the unit perimeters or within clumps in the units, where available.Alternative C would reduce the possibility of snag removal for operability or as hazards compared to Alternative B due to fewer acres of mechanical thinning.

CUMULATIVE EFFECTS: Across the landscape, the Snag standard and guideline would be met.

8.4 Large Down Wood

Table 2 of the SNFPA ROD 2004 and HFQLG FEIS states: Within westside vegetation types, generally retain an average over the treatment unit of 10-15 tons of large down wood per acre (equivalent to 8-12

logs per acre ≥ 20-inch dbh and 10 foot in length or longer),with an emphasis on retention of wood that is in the earliest stages of decay.

Affected Environment

Large Down Wood is an important habitat component of forests for a multitude wildlife and aquatic species.Analysis based on common stand data show that on average the units within the project area consists of an average of **9 tons per acre**(≥ 20-inch diameter and 10 foot in length or longer). Refer to **Table 10**. These numbers were based on information collected during Common Stand Exams within the project area during 2015. Numbers from 2013 soil transects show similar tons per acre. High quantities of downed large woody material are not expected to exist equally across the landscape. Overall, less productive soil types, such as exposed sites including ridge tops or south-facing slopes and areas with shallow or erosive soils, are expected to have less downed large woody material due to more open forest cover and slower growth rates of vegetation. Productive sites are capable of growing vegetation more quickly and produce high tree sizes, and densities associated with mortality.

Table 10. Large Down wood data from Common Stands Exams for Gibsonville area.

Common Stan Exam Plot Area	Tons per acre	# Logs per acre	Cubic Volume per acre
Gibsonville	14.285	7	571.4
Thistle Shaft	3.5475	3.7	141.9
Average	**8.925**	**5.4**	**357**

Environmental Consequences

No Action: Alternative A

DIRECT and INDIRECT EFFECTS: Under Alternative A, no Large Down Wood (LDW) would be removed. Also, no future log recruitment trees such as snags and large trees 30” or greater would be removed for operability or as safety hazards. Depending on each stands density and tree sizes, tree growth could be affected at varying rates due to competition for nutrients and space. While maintaining the stand densities in the short-term, this competition could reduce the recruitment of large trees and future snags and large wood material for the long-term.

Action Alternatives: Alternatives B and C

DIRECT AND INDIRECT EFFECTS: The SNFPA ROD 2004 standard and guideline for large down woody material is not met within the Gibsonville project area.Presently the project area is at 9 tons per acre (≥ 20-inch diameter and 10 foot in length or longer) which is below the minimum requirement of 10-15 tons per acre and the desired condition of over 20 tons per acre CSO and NOGO PACs**.** Under the action alternatives, LDW is not specifically proposed for removal but a portion is expected to be removed for operability. Also,future log recruitment trees such as snags and large trees 30” or greater could be removed for operability or as safety hazards.This is expected to occur more on Alternative B which has 116 additional acres of VDT than Alternative C. A design feature would be in place to **not YUM** (Yard Unmerchantable Material) logs 20”diameter and 10’ length but to leave the cull logs to meet the large down wood standard, where feasible. The C clause, C6.7,will be used for all proposed treatment units. The contractor will be required to leave 8-12 logs per acre, which generates approximately 10-15 tons per acre, that are 20 inches or greater at the small end diameter and 10 feet long or longer. Logs will be evenly disturbed within units to the extent possible. However, it is expected that the snags and large trees that would be removed for operability and/or safety hazards which would have eventually fallen and contributed to the tons per acre. Since it is not know exactly how many logs could be recruited as a result of the no YUM design feature it is unknown whether more logs could be recruited if there was no

treatment, and any large trees and snags that could be removed for operability or as safety hazards were retained.

CUMULATIVE EFFECTS: Across the landscape the large down wood would be below requirements.

8.5 Hardwoods

The SNFPA ROD 2004 includes management direction for retention of hardwoods. Site specific planning will determine feasibility and specific needs. Retain smaller oaks, if determined to be necessary for future recruitment. Page 52 of SNFPA ROD 2004 states "During mechanical vegetation treatments, prescribed fire, and salvage operations, retain all large hardwoods on the west side except where: (1) large trees pose an immediate threat to human life or property or (2) losses of large trees are incurred due to prescribed or wildland fire. Large montane hardwoods are trees with a DBH of 12 inches or greater.

Affected Environment

Of the **3,952** acre analysis area (FS lands only) consists on average of **1%**black oak. These numbers were based on information collected during Common Stand Exams within the project area during 2015. Hardwoods are a critical habitat type for wildlife. Oaks (Quercus spp.) may be the single most important genus used by wildlife for food and cover in California forests and rangelands, and black oak occupies more total area in California than any other hardwood species. The physical structure of oak communities determines the availability of shelter, nesting sites, and corridors for travel. Wildlife use oaks as places to hide, shade, and escape from predators and from fires (Pavlik et al. 1991). Large diameter black oak is lacking in the greater than 15 inch diameter classes. This species provides wildlife habitat and contributes to vegetative species diversity. California black oak is shade-tolerant in early life, but as the oak tree ages, it becomes more shade tolerant. If overtopped, the oak either dies outright or dies back successively each year. With continued overtopping, death is inevitable (Burns and Honkala 1990). Retention of oaks includes oaks eight inches in diameter and greater, especially those areas where the basal area is not met.

Environmental Effects

No Action: Alternative A

DIRECT and INDIRECT EFFECTS: Under Alternative A, no hardwoods would be removed as no treatments would occur.

Action Alternatives: Alternatives B and C

DIRECT and INDIRECT EFFECTS: There are few hardwoods within the project area, less than 1% of the area. The action alternatives do not propose to remove any hardwoods. However, if there are any hardwoods within the VDT or mastication and they are under 10"dbh they could end up removed.

CUMULATIVE EFFECTS: Across the landscape the large tree standards and guidelines would be met.

8.6 Road Density

Affected Environment

Roads and trails were compiled to determine the number of miles and density by subwatershed to get an overview of their impact on the landscape. The complied data came from road surveys, our corporate layers, and aerial photos. Due to the high road density, road surveys were conducted in 2012, 2013, and 2015 but the majority of the surveys occurred in 2012. Refer to Gibsonville Hydrology Report 2016. **Table 11** indicates that the average density of roads for the watershed analysis area is 3.3 miles of roads per square mile.

Table 11. Road density (miles per square mile) by subwatershed.

Sub-watershed		ROAD DENSITY			
#	Name	County	Forest Service System	Unclassified	Total
1	Whiskey Creek	0.1	3.8	0.3	4.2
2	Union Keystone	1.2	1.4	0.8	3.4
3	Gibson Creek	1.9	1.0	1.4	4.3
4	Slate Creek	1.1	1.4	2.2	3.7
5	Wallace Creek	0.0	0.1	0.6	0.7
	Total	**4.3**	**7.7**	**5.3**	**16.30**
	Average	**0.9**	**1.5**	**0.6**	**3.26**

Roads modify drainage networks and accelerate erosion processes, resulting in the alteration of physical processes in streams. These changes can be dramatic and long lasting and can degrade water quality and aquatic habitat. Roads can directly affect water quality and aquatic habitat by altering flow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, stream temperatures, and riparian condition in watersheds. Common problems on roads include rutting, blocked drainages, lack of placement of BMPs, and entrenchment of roads. The existing road density within the analysis area and associated stream crossings and culverts has caused fragmentation to the hydrology and aquatic habitat. Ecological processes that occur in the hyporheic zones (where water and land meet in saturated sediments beneath and beside a river channel) have strong effects on stream water quality. Rivers with extensive hyporheic zones retain and process nutrients efficiently, which has a positive effect on water quality and on the ecology of the riparian zone. Scientific research emphasizes the importance of maintaining connectivity between the channel, hyporheic, and riparian components of river ecosystems. When human actions, such as encasing streams in pipes, sever those connections, the result is poorer water quality and degraded fish and aquatic species habitat downstream. Stable streambanks sustain desired habitat diversity and minimize erosion and sedimentation into streams. However, the physical structure and condition of some streambanks has degraded due to poorly maintained or improperly designed roads and stream crossings and heavy impacts from recreational uses. At these locations there is an alteration in flow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, and riparian condition, leading to degradation of water quality and aquatic habitat.

Environmental Effects

No Action: Alternative A

DIRECT and INDIRECT EFFECTS: Under Alternative A, no new roads would be constructed as no treatments would occur.

Action Alternatives: Alternatives B and C

DIRECT and INDIRECT EFFECTS: The SNFPA FSEIS and ROD 2004 provides multiple directions and Standards and guidelines for the importance of controlling road density within wildlife and aquatic habitat. The density numbers are rated as good, fair or poor based on the Washington Office (WO) Forest Service Watershed Condition Classification Assessment (WCA) Guide (USDA Washington Office 2010). The following are how road densities are rated:

- Good = Road density < 1 mi/mi^2
- Fair = Road density of 1 – 2.4 mi/mi^2
- Poor = Road density > 2.4 mi/mi^2

The watersheds within the analysis area have a road density that does not meet the desired condition for minimizing road impacts to aquatic and riparian environments.Based on the average density of roads the overall rating for the five subwatersheds is poor. No road decommissioning is presented or analyzed in the report because it was not part of the purpose and need. Alternative B proposes 1.6 miles of new temporary road construction. While Alternative C proposes 0.4 miles of new temporary road construction. Temporary roads are expected to be closed post-project completion but many temporary roads once constructed are retained and eventually become FS system roads.

CUMULATIVE EFFECTS: Across the project areathe road density standards would **NOT** be met.

8.7 Aquatic& Riparian Habitat

Affected Environment

The elevation in the project area ranges from 5,200 feet near Wallace and Slate Creeks to 6,400 feet near Gibsonville Ridge. Elevation affects the forest types that are present. The forest types in the analysis area range from ponderosa pine and Sierra mixed conifers at lower elevations to true fir (white and red fir) at higher elevations. Refer to **Table 12**. Refer to Gibsonville Botany Report 2016 for list of riparian species within the project area.

Table 12. Description of forest types found in the project area.

Forest Type	Major Species	Other Species Present
Ponderosa pine	Ponderosa pine (*Pinus ponderosa*)	Incense-cedar (*Calocedrus decurrens*) Douglas-fir (*Pseudotsuga menziesii)* Sugar pine (*Pinus lambertiana*)
Sierran mixed conifer	Jeffrey pine (*Pinus jeffreyi*), Sugar pine, Incense-cedar *and* White fir (*Abies concolor*)	Douglas-fir Black oak (*Quercus kelloggi*)
True fir	White fir (*Abies concolor*) Red fir (*Abies magnifica*)	Incense-cedar, Douglas-fir, sugar pine, and Black oak

On a landscape scale, **Table 13**(FS lands) shows existing CWHR vegetation types, size class distribution, and canopy cover distribution for the sub-watersheds within the project area and **Table 14** shows the landscape structure within each sub-watershed.Over 65 percent of the acres in the analysis area are in the moderate to dense canopy cover classes, which indicates multiple canopy layers and interlocking crowns. In addition, over 68 percent of the analysis area is in the poles to small tree size classes, which indicate an increased fire hazard risk potential.Refer to the Gibsonville Silviculture Report 2016, Tables 11 and 13, for further break outs.

Table 13. Summary of vegetation type, size class and canopy closure distribution within Gibsonville analysis area.

CWHR	Forest Vegetation Data	Acres	
		Total Sub-Watershed	Percent ofTotal
Vegetation type diversity	Barren (includes water and wet meadow)	123	3.1%
	Shrub Types (montane chaparral)	514	13.0%
	Oak woodland, foothill pine	0	0%
	Montane hardwoods	0	0%
	Sierra mixed conifer	1,629	41.2%
	True fir (White and Red)	1,683	42.6%
	Pine (ponderosa, Jeffrey)	3	0.1%
	TOTALS	**3,952**	**100%**
Size Class Distribution	Miscellaneous (barren, water, grassland, shrubs)	631	16.0%
	1) Seedling (less than 1 inch DBH)	0	0%
	2) Sapling (1–6 inches DBH)	9	0.2%
	3) Pole (6–11 inches DBH)	565	14.3%
	4) Small Tree (11–24 inches DBH)	2,094	53.0%
	5) Medium/Large Tree (> 24 inches DBH)	653	16.5%
	6) Multi Layered (Size 5 over 4 or 3; Canopy >60%)	0	0%
	TOTALS	**3,952**	**100%**
Canopy Closure Distribution	NA (0–9%) (barren, water, grassland, shrubs)	631	16.0%
	S) Sparse (10–24%)	162	4.1%
	P) Open (25–39%)	588	14.9%
	M) Moderate (40–59%)	895	22.7%
	D) Dense (60–100%)	1,676	42.4%
	TOTALS	**3,952**	**100%**

Table 14.Existing acres of CWHR size and density classes within the Gibsonville analysis area (FS lands).

CWHR Size and Density Class	**Acres by sub-watershed**					
	Gibson Creek	Slate Creek	Union Keystone	Wallace Creek	Whiskey Creek	**Total**
X	85	319	146	8	73	**631**
2D			3		2	**5**
2P					0	**0**
2S					4	**4**
3D	3	70		84		**157**
3M	22		14	6	4	**46**
3P	20	2	111	12	72	**217**
3S	10	7	46		82	**145**
4D	192	117	459	118	210	**1,095**
4M	118	82	15	111	376	**702**
4P	133	14	46	5	86	**284**
4S		3		3	7	**13**
5D	261	49	38	71		**419**
5M	0	52	28	67		**148**
5P		28	24		35	**87**
Total	**842**	**744**	**931**	**485**	**950**	**3,952**

Environmental Effects

Landscape structurerefers to the distribution of relative successional (seral) stages on the landscape, and the relative distribution of closed-canopy and open-canopy stands. This is an important indicator because it may be used as a measure of landscape heterogeneity and diversity, and as a measure of cumulative effects to forest vegetation on the landscape scale. Landscape structure is measured by calculating the distribution of these seral stages within the vegetation analysis area. The relative distribution of seral stages within the landscape is measured by using CWHR size and density class as a proxy for seral stage.

Table 15 displays a summary comparison of the differences in acres treated between the no action alternative, Alternative A, and the action alternatives, Alternatives B and C. Refer to Gibsonville Silviculture Report 2016, Tables 18, 19 and 21 for a finer breakout of treatments.

Table 15. Summary comparison of treatment acres by action alternatives.

Proposed Treatment	Alternative B (acres)	Alternative C (acres)	Difference (acres)
Variable Density Thin-40% canopy cover, Underburn &Biomass	**359**	**243**	**-116**
Aspen Release and Biomass	**23**	**23**	**0**
Hand cut pile burn and Underburn	**345**	**435**	**+91**
Masticate and Underburn	18	18	0
Masticate and Underburn and Biomass	26	26	0
Masticate or Hand cut pile burn or Underburn	137	137	0
Meadow Restoration and Biomass	9	9	0
Riparian Restoration	16	16	0
Roadside Hazard and Hand cut pile burn	54	54	0
Roadside Hazard and Hand cut pile burn and Biomass	61	61	0
Underburn	7	7	0
No Treatment	**146**	**171**	**+25**
Total	**1,200**	**1,200**	

One of the primary goals of the project is aspen restoration byremoving competing conifers thereby retaining existing aspen and initiate aspen regeneration, and to improve meadow conditions. Also to reduce the surface and ladder fuels across the landscape to minimize the potential adverse effects of a wildfire (large intensity &high severity). Under existing condition the flame lengths are too high and the canopy base height are to low which can be a recipe for a passive to active crown fire. By moving forward with the proposed treatments the goal is to reduce the flame lengths to below 4 feet and raise the canopy base height to a point where the fire type changes from a passive crown to a surface fire (Refer to Gibsonville Fire & Fuels Report 2016 for more details). According to PSW-GTR-247 fire behavior in riparian areas vary with landscape attributes. Of the papers that they synthesized the found that generally that larger (4th order and higher) streams often burned less frequent and less severe due to the moisture microclimates whereas smaller, headwater streams often burned similarly to adjacent uplands (USDA Forest Service 2014). The majority of streams found within the project boundary are 1st through 3rd order streams and the common stand exam data collected for the project does indicate that the RCAs have a high tree density. The high tree density and several years of drought does make these riparian areas more susceptible to act as fire wicks that can carry a high-intensity fire. In order to improve RCAs resiliency treatments within these areas was allowed. Refer to Gibsonville Hydrology Report 2016.

Within the **3,952** acre analysis area (FS lands only) there are approximately 69.5 miles of perennial, intermittent and ephemeral streams and there are approximately 268 road crossings on these streams. Of the total 69.5 miles of streams, there are approximately 31.3 miles of perennial and intermittent streams.

Refer to **Tables 16 and 17**. These numbers were based on information collected from field surveys and GISqueries. Refer to Gibsonville Hydrology Report 2016.

Table 16. Miles of streams within five subwatersheds by stream type.

Subwatershed Name &Number	Stream Type & Miles			Total	Intermittent & Perennial
	Ephemeral	Intermittent	Perennial		
Whiskey Creek (1)	7.1	2.9	3.2	**13.3**	6.2
Union Keystone (2)	8.7	3.1	3.9	**15.6**	7.0
Gibson Creek (3)	10.4	4.5	3.2	**18.1**	7.7
Wallace Creek (4)	3.6	1.2	3.2	**8.1**	4.4
Slate Creek (5)	8.4	2.7	3.3	**14.4**	6.0
Total	**38.3**	**14.5**	**16.8**	**69.5**	**31.3**

Table 17. Number of Stream Crossings by Road Type.

Subwatershed Name & Number Stream Type	Roads			
	County	Forest Service System	Unclassified	Total
Whiskey Creek (1)	3	32	1	**36**
Ephemeral	1	21	-	**22**
Intermittent	-	**6**	1	**7**
Perennial	2	**5**	-	**7**
Union Keystone (2)	10	13	7	**30**
Ephemeral	6	9	1	**16**
Intermittent	4	**2**	5	**11**
Perennial	-	**2**	1	**3**
Gibson Creek (3)	50	3	95	**148**
Ephemeral	29	3	52	**84**
Intermittent	16	-	31	**47**
Perennial	5	-	12	**17**
Wallace Creek (4)	22	5	32	**59**
Ephemeral	9	3	17	**29**
Intermittent	4	-	10	**14**
Perennial	9	**2**	5	**16**
Slate Creek (5)	-	-	3	**3**
Ephemeral	-	-	2	**2**
Intermittent	-	-	1	**1**
Perennial	-	-	-	-
Total	**85**	**53**	**138**	**268**

Watersheds and stream channels have a natural capacity to absorb various levels of land disturbance without major adjustment to their function and condition. However, there is point where additive or synergistic effects of land use activities would cause a watershed to become highly susceptible to cumulative effects. This upper estimate of watershed "tolerance" to land use is described as the threshold of concern (TOC). When the sum of disturbances exceeds the TOC, water quality may be impaired for established beneficial uses, such as aquatic habitat. Stream channels and water quality can deteriorate to the point where adjacent riparian areas and wetlands become severely damaged.

The proposed project under this alternative increased the percent TOC across all subwatersheds when compared to the existing condition. The range of percent TOC is 9 to 48 percent. The largest increase in percent TOC occurred in the following subwatersheds 3, 2, and 1 with corresponding increases of 23 percent, 22 percent, and 16 percent.

Environmental Effects

No Action: Alternative A

DIRECT and INDIRECT EFFECTS: Under Alternative A, Riparian Conservation Areas (RCAs) such as aquatic and riparian zones would not be entered. Therefore they would remain as they are. The aspen, meadow and riparian habitatwould not be treated and theaspen habitat which is already in decline could be lost to conifer competition. Meadow and aspen habitat is a limiting habitat type on the Feather River Ranger District (FRRD). Also, dense surface and ladder fuels would not be removed thereby contributing to potential habitat loss due to high severity wildfire (refer to Gibsonville Fire& Fuels Report 2016).

Action Alternatives: Alternatives B and C

DIRECT and INDIRECT EFFECTS:

Table 18 displays a summary comparison of the differences in acres treated between the no action alternative, Alternative A, and the action alternatives, Alternatives B and C. Refer to Gibsonville Silviculture Report 2016, Tables 18, 19 and 21 for a finer breakout of treatments.

The RCA widths listed within the SNFPA ROD 2004 are described as 300 ft for perennial and 150 ft for intermittent and ephemeral. The RCA widths may be "**adjusted"** at the project level if a landscape analysis has been completed and a site specific RCO analysis demonstrates a need for different widths. Based on a landscape and RCO analysis, and project area field visits it was determined to implement treatments within the outer half of the un-adjusted RCA buffer widths. Refer to Design Features-RCAs aboveand RCOs **(Appendix B**).

A total of 1,101 acres for Alternative B and 1,066 acres for Alternative C is proposed for treatment within the full un-adjusted RCA buffers. These acres are greater than the total 616.9 acres of RCAs found in the project boundary because the footprint of the RCAs may potentially be treated more than once, such as first treatment being a VDT and a follow-up treatment being an underburn or biomass. Alternative C would have fewer acres of VDT and more acres of HCPB. Alternative C and would ends up with a higher than expected number of RCA acres treated because the VDT proposes RCA buffers and the HCPB does not propose RCA buffers. Table 9 shows the allowed treatments within the full un-adjusted RCAs while adhering to the RCOs, by treatment type. **Under Alternative C, approximately 22 acres would change from VDT (mechanical) to HCPB (non-mechanical).** All treatments would adhere to the RCOs (**Appendix B**) and BMPs (**Appendix A**) 1.8 streamside management zone designation.

The following is a discussion by proposed treatment within the full un-adjusted but outside the adjusted RCA:

Alternative B, and to a lesser degree Alternative C, have the potential to directly and/or indirectly affect aquatic and riparian habitat, and water quality and associated uses but the potential is low due to the implementation and effectiveness rate that the BMP program demonstrated, and RCA buffers with no treatments to limited in amount or intensity of treatments and other design features and conservation measures. Providing adequate protection to streams, as well as use of effective nonpoint source pollution prevention measures, would greatly reduce the potential of sediment reaching stream channels within and downstream of proposed treatment units. BMPs apply to all the proposed treatments but not all the treatments will have the same number or combination of BMPs. Refer to BMPs and RCAs under Design Features above. Refer to **Table 18**.

- **Mechanical treatment** The total potential mechanical treatments in RCAs is **187.9** acres for Alternative B which does not include the secondary treatment of 130.5 acres of biomass removal. The total potential mechanical treatments in RCAs is **166.3** acres for Alternative C, which does not include the secondary treatment of 108.9 acres of biomass removal. Mechanical treatment is a

more invasive activity which removes canopy cover as well as surface and ladder fuels, and using large equipment. Also, requires constructing larger or new landings, and more new roads.

- **Non-mechanical treatment** Alternative B proposes **336.7** acres of non-mechanical treatments in RCAs which does not include the secondary treatment of 446.2 acres for underburning. Alternative C proposes **358.6** acres of non-mechanical treatments in RCAs is for which does not include the secondary treatment of 432.3 acres of underburning. Non-mechanical treatment such as handcut/handpile/burn removes only sapling to pole size trees, up to 10"dbh by chainsaw. This treatment is much less intensive on the ground and retains the middle and upper canopy cover. Also, does not require construction of larger or new landing, nor new temporary road construction.

Table 18. Acres of treatment types within un-adjusted Riparian Conservation Areas (RCAs).

TREATMENT TYPE	Alternative B	Alternative C
Primary Treatments - Mechanical		
Variable Density Thinning (VDT)	86.5	64.9
Aspen Release	15.1	15.1
Roadside Hazard Tree	32.4	32.4
Mastication	53.9	53.9
subtotal	**187.9**	**166.3**
Primary Treatments - Non-mechanical		
Meadow Restoration	8.8	8.8
Riparian Restoration	15.2	15.2
Hand Cut Pile Burn (HCPB)	312.7	334.5
subtotal	**336.7**	**358.6**
total	524.6	524.9
Secondary Treatments		
Underburn (UB) (secondary treatment to VDT, mastication and HCPB)	446.2	432.3
Biomass Removal (secondary treatment to VDT, aspen, roadside hazard tree, mastication, meadow)	130.5	108.9
Grand Total	**1101.3**	**1066.0**

The following is a discussion by proposed treatment within the adjusted RCAs:

*The full RCA buffers of 300 and 150 ft were adjusted to 150 ft for perennial streams and 82 ft for intermittent and ephemeral streams. Within the adjusted RCA buffers there is a Equipment Exclusion Zone (EEZ) for all mechanical treatments of 150 ft for perennial streams and 82 for intermittent and ephemeral. Refer to **Table 20** below.

Variable Density Thinning (VDT): Alternative B proposesa total of 359 acres and Alternative C proposesa total of 243 acres of VDT. ***For all VDT units the adjusted RCAs for perennial streams is 150 ft and intermittent/ephemeral streams is82 ft., with anEEZ for no mechanical treatment allowed except for the option to non-mechanically HCPB.*Important Note: Under Alternatives Band C, for the total 359 acres of proposed VDT, there are 125.4 acres within the adjusted RCA with a EEZ that will not be mechanically treated but may be treated non-mechanically by HCPB.***The majority of the difference from Alternative B to Alternative C is that 116 acres drop from VDT and 91 acres are proposed for HCPB treatment which is non-mechanical and thereby less damage on the landand 25 acres of no treatment.The HCPB does not have a RCA buffer for treatment. A secondary treatment of underburning and/or biomass is proposed. Refer to discussions below for requirements for these treatments. A defined EEZs will be in

place to be effective for buffering/filtering any potential affects to wildlife and surface runoff due to the activity. In addition, BMPs will help minimize the potential for surface runoff from reaching any streams such as: 1.8 Streamside Management Zone designation, 1.9 determining tractor-loggable ground, 1.05 limiting operating period (LOP),1.12 log landing location, 1.16 log landing erosion control, 1.17 erosion control on skid trails, and 1.19 erosion-control structure maintenance. The treatment will not change the water quality or its beneficial uses.

Mechanical treatments such as **VDT** is a more intense type of fuels treatment and have the potential to directly and indirectly effect riparian areas and aquatic systems. The removal of vegetation within a few hundred feet of streams reduces microclimate regulation of the near stream environment. This has been shown to be the case in Pacific Northwest riparian zones and likely holds for other areas, although the microclimate regulation from vegetation as a function of distance from streams has not been well documented in other forest types and regions. However, it is clear that the removal of vegetation close to streams results in some loss of microclimate regulation within the stream environment (Hewlett and Fortson 1982; Platts, 1983; Rhodes et al., 1994; Brosofske et al., 1997). Vegetation loss near the channel can increase the propensity of streams to freeze during winter periods, increasing the overwinter mortality of fish and other aquatic life (Platts, 1983; Rhodes et al, 1994). Mechanical treatments practices increase short-term and/or long-term levels of fuels that may contribute to higher-severity fire. Mechanical treatments can open stands and increase wind speeds, while reducing moisture levels, which can contribute to higher-severity fire (Martinson and Omi, 2003, Raymond and Peterson 2005).

Aspen Release: Alternatives B and C propose 23acres of aspen release, **15-17 acres**are within the adjusted RCAs. Aspen restoration would follow the latest and the most relevant science for the area for management. ***Two perennial streams within aspen units, AO1 and AO2, will have an 82 ft buffer with no activity within the first 10 feet and only end-lining out allowed within the outer 72 feet. The other streams within all the aspen units are ephemerals and have 10 ft no equipment entry***.The reason for the high percentage of acres treated within the RCAs is because much of the aspen areas is identified as RCA. A secondary treatment of biomass is proposed (refer to discussion below). Buffers are purposefully narrow for streams, spring and meadowsin order to accomplish the beneficial treatment of conifer removal. Shading from competing conifers leaves aspen vulnerable to disease and infection, and inhibits successful growth and vitality of aspen suckers as well as mature aspen trees. The intent of the treatment is to initiate aspen regeneration via the removal of competing conifers which stimulates the sprouting process, along with warmer soil temperatures and increased sunlight (Sheppard 2004 and 2006). Removing conifer competition would meet the specific requirements needed to initiate aspen regeneration as well as provide an ideal microclimate for viable sucker growth (Doucet 1989; Navratil 1991). The intent is to take down the canopy cover down to 10-15 percent and keep trees 30 inches in DBH or larger. The number of miles affected by the aspen release treatment is 0.82 miles.In addition, the headwater reaches of Whiskey Creek in the aspen/meadow area are shallow, shaded and lacking pools. The headwaters are perennial/intermittent but the creeks are only 1-2 feet in depth and water during spring melt and runoff flows over the larger aspen and meadow area but the creeks do not get deeper. There is a concern for implementing conifer release due to the water availability situation.

NOTE: Presently, the Regular Baptist Group is diverted water from several springs thatare expected to have historically provided water for the aspen, meadow and riparian areas. The aspen habitat is in a state of decline. It is expected that the conifer will help to restore the habitat but it is still unknown how much the impact of water diverting from the aspen area has also lead to the decline. The past few years of drought have also aggravated the situation. It is expected that even if the diverted water (quantity and timing) is not dealt with prior to project implementation that the area would still benefit by the proposed conifer removal. Although the diversions are permitted by the State Water Agency they do not have a

USDA–FS "Special Use Permit (SUP)" for pipes and structures on FS lands not the environmental analysis of possible effects to aquatic or wildlife, or their habitat. Users have been contacted and understand that they need to request a SUP and conduct an environmental analysis prior to obtaining a SUP. The "State" permit allows a set amount of water divergence from June 1st through Oct 1st. It is not exactly known how much the users are diverting but they have acknowledged diverting year-round. Field observations during 2014 and 2015 observed this as well. This situation has been going on for 20+ years and in light of the endangered listing of the SNYLF and that the area is totally within a Critical Aquatic Refuge for the SNYLF and FYLF, needs to be given serious consideration for resolution.

Roadside Hazard Tree: Alternatives B and C propose 115 acres of Roadside Hazard Tree (RHT) removal (200ft on either side of level 3 road). For all Roadside Hazard Tree units the adjusted RCAs forperennial streams is 150 ft and intermittent/ephemeral streams an 82 ft. with a EEZ of no mechanical treatment allowed. ***Any hazard trees within the EEZ will be directional felled away from the stream and left on site***. The removal of hazard trees should be much less intensive on the landscape than VDT unless the conditions change by the time the project is implemented. Hazard trees is a safety matter and supersedes most other concerns. Hazard trees must be felled away from streams. ***A secondary treatment of HCPB and/or Biomass will follow design features above and discussion below.*** HCPB would not have an exclusion zone for the RCA buffer, however, Biomass will have an EEZ buffer of 150 ft for perennial stream and 82 ft for intermittent streams. The removal of hazard trees will not change habitat for wildlife, and water quality or its beneficial uses. Roadside Hazard Tree units will adhere to BMP 1-8 stream management zone designation.

Mastication: Alternatives B and C propose a total of 181 acres of mastication. ***For all Mastication units the adjusted RCAs for perennial and intermittent streams is 82 ft., with an EEZ for no mechanical treatment allowed except for the option to non-mechanically HCPB.*Important Note: Under Alternatives B and C of the total 181 acres of proposed Mastication,there are54.5 acres of adjusted RCAs with an EEZ that will not be mechanically treated but may be treated non-mechanically by HCPB***.Mastication treatments are unlikely to produce additional surface runoff because the treatment creates more surface soil cover which is an important component in the formation and slowing down of runoff. The goal of masticating is that it takes the ladder fuels and it rearranges them to surface fuels. The masticator equipment will be limited by the equipment exclusion zone along RCAs.A secondary treatment of HCPB and/or Biomass and/or Underburn will follow design features above and discussion below. Within the equipment exclusion zone, biomass would not be allowed, hand cutting of conifers up to 10 inches in DBH would be allowed and the piles would be place 25 feet away from any stream bank, and underburning would require preventing fire into 82 of streams. Masticating along RCAs will not change water quality and its beneficial uses. Mastication units will adhere to BMP 1-05 soils LOP and 1-8 stream management zone designation. A secondary treatment of HCPB, underburning and/or biomass is proposed (refer to discussions below).

Meadow & Riparian Restoration: Alternatives B and C propose**25 acres**of meadow and riparian restoration. All of these acresare within RCAs. **The majority of the meadow/riparian habitat is dry meadows with riparian zones along intermittent or ephemeral streams but not perennial streams.** The main goal is to improve the health of the meadow/riparian habitats. Meadows are a limited habitat type on the FRRD of the PNF. The intent is to remove the encroaching conifers (especially fir) thereby increasing the meadow size and raising the water table. No riparian vegetation would be removed. The treatments will improve the meadow/riparian habitat for wildlife, and water quality but not change the associated beneficial uses. Both alternatives will HCPB shrubs and trees up to 10"DBH and a few up to 16" dbhwithin the entire meadow/riparian allocation area regardless the type of stream or if it's a spring. No riparian vegetation is to be removed. Piles should be at least 25 ft. from the edge of stream bank or

spring but piles may be placed within meadows. Directional light all piles to allow any critters a route for escape.

Handcut, Handpile and Pile Burn (HCPB): Alternative B proposes 345 acres and Alternative C, 435 acres of HCPB. The hand cutting of shrubs and conifer trees up to 10 inches in DBH removes the saplings and poles trees adjacent to the riparian and within meadows. ***Important Note: Under Alternatives B and C of the total 345 acres of proposed HCPB,there are 54.5 acres of adjusted RCAs.*** No riparian vegetation is to be removed. Hand cutting conifers up to 10 inches in DBH applies across the entire project regardless if it's in or out of an RCA. The majority of the difference from Alternative B to Alternative C is that 91 acres proposed for VDT would change to a treatment of HCPB. ***A RCAs EEZ is not required for HCPB however burn piles must be located a minimum of 25 feet from perennial and intermittent streams, and springs. Piles must be directional lit to allow critters to escape.***Piles may be piled within the meadow. A HCPB would primarily reduce ground and ladder fuels up to 10"dbh while a VDT treatment wouldalso reduce canopy cover down to an average of 40%.Allthe mechanical treatment units that have HCPB can be treated within the equipment exclusion zone.

As presented in **Table 19**theaverage percent canopy cover for the understory can change by as much as 20%: 12-14 percent by simply removing the saplings (0-6" DBH) and another 6-7 percent by simple removing pole size trees (6-10 dbh). The change in percent canopy cover is not exact it's qualitative but it does illustrate that it does change. Depending of mechanical treatment proximity to the RCA feature plus the HCPB within the equipment exclusion zone buffer the exact percent canopy cover is unknown because it was not modeled. **Table 19**shows that the average total tree per acre is 995.8, by simply hand cutting within the RCAs the number of trees per acres decrease to 97.7. The assumption is the saplings and poles classes are treated/removed. Although the pole tree class ranges from 6-11 inches in DBH which is 1 inch greater than what the HCPB treatment it's still a good approximation and representation of how significantly the ground and ladder fuels are reduced. The reduction of ground and ladder fuels will make the RCAs more fire resilient. The stand/stream ID column are the streams that were surveyed. The 9 plots per stream the data was compiled into one. The canopy cover for stream 809 is 68.3 percent while the canopy cover without saplings (trees less than 6 inches in DBH) is 60.7 percent. The average canopy cover for all 3 streams is 63 percent while the canopy cover without saplings is 52.6 percent. The average total trees per acre for all 3 streams is 995.8 while the average total trees without samplings is 113.5 which is significant difference. Refer to Gibsonville Hydrology Report 2016.

Table 19. Common stand exams in RCAs.

Stand / Stream ID	Canopy Cover Percent		Trees Per Acre						
			Sapling	Pole	Small	Med.	Large	Tot.	Tot. w/out Saplings
	0-99" DBH	6-99" DBH	0-6" DBH	6-11" DBH	11-24" DBH	24-30" DBH	>30" DBH	0-99" DBH	6-99" DBH
809	68.3	60.7	646.8	56.0	64.3	19.2	22.2	808.6	161.7
855	64.6	50.1	1134.0	40.6	88.3	12.1	9.0	1284.0	150.0
970	56.0	47.0	806.1	10.8	37.0	16.5	24.4	894.9	88.7
Avg.	63.0	52.6	862.3	35.8	63.2	16.0	18.5	995.8	133.5

The hand treatment within RCAs will not change the water quality or its beneficial uses because the activity does not significant change effective soil cover to promote erosion or the canopy to change the water temperature of steams. The hand cut pile burn treatments within RCAs are intended to help reduce the fuels before underburning. The discussion above about the changes in percent canopy cover and trees per acre applies to this treatment.

Underburn: Alternatives B and C proposes underburning on 7 acres as a primary treatment. In addition, underburing is proposed as a secondary treatment on 892 acres under Alternative B proposesand866 acres under Alternative C. There is the potential for a portion of the proposed secondary underburn acres to be biomassed instead. ***Fire will be ignited no closer than 150 ft. away from any stream, spring, and meadow. Underburn will be allowed to back into adjusted RCA buffers under the ideal conditions. However, monitor and control the fire to avoid entry within 82 ft of perennial or intermittent streams. DO NOT construct handline within the 82 ft buffer***.The BMP Evaluation Program from 2010-2012 found that prescribed fire (F25) BMPs were rated at 100 percent for implementation and 97 percent for effectiveness (USDA Forest Service 2013). The high success rate of implementation and effectiveness of BMPs when conducting underburns means that the Forest Service met or exceed project identified effective soil cover, and little or no hydrophobic soils and rilling was observed. The utilization of BMPs, design features and proper buffers for RCAs is crucial to treating within RCAs; this would make them more fire resilient yet not jeopardize the RCAs and its associated beneficial uses (refer to Gibsonville Hydrology report 2016).

Biomass Removal: Alternative B proposesa total of 478 acres and Alternative C proposes a total of 362 acres of biomass removal, as a potential secondary treatment within the VDT, Aspen and Roadside Hazard Tree units. ***Biomass has the same EEZ as primary treatments of 150 ft EEZ for perennial streams and 82 ft EEZ for intermittent and ephemeral streams.Refer to the associated mechanical treatment.*** The majority of the 116 acre difference from Alternative B to Alternative C is VDT units which were changed to HCPB or no treatment which does not have biomass as a secondary treatment. There is the potential for a portion of the proposed biomassed acres to be underburned instead. Refer to discussion for underburns above. Biomass removal is the mechanical removal of surface and ladder fuels (trees 3-9.9 inches in DBH). This treatment allows the option for these trees to be sold for small log uses rather than cut, piled and burned on site. There was an assumption made when determining the acres treated within RCAs, that if the treatment is identified with some kind of mechanical treatment then it would fallow those equipment exclusion zone buffers.

CUMULATIVE EFFECTS:

The biggest contrast between Alternative B and Alternative C is found in the Wallace Creek subwatershedat 45% TOC. When both alternatives are compared to the existing condition; under Alternative C the subwatershed has only a 6 percent increase in TOC while Alternative B shows a 16 percent increase in TOC. However, the end result of the ERA model indicates that none of the subwatersheds should experience any cumulative effects because all the subwatersheds are well below the threshold of concern. Based on the ERA modeling for this alternative, the cumulative effects of all past, present and foreseeable future activities within the analysis area, coupled with the implementation of the proposed action with BMPs, and design features would not alter surface runoff patterns and timing enough to significantly impact water quality or affect beneficial uses of water. Refer to Gibsonville Hydrology Report 2016.

8.8 Sierra Nevada and Foothill Yellow-legged Frog

Affected Environment

***Status*:**The Sierra Nevada yellow-legged frog (*Rana sierra*)(SNYLF) and the Foothill yellow-legged frogs (*Rana boylii*)(FYLF) have been difficult to separate out species wise in the overlap of their historical range. Historical and recent detections of SNYLF below 4500 ft (as low as 3,500 ft on the PNF) and FYLF above 6,000 ft are being investigated and DNA conducted to confirm species for the locations and to get a better understanding of how the two species are using stream and lake habitat. Also, to

determine if there is any potential hybridization occurring between the two yellow-legged frog species. Refer to **Appendix C** for habitat account.

- **Sierra Nevada yellow-legged frog**is a federally endangered species under the *Endangered Species Act*. These species were once extremely abundant throughout their range. Historically these frogs were found throughout the Sierra Nevada mountain range in California and Nevada and along the transverse range in southern California. Northern Sierra Nevada frogs belong to *R. sierrae* based on genetic work, morphology and acoustics. These frogs are endemic to Region 5, and most remaining populations occur on public lands. The SNYLF can be found on the El Dorado, Inyo, Lassen, Plumas, Sierra, Stanislaus, Tahoe and Lake Tahoe Basin National Forests. On the Feather River Ranger District of the Plumas National Forest we have two confirmed populations along with incidental YLFs detections as low as 3500 ft that are in the process of being surveyed and confirm identification using DNA testing.
- **Foothill yellow-legged frog**is a USFS Region 5 Sensitive Species. The FYLF has suffered significant population declines across the majority of the known range. Historically this frog was found across most of southwestern Oregon west of the Cascades Mountains crest south through California to Baja California (Fellers 2005; Jennings and Hayes 1994). The foothill yellow-legged frog is found in most of northern California west of the Cascade Mountains crest, in the Coast Ranges from the California-Oregon border south to the Transverse Mountains in Los Angeles County and along the western slope of the Sierra Nevada Mountains south to Kern County. This frog can be found from near sea level to 1940m (6370 ft.) where habitat is suitable (Morey 2000). Populations of foothill yellow-legged frogs in the Pacific Northwest are considered to be the most stable with approximately 40% of streams occupied, 30% are occupied in the Cascade Mountains, 30% in the south Coast Range south of San Francisco and 12% in the Sierra Nevada foothills **(Fellers 2005)**. Foothill yellow-legged frogs are found in partially shaded rocky streams in a variety of habitats including: valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral and wet meadows and appear to be highly dependent on free water for all life stages (Morey 2000).

Survey*:** Protocol surveys for amphibians using "A standardized protocol for surveying aquatic amphibians" by Fellers and Freel, 1995, were conducted including visual searches of all streams (16 stream reaches) and other aquatic resources (two ponds) within the Gibsonville (formally known as Sacketts) project area in 2013. In 2014, we revisited areas containing habitat with the highest potential to support the listed species of amphibians. A brief survey was conducted in 2015 to follow-up on two pond locations that had potential for finding the Sierra Nevada yellow-legged frog. No Sierra Nevada yellow-legged frogs (*Rana sierra*)(SNYLF)(federally listed endangered) or Foothill yellow-legged frogs (*Rana boylii*)(FYLF) were discovered within the project analysis area. ***The program of work for 2016 includes additional stream and pond surveys due to drought conditions during 2013 through 2015 survey period.

Area Occurrence Potential: The results of the amphibian surveys and habitat analysis suggest there is potentially suitable habitat to support Sierra Nevada and Foothill yellow-legged frog individuals if not a population.

- **Sierra Nevada yellow-legged frog**There is potentially suitable habitat, side pools with ponded or slower moving water, for *Rana sierra* along mainstems of Gibson, Whiskey, Wallace and Slate Creeks. However, the presence of trout species may be a limiting factor for occupation by the SNYLF, especially Whiskey Creek which had a high fish presence. Also, the upper tributaries of Whiskey Creek are less likely to be suitable due to steep gradient and fast moving water in spring,

lack of pooling, and the tendency to dry out in one season (SNYL need 2 years to morph from tadpoles to frogs). In addition, the headwater reaches of Whiskey Creek in the aspen/meadow area are shallow, shaded and lacking pools. The headwaters are perennial/intermittent but the creeks are only 1-2 feet in depth and water during spring melt and runoff flows over the larger aspen and meadow area. There are two pond sites, Union Keystone and Whiskey 3, with potentially suitable habitat, but with dry conditions during 2013-2015 surveys they became unsuitable quickly and were not occupied. Delahunty Lake has potentially suitable habitat, and the lake level was maintained at full levels during 2013-2015, however, it was not surveyed due to the fact that it is located on private property.

- **Foothill yellow-legged frog**Field assessment revealed 16 stream reaches containing habitat components typical of *Rana boylii* habitat. These were found within Gibson, Whiskey, Wallace, Slate Creeks, Delahunty Creek and their tributaries, within all 5 watershed areas in the project area. In brief, these areas typically provide permanent perennial water sources with pools containing a variable rocky substrate and an abundance of sunlit basking sites. However, due to the 5200-6400' elevational range within the analysis area, snow conditions, and winter air and water temperatures may be limiting factors for occupancy.

Environmental Effects

No Action: Alternative A

DIRECT and INDIRECT EFFECTS: Alternative A is the No Action alternative, in which no project activities would be proposed. While the SNYLF and FYLF individuals, if there, would not be directly affected, the habitat would not be improved by not implementing the aspen, meadow and riparian improvement actions and reducing the surface and ladder fuels. The analysis of the No Action Alternative provides reviewers disclosure of effects of the "No Action" to compare the magnitude of environmental effects of the action alternatives. No project related ground, vegetative, or wildlife disturbance would occur. No road reconstruction or decommissioning in connection with this project would occur. With this alternative, no fuel reduction activities would take place area at this time. Fuels would continue to accumulate and fire hazards would continue to increase (refer to Gibsonville Fire & Fuels Report 2016). Insect and disease mortality would continue to take tolls on trees with low vigorincrease (refer to Gibsonville Silviculture Report 2016). Aquatic habitat may undergo adverse disturbance if fuels continue to accumulate overtime and a wildfire occurs, subjecting species to increased sedimentations, increase turbidity, and solar radiation. Species could individually suffer or die due to catastrophic fire events. Aquatic species may not have adequate food supply due to suspended particles in streams causing mortality to macro invertebrates. Habitat alterations would not occur quickly as in the proposed actions and therefore species behavioral changes may not be directly affected but because of fire suppression and the normal succession has be altered aquatic species may indirectlyeffect behavior over a span of time.

A catastrophic fire event would increase sediment into the streams adding stress to watersheds which could lead to water quality concerns. If there is a catastrophic fire as a result of not implemented this project, then the cumulative effects would potentially be much greater than with Alternatives B and C depending on fire severity and the number of moist riparian areas affected versus lower order streams which tend to burn hotter, which would increase adverse effects to aquatic species.

Action Alternatives: Alternatives B and C

DIRECT and INDIRECT EFFECTS:

Direct and Indirect Effects are expected to be minimal, if at all, with full application of all USFWS Conservation Measures and USDA-FS Design Features. However, effects are possible due to proposed non-mechanical treatments within mapped and field documented suitable habitat within 82 ft of perennial

& intermittent streams. All treatments would benefit habitat in the short-and long-term.The Sierra Nevada or Foothill yellow-legged frogswerenot detected in the project area during two years of surveys of streams. ***Surveys will be conducted again in 2016 due to drought conditions during the past few previous years of survey effort.*** Some streams had low or no water flow when they would be expected normally to be flowing streams. Refer to Road Density and Aquatic &Riparian Habitat discussion above for effects to riparian habitat, including streams. Refer to Gibsonville Hydrology Report 2016 for additional hydrology discussion.

USFWS "Conservation Measures" and USDA-FS "Design Features"would be followed to avoid or reduce possible adverse effects including:

1) Riparian Conservation Area (RCA) buffers in place at varying widths, to protect with no activity or to allow limited activity to benefit aspen, meadow and riparian habitat, including streams.
2) Meet all Riparian Management Objectives (RCOs) to maintain or improve aquatic and riparian habitat.
3) Apply a 82 ft Equipment Exclusion Zones (EEZs), of no mechanical treatment, on all perennial and intermittent, and even ephemeral streams for all mechanical treatments such as VDT, Aspen, Mastication, Roadside Hazard Tree and Biomass.
4) End-lining out material on two short reaches of perennial stream in aspen units AO1 and AO2.
5) Limited Operating Periods (LOPs) of operating only during June(or when BMPs are met) through October 31st (or first wetting rainswhich is continual for 72 hours) or as otherwise approved by District Biologist.
6) Apply all applicable Best Management Practices (BMPs) to protect streams.
7) Include B&C Clauses on all project associated contracts for additional frog protection.
8) Re-design 5 culverts.
9) Add additional rolling dips along haul routes.
10) Igniteunderburn fires no closer than 150 feet from streams, springs or meadows.
11) No fire entry within the 82 ft buffer zone.
12) No handlines constructed within the 82 ft buffer zone.
13) Directional light piles to allow exit route for frogs; 13) no piles within 25 feet of all streams.
14) Retain all large trees(≥30"dbh). *With the exception of the aspen habitat.
15) Retain snags (#4≥15"dbh), where available and feasible.
16) Retain large down wood (10-15 tons/ac),where available and feasible.
17) Retain riparian habitat.
18) No new landings within 300 ft of perennial streams and 150 feet of intermittent streams.
19) Follow PNF Water Drafting Guidelines. Pre-approve all project-related water drafting sites and specifications.

- **Riparian Conservation Areas (RCA)**
  - Number of adjusted RCA acres improved: 707 acres
  - Number of adjusted RCA acres reduced: 0 acres

Refer to Section 8.7Aquatic &Riparian Habitat, Environmental Effects discussion and analysis above. Riparian Conservation Areas (RCAs)and Riparian Conservation Objectives (RCOs) are "Standards and Guidelines" established under the SNFPA 2004 ROD to protect, maintain or improve riparian and aquatic habitat and all associated species. Refer to **Appendix B** for the RCO analysis. The RCAs were put in place to protect species while allowing activities to maintain or improve habitat conditions. Habitat improvement activities such as removing encroaching conifers from meadows and aspen stands which could be lost due to conifer conversion, or

reducing surface and ladder fuels which could lead to habitat loss due to high intensity and severity wildfires.

There are some mechanical treatments proposed within the larger un-adjusted RCAs but there is only non-mechanical treatments such as HCPB and/or Underburn. The adjusted RCAs have anEEZ (no mechanical activity) of 150 ft for perennial streams and 82 ft EEZ for intermittent, and ephemeral streams. Handcut&HandPile&Burn may occur within these zones but piles must be placed 25 feet beyond stream. Underburns may occur within these zones but the must be ignited 150 ft from the stream and only allowed to backburn to within 82 ft of the perennial or intermittent stream but may enter ephemeral stream EEZ zone. Within the 82 ft EEZ for Aspen units, there is a 10 foot no treatment zone for all streams and a 72 ft zone for two perennial stream segments through Aspen units AO1 wherematerial may be end-lined out of the EEZ.Refer to **Figure 4**below which shows the 150 ft EEZ for perennial and 82 ft EEZ for intermittent and ephemeral streams.

- **Suitable habitat within 82 ft of perennial & intermittent streams or proposed critical habitat**
  - Number of acres of Critical Habitat improved = 0
  - Number of acres of Critical Habitat reduced = 0
  - Number of acres of suitable habitat within 82 ft of perennial & intermittent streams reduced = 0
  - Number of acres of suitable habitat within 82 ft of perennial intermittent streams improved = 196.2
    - ✓ 72.1 acres of Perennial stream habitat
    - ✓ 124.1 acres of Intermittent stream habitat

  NOTE: Number of acres of ephemeral streams improved = 197.9

Refer to Section 8.7 Aquatic & Riparian Habitat, Environmental Effects discussion and analysis above. Refer to **Table 20** for a list of acres of perennial and intermittent, and ephemeral streams within the 82 ft SNYLF suitable habitat buffer. All proposed treatments follow all the USFWS Conservation Measures for the SNYLF, as well as, additional USFWS Design Features for additional species protection. No mechanical activities are proposed within a 150 ft of perennial streams (which includes the 82 ft SNYLF suitable habitat buffer). Non-mechanical beneficial activities are proposed within the 150 ft buffer for perennial streams. Refer to **Figure 5**below which shows the 82 ft buffer for perennial and intermittent, and ephemeral streams.

Alternative B and C would allow for fuels reduction such as VDT along high use roads and mastication, HCGP,aspen/meadow/riparian restoration and/or underburning which would reduce the fuel loading and increase the water flow into creeks. However, under Alternative A, areas within the RCAs will be will not be treated which could decrease the opportunities for opening up over crowded areas with dense surface and ladder fuels, thereby leaving existing fuel-loadings which could lead to high intensity and severity wildfires, and not increasing water availability to creeks. This would be an adverse effect to frogs and their habitat. Habitat improvement activities such as removing encroaching conifers from meadows and aspen stands which could be lost due to conifer conversion, or reducing surface and ladder fuels which could lead to habitat loss due to high intensity and severity wildfires. These activities would benefit habitat in the short- and long-term for frogs.

Table 20. Acres within 82 ft of Perennial, Intermittent and Ephemeral stream buffers.

TREATMENT TYPES	ACRES					
	Perennial		Intermittent		Ephemeral	
	Alt B	Alt C	Alt B	Alt C	Alt B	Alt C
Mechanical– no treatment in 82ft buffer						
VDT 40% and UB and BIOMASS	17.6	16.8	44.3	41.1	45.9	33.0
Aspen Release and BIOMASS	6.0	6.0	3.5	3.5	7.2	7.2
MAST and UB	2.2	2.2	7.0	7.0	1.2	1.2
MAST and UB and BIOMASS	0.0	0.0	0.0	0.0	2.3	2.3
MAST or HCPB or UB	4.2	4.2	10.4	10.4	27.2	27.2
Roadside Hazard and HCPB	0.0	0.0	11.5	11.5	11.4	11.4
Roadside Hazard and HCPB and BIOMASS	8.0	8.0	2.8	2.8	11.6	11.6
subtotal	**38.0**	**37.2**	**79.5**	**76.3**	**106.8**	**93.9**
Non-Mechanical – treatments within 82 ft buffer						
Riparian Restoration	2.1	2.1	4.9	4.9	2.4	2.4
Meadow Restoration and BIOMASS	0.4	0.4	4.5	4.5	2.3	2.3
HCPB and UB	21.8	21.8	30.1	33.2	66.0	73.9
UB	0.0	0.0	0.0	0.0	2.7	2.7
NT	9.8	10.6	5.1	5.2	17.7	22.6
subtotal	**34.1**	**34.9**	**44.6**	**47.8**	**91.1**	**103.9**
Totals	**72.1**	**72.1**	**124.1**	**124.1**	**197.9**	**197.8**

Riparian acres were calculated and mapped using GIS, GPS, by FRRD District Hydrology or hydrology crew. Riparian acres were buffered following management directions. Units with heavy concentrations of fuels were allowed to have treatments within the riparian buffers. Although all the action alternatives havethe potential for short-term negative effects, these effects are expected to be minimal and last only during initial treatment. Treatments to habitat can directly affect species and indirectly cause interruptions in reproduction, foraging and shelter. All of the Alternatives have positive effects,in the short- and long-term, as a result from implementation. Positive effects by implementation of the action alternatives would reduce fuel accumulation and decrease fire hazards and the potential loss of habitat due to high-severity fires. Trees with low vigor would be removed creating openings for grasses, Forbes, brush species and riparian trees. Aquatic habitat would not be lost to a catastrophic fire because of the treatments in the RCA's by removing surface and ladder fuels and thinning tree crown spacing.

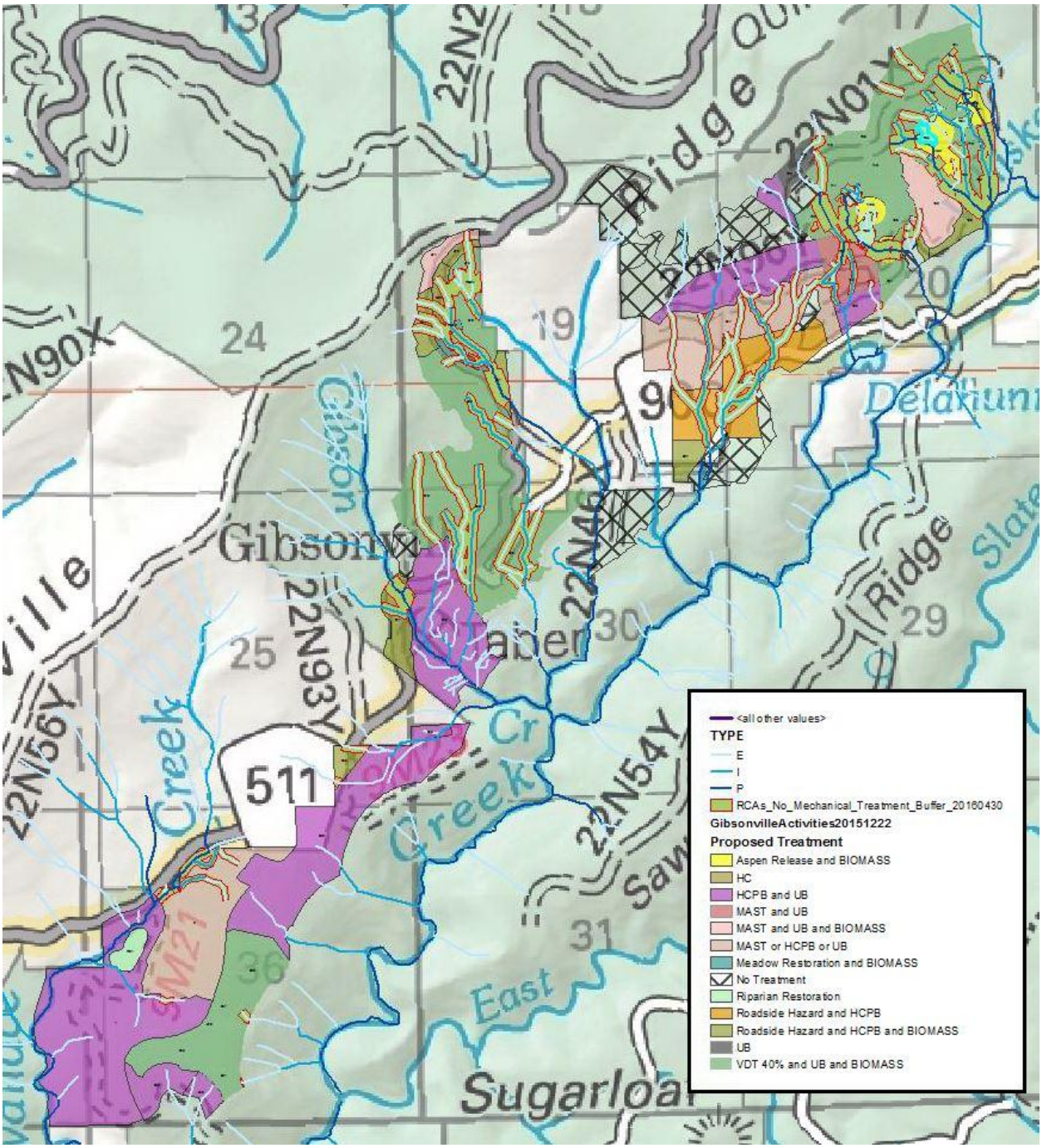

Figure 4. Figure shows the 150 ft EEZ for perennial and 82 ft EEZ for intermittent and ephemeral streams.

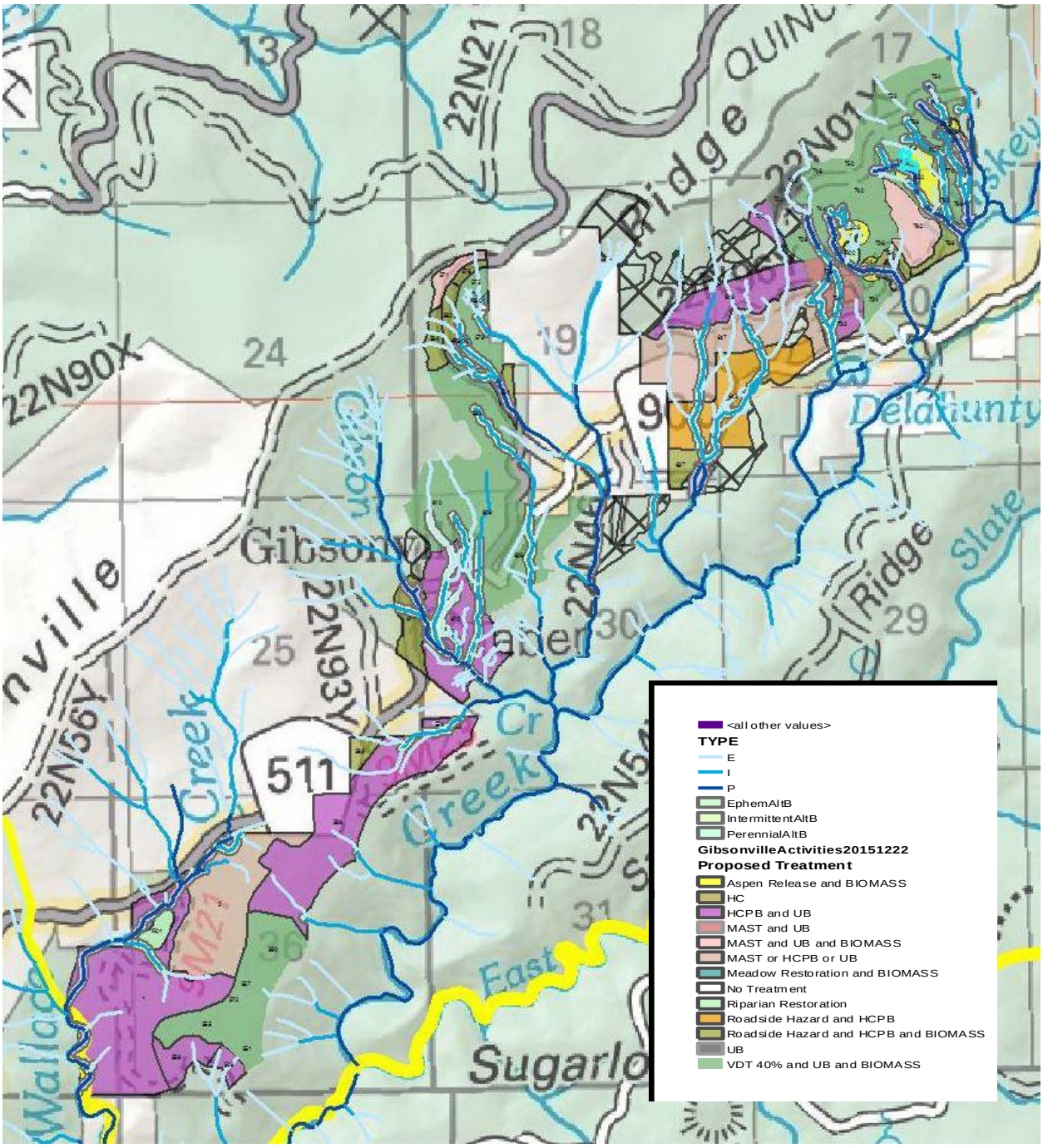

Figure 5. Figure shows 82 ft buffer on perennial andintermittent streams, and ephemeral streams.

Mechanical Treatments: Refer to Section 8.7 Aquatic & Riparian Habitat, Environmental Effects discussion and analysis above. Refer to above listed USFWS "Conservation Measures" and USFS "Design Features" which would be followed to avoid or reduce possible adverse effects.Alternatives B and C are very similar in the number of acres of perennial and intermittent streams, and ephemeral streams with an 82 ft EEZ for proposed mechanical treatments such as VDT, aspen, mastication, roadside hazard tree and biomass removal. No mechanical treatments are proposed on as much as 38 acres of perennial stream and on as much as 79.5 intermittent streams. In addition, as much as 106.8 acres of ephemeral streams will have an 82 ft EEZ. The difference in 12.9 acres of ephemeral streams between Alternative B and C is due to 116 acres changing from VDT treatment to 91 acres of HCPB and 25 acres of no treatment.***NOTE: Perennial streams also have anEEZ (no mechanical entry) of 150 ft for perennial streams extending beyond the required 82 ft SNYLF buffer.***

VDT:The proposed VDT treatment is not expected to adversely affect the SNYLF nor the FYLF. The proposed VDT treatments would have an EEZ of 150 ft for perennial (which includes the 82 ft SNYLF suitable habitat buffer and 82 ft for intermittent streams). Also, an additional 82 ft EEZ for ephemeral streams. The three new proposed landings must be 150 ft from perennial and 82 from intermittent streams. The two largest differencesbetween action alternatives are: 1) Alternative B would construct 1.6 mile of new temporary road and Alternative C would only construct 0.4 miles; and 2) Alternative B proposes 116 acres of VDT changing to HCPB or no treatment under Alternative C. These two differences would not change the effects discussion for the frog between the because the 1.4 miles of additional road under Alternative B and the 116 acres of VDT changed to HCPB or no treatment is not within suitable habitat for the SNYLF.

Aspen: The proposed aspen treatment is not expected to adversely affect the SNYLF nor the FYLF. The proposed treatments would have an EEZ of 82 ft for perennial,intermittent streams, and ephemeral streams. The two short stretches of perennial within the aspen units would have an EEZ of no treatment within 10ft and only end-lining allowed within the next 72 ft.The majority of the streams within the Aspen units are ephemeral.In addition, the headwater reaches of Whiskey Creek in the aspen/meadow area are shallow, shaded and lacking pools. The headwaters are perennial/intermittent but the creeks are only 1-2 feet in depth and water during spring melt and runoff flows over the larger aspen and meadow area.

Mastication:The proposed mastication treatment is not expected to adversely affect the SNYLF nor the FYLF. The mastication treatments would have an EEZ of 82 ft for perennial and intermittent streams. Also, an additional EEZ of 82 ft for ephemeral streams. Mastication is a mechanical treatment but the type of machinery is much smaller and has less impact on the ground minimizing habitat impact and sedimentation compared with VDT machinery.

Biomass:The proposed biomass removal as a secondary treatment is not expected to adversely affect the SNYLF nor the FYLF. Proposed secondary treatments such as biomass removal is not more invasive or land disturbing then the proposed primary treatments. Biomass removal is a mechanical treatment but the type of machinery is much smaller and has less impact on the ground minimizing habitat impact and sedimentation compared with VDT machinery. **This treatment would follow the same rules as the primary treatment**. One example would be a primary treatment of VDT with a secondary treatment of biomass removal.

Non-mechanical Treatments: Refer to Section 8.7 Aquatic & Riparian Habitat, Environmental Effects discussion and analysis above. Refer to above listed USFWS "Conservation Measures" and USFS "Design Features" which would be followed to avoid or reduce possible adverse effects.Alternatives B and C are very similar in the number of acres of perennial and intermittent streams withinproposed non-mechanically treated units such as meadows, riparian, HCPB, underburns and no treatment units.The major difference is that 116 acres of VDT change to 91 acres of HCPB and 25 acres of no treatment, therefore the acres of perennial an intermittent streams treated stays the same but the treatment intensity changes from mechanical to non-mechanical.

Riparian/Meadow Restoration: The proposed riparian/meadow treatmentsmay affect but not likely adversely affect the SNYLF nor the FYLF.The majority of the meadow/riparian habitat is dry meadows with riparian zones along intermittent or ephemeral streams but not perennial streams.In addition, the headwater reaches of Whiskey Creek in the aspen/meadow area are shallow, shaded and lacking pools. The headwaters are perennial/intermittent but the creeks are only 1-2 feet in depth and water during spring melt and runoff flows over the larger aspen and meadow area.No riparian vegetation would be removed. The treatments will improve the meadow/riparian habitat for wildlife, and water quality but not change the associated beneficial uses. Both alternatives will HCPB shrubs and trees up to 10"DBH and a some up to 16" dbhwithin the entire meadow/riparian allocation area regardless the type of stream or if it's a spring. No riparian vegetation is to be removed. Piles would be at least 25 ft. from the edge of stream bank or spring but piles may be placed within meadows. All pileswould be directional lite to allow any frog a route for escape.

HCPB:The proposed HCPB treatmentsmay affect but not likely adversely affect the SNYLF nor the FYLF. No riparian vegetation is to be removed. Hand cutting conifers up to 10 inches in DBH applies across the entire project regardless if it's in or out of an RCA. The majority of the difference from Alternative B to Alternative C is that 91 acres proposed for VDT would change to a treatment of HCPB. ***A RCAs EEZ is not required for HCPB however burn piles must be located a minimum of 25 feet from perennial and intermittent streams, and springs. Piles must be directional lit to allow critters to escape.*** Piles may be piled within the meadow. Treatments have the potential to cause direct effects by hand crews crushing, burning or injury during implementation.Alternative C will also treat and additional 91 acres of HCGP which is much less noise and ground disturbance than mechanical treatments such as VDT or mastication or biomass removal

Underburns: The proposed underburn secondary treatments may affect but not likely adversely affect the SNYLF nor the FYLF. ***Fire will be ignited no closer than 150 ft. away from any stream, spring, and meadow. Underburns will be allowed to back into adjusted RCA buffers under the ideal conditions. However, monitor and control the fire to avoid entry within 82 ft of perennial or intermittent streams. DO NOT construct handline within the 82 ft buffer***.Fires can cause death if individuals that do not have enough time to evacuate from danger. Frogs may leave riparian areas in response to treatments which may cause stress to individuals which then can lead to behavior changes in viable reproduction, critical foraging or individuals' secure mobility within the riparian areas. These changes would be short termed. Frogs will return. Site fidelity is very high in both species and they will return once disturbance is halted. Positive indirect effects

toRiparian vegetation from thinning will create basking areas and added nutrients from the proposed under burns which is a secondary treatment in most of the Union Hill treatment units.

- **Stream Health**
  - Number of stream crossings removed or improved: 4

    Review of the roads survey data of the Gibsonville project it is recommended that the following stream crossings identified in **Table 21** need the culverts to be replaced or reused and set properly where the outlet drop is close to zero feet. This applies to both action alternatives. Refer to Gibsonville Hydrology Report 2016.

    ***This is a recommendation by Hydrology but a design feature for Aquatics.**
    This would improve suitable habitat health for the SNYLF, and FYLF by reducing sedimentation into streams. Also, individual frogs would be able to access stream and riparian habitat up- and downstream through the culverts instead of crossing the roads and thereby potential injury or mortality.

    Table 21. Recommended stream crossings that need work.

Road ID	Stream Type	Outlet Drop (ft.)
22N96Y	Intermittent	1
22N01X	Perennial	2
22N01X	Perennial	3
9M21	Ephemeral	1

  - Number of road improvements: TBD

    The Gibsonville Hydrology Report 2016 recommendsthat the haul routes have additional dips and critical dips before the implementation of the project. Critical dips are dips located adjacent to a culvert stream crossing that in the event of overtopping the flow is diverted back to the stream channel instead of going down the road prims to into another dip, ditch relieve culvert, or stream crossing. This applies to both action alternatives

    ***This is a recommendation by Hydrology but a design feature for Aquatics.**
    This would improve suitable habitat health for the SNYLF, and FYLF, by reducing road gullying and potential road washouts/diversions and thereby sedimentation into streams.

  - Miles of road decommissioned: 0

    Refer to Road Density discussion above. Based on the average density of roads 4 of the 5 subwatersheds individually and cumulatively are rated as poor. Wallace Creek subwatershed is the only exception. This applies to both action alternatives. Refer to Gibsonville Hydrology Report 2016.

    ***No road decommissioning is presented or analyzed because it's not part of the purpose and need for the project, as per the line officer decision.**

    If implemented, this would have improved suitable habitat health for the SNYLF, and FYLF. Reducing sedimentation from roads, bisected habitat and possible mortality from frogs trying to cross roads.

CUMULATIVE EFFECTS:

- **Sedimentation**

- TOC with a percent value = ≥ 100 %
  Refer to Section 8.7 Aquatic & Riparian Habitat, Environmental Effects discussion and analysis above.The TOC being low for 4 subwatersheds and moderate for the Wallace Creek subwatershed may affect but not likely adversely affect the SNYLF nor the FYLF. However, the lower the TOC the better for suitable habitat for the SNYLF and FYLF.The biggest contrast between Alternative B and Alternative C is found in the Wallace Creek subwatershed at 45% TOC. When both alternatives are compared to the existing condition; under Alternative C the subwatershed has only a 6 percent increase in TOC while Alternative B shows a 16 percent increase in TOC. Refer to Gibsonville Hydrology Report 2016.

9. CUMULATIVE EFFECTS COMMON TO ALL ACTION ALTERNATIVES

The cumulative effects of this project on wildlife species include those effects from past, present, and reasonably foreseeable projects occurring in the Gibsonville Project wildlife analysis area, which includes 3,952 acres of National Forest System land. Past activities are considered part of the existing condition and are discussed in the "Affected Environment and Existing Conditions", and "Environmental Effects" sections for each resource.

The cumulative effects are typically based on components starting with the understanding of the general status and trends of trying to predict how the activity would influence the natural workings of the habitat. For the purpose of the cumulative effects analysis, it is assumed that the current vegetation conditions reflect the sum of all past human-caused and natural disturbances within the planning area.

It is uncertainexactly what the wildlife species cumulative impact will be from these actions but some level of effects is expected. Proposed treatments for the Gibsonville Project are expected to result in low incremental impact when added to actions on the private land. Short-term habitat suitability reductions by implementation of either action alternative will be offset by fuel treatments that in the long-term would reduce the potential risk of loss of wildlife habitat to wildfire, insect or disease, which can lead to large-scale habitat loss.

9.1 Past, Present and Foreseeable Future

The following is from the Gibsonville Silviculture & Hydrology Reports 2016 with some additional text as related to aquatic and wildlife species.

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, 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.

The Council of Environmental Quality (CEQ) issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." For these reasons, the analysis of past actions in this section is based on current environmental conditions.

The cumulative effect of past management practices, logging, mining, fire exclusion, and high-mortality fires have largely shaped the forest that exists in the project area today. These past projects and events are reflected in the vegetation layer used to characterize the existing conditions (the baselines for analysis) in the project area.

Table 22 displays the past, present, and foreseeable future actions or activities that have contributed to the current environmental conditions. Timber harvest activities presented in this appendix are activities that occurred within the CWE analysis area (Subwatershed 1-6) within the past 25 years both on NFS land and private. Activities planned in 2016 besides the proposed action is considered future foreseeable actions and anything prior is considered to be past activities. The past NFS timber activities were derived from the FACTS (Forest Service Activity Tracking System) database. A GIS shapefile of Timber Harvest Plans (THPs) were attained from the California Department of Forestry and Fire Protection (CALFIRE) for the past and future foreseeable private timber harvest activities. Imagery from various years was used to determine areas that had past timber activities that weren't covered by the FACTS database and the THP shapefile. The acres and timber harvest activities (prescriptions) reflected in this appendix is as accurate as possible because the missing data gaps were filled in by the aerial photos and professional judgement.

Table 22. Past, Present, and Future Foreseeable Actions within the Gibsonville Sub-Watersheds.

PAST, PRESENT, AND FUTURE ACTIONS	ACRES	TIME PERIOD	PROJECT LEVEL CUMULATIVE EFFECTS (Indicators and Units of Measure) (1,200 ACRES)				SUB-WATERSHED AREA CUMULATIVE EFFECTS (3,952 ACRES)
PROJECT / ACTIVITY			FOREST HEALTH INDICATOR		FIRE RESISTENCE INDICATOR		CWHR DIVERSITY & LANDSCAPE STRUCTURE
			Trees per Acre	Basal Area	Stand Structure - Trees per Acre by DBH Classes	Stand Structure - Canopy Cover by DBH Classes	
PAST PROJECTS	NA	< 2000	Cumulative effects of past projects were taken into account based upon the updated timber type layers and the 2012 aerial photograph interpretation		Cumulative effects of past projects were taken into account based upon the updated timber type layers and the 2012 aerial photograph interpretation		Effects of past projects were taken into account for CWHR habitat analysis using the updated GIS timber type layers
Gibsonville Resale	4.6	1997	Very minimal effect. Less than 1.0% overall change		Very minimal effect. Less than 1.0% overall change		Very minimal effect. Less than 0.3% overall change
Tree Release and Weed	7.2	2000					
Pre-commercial Thin	45.7	2003	Very minimal effect. Less than 3.8% overall change		Very minimal effect. Less than 3.8% overall change		Very minimal effect Less than 1.2% overall change
La Porte-Quincy Hazard Tree	28.8	2014	An average of 2-6 trees per acre removed. Very minimal effect.		An average of 2-6 trees per acre removed. Very minimal effect.		An average of 2-6 trees per acre removed. Very minimal effect.
Single Tree Selection	1.9	2015					
Gibsonville Project							
Variable Density Thinning	359	2017-2018	Commercial thin is about 30% of the project.		Commercial thin is about 30% of the project.		Low effect. Less than 9.1% overall change.
Roadside Hazard	115	2017-2018	Roadside hazard tree removal is about 9.6% of the project. An average of 2-6 trees per acre removed.		Roadside hazard tree removal is about 9.6% of the project. An average of 2-6 trees per acre removed.		Very minimal effect. Less than 2.9% overall change.
Aspen, Meadow, and Riparian Restoration	48	2017-2018	Restoration treatments are about 4.0% of the project.		Restoration treatments are about 4.0% of the project.		Very minimal effect. Less than 1.2% overall change.
Mastication and Underburing	181	2018-2019	Mastication is about 15.1% of the project.		Mastication is about 15.1% of the project. Minimal effect to canopy cover.		Minimal effect. Less than 4.6% overall change.
Handcut Pile burn and Underburn	352	2018-2019	Handcutting and underburning are about 29.3% of the project.		Handcutting and underburning are about 29.3% of the project. Minimal effect to canopy cover.		Low effect. Less than 8.9% overall change.
Sugarloaf Project	34	2018-2020	Very minimal effect. Less than 2.8% overall change		Very minimal effect. Less than 2.8% overall change		Very minimal effect. Less than 0.9% overall change
Tree Release and Weed							

Notes: Sub-watershed acres does not include acres from private land.

Changes in vegetation structure as a result of fires and recent past projects since the baseline data was collected has been incorporated into the Gibsonville Project's cumulative effects analysis. The table displays the acres for each project, the type of activity, and the number of acres that are located within the Gibsonville project and sub-watershed analysis areas.

The projects listed in **Table 23** would have no cumulative effects on vegetation attributes (i.e., tree density, canopy cover, species composition, stand structure, etc.) since the treatments themselves (i.e., underburning, hand cutting, or mastication) would have minimal effects. At the sub-watershed level (3,952 acres), Alternatives B and C would have a less than a 13.2 percent change in the small to large trees (i.e., canopy cover, stand structure, and landscape structure).

Roadside hazard tree projects have been determined to have no cumulative effects to vegetation attributes (i.e., tree density, canopy cover, species composition, stand structure, etc.) since they would remove approximately two to six trees per acre along a 150-200 foot road corridor (see Appendix C, Table C-1). Roadside hazard tree projects also would not change seral stage diversity classes (i.e., CWHR size and density classes for each vegetation type).

Botanical (i.e., aspen restoration, noxious weed control), watershed (i.e., meadow or stream restoration), special uses (i.e., mining) and wildlife projects (i.e., oak enhancement) projects are generally not implemented at a scale (i.e., less than 70 acres) or location to influence vegetation attributes on a project or landscape-level analysis area. Christmas trees and fuel wood cutting have a negligible effect on vegetation attributes at a project and landscape-level analysis area due limited access (i.e., adjacent to roads) and to the seasonal and dispersed nature of these activities.

The desired conditions for maintaining various seral stages or timber strata by vegetation type, size class, and canopy cover (CWHR) does not include lands on private property. Therefore, harvest or thinning projects on private property would have no cumulative effects on vegetation attributes, (i.e., tree density, canopy cover, species composition, stand structure, etc.) for the Gibsonville project.

9.2 Private

Of the 5,330 acre wildlife analysis area for the Gibsonville Project area, there are 1,378 acres of private lands. The nature of the private lands is that they are urbanized or managed for industrial timber such as by Sierra Pacific Industries. In general, these private lands are treated with different objectives than National Forest lands and therefore are minimally or not suitable as habitat for mature/older-forest dependent species. Sierra Pacific Industries, the largest private landowners in the analysis area, has outlined strategies that provide certain owl protections on their land. The company implements such activities such as conducting surveys for spotted owls before timber harvests, and/or buffer nest centers from disturbances, and/or protect forest units with nesting spotted owls from harvest altogether. The industry lands in the Goat Mountain area (southwest of the Gibsonville project area) have been heavily managed for timer production. Refer to **Table 23**. The majority of the industry timber lands are not expected to be suitable habitat for the owl. The land owned by a private landowner in Section 19 is not being managed for suitable aquatic or wildlife habitat for T&E or FS Sensitive species.

Table 23. Future foreseeable private timber harvest activities

Type of Activity	Acres
Group Selection	11.2
Substantially Damaged Timberland	0.5
Total	**11.8**

9.3 Climate Change Trends

The following is from the Gibsonville-Silvicutural Report, 2016 with references. The majority of scientific research concerning climate trends indicates that climate has been changing likely due to the increase in human activities which emit greenhouse gases such as the combustion of fossil fuels. Trends suggest that the Northern Sierra Nevada may become generally warmer and wetter, with longer periods of prolonged summer drought. While warmer and wetter weather patterns may increase forest growth and

carbon sequestration, warmer temperatures in combination with longer periods of prolonged summer drought may likely increase forest insect and disease outbreaks and the occurrence of high severity fire – disturbances which may result in increased carbon losses. Such high severity disturbances could result in conversion of forest to shrub lands in forested ecosystems that are not adapted to such disturbance patterns – which could drastically alter carbon cycles in the short and long term.

Current trends have been quantified showing an increase in the proportion of high severity fire in the Sierra Nevada mountain range. High severity patches more than a few acres in size were unusual in fires in the Sierra Nevada before Euro-American settlement (Show and Kotok 1924, Kilgore 1973, Stephenson et al 1991, Skinner 1995, Skinner and Chang 1996, Weatherspoon and Skinner 1996). Miller et al. (2009) have also shown that the average size of high severity patches in Sierra Nevada wildfires has increased by about 100% over the last 25 years.

While the occurrence of fire (including low, moderate, and high severity fire) on the landscape is a natural disturbance that is essential to ecosystem function, the large scale of these fires, particularly the vast proportion that burned under high severity, are well outside the natural range of variability in fire size and severity experienced on the Plumas National Forest in the past and are uncharacteristic of the "natural" fire regimes typically described for the dry Sierra Nevada forests (Miller et al. 2009, Safford et al. 2007, Beaty and Taylor 2007, Moody and Stephens 2002, Beaty and Taylor 2001, Gruell 2001, McKelvey et al. 1996, Weatherspoon 1996, Weatherspoon and Skinner 1996, Skinner and Chang 1996, McKelvey and Johnston 1992).

In addition, recent occurrences of large scale Heterobasidion root disease and bark beetle outbreaks have been linked to recent drought periods that have affected areas in the Southern California Mountains, and in the Lake Tahoe area (Guarin and Taylor 2005, Macomber and Woodock 1994). Such disturbances that result in abnormally large levels of mortality have the potential to affect fuels dynamics, potential fire behavior, and resulting future forest structure and composition.

Such warming trends may lead to the reproductive and overwintering success of forest pathogens and insects, thereby increasing their severity, while prolonged summer droughts, exacerbated by high stand densities, mistletoe and root disease infection, will likely lead to increased moisture stress and decreased health and vigor of forest trees making them more susceptible to mortality from such pathogens and insects (Battles et al. 2008).

Battles et al. (2008) evaluated the impacts of climate change on the mixed-conifer region in California providing insight to forest health and management implications for forest managers. This study found that changes in climate could "exacerbate forest health concerns" by increasing weakened tree susceptibility to mortality as a result of fire, disease epidemics and insect outbreaks and potentially enabling forest insects and disease to expand ranges or increase potential for widespread damage. The authors suggest that forest management strategies that increase species diversity, promote heterogeneity, and create lower density stands would be effective in providing "structures that are more resilient to catastrophic events like fire and epidemics" (Battles et al. 2008).

Predicted climate change is likely to impact trees growing in the Gibsonville area over the next 100 years. Although no Plumas National Forest specific climate change models are available at this time, there is a general consensus among California models that summers will be drier than they are currently. The risk of bark beetle caused tree mortality will likely increase for all conifer species under this scenario, especially drought intolerant white fir. Improving the resilience of stands to future disturbance events through density, size class and species composition management will be critical to maintaining a healthy forested landscape (Cluck 2014).

10.DETERMINATIONS

Refer to **Table 24** for a summary of effect determinations for wildlife species that potentially occur within the planning area and could be affected by implementation of the GibsonvilleHealthy Forest Restoration Project.The following determinations are based on the extent of habitat modification weighed against potential risk for habitat loss due to wildfires or disease.

10.1 Alternative A (No Action ALternative)

***Endangered species* with *a May Affect, Likely to Adversely Affect*:**It is my determination that the proposed project may affect, likely adversely affect the**Sierra Nevada yellow-legged frog,** in the planning area. Potential adverse effects are due to continued reduction in quality and quantity of aquatic, riparian and aspen habitat, and potential loss of habitat due to wildfire.

***Forest Sensitive Species with a May Effect*:**It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viabilityfor the**Foothill yellow-legged frog**in the planning area.

10.2 Alternatives Band C (Action Alternatives)

***Endangered species* with *a May Affect, Likely to Adversely Affect*:**It is my determination that the proposed project may affect, likely adversely affect the **Sierra Nevada yellow-legged frog** in the planning area. Potential adverse effects are due to the proposed non-mechanical beneficial treatments within the 82 ft suitable habitat zone.

***Forest Sensitive Species with a May Effect*:**It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viabilityfor the**Foothill yellow-legged frog**in the planning area.

Table 24. Summary of effects for aquatic-associatedspecies which could be affected by the GibsonvilleHealthy Forest Restoration Project.

SPECIES	A	B	C
Sierra Nevada Yellow-legged Frog	MALAA	MALAA	MALAA
Foothill Yellow-legged Frog	MAI	MAI	MAI

***MALAA* = May Affect, Likely to Adversely Affect**
MAI = May Affect Individuals

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APPENDIX A

Best Management Practices (BMPs)

Land management activities have been recognized as potential sources of non-point source water pollution. By definition, non-point source pollution is not controllable through conventional treatment plant means. Containing the pollutant at its source or precluding delivery to surface water controls non-point source pollution. Sections 208 and 319 of the Federal Clean Water Act, as amended, acknowledge land treatment measures as being an effective means of controlling non-point sources of water pollution and emphasize their development.

Working cooperatively with the California State Water Quality Board, the Forest Service has developed and documented non-point source pollution control measures applicable to National Forest System Lands. Following evaluations of the control measures by State Water Quality Board personnel as they were applied on site during management activities, an assessment of monitoring data, and the completion of public workshops and hearings, the Forest Service's measures were certified by the State and approved by the Environmental Protection Agency as the most effective means the Forest Service could implement to control non-point source pollution. These measures were termed "Best Management Practices" (BMPs). Best Management Practice control measures are designed to accommodate site-specific conditions. They are tailor made to account for the complexity and physical and biological variability of the natural environment. The implementation of BMPs is the performance standard against which the successes of the Forest Service's non-point source pollution water quality management efforts are judged. **Table 1**includes a listing of Region 5 BMPs, while **Table 2** includes a list of the National Core BMPs that would guide the Gibsonville project.

Table 1. Region 5 Best Management Practices for the Gibsonville Project

Standard Management Requirements	
Implement Best Management Practices (BMPs):	
Timber Management Practices	
1.1	Planning Process
1.2	Timber Harvest Area Design
1.3	Use of Erosion Hazard Rating (EHR) for Timber Harvest Area
1.4	Use of Sale Area Maps for Designating Water Quality Protection Needs
1.5	Limiting the Operating Period of Timber Sale Activities
1.6	Protection of Unstable Lands
1.8	Streamside Management Zone Designation
1.9	Determining Tractor Loggable Ground
1.10	Tractor Skidding Design
1.11	Suspended Log Yarding in Timber Havesting
1.12	Log Landing Location

Standard Management Requirements	
1.13	Erosion Prevention and Control Measures During Timber Sale Operations
1.14	Special Erosion Prevention Measures On disturbed Land
1.15	Re-vegetation of Areas Disturbed by Harvest
1.16	Log Landing Erosion Prevention and Control
1.17	Erosion Control on Skid Trails
1.18	Meadow Protection During Timber Harvesting
1.19	Streamcourse Protection
1.20	Erosion Control Structure Maintenance
1.21	Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
1.22	Slash Treatment in Sensitive Areas
1.23	Five-Year Reforestation Requirement
1.25	Modification of the Timber Sale Contract
Road Management Practices	
2.1	Travel Management Planning and Analysis
2.2	General Guidelines for the Location and Design of Roads
2.3	Road Construction and Reconstruction
2.4	Road Maintenance and Operations
2.5	Water aSource Development and Utilization
2.6	Road Storage
2.7	Road Decommissioning
2.8	Stream Crossings
2.9	Snow Removal and Storage
2.10	Parking and Staging Areas
2.11	Equipment Refueling and Servicing
2.12	Aggregate Borrow Areas
2.13	Erosion Control Plans (roads and other activities)
Vegetation Manipulation Practices	
5.2	Slope Limitations for Mechanical Equipment Operations
5.3	Tractor Operation Limitation in Wetlands and Meadows
5.5	Disposal of Organic Debris
5.6	Soil Moisture for Mechanical Equipment Operations
5.7	Pesticide Use Planning Process
5.8	Pesticide Application According to Label Directions & Applicable Legal Requirements
5.9	Pesticide Application Monitoring & Evaluation
5.10	Pesticide Spill Contingency Planning

Standard Management Requirements	
5.11	Cleaning and Disposal of Pesticide Containiers and Equipment
5.12	Streamside Wet Area Protection During Pesticide Spraying
5.13	Controlling Pesticide Drift During Spray Application
Fire Suppression and Fuels Management Practices	
6.1	Fire and Fuels Mangement Activities
6.2	Consideration of Water Quality in Formulating Fire Prescriptions
6.3	Protection of Water Quality from Prescribed Burning Effects
Watershed Management Practices	
7.3	Protection of Wetlands
7.4	Forest Hazardous Substance Spill Prevention Control and Countermeasures Plan
7.6	Water Quality Monitoring
7.8	Cumulative Off-site Watershed Effects

Table 2. National Core Best Management Practices for the Gibsonville Project

Standard Management Requirements	
Implement Best Management Practices (BMPs):	
Mechanical Vegetation Management Activities	
Veg-1	Vegetation Management Planning
Veg-2	Erosion Prevention and Control
Veg-3	Aquatic Management Zones
Veg-4	Ground-Based Skidding and Yarding Opertaions
Veg-6	Landings
Veg-7	Winter Logging
Veg-8	Mechanical Site Treatment
Road Management Activities	
Road-1	Travel Management Planning and Analysis
Road-2	Road Location and Design
Road-3	Road Construction and Reconstruction
Road-4	Road Operations and Maintenance
Road-5	Temporary Roads
Road-6	Road Storage and Decommissioning
Road-7	Stream Crossings
Road-8	Snow Removal and Storage
Road-9	Parking and Staging Areas

Standard Management Requirements	
Road-10	Equipment Refueling and Servicing
Road-11	Road Storm-Damage Surveys
Water Use Management Activities	
WatUses-1	Water Use Planning
WatUses-1	Administrative Water Developments
Aquatic Ecosystems Management Activities	
AqEco-1	Aquatic Ecosystems Improvement and Restoration Planning
AqEco-2	Operations in Aquatic Ecosystems
AqEco-3	Pond and Wetlands
AqEco-4	Stream Channels and Shorelines
Wildland Fire Management Activities	
Fire-1	Wildland Fire Management Planning
Fire-2	Use of Prescribed Fire
Chemical Use Management Activities	
Chem-1	Chemical Use Planning
Chem-2	Follow Label Directions
Chem-3	Chemical Use Near Waterbodies
Chem-4	Chemical Use in Waterbodies
Chem-5	Chemical Handling and Disposal
Chem-6	Chemical Application Monitoring and Evaluation

Site-specific measures that relate directly to these BMPs would be used on the Gibsonville Project to minimize erosion and resultant sedimentation. The BMPs would also be used to minimize negative changes in other water quality parameters such as dissolved oxygen, water temperature, and turbidity. These measures follow the 2004 Sierra Nevada Forest Plan Amendment's Aquatic Management Strategy for water quality and areas adjacent to stream courses, special aquatic features, and streamside guidelines presented in the Plumas National Forest Land and Resource Management Plan (the Forest Plan). Protection and improvement measures would include minimizing disturbance of riparian conservation areas (RCAs), stream shading, recruitment of large organic debris in stream channels, maintenance of side slope and stream channel stability, and prevention of an over accumulation of activity-generated organic debris in stream channels. Timber sale contracts contain many standard provisions that help ensure protection of soil and water resources. These include provisions for an erosion control plan, road maintenance, and skid trail spacing.

BMP Implementation Monitoring Checklist

All projects with potential to adversely affect water quality will have BMP implementation monitoring using a "checklist" approach. BMP implementation checklists will document whether, and when, the site-specific BMPs specified in NEPA analyses were implemented. These checklists will be the primary systematic means for early detection of potential water-quality problems, and will be completed early

enough to allow corrective actions to be taken, if needed, prior to any significant rainfall or snowmelt throughout the duration of the project. Checklists will be completed several times during the life of most projects, including prior to ground-disturbing activities, prior to winter periods, and at the completion of the project. Forest Service watershed staff will develop the checklists for the Gibsonville Project based on BMPs identified in NEPA documents. Forest Service project staff (timber, range, recreation, engineering, etc.) will complete the checklists and forest hydrologists will coordinate and review the checklists to ensure that any deficiencies are corrected effectively.

Water Monitoring Requirements

Implementation Monitoring

Implementation monitoring is required in order to assess the extent to which activities are implemented according to the ROD. With respect to watershed resources, this is comprised of the Best Management Practices Evaluation Program (BMPEP). The question to be answered is: "Are BMPs implemented during project activities?" The objective is for BMP implementation to be at 100 percent. Results for any BMP below 90 percent will trigger a review of the activity area before implementation of further projects. Implementation monitoring is achieved by selecting a representative number of treatment units each year from a sample pool of completed stands or project areas. Across the forest, 30 evaluations are made each year of stream protection zones (T01), skid trails (T02), landings (T04), roads and stream crossings (E08 and E09), road decommissioning (E10), and prescribed burns (F25). These results are summarized and reported annually. Effectiveness monitoring (see below) will be conducted at the same sites. When portions of the Gibsonville Healthy Forest Restoration are completed, they will be entered in the sample pool for the year of completion (or sometimes the following year, depending on the BMP to be evaluated), and may be chosen for evaluation.

Effectiveness Monitoring

The purpose of effectiveness monitoring is to evaluate whether the implementation of the project meet resource objectives. There are a few resource objectives for watershed and aquatics. The following question is project specific.

- Are Best Management Practices applied during project activities effective in meeting onsite objectives? The objective is 100 percent BMP effectiveness. Results for any BMP below 90 percent trigger a review of the activity area before implementation of further projects. Sites with poor effectiveness will be reviewed promptly for remediation.
- The sample pool selected for implementation monitoring will also be evaluated for BMP effectiveness. When portions of the Gibsonville Healthy Forest Restoration are completed, they will be entered in the sample pool for the year of completion (or sometimes the following year, depending on the BMP to be evaluated), and may be chosen for evaluation. The recent Region 5 amendment to the Forest Service Handbook for water quality management indicates Forests should strive to achieve BMP effectiveness rates of 90% to 95% (USDA Forest Service 2011).

APPENDIX B

RIPARIAN CONSERVATION STRATEGY

Aquatic Management Strategy (AMS) Goals

Gibsonville Project would meet all AMS goals.

#1: Water Quality: Maintain and restore water quality to meet goals of the Clean Water Act and Safe Drinking Water Act, providing water that is fishable, swimmable and suitable for drinking after normal treatment.

#2: Species Viability: Maintain and restore habitat to support viable populations of native and desired non-native plant, invertebrate, and vertebrate riparian-dependent species. Prevent new introductions of invasive species. Where invasive species are adversely affecting the viability of native species, work cooperatively with appropriate State and Federal wildlife agencies to reduce impacts to native populations.

#3: Plant and Animal Community Diversity: Maintain and restore the species composition and structural diversity of plant and animal communities in riparian areas, wetlands and meadows to provide desired habitats and ecological functions.

#4: Special Habitats: Maintain and restore the distribution and health of biotic communities in special aquatic habitats (such as springs, seeps, vernal pools, fens, bogs, and marshes) to perpetuate their unique functions and biological diversity.

#5: Watershed Connectivity: Maintain and restore spatial and temporal connectivity for aquatic and riparian species within and between watersheds to provide physically, chemically and biologically unobstructed movement for their survival, migration and reproduction.

#6: Floodplains and Water Tables: Maintain and restore the connections of floodplains, channels, and water tables to distribute flood flows and sustain diverse habitats.

#7: Watershed Condition: Maintain and restore soils with favorable infiltration characteristics and diverse vegetative cover to absorb and filter precipitation and to sustain favorable conditions of stream flows.

#8: Streamflow Patterns and Sediment Regimes: Maintain and restore in-stream flows sufficient to sustain desire conditions of riparian, aquatic, wetland, and meadow habitats and keep sediment regimes as close as possible to those with which aquatic and riparian biota evolved.

#9: Stream Banks and Shorelines: Maintain and restore the physical structure and condition of stream banks and shorelines to minimize erosion and sustain desired habitat diversity.

Riparian Conservation Areas

Designation

Riparian conservation area (RCA) widths are described below. RCA widths shown below may be adjusted at the project level if a landscape analysis has been completed and a site-specific RCO analysis demonstrates a need for different widths.

Perennial Streams: 300 feet on each side of the stream, measured from the bank full edge of the stream

Seasonally Flowing Streams (includes intermittent and ephemeral streams): 150 feet on each side of the stream, measured from the bank full edge of the stream

Streams in Inner Gorge[1]: top of inner gorge

Special Aquatic Features[2] or Perennial Streams with Riparian Conditions extending more than 150 feet from edge of streambank or Seasonally Flowing streams with riparian conditions extending more than 50 feet from edge of streambank: 300 feet from edge of feature or riparian vegetation, whichever width is greater

Other hydrological or topographic depressions without a defined channel: RCA width and protection measures determined through project level analysis.

Desired Conditions

Water quality meets the goals of the Clean Water Act and Safe Drinking Water Act; it is fishable, swimmable, and suitable for drinking after normal treatment.

Habitat supports viable populations of native and desired non-native plant, invertebrate, and vertebrate riparian and aquatic-dependent species. New introductions of invasive species are prevented. Where invasive species are adversely affecting the viability of native species, the appropriate State and Federal wildlife agencies have reduced impacts to native populations.

Species composition and structural diversity of plant and animal communities in riparian areas, wetlands, and meadows provide desired habitat conditions and ecological functions.

The distribution and health of biotic communities in special aquatic habitats (such as springs, seeps, vernal pools, fens, bogs, and marshes) perpetuates their unique functions and biological diversity.

Spatial and temporal connectivity for riparian and aquatic-dependent species within and between watersheds provides physically, chemically and biologically unobstructed movement for their survival, migration and reproduction.

The connections of floodplains, channels, and water tables distribute flood flows and sustain diverse habitats.

Soils with favorable infiltration characteristics and diverse vegetative cover absorb and filter precipitation and sustain favorable conditions of stream flows.

In-stream flows are sufficient to sustain desired conditions of riparian, aquatic, wetland, and meadow habitats and keep sediment regimes as close as possible to those with which aquatic and riparian biota evolved.

The physical structure and condition of stream banks and shorelines minimizes erosion and sustains desired habitat diversity.

The ecological status of meadow vegetation is late seral (50 percent or more of the relative cover of the herbaceous layer is late seral with high similarity to the potential natural community). A diversity of age classes of hardwood shrubs is present and regeneration is occurring.

Meadows are hydrologically functional. Sites of accelerated erosion, such as gullies and headcuts are stabilized or recovering. Vegetation roots occur throughout the available soil profile. Meadows with perennial and intermittent streams have the following characteristics: (1) stream energy from high flows is dissipated, reducing erosion and improving water quality, (2) streams filter sediment and capture bedload, aiding floodplain development, (3) meadow conditions enhance floodwater retention and groundwater recharge, and (4) root masses stabilize stream banks against cutting action.

Critical Aquatic Refuges

Designation

Critical aquatic refuges (CARs) are subwatersheds, generally ranging between 10,000 to 40,000 acres, with some as small 500 acres and some as large as 100,000 acres, that contain either:

- known locations of threatened, endangered, or sensitive species,
- highly vulnerable populations of native plant or animal species, or
- localized populations of rare native aquatic- or riparian-dependent plant or animal species.

Critical aquatic refuges are shown on maps in Volume 4, Appendix I of the SNFPA FEIS (January 2001), beginning on page I-53. The boundaries of CARs may be refined during landscape analysis based on the findings from conservation assessments or verification of the presence and condition of habitat for threatened, endangered, and sensitive species. Additional CARs may be added by individual national forests.

Desired Conditions

Critical aquatic refuges provide habitat for native fish, amphibian and aquatic invertebrate populations. Remnant plant and animal populations in aquatic communities are maintained and restored.

Streams in meadows, lower elevation grasslands, and hardwood ecosystems have vegetation and channel bank conditions that approach historic potential.

Water quality meets State stream standards.

Riparian Conservation Objective (RCO)

Gibsonville Project would meet all RCOs, as applicable.

Riparian Conservation Objectives (RCOs) are presented and described in Appendix A of the 2004 ROD for the Sierra Nevada Forest Plan Amendment (USDA, 2004). Integral to achievement of these objectives are the 32 prescribed standards and guidelines for riparian conservation areas listed in section D of the ROD appendix. An analysis of the RCOs relative to the GibsonvilleHealthy Forest Restoration Project is presented below.

RCO #1: Ensure that identified beneficial uses for the water body are adequately protected. Identify the specific beneficial uses for the project area, water quality goals from the Regional Basin Plan, and the manner in which the standards and guidelines will protect the beneficial uses.

Beneficial uses of surface water bodies that may be affected by activities on the Forest are listed in Chapter 2 of the Central Valley Region's Water Quality Control Plan (commonly referred to as the "Basin Plan") for the Sacramento and San Joaquin River basins (SWRCB, 1998). The GibsonvilleHealthy Forest Restoration Project is located in the upper Indian Creek watershed which drains to North Fork Feather River. Existing beneficial uses include municipal and domestic water supply, hydropower generation, recreation, freshwater habitat, habitat suitable for fish reproduction and early development, and wildlife habitat. Among these beneficial uses, aquatic habitat is the most sensitive to the most common water quality effect (delivery of fine sediment) that could potentially result from land disturbing activities such as those proposed for the GibsonvilleHealthy Forest Restoration Project. For example, delivery of fine sediments from the project could decrease the quality of coldwater fish habitat by infilling pools and embedding spawning gravels. Alternatively, land disturbance could cause concentration of surface runoff, which could result in detrimental changes to stream channel condition that could subsequently have effects on downstream water quality and beneficial uses.

Project design features, including streamside protection zones and standard BMPs implemented during all ground disturbing activities would prevent sediment delivery to streams which could result in significant water quality impacts, stream channel condition damage, or effects to state-designated beneficial uses of water.

RCO #2: Maintain or restore: (1) the geomorphic and biological characteristics of special aquatic features, including lakes, meadows, bogs, fens, wetlands, vernal pools, springs; (2) streams, including in stream flows; and (3) hydrologic connectivity both within and between watersheds to provide for the habitat needs of aquatic-dependent species.

Severalaspen, meadows, riparian zones, ponds and springs are present within the GibsonvilleHealthy Forest Restoration Project area and are expected to benefit from the proposed actions. Road improvements are designed to restore hydrologic connectivity and limit road related sediment inputs. Removing conifers from overstocked timber stands increases water availability in two ways: 1) A densely forested canopy may intercept nearly 20 percent of the precipitation that would otherwise fall to the ground and be available to recharge local groundwater (Bales, 2011). 2) This same overstocked forest will further deplete groundwater supplies through a process known as transpiration – the evaporation of water from the needles or leaves. The ever present, shade tolerant, white fir have been documented to transpire up to three times as much water as a shade-intolerant ponderosa pine (Helms & Rutter, 1979).

RCO #3: Ensure a renewable supply of large down logs that: (1) can reach the stream channel and (2) provide suitable habitat within and adjacent to the RCA.

The proposed mechanical and non-mechanical treatments within RCAs would return Gibsonville project units to a level of health that is more closely related to its historic condition. While volume of wood per acre may be near historic levels, it is in the boles of numerous small, less fire resistant trees. Removing the surface ladder fuels would encourage the stand to return to its natural state and greatly enhance it by reducing competition for nutrients, water, and sunlight.

Within treatment units, the objective is to reduce dense fuel concentrations. Thinning within RCAs may release the residual conifers and deciduous trees thus stimulating growth. LWD and snag retention standards would be implemented. Prescribed fire would not be ignited within 150 feet of perennial streams but would be allowed to run tup to 82 ft of the stream. Intermittent and ephemeral would have a 82 ft buffer of no fire entry. Most piles would be burned but some would be retained on site of smaller diameter material to provide wildlife habitat. Prescribed fire outside of the 82 foot buffer would occur during times of elevated moisture, resulting in less LWD consumption but also the potential for fire killed trees that could renew the snag and LWD cycle.

RCO #5: Preserve, restore, or enhance special aquatic features, such as meadows, lakes, ponds, bogs, fens, and wetlands, to provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.

As described above in the analysis for RCO #2, several benefits to these special aquatic features are expected as a result of the proposed actions. Aspen and meadow and riparian restoration is another example of how the Gibsonville project would improve ecological conditions and processes so as to protect these unique riparian ecosystems from localized extinction.

RCO #6: Identify and implement restoration actions to maintain, restore or enhance water quality and maintain, restore, or enhance habitat for riparian and aquatic species.

Proposed action activities would provide localized, but long-term, enhancements to water quality protection. The proposed reconstruction of four water sources, per BMP 2.5, would improve long-term protection of water quality at these drafting sites. Four culverts are proposed for replacement with inkind or new structure. Additional dips are proposed for haul routes.

The Gibsonville project proposes to improve Sierra Nevada Yellow Legged Frog habitat by reducing surface and ladder fuels which could lead to a high intensity and severity fire and potential habitat loss. Restoring habitat within aspen, meadow, riparian and streams. Opening up vegetation along some streams to provide more basking sites for frogs. Refer to RCO #5.

Standards and Guidelines (S&GLs)

Gibsonville Project would meet all S&GLs, as applicable.

Standards and Guidelines for Riparian Conservation Areas

91. Designate riparian conservation area (RCA) widths as described in Part B of this appendix. The RCA widths displayed in Part B may be adjusted at the project level if a landscape analysis has been completed and a site-specific RCO analysis demonstrates a need for different widths.

- The vegetation density in the project area is high due to the amount of precipitation and lack of timber and fuel management activities over the past 25 years (see Appendix E) despite the low productive soils. The majority of the soils in the project have a forest survey site class of 6 (67 percent), 1 being the most productive and 7 being the least productive. The treatment widths were designed to reduce the amount of fuel adjacent to streams, springs and meadows while protecting water quality.

92. Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species.

- All the design features are intended to project water quality and minimize the impacts to aquatic-or riparian-dependent plant and animal species however they are not intended to be mitigations. The implementation of BMPs (see Appendix B of this report and management requirement table of this project) will help minimize the impact to water quality during the implementation of the project. A few examples of the design features are listed below. A LOP on soils will help limit compaction and limit rutting that could channelization of sediment to streams. All subsoiled temporary roads will have effective soil cover in particular at stream crossings. Add 100 feet of on effective soil cover on both sides of a perennial stream and 75 feet on seasonally flowing streams. All the treatment buffers within the RCAs are designed to treatment fuels in the project and yet project water quality.

93. Identify existing uses and activities in CARs and RCAs during landscape analysis. At the time of permit reissuance, evaluate and consider actions needed for consistency with RCOs.

- Refer to responses to other S&GLs.

94. As part of project-level analysis, conduct peer reviews for projects that propose ground-disturbing activities in more than 25 percent of the RCA or more than 15 percent of a CAR.

- Not applicable

Standards and Guidelines Associated with RCO #1

- Beneficial uses are defined under California State law, in order protect against quality degradation of water resources and to meet state water quality objectives. The USDA Forest Service is required to protect and enhance existing and potential beneficial uses during water

quality planning (California Regional Water Quality Control Board [CRWQCB], 1998, revised 2007). Beneficial uses of surface water bodies, including those that may be affected by activities on the PNF are listed in Chapter 2 of the Basin Plan (CRWQCB 1998, revised 2007). All the subwatersheds that were created for the project fall within the Slate Creek six-level HUC (hydrologic Unit Code) subwatershed which is 39,323 acres. Slate Creek flows into the North Yuba River and then into then to New Bullards Bar Reservoir and eventually into Englebright Dam. The beneficial uses identified will be associated to Englebright Reservoir. The defined existing beneficial uses are identified below.

95. For waters designated as "Water Quality Limited" (Clean Water Act Section 303(d)), participate in the development of Total Maximum Daily Loads (TMDLs) and TMDL Implementation Plans. Execute applicable elements of completed TMDL Implementation Plans.

- There are no 303d listed water bodies within the immediate subwatershed boundaries. All the subwatersheds feed into Slate Creek which flows into the North Fork Yuba River which is 303d listed. A few miles down from their confluences the North Fork Yuba River flows into New Bullards Bar Reservoir which is 303d listed too. Both 303d list water features are on the list for mercury. The proposed activities are not expecting to contribute to TMDLs for mercury.

96. Ensure that management activities do not adversely affect water temperatures necessary for local aquatic- and riparian-dependent species assemblages.

- Hand thinning (i.e. HCPB), mastication, and biomass removal remove vegetation less than 10 inches in DBH. As noted in the hydrology report common stand exams were conducted on 3 streams and found that the average canopy within the RCAs was 63 percent for material ranging from 0 to 99 inches in DBH. If the sapling material (0-6 inches in DBH) were to be treated a 10 percent decrease in canopy cover is anticipated. However, the goal is treat up to 9.99 inches in DBH. The exact decrease in canopy cover in RCAs is unknown but it can be said that it will be more than 10 percent. The trees larger than 10 inches in DBH would still remain and provide sufficient shade and not affect water temperature. The reduction in canopy cover is short-term but long-term it is anticipated that trees larger than 10 inches in DBH will grow in height and diameter which will provide greater shade and large woody material recruitment. VDT and roadside hazard treatments will be limited to 150' for perennial stream and 75' for intermittent and ephemeral streams (buffers apply to both sides of the stream). Within the no mechanical treatment zones of the RCAs the only treatments allowed are HCPB and underburn. As discussed above it's anticipated that the canopy cover immediately adjacent the RCA features would see at least 10 percent decrease in canopy cover. Prescribed fire will be ignited no closer than 150 ft. away from any stream, spring, and meadow allowed to back into the stream under the ideal conditions for underburning. Prescribed fire is anticipated to leave a mosaic pattern due to variances in moisture content along the streams. The prescribed fire is anticipated to create some heterogeneity to the vegetation with the RCAs. All proposed units with primary and/or secondary underburns are anticipated to reduce the fuel and improve competition of trees, shrubs, and riparian vegetation therefore improving the health of stand. As the health of the stand improves shade is anticipated to increase therefore water temperature shall either remain relatively the same or improve. Additionally, by treating portions of the RCAs, high-intensity fires would potentially be reduced thereby allowing the ecosystem with these corridors to return to a more productive historic condition. Competition

between co-dominants and dominant trees will decrease and growth rates will increase while mortality rates decline. The treatment of the meadows will not affect water temperatures.

The only treatment that may see water temperatures increase are the aspen release treatments where trees are intended to be removed up to 10 feet away from any stream. The reason for this type of treatment is because the aspen are primarily next to the streams in the project. The goal is to enhance the habitat of the aspen which entails removing its competition and disturbing the landscape which stimulates its growth. The number of miles affected by the aspen release treatment is 0.82 miles which is relatively minor when compared to 31.3 miles of intermittent and perennial streams found in the analysis area.

97. Limit pesticide applications to cases where project level analysis indicates that pesticide applications are consistent with riparian conservation objectives.

- If trees of 14 inches in diameter and greater are cut down within the standard RCA buffers they will not be treated with borax. No other pesticides proposed.

98. Within 500 feet of known occupied sites for the California red-legged frog, Cascades frog, Yosemite toad, foothill yellow-legged frog, mountain yellow-legged frog, and northern leopard frog, design pesticide applications to avoid adverse effects to individuals and their habitats.

- No pesticides proposed. Refer to #97 above.

99. Prohibit storage of fuels and other toxic materials within RCAs and CARs except at designated administrative sites and sites covered by a Special Use Authorization. Prohibit refueling within RCAs and CARs unless there are no other alternatives. Ensure that spill plans are reviewed and up-to-date .

- BMP 2.11 (Equipment Refueling and Servicing) will prevent fuels, lubricants, cleaners, and other harmful materials from discharging into nearby surface waters or infiltrating through soils to contaminate groundwater resources.

Standards and Guidelines Associated with RCO #2

100. Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.

- No roads or trails were identified that intercept, divert, or disrupt natural surface and subsurface water flow paths.

101. Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to in stream flows and depletion of pool habitat. Where possible, maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features.

- If any stream crossings are used for the project they will have to be approved by the district hydrologist or wildlife biologist. Both action alternatives have identified 8.9 acres of meadow restoration and 15.8 acres of riparian restoration. The goal is to improve the health and extent of the meadows and riparian habitat. The water table elevation of the meadows are anticipated to increase. There other dry meadows within the project that will be treated up to the meadows

edge and not within via VDT, mastication, aspen release and HCPB treatments. These treatments are more passive than the fore mentioned units identified as meadow and riparian restoration.

102. Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or cause an upward trend in conditions. Evaluate required long-term restoration actions and implement them according to their status among other restoration needs.

- The streams are within the range of natural variability. No long term restoration actions were identified and is outside the scope of the project.

103. Prevent disturbance to streambanks and natural lake and pond shorelines caused by resource activities (for example, livestock, off-highway vehicles, and dispersed recreation) from exceeding 20 percent of stream reach or 20 percent of natural lake and pond shorelines. Disturbance includes bank sloughing, chiseling, trampling, and other means of exposing bare soil or cutting plant roots. This standard does not apply to developed recreation sites, sites authorized under Special Use Permits and designated off-highway vehicle routes.

- Not applicable.

104. In stream reaches occupied by, or identified as "essential habitat" in the conservation assessment for, the Lahonton and Paiute cutthroat trout and the Little Kern golden trout, limit streambank disturbance from livestock to 10 percent of the occupied or "essential habitat" stream reach. (Conservation assessments are described in the record of decision.) Cooperate with State and Federal agencies to develop streambank disturbance standards for threatened, endangered, and sensitive species. Use the regional streambank assessment protocol. Implement corrective action where disturbance limits have been exceeded.

- No essential habitat is identified in the Gibsonville Healthy Forest Restoration.

105. At either the landscape or project-scale, determine if the age class, structural diversity, composition, and cover of riparian vegetation are within the range of natural variability for the vegetative community. If conditions are outside the range of natural variability, consider implementing mitigation and/or restoration actions that will result in an upward trend. Actions could include restoration of aspen or other riparian vegetation where conifer encroachment is identified as a problem.

- Both action alternatives propose approximately 8.9 acres of meadow restoration, 15.8 acres of riparian restoration, and 22.8 acres of aspen release. These areas were specifically identified because the encroaching conifers are deteriorating their habitat. See table 9 of the hydrology report for exact treatments within meadows, riparian, and aspen release units. There other dry meadows within the project that will be treated up to the meadows edge and not within via VDT, mastication, aspen release and HCPB treatments. These treatments are more passive than the fore mentioned units identified as meadow and riparian restoration.

106. Cooperate with Federal, Tribal, State and local governments to secure in stream flows needed to maintain, recover, and restore riparian resources, channel conditions, and aquatic habitat. Maintain in stream flows to protect aquatic systems to which species are uniquely adapted. Minimize the effects of stream diversions or other flow modifications from hydroelectric projects on threatened, endangered, and sensitive species.

- Stream flows are expected to improve with the reduction of dense surface and ladder fuels.

107. For exempt hydroelectric facilities on national forest lands, ensure that special use permit language provides adequate in stream flow requirements to maintain, restore, or recover favorable ecological conditions for local riparian- and aquatic-dependent species.

- Not applicable.

Standards and Guidelines Associated with RCO #3

108. Determine if the level of coarse large woody debris (CWD) is within the range of natural variability in terms of frequency and distribution and is sufficient to sustain stream channel physical complexity and stability. Ensure proposed management activities move conditions toward the range of natural variability.

- Refer to Large Down Wood discussion in main document. Large woody debris (LWD) plays an important part in storing sediment and small wood in collivial channels. Large wood may be the cornerstone for storing sediment in steep headwater streams because it provides a physical obstruction to transport in high-energy environments. In the absence of wood, small headwater steams may become a chronic source of sediment to downstream areas. By increasing the sediment storage capacity of the channel, large wood buffers the sedimentation impacts on downstream reaches when pulses of sediment enter headwater streams(May and Gresswell 2003). LWD adds structure to stream channels and creates habitat for a variety of organisms, including fish and small burrowing mammals. It also acts as a reservoir, retaining moisture throughout the summer months. Many species of plants and animals depend on this moisture. Decomposing LWD slowly returns nutrients back into the system over the long term, and helps support a diverse population of riparian entities.
- The various treatments proposed would remove many of the problematic smaller woody material and encourage the retained trees to grow at accelerated rates, improving LWD recruitment potential over time. LWD retention would be improved as logs would be larger and take longer to decompose; both natural and prescribed fires would burn with less intensity, reducing LWD consumption. The removal of smaller materials from future recruitment through HCPB, mastication and underburning would improve current stream channel integrity, channel processes and sediment regime.

Standards and Guidelines Associated with RCO #4

109. Within CARs, in occupied habitat or "essential habitat" as identified in conservation assessments for threatened, endangered, or sensitive species, evaluate the appropriate role, timing, and extent of prescribed fire. Avoid direct lighting within riparian vegetation; prescribed fires may back into riparian vegetation areas. Develop mitigation measures to avoid impacts to these species whenever ground-disturbing equipment is used.

- Proposed treatments within designated CAR would follow all USFWS Conservation Measures and USDA FS Design Features.

110. Use screening devices for water drafting pumps. (Fire suppression activities are exempt during initial attack.) Use pumps with low entry velocity to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats.

- A project Design Feature is to follow "PNF Water Drafting Guidelines".

- BMP 2.5 (Water Source Development and Utilization) address water drafting sites. Emergency Exemptions for Water Drafting Streamflow Criteria (February 28, 2014).
  For fish-bearing streams—
  1.The water drafting rate should not exceed 350 gallons per minute for streamflow greater than or equal to 4.0 cubic feet per second (cfs);
  2.Below 4.0 cfs, drafting rates should not exceed 20% of surface flows;
  3.Water drafting should cease when bypass surface flows drop below 1.5 cfs.
  For non-fish-bearing streams—
  1.The water drafting rate should not exceed 350 gallons per minute for streamflow greater than or equal to 2.0 cfs;
  2.Drafting rates should not exceed 50% of surface flows;
  3.Water drafting should cease when bypass surfaced flows drop below 10 gallons per minute.

111. Design prescribed fire treatments to minimize disturbance of ground cover and riparian vegetation in RCAs. In burn plans for project areas that include, or are adjacent to RCAs, identify mitigation measures to minimize the spread of fire into riparian vegetation. In determining which mitigation measures to adopt, weigh the potential harm of mitigation measures, for example fire lines, against the risks and benefits of prescribed fire entering riparian vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could be damaging to habitat or long-term function of the riparian community.

- This S&GL would be met.by following all Conservation Measures and Design Features.

- Where underburns are proposed, fire will be ignited no closer than 150 ft. away from any perennial stream but allowed to back down to within 82 ft of stream andno closer than 82 ft. away from any perennial stream but allowed to back down to within 82 ft of stream, intermittent or ephemeral streams. Burn piles will be located above the riparian area or at least 25 feet away from the edge of the RCA feature, whichever is greater. Burn plans and prescriptions would be written to assure that burn intensities would remain low and Minimum Impact Suppression Techniques (MIST) would be implemented in order to retain riparian values. A study of prescribed burning in riparian areas in the Sierra Nevada suggests that effects of underburning in riparian conditions are limited in intensity and duration (Beche et al. 2005) due to higher moisture content of riparian vegetation. As such, prescribed fires within RCAs typically burn non-uniformly and with low intensity, resulting in low tree mortality and negligible reductions to canopy cover. Shrub cover would be reduced, but this is relatively inconsequential as the majority of shading needed to maintain stream temperatures are provided by mature trees. In the short-term, limited sediment and nutrient delivery to streams may occur after burning. However, Best Management Practice (BMP) evaluations from 2010 to 2012 for Plumas National Forest projects only one of the 37 units evaluated for prescribed fire failed due to ground cover not meeting standard within the SMZ and more than 10% hydrophobic soils observed (USDA Forest Service 2013).Additionally, scorched conifers often drop needles following low or moderate severity fires. This needle cast provides ground cover that helps reduce rill and inter-rill erosion and sediment delivery to streams (Pannkuk and Robichaud 2003).

112. Post-wildfire management activities in RCAs and CARs should emphasize enhancing native vegetation cover, stabilizing channels by non-structural means, minimizing adverse effects from the existing road network, and carrying out activities identified in landscape analyses. Post-wildfire operations shall minimize the exposure of bare soil.

- This S&GL would be met.by following all Conservation Measures and Design Features.

113. Allow hazard tree removal within RCAs or CARs. Allow mechanical ground disturbing fuels treatments, salvage harvest, or commercial fuelwood cutting within RCAs or CARs when the activity is consistent with RCOs. Utilize low ground pressure equipment, helicopters, over the snow logging, or other non-ground disturbing actions to operate off of existing roads when needed to achieve RCOs. Ensure that existing roads, landings, and skid trails meet Best Management Practices. Minimize the construction of new skid trails or roads for access into RCAs for fuel treatments, salvage harvest, commercial fuelwood cutting, or hazard tree removal.

- This S&GL would be met.by following all Conservation Measures and Design Features.
- The construction of new skid trails will be limited throughout the project in particular within the RCAs and will adhere to BMPs. Hazard trees will be allowed to be removed within the RCAs but will have to adhere to the equipment exclusion zone (75ft. for ephemeral and intermittent streams while 150ft. for perennials). Within the equipment exclusion zone trees may be felled but left alone afterwards.

114. As appropriate, assess and document aquatic conditions following the Regional Stream Condition Inventory protocol prior to implementing ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog.

- A Steam Condition Inventory was conducted for the Slate Creek area. Gibsonville lies within that area.

115. During fire suppression activities, consider impacts to aquatic- and riparian-dependent resources. Where possible, locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of RCAs or CARs. During pre-suppression planning, determine guidelines for suppression activities, including avoidance of potential adverse effects to aquatic- and riparian-dependent species as a goal.

- Not applicable.

116. Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.

- Not applicable.

Standards and Guidelines Associated with RCO #5

117. Assess the hydrologic function of meadow habitats and other special aquatic features during range management analysis. Ensure that characteristics of special features are, at a minimum, at Proper

Functioning Condition, as defined in the appropriate Technical Reports (or their successor publications): (1) "Process for Assessing PFC" TR 1737-9 (1993), "PFC for Lotic Areas" USDI TR 1737-15 (1998) or (2) "PFC for Lentic Riparian-Wetland Areas" USDI TR 1737-11 (1994).

- Not applicable.There is no range allotments within the project boundary and no hydrologic function of the meadows were done in a range management analysis. However, a few meadows and springs were identified to within the project boundary which have encroaching conifers some of these will be treated up to and/or within the hydrologic feature. The treatments are intended to maintain or improve the condition of these features.

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. Criteria for defining bogs and fens include, but are not limited to, presence of: (1) sphagnum moss (Sphagnum spp.), (2) mosses belonging to the genus Meesia, and (3) sundew (Drosera spp.). Complete initial plant inventories of bogs and fens within active grazing allotments prior to re-issuing permits.

- Not applicable.There are no bogs or fens identified in the project boundary.

119. Locate new facilities for gathering livestock and pack stock outside of meadows and riparian conservation areas. During project-level planning, evaluate and consider relocating existing livestock facilities outside of meadows and riparian areas. Prior to re-issuing grazing permits, assess the compatibility of livestock management facilities located in riparian conservation areas with riparian conservation objectives.

120. Under season-long grazing:

- Not applicable. There is no range allotments within the project boundary

121. Limit browsing to no more than 20 percent of the annual leader growth of mature riparian shrubs and no more than 20 percent of individual seedlings. Remove livestock from any area of an allotment when browsing indicates a change in livestock preference from grazing herbaceous vegetation to browsing woody riparian vegetation.

- Not applicable. There is no range allotments within the project boundary

Standards and Guidelines Associated with RCO #6

122. Recommend restoration practices in: (1) areas with compaction in excess of soil quality standards, (2) areas with lowered water tables, or (3) areas that are either actively down cutting or that have historic gullies. Identify other management practices, for example, road building, recreational use, grazing, and timber harvests, that may be contributing to the observed degradation.

- There is no identified areas identified with compaction in excess of soil quality standards but the last 200 feet of main existing skid trials leading to the landings will be subsoiled and any new temporary roads will have the entire length will be subsoiled. Approximately 8.9 acres of meadow restoration, 15.8 acres of riparian restoration, and 22.8 acres of aspen release have their water tables lower due to the encroaching conifers. The selection of one of the action alternatives will help raise the water table of these identified areas. There other dry meadows within the project that will be treated up to the meadows edge and not within via VDT,

mastication, aspen release and HCPB treatments. These treatments are more passive than the fore mentioned units identified as meadow and riparian restoration and will see less of a water table rise.There are no areas proposed for restoration on actively down cutting or that have historic gullies.

Standards and Guidelines for Critical Aquatic Refuges

123. Determine which critical aquatic refuges or areas within critical aquatic refuges are suitable for mineral withdrawal. Propose these areas for withdrawal from location and entry under U.S. mining laws, subject to valid existing rights, for a term of 20 years.

- There are a few mining claims in the area. Although not part of the proposed action, mining claims are continuously evaluated for possible withdrawal.

124. Approve mining-related plans of operation if measures are implemented that contribute toward the attainment or maintenance of aquatic management strategy goals.

- Plans Of Operation (POO) for mining claims are always reviewed for resource impacts prior to approving any newly proposed POO or any changes or extension of an existing POO.

APPENDIX C

Habitat for Yellow-legged-frogs (*Rana spp.*)

Sierra Nevada Yellow-legged Frog (*Rana sierra*)

Sierra Nevada yellow-legged frogs are highly aquatic, utilizing only the immediate bank and emergent rocks and logs. Their preferred aquatic habitat consists of stream or lakes with a gentle slope such that at the shore there is shallow warm water. Historically streams with a bank of less than 10 inches in vertical height with a moderately rocky, sparsely vegetated bank harbored the densest populations (Mullally and Cunningham 1956). Highest summer densities and overall total numbers are found in lakes lacking introduced fish, possessing high numbers of *Hyla regilla* tadpoles, more than 1 meter in depth and near-shore habitat with warm water temperatures (Pope and Matthews 2001). Site fidelity is high for breeding, foraging and overwintering for this species (Matthews and Preisler 2010). Adult yellow-legged frogs readily consume *Hyla regilla* tadpoles (Pope and Matthews 2001). In areas with high numbers of larval *H. regilla* adult yellow-legged frogs have better body conditions compared to areas with low numbers. Additionally, the presence of small larval tadpoles such as *H. regilla* or *Bufo spp.* greatly increases both the probability of finding yellow-legged frogs and the actual numbers of yellow-legged frogs on site. These tadpoles represent an abundant, energetically profitable food source and are an important supplemental food source to the regular invertebrate prey (Pope and Matthews 2002).

Adult SNYLF have an activity pattern that involves three main sites: overwintering, breeding and foraging. Of these three overwintering sites are the most limiting to adults. Dispersal between these sites is not limited to aquatic routes. Although these frogs are often seen within a meter or two of water they can make terrestrial movements of as much as one kilometer. Water temperature does not seem to have a significant impact on this species as they are able to fully function in water as cold as 3C (37.4F). Yellow-legged frog home range varies throughout the year and by individual. In August home range can vary from a little under 20m^2 to over 1000m^2. Home ranges are largest in September (53 to 9807m^2) which likely accounts for foraging movements. By October home ranges are very small (3.2 to 82m^2) as frogs settle into overwintering habitat (Matthews and Pope 1999). Tadpoles overwinter at least once up to four years at high elevations (Matthews and Miaud 2007). Frogs grow faster and are typically larger at lower elevations due to the extended summer enabling additional foraging and growth (Matthews and Miaud 2007). However, the additional snow pack of higher elevation animals does not appear to impact survival as year-to-year adult survival is often highest in years with the greatest snowpack.

Foothill Yellow-legged Frog (*Rana boylii*)

The habitat characteristics of non-breeding adult foothill yellow-legged frogs have not been fully evaluated. They are rarely seen more than a few meters away from water, but it remains unknown if they utilize upland areas during winter months (Kupferberg 1996). Habitat use of juvenile frogs is also largely unknown. Some evidence indicates that they potentially use smaller waterways such has springs or small tributary streams (Lind et al. 2011). Breeding habitat is typically classified as a stream with riffles containing cobble-sized or larger rocks as substrate (Morey 2000). Egg attachment sites are usually cobbles or boulders, but frogs may sometimes utilize bedrock or vegetation. Wheeler and Welsh (2008) found that approximately 68% of adult male foothill yellow-legged frogs in their study were site faithful. Larval foothill yellow-legged frogs primarily consume algae and will preferentially graze on epiphytic diatoms as this food item allows them to grow more rapidly (Jennings and Hayes 1994). Post-metamorphose likely consume both aquatic and terrestrial insects but there is little research on the subject (Jennings and Hayes 1994). Adult diet is thought to include: flies, moths, hornets, ants, beetles,

grasshoppers, water striders and snails with a terrestrial arthropod composition of 87.5% insects and 12.6% arachnids (Fellers 2005). Breeding can occur as early as April 7th but may start as late as May 8th and typically continues at least a month with an average duration of 49.5 days between first and last egg depositions (Wheeler and Welsh 2008; Kupferberg 1996). After hatching, tadpoles move away from the egg mass. As with egg development, larval development is temperature dependent with metamorphosis typically occurring 3-4 months after hatching with no documented overwintering of larvae. Foothill yellow-legged frogs metamorphose at a size of 1.4-1.7 cm in length. Reproductive maturity is thought to occur the second year after metamorphosis, but can occur as early as six months after metamorphosis. Longevity for this species is unknown (Fellers 2005).