

**BIOLOGICAL EVALUATION  
FOR THE  
CALIFORNIA HIGH SPEED RAIL AUTHORITY  
GEOTECHNICAL INVESTIGATION**

**Los Angeles County, California**

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## I. INTRODUCTION

The purpose of this Biological Evaluation (BE) is to analyze and present the anticipated biological effects of the proposed activities (Geotechnical drilling) on all Forest Service Sensitive (FSS) plant and animal species that are known to occur, or have the potential to occur within the California High Speed Rail Authority Geotechnical Investigation project area.

The FSS plant and animal species considered in this document are as follows:

### Plants

- Abram's Flowery Puncturebract (*Acanthoscyphus parishii* var. *abramsii*)
- Club-haired Mariposa Lily (*Calochortus clavatus* var. *clavatus*)
- Slender Mariposa Lily (*Calochortus clavatus* var. *gracilis*)
- San Gabriel Mountains Sunflower (*Hulsea vestita* ssp. *gabrtielensis*)
- San Gabriel Linanthus (*Linanthus concinnus*)
- Robbins' Nemacladus (*Nemacladus secundiflorus* var. *robbinsii*)
- Chickweed Starry Puncturebract (*Sidotheca caryophylloides*)
- Rigid Fringepod (*Thysanocarpus rigidus*)

### Wildlife

- San Bernardino Mtn. Kingsnake (*Lampropeltis zonata parvirubra*)
- Pallid Bat (*Antrozous pallidus*)
- Townsend's Big-Eared Bat (*Corynorhinus townsendii*)
- Fringed Myotis (*Myotis thysanodes*)

## II. GUIDING POLICY AND REGULATION

**Endangered Species Act of 1973 (as amended):** "...all Federal departments and agencies shall seek to conserve endangered species and threatened species...to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats."

**Forest Service Sensitive Species:** Management direction for Forest Service sensitive species on the Forest comes from the Angeles National Forest Land Management Plan (LMP) adopted by the Record of Decision signed on September 20, 2005 (USDA 2005). Strategic Goals, Program Strategies and Tactics, Standards, and Appendices A-J provide guidance on management of wildlife and botany resources.

Land Management Plan, Part 2 Angeles National Forest Strategy:

WL 1/WL-2: Threatened, Endangered, Proposed, Candidate and Sensitive species management:

- Manage habitat to move listed species toward recovery and de-listing. Implement Forest Service actions as recommended in recovery plans for federally listed species.
- Prevent listing of proposed and sensitive species.

- Use vegetation management practices to reduce the intensity of fires to reduce habitat loss due to catastrophic fires.
- Protect habitat during fire suppression activities where feasible.

Land Management Plan, Part 3 describes design criteria, which includes the laws, standards, and other applicable guidance that the Forest Service uses during project planning and implementation. Standards are mandatory requirements that come into play as site-specific activities are planned, and are designed to be consistent with the objectives in Part 2 and the desired conditions in Part 1 of the plans. The following are design criteria that are applicable to the proposed action:

- S11: When occupied or suitable habitat for a threatened, endangered, proposed, candidate or sensitive species (TEPCS) is present in an ongoing or proposed project site, consider species guidance documents (see Appendix H of the Land Management Plans) to develop project-specific or activity-specific design criteria. This guidance is intended to provide a range of possible conservation measures that may be selectively applied during site-specific planning to avoid, minimize or mitigate negative long-term effects on TEPCS species and habitat. Involve appropriate resource specialists in the identification of relevant design criteria. Include review of species guidance documents in fire suppression or other emergency actions when and to the extent practicable.

Forest Service Manual 2670 provides the following direction: “Manage habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations...Manage National Forest System habitats and activities for threatened and endangered species to achieve recovery objectives....Develop and implement management practices to ensure that species do not become threatened or endangered because of Forest Service Actions.”

**National Forest Management Act (NFMA) for all Species:**

National Forest Management Act (NFMA) of 1976 states that “fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired nonnative vertebrate species in the planning area”. For planning purposes, a viable population shall be regarded as one which has the estimated numbers, and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area (36 CFR 219.19).

The regulations also mandate that “all management prescriptions shall provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species and provide that habitat for species chosen under 219.19 is maintained and improved to the degree consistent with multiple-use objectives established in the plan” (36 CFR 219.27(a)(6)).

Diversity states in part: “Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species” (36 CFR 219.27(g)).

### **III. PROJECT DESCRIPTION**

#### **Proposed Action**

The California High-Speed Rail Authority is proposing to conduct geophysical/geotechnical (GI) testing at five to eight locations within the ANF. Five sites have already been selected to investigate in-situ rock conditions and to measure groundwater pressures along the proposed tunnel alternatives. If additional drill sites are necessary (up to three additional sites), they will have to be approved by the USFWS prior to drilling. These test borings are needed to test site conditions in locations that lie in close proximity to the alternative alignments proposed by the Authority or to help understand the geology in the vicinity of the alignment alternatives. The test borings will provide data to help evaluate potentially challenging conditions for tunnel design and construction at depth within the ANF by investigating groundwater pressures, hydraulic conductivity, and adverse geology, including faults, rock conditions, and squeezing ground.

All proposed exploration sites will be drilled along forest roads accessible by a truck-mounted drill rig and all project activities will be managed by drive up access. Each exploration site has unique conditions that require site-specific layouts, water supply, delivery, and storage, drill pad footprint, equipment storage and staging areas.

Drill rig work areas are roughly rectangular shaped and ideally range from 80 feet by 30 to 40 feet on their sides but can be fit into smaller areas depending on site access limitations, type of drill rig mounting (i.e., truck mounted or track mounted) and options for equipment laydown. All support equipment will be stored on site adjacent to the drill site. The area of site operation is limited to 80 feet by 30 to 40 feet. No grading will occur at the drill sites, but vegetation may be removed to allow for staging and to reduce the risk of wildfire ignition.

Water will be delivered to the site by tanker trucks and stored in tanks nearby each drill site. These water bladders/tanks will be utilized for drilling purposes and any potential fire suppression. Water bladders/tanks will be located near the core hole site in a staging area for water storage. A temporary water line extending from staging areas located along forest roads will be designated for each site.

Oversized casing (e.g. PWT or HWT, 5.5" and 4.5" Outer Diameter, respectively) will be used to over case the upper part of each borehole for stability. Core hole conditioning to retain drill fluid circulation or stabilize the borehole may require running casing, drill additives or grouting problem areas and re-drilling. Drilling additives are used to help maintain hole stability, retard water loss from the core hole, and retrieve cuttings through fluid circulation to the surface. These materials are either inert or biodegradable and are designed for drilling water wells and exploratory geotechnical borings.

Drilling fluids and cuttings will be collected as coring advances, then removed and disposed of at a licensed disposal facility after being tested for metals or other constituents as necessary. Chain of custody sheets on disposal will be maintained for project records. Drill cuttings will be contained and disposed offsite according to regulations for liquid waste disposal in accordance with environmental protection agency (EPA) requirements and USFS permit requirements.

The core holes will be drilled and abandoned under permits issued by the County of Los

Angeles Department of Public Health (County DPH), in accordance with Environmental Health, Bureau of Environmental Protections, Drinking Water Program, Requirements for Well Construction/ Decommissioning. The permits also include abandonment procedures for the core holes. Each core hole will be abandoned according to County of Los Angeles and State of California regulatory guidelines for well drilling and abandonment in accordance with the permitting agency, County DPH. No drilling will commence until County permits have been approved for the drilling operation.

The abandonment procedure includes grouting each of the core holes closed with a cement-bentonite grout mixture to close off hydraulic communication between different levels within each of the core holes (in accordance with Department of Water Resources Bulletins 74-81 and 74-90, and with the County DPH).

At the same time, grouting that closes the core holes also grout in place the pressure transducers at selected depths. The grout will be placed in each core hole using tremmie pipes to fill the hole with a cement-bentonite mix from the bottom of the core hole up to the base of the surface seal. At the surface, a 10- foot long seal of bentonite will be placed at the top of the hole for completion of the abandonment procedure.

The duration of drilling is conservatively assumed to be six months at each of the core holes. Upon completion of drilling activities, the core holes will be grouted completely closed and drill sites will be rehabilitated to pre-exploration condition.

## **Design Features**

The following design features (avoidance and minimization measures) were designed to reduce potential adverse effects associated with the project activities. These design features are incorporated into the proposed action and are a component of the project implementation.

### **Invasive Plant Management Design Features**

1. To limit the spread and establishment of invasive plant species, Vehicle and Equipment Washing Requirements will be implemented (Attachment A - Vehicle and Equipment Washing Requirements).
2. To prevent the spread of highly invasive yellowstar thistle, installation of an FS approved vehicle washing station is required at the entrance of the Dillon Divide (3N32.1) road.
3. All plant material (e.g., straw, mulch, seeds, etc...) used for erosion control and/or road maintenance must be certified weed-free. Only weed-free rice straw or rice mulch is allowed. All erosion control material must be biodegradable. Wattles wrapped in "photodegradable" plastic will not be acceptable.
4. All fill material (soil, sand, gravel, rock) used for project activities must be from an ANF approved material site.
5. Monitoring for detection of new or expanding invasive plant populations must be conducted at all Project drill locations (with the exception of E1-B2) for two growing seasons after completion of the Project. Monitoring will be conducted within the road prism and five feet either side of the portions of the road utilized by the Project for two growing seasons after completion of the Project. On the Santa Clara Divide Road (3N17) this monitoring will focus on yellowstar thistle. On the Kagel Mountain Road (3N32.2) this monitoring will focus on yellowstar thistle and

Spanish broom. If new infestations are detected, they must be eradicated. Eradication will be considered complete when the infestation is shown to be absent for two consecutive growing seasons. Based on site specific circumstances, an ANF line officer has discretion to modify the period of time required for determining that eradication efforts are complete. The Project Restoration Plan includes a detailed description of the required restoration success criteria.

### **Soil and Water Design Features**

6. All appropriate BMPs shall be implemented to minimize damage to surface soil structure and to reduce potential for erosion and sediment transport to drainages due to project activities. All ground disturbing activities with the potential for erosion must be consistent with FSH 2509.22 – Soil and Water Conservation Practices Handbook and Best Management Practices.
7. Ground disturbance will be limited to the minimum necessary. Parking/staging areas and disturbance boundaries must be marked with signs, staking, and flagging to keep construction activities confined to designated areas.
8. Project generated material will not be allowed to roll downslope. No sidecasting is permitted.
9. All equipment and work areas must contain appropriate spill containment kits to respond to leaks and spills. Personnel must have training on proper response to any type of hazmat situation. All hazmat situations must be reported to the Forest Hazmat Coordinator according to the Forest guidelines.

### **Restoration Design Features**

10. Drill sites E1-B3 and E1-B2 will not require revegetation as long as disturbances are kept within the existing turnout area and debris disposal area, respectively. For drill sites E1-B1, FS-B1 and E3-B2, the objective is to restore the site to pre-project conditions once the project activities are complete. If this cannot be accomplished through natural regeneration, post-project revegetation will be required. Revegetation will be accomplished using locally collected native seed, according to the Forest Service approved Restoration Plan. The Project Restoration Plan includes a detailed description of the required restoration success criteria.
11. Impacts to all oaks and native trees will be recorded regardless of size. This evaluation shall include the species and number of individuals, their DBH, location and potential impact type. Project activities within the driplines of all native trees and oak trees/shrubs, and incidental trimming or damage to trees shall not occur until the trees are evaluated by a qualified arborist. This person shall identify appropriate measures to minimize tree loss, such as the placement of fence around the dripline, padding vehicles, minimizing soil removal or addition around driplines, and the placement of matting under the existing dripline during construction activities.

### **Wildlife Design Features**

12. All project personnel will be trained by a qualified Forest biologist on proper implementation of project design features, identification of condors, required response if condors enter the work area and reporting requirements.
13. Vehicles shall only be allowed to idle for two minutes or less to reduce emissions.
14. Unattended open drilling holes will be covered to prevent wildlife entrapment.
15. Pets of project personnel and employees shall not be allowed on-site.

16. Wildlife encountered during the course of project implementation should be given the opportunity to evacuate the site. Personnel will be reminded that harassment, handling or removal of wildlife from the site is not permitted.
17. Trash, food and debris shall be stored in closed containers and properly disposed of off Forest on a daily basis. Littering of trash and food waste is prohibited.
18. Items that could pose a risk of entanglement such as ropes, cables, lines, etc... will be kept secure.
19. All project materials will be properly stored and secured. Tools, hardware, equipment and all loose items must be stored in a manner that would prevent their removal or ingestion by a condor. Materials that are in any type of liquid or powder form must be stored in sealed leak-proof containers.
20. All parked vehicles/equipment will be kept free of leaks, particularly anti-freeze, since this could be fatal if consumed by a condor.
21. If condors enter any of the drill sites at any time during the project implementation, all personnel will be instructed to assess current work activities to ensure that none of them present a hazard (moving vehicles, equipment loading, etc...). Any activities identified as presenting a potential hazard will be stopped or blocked to prevent condor access to the specific activity.
22. USFWS approved methods for hazing condors away from the site and any people that might be present can be utilized. These hazing methods will be in compliance with the September 2013 USFWS Recovery Program Guidance on Hazing California Condors (Appendix A). Acceptable hazing includes clapping, yelling and stomping but does not include any physical contact with the birds or any action that would pose a risk to the bird's safety.
23. Any condors in the work area would be observed until they have safely left the site.
24. Any observations of condors within the project area will be reported to the ANF biologist with information including the date, time, location and wing numbers if readable.

### **Monitoring Design Features**

25. All areas subject to ground disturbance from the Project activities must have their perimeters GPS'd and have representative photos of the site(s) taken upon project completion. These shapefiles and photos must be sent to the ANF botanist.
26. A FS approved monitor will be present at the Dillon Divide site to monitor the vehicle washing station and ensure compliancy with the project requirements. The monitor will ensure the vehicle washing station is properly functioning and that all vehicles exiting the Dillon Divide work area are properly washed. The monitor must be present on all work days when project vehicles (including passenger vehicles) are entering the Dillon Divide work area.

## **ATTACHMENT A**

### **Vehicle and Equipment Washing Requirements**

#### **Equipment Cleaning**

*Forest Service policy provides direction regarding implementation of noxious weed control measures for activities with potential to spread invasive plants (FSM 2900, 12/05/2011). In response to FSM 2900, the following guidelines will be adhered to for all ground disturbing and vegetation treatment projects:*

***Prior to entering Forest Service Land:***

- 1) All tools and all equipment will be cleaned prior to entering Forest Service land. This includes all ground disturbing and vegetation removal tools and project vehicles and equipment. Washing of equipment and vehicles must include tires/tracks, wheel wells, bumpers, fuel/skid pans, undercarriages or any equipment other than personnel transport vehicles. All tool/equipment washing will occur in a manner that will not further enhance the spread of invasives through improper disposal of rinse water.
- 2) Holder shall notify Forest Service at least 2 working days prior to moving each piece of equipment on to National Forest Land, unless otherwise agreed. Notification will include a Certificate of Cleaning Equipment. Upon request of Forest Service, arrangements will be made for Forest Service to inspect each piece of equipment prior to it being placed in service. This requirement for notification does not apply to handheld equipment and tools.
- 3) The Certificate of Cleaning Equipment will include a record of the following:
  - Location where equipment was washed
  - Date and time
  - Methods used
  - Staff present
  - Equipment washed
  - Signature of responsible crew member
  - All equipment wash must have an accompanying photograph

***Vehicle Washing Stations Located at the Project Site:***

- 4) A FS approved vehicle washing station will be installed at the entrance of the Dillon Divide Road (3N32).
- 5) All project vehicles (including passenger vehicles) and equipment exiting the Dillon Divide road must be cleaned before leaving. Washing at the site is not required upon entering. Required cleaning includes dry brushing and a wet wash at the FS approved vehicle washing station.
- 6) At the wash station, equipment must be dry washed before washing with water. Bumpers, wheel wells, tires/tracks must be brushed without using water. To facilitate effective collection of material removed during brushing, the dry wash will occur at the wet wash station.
- 7) After vehicles and equipment are dry washed, they must be washed with water for a minimum of 6 minutes. Ideally, vehicles and equipment will be washed with water for 10 minutes. Washing will include undercarriages, bumpers, wheel wells, tires/tracks and fuel/skid pans.
- 8) All washing done at this site must take place where rinse water and debris is appropriately filtered or otherwise collected and disposed of in either a sanitary sewer, landfill or other authorized facility off ANF lands.
- 9) A FS approved monitor will be present at the Dillon Divide site to monitor the vehicle washing station and ensure compliancy with the project requirements. The monitor will ensure the vehicle washing station is properly functioning and that all vehicles exiting the Dillon Divide work area are properly washed. The monitor must be present on all work days when project vehicles (including passenger vehicles) are entering the Dillon Divide work area.

The five ANF locations selected for geophysical/geotechnical (GI) testing include the following:

### **E1 -B1 (T4N, R13W, Section 30)**

Drill site E1-B1 is located on 3N17.7 Santa Clara Divide, approximately 0.85 miles east of the junction of 4N37 Indian Canyon Road and 3N17.7 Santa Clara Divide. The road is unpaved, and is approximately 20 feet wide at the proposed location, the core hole is positioned just north of the roadway in an open, relatively flat area that is part of a fuel break, approximately 110 ft southeast of the E1a/E1b Alternative alignment. The site is accessible by high clearance vehicles along 3N17.7. The ground surface elevation is approximately 4,900 feet. The core hole will be drilled vertically to the depth of the tunnel to evaluate rock conditions, conduct geophysical surveys, and measure in-situ water pressures. The core hole is anticipated to encounter medium to very coarse grained anorthosite and granite pegmatite and to a lesser degree diorite, norite and/or gabbro. In the San Gabriel Mountains sheared, shattered (fractured) and brecciated anorthosite and gabbro have been documented and may also be encountered at depth in the core hole.

### **E1-B2 (T3N, R14W, Section 16)**

Drill site E1-B2 is located just north of the intersection of 3N32.1 Mendenhall Ridge Road and Little Tujunga Canyon Road. A parking/staging area approximately 200 feet northwest of the gate to 3N32.1 Mendenhall Ridge Road is the proposed drilling location. The site is accessible by high clearance vehicles. The site is used by LA County road maintenance for stockpiling and borrowing earth materials. A potential conflict may exist for use of this site as a core hole site. Coordination with LA County is necessary to avoid potential conflicts. The area is large enough to accommodate drilling and is near a mapped fault within the San Gabriel Fault Zone. The core hole would be inclined approximately 60 degrees to the northeast to intersect a northern trace of the San Gabriel fault at depth for in-situ testing and instrumentation. In order to estimate a depth of the core hole, detailed geologic mapping would need to be completed in advance of confirming the surface location of targeted fault trace with respect to core hole location. Elevation at the core hole site is 2,755 feet and is anticipated to encounter predominantly granodiorite that may include Quartz Diorite, Lowe Granodiorite, and Wilson Diorite. These rocks are mostly massive, but it is also common to see gneissoid rock near contacts with older rocks and to see inclusions and pendants of gneiss and Placerita metasediments.

### **E1-B3 (T3N, R14W, Section 16)**

Drill site E1-B3 is located on 3N32.2 Kagel Truck Trail, approximately 0.9 miles southwest of Little Tujunga Canyon Road. The road is unpaved, and is approximately 15 feet wide. A small work area approximately 30 feet by 20 feet adjacent to and north of the road positions the core hole approximately 300 feet northwest of the E1a/E1b Alternative Alignment. The site would require brush clearance and minor grading to enlarge the working area for the drilling and support equipment. There may be periods of time when Kagel Truck Trail may be partially blocked with equipment. The site is accessible by high clearance vehicles. The ground surface elevation is approximately 2,800 feet. The core hole is anticipated to encounter predominantly granodiorite that may include Quartz Diorite, Lowe Granodiorite, and Wilson Diorite. These rocks are mostly massive, but it is also common to see gneissoid rock near contacts with older rocks and to see inclusions and pendants of gneiss and Placerita metasediments. The

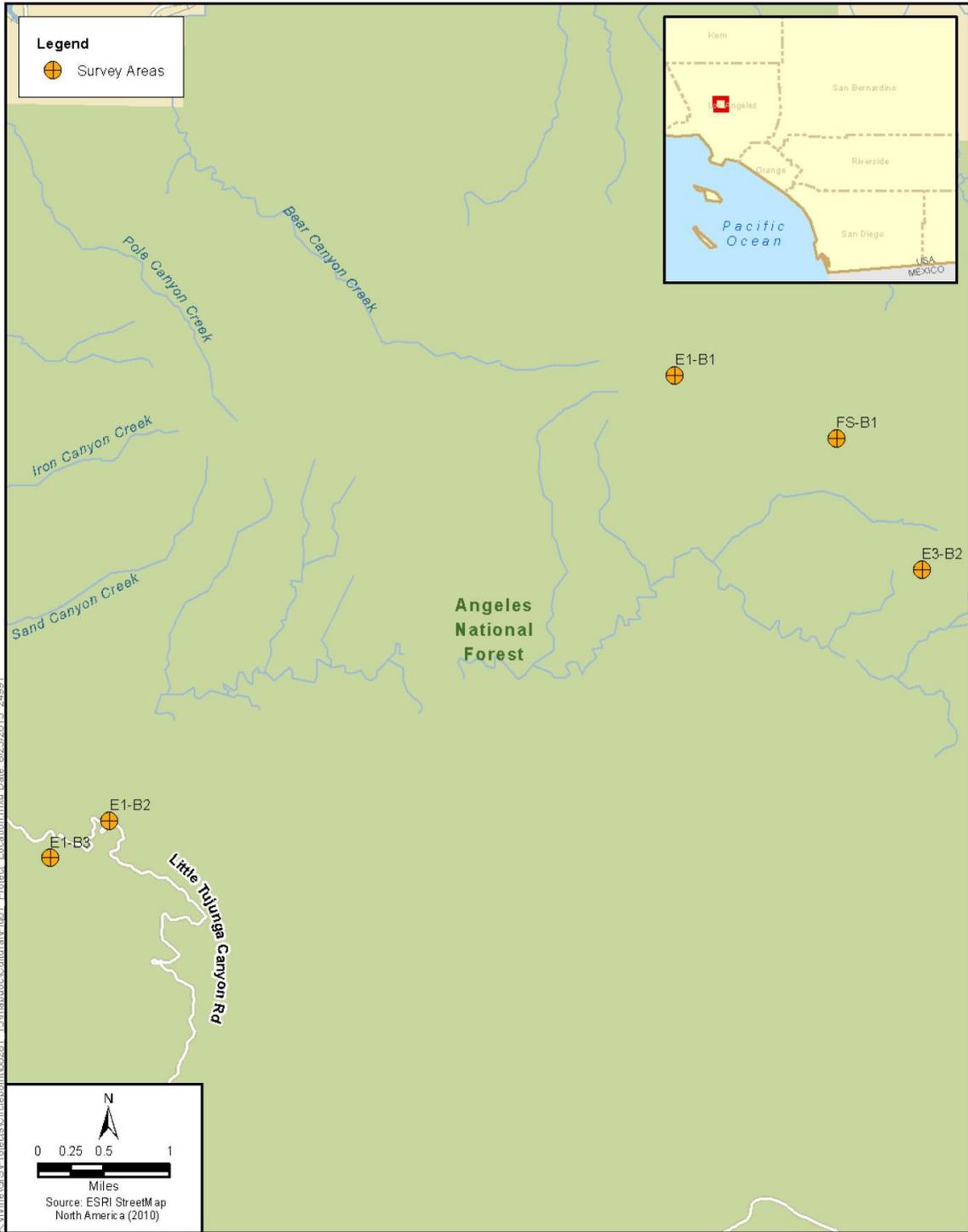
core hole would be inclined approximately 60 degrees to the northeast to intersect a southern trace of the San Gabriel fault (De Mille fault) for in-situ testing and instrumentation. In order to estimate depth of the core hole, detailed geologic mapping would need to be completed in advance of confirming the targeted fault traces with respect to core hole location. Within the San Gabriel fault zone, dark Diorite gneiss including metadiorite, massive hornblende diorite and amphibolite and biotite schist may also be seen in the site vicinity. Because Kagel Truck Trail is used by the public for access to a hang-gliding site, traffic control measures such as signage will be necessary along the road to warn drivers of potential road blockage or equipment. A minimum road width of 12 feet will be maintained to allow traffic to pass freely.

#### **E3-B2 (T3N, R13W, Section 4)**

Drill site E3-B2 is located along 3N17 Santa Clara Divide, approximately 7 miles east of 4N37 Indian Canyon Road and 3N17 Santa Clara Divide. The ground surface elevation is approximately 5,005 feet south of this 20 foot wide unpaved road, where a relatively flat area provides ample work area for drilling. The flat area is a fuel break area and has been used as a fire fighting staging area in the past. This site is located approximately 975 feet southeast of the E3a/E3b Alternative Alignment. The site is accessible by high clearance vehicles. The core hole will be drilled vertically to the depth of the tunnel to evaluate rock conditions, conduct geophysical surveys, and measure in-situ water pressures. Like Alternate E3-B1, the core hole is anticipated to encounter predominantly syenite, a massive dark, augite to augite quartz syenite that weathers to a reddish colored rock at the ground surface. This rock type is present along significant portions of the E3a and E3b Alternative Alignments.

#### **FS-B1 (T4N, R13W, Section 33)**

Drill site FS-B1 is approximately 650 feet southwest of 3N17.7 Santa Clara Divide and approximately 750 feet over a ridge from the Pacific Crest Trail. This candidate is proposed to investigate a fault/shear zone that is located between the E2 and E3 Alternative Alignments and intersects these alternatives farther west along the fault contact. The core hole is near a helicopter pad at the Forest Service station at 3N17.7 Santa Clara Divide just north of 4N35 Pacoima Canyon Road/ S/N Fork Road, and is vehicle accessible by crossing the USFS station property. Available work area dimensions are approximately 80 feet by 30 feet. The ground surface elevation varies between approximately 4,205 feet to 4,214 feet at this location. The faulted contact of the syenite, a massive dark, augite to augite quartz syenite that weathers to a reddish colored rock is juxtaposed against anorthosite, a light-colored feldspar rich rock approximately 260 feet northwest of the site. The core hole would be inclined approximately 60 degrees to the northwest to intersect the Transmission Line fault separating the anorthosite from syenite rock and would be used for in-situ testing, groundwater pressure measurements, rock quality, and instrumentation. The purpose of the core hole is to measure the width of shearing associated with the fault, to evaluate the rock quality and hydrogeologic conditions in association with the fault at depth.



**Fig 1-1**  
**Proposed Geotechnical Boring Locations**  
**High-Speed Rail**

## **IV. EXISTING ENVIRONMENT**

### **Physical Landscape**

The San Gabriel Mountains are located within the central part of the 300-mile long, east-west trending Transverse Ranges Geomorphic Province. The San Gabriel Mountains are situated between San Bernardino and Castaic Mountains to the east and west, respectively. They are bounded on the north and south by the Mojave Desert and San Fernando Valley, respectively. The project site is within the western part of the San Gabriel Mountains. Here the mountains are characterized by east-west trending ridges (generally) above steep-walled canyons. The canyons provide surface water drainage to the north into Soledad Canyon/Santa Clara River, and to the south into the San Fernando Valley and Los Angeles River, generally via Big Tujunga or Little Tujunga Canyons.

The San Gabriel Mountains form a basement massif that includes components of Pre-Cambrian to late-Cretaceous metamorphic and plutonic rocks. These are the oldest basement rocks in the Los Angeles area and appear to represent old continental crust at the western margin of the North American craton that has been thrust over Jurassic oceanic crust. The San Gabriel Mountains consist of two geologic terrains, the Mesozoic Pelona Schist (lower plate) and a complex of Precambrian to Cretaceous igneous and metamorphic rocks (upper plate), separated by the (inactive) Vincent thrust fault. The igneous rocks, which are generally exposed in the project area, are composed of granite, diorite and gabbro, and the metamorphic rocks are primarily gneiss. Along the west side of the project site layers of Tertiary-age sedimentary rocks (siltstone and sandstone) are present. The rocks are separated from the older igneous rocks by the southwest trending Soledad and Pole Canyon faults.

The igneous and metamorphic bedrock in the project area contain little to no porosity within the rock mass. The bedrock fractures and faults create voids within the bedrock that allow groundwater to reside and move through the rock mass forming the San Gabriel Mountains. The water stored in the fractured hard bedrock moves down through fractures and where the fractures intersect a canyon wall or bottom, the groundwater will discharge at the ground surface as a spring or seep and join with surface runoff in streams. If the water intersects a less permeable rock mass or a fault along its path, the groundwater movement is interrupted and often redirected, perched or held behind the fault acting as a barrier to groundwater flow. The combined spring water and surface runoff water will enter the alluvial basins and recharge local water-bearing alluvium to the west, north, and south of the proposed tunnel corridor.

The San Gabriel Mountains have a Mediterranean climate, which is marked by hot dry summers and cool wet winters. The climate is also characterized by wide variability in precipitation from year-to-year and storm-to-storm. Individual rainfall events can also vary widely with intense storms delivering substantial precipitation in a few hours' time. Other natural processes that have and will continue to influence the physical and biological landscape are fire and flooding, though the natural flooding regime has been greatly modified through the construction of dams.

### **Biological Landscape**

The type of vegetation present and the level of vegetation canopy cover varies between the sites. A brief description of the vegetation condition for each of the five sites is included.

### E1-B2 (Figure 2)

This drill site is dominated by a 50-60% cover of predominately annual non-native species, dominated by shortpod mustard (*Hirschfeldia incana*), tumble mustard (*Sisymbrium altissimum*), tocalote (*Centaurea melitensis*), brome grasses (*Bromus* spp.) and yellowstar thistle (*Centaurea solstitialis*). No sensitive species were observed during the survey.

Native plant species observed at this location include the following: *Eriogonum fasciculatum*, *Cercocarpus betuloides*, *Acmispon glaber*, *Salvia mellifera*, *Artemisia californica*, *Eriodictyon crassifolium*, *Phacelia cicutaria*, *Hesperoyucca whipplei*, *Mimulus aurantiacus*, *Adenostoma fasciculatum*, *Helianthus annuus*, *Ericameria linearifolia*, *Hazardia squarrosa*, *Datura wrightii*, *Chlorogalum pomeridianum*, *Pluchea sericea*, *Corethrogyne filaginifolia*, *Baccharis salicifolia* and *Ambrosia psilostachya*.

Weed species observed at this location include the following: *Hirschfeldia incana*, *Salsola tragus*, *Centaurea solstitialis*, *Centaurea melitensis*, *Tribulus terrestris*, *Bromus diandrus*, *Bromus tectorum*, *Erodium cicutarium*, *Stipa miliacea* and *Nicotiana glauca*.

**Drill Site E1-B2 (Figure 2)**



**Drill Site E1-B3 (Figure 3)**



### E1-B3 (Figure 3)

The vegetation community at this site is California buckwheat scrub. The site has a canopy cover of roughly 15-20% native species (dominated by California buckwheat, *Eriogonum fasciculatum*) and 1-5% non-native species (dominated by cheatgrass). No sensitive species were observed during the survey.

Native plant species observed at this location include the following: *Quercus agrifolia*, *Artemisia californica*, *Acmispon glaber*, *Phacelia campanularia*, *Eriodictyon crassifolium*, *Eriogonum fasciculatum*, *Adenostoma fasciculatum*, *Ceanothus crassifolium*, *Quercus wislizenii*, *Mimulus aurantiacus*, *Hesperoyucca whipplei*, *Pseudognaphalium stramineum*, *Corethrogyne filaginifolia*, *Acer macrophyllum*, *Cercocarpus betuloides*, *Marah macrocarpus*, *Prunus ilicifolia*, *Cuscuta californica* and *Eriophyllum confertiflorum*.

Weed species observed at this location include the following: *Bromus tectorum*

### E1-B1 (Figure 4)

The vegetation community at this site is California buckwheat scrub. The site has a canopy cover of roughly 60% native species (dominated by California buckwheat) and 1-5% non-native species (dominated by cheatgrass, *Bromus tectorum*). No sensitive species were observed during the survey.

Native plant species observed at this location include the following: *Eriogonum fasciculatum*, *Eriastrum densifolium*, *Adenostoma fasciculatum*, *Corethrogyne filaginifolia*, *Eriophyllum confertiflorum*, *Quercus wislizenii*, *Eriogonum baileyi*, *Ambrosia psilostachya*, *Hesperoyucca whipplei*, *Penstemon centranthifolius*, *Eriodictyon parryi*

Weed species observed at this location include the following: *Elymus ponticus*, *Erodium cicutarium*, *Bromus diandrus*, *Bromus tectorum*, *Hirschfeldia incana*, *Sisymbrium altissimum*

**Drill Site E1-B1 (Figure 4)**



**Drill Site E3-B2 (Figure 5)**



### E3-B2 (Figure 5)

The vegetation community at this site is chamise chaparral. The site has a canopy cover of roughly 30% native species (dominated by chamise, *Adenostoma fasciculatum*) and no non-native cover. No sensitive species were observed during the survey.

Native plant species observed at this location include the following: *Eriogonum fasciculatum*, *Adenostoma fasciculatum*, *Penstemon grinnellii*, *Penstemon spectabilis*, *Melica imperfecta*, *Hesperoyucca whipplei*, *Cercocarpus betuloides*, *Corethrogyne filaginifolia*, *Ceanothus leucodermis*, *Eriodictyon crassifolium*, *Salvia columbrianae*, *Arctostaphylos glauca*, *Eriodictyon parryi*

Weed species observed at this location include the following: *Bromus tectorum*, *Bromus diandrus*

### FS-B1 (Figure 6)

The vegetation community along the temporary access route to the drill site is mixed conifer forest. The vegetation community at the drill site is mixed chaparral. The access route has a roughly 60-70% overstory canopy cover of conifers and 1-5% understory cover of non-

native grasses. The drill site has a canopy cover of roughly 70-80% native species (dominated by chamise) and no non-native cover. No sensitive species were observed during the survey.

Native plant species observed at this location include the following: *Adenostoma fasciculatum*, *Hesperoyucca whipplei*, *Arctostaphylos glauca*, *Eriogonum fasciculatum*, *Ericameria linearifolia*, *Penstemon centranthifolius*, *Eriodictyon parryi*, *Pinus coulteri* (planted,) *Eriastrum densifolium*, *Eriophyllum confertiflorum*, *Corethrogyne filaginifolia*, *Quercus berberidifolia*, *Eriodictyon crassifolium*, *Astragalus douglasii*, *Eriodictyon parryi*, *Pinus jeffreyi*, *Juniperus occidentalis*

Weed species observed at this location include the following: *Stipa miliaceum*, *Bromus tectorum*, *Bromus diandrus*.

### Drill Site FS-B1 (Figure 6)



### Plant Species

#### Pre-Field Review

##### *Plants*

Determinations regarding plants potentially occurring in the project area were based on species with ranges overlapping the project area and/or consideration of whether or not suitable habitat was present. The following sources were reviewed to help determine which species had potential to occur within the project area:

- The USGS 7.5 minute topographic quadrangles for the project area;
- California Department of Fish and Game's (CDFG) California Natural Diversity Data Base (CNDDDB) (CDFG 2004a) records of plant and wildlife species occurrences for quadrangles within the ANF

Based on this approach, the following Forest Service sensitive plant species are considered as potentially occurring in the project area:

Abram's flowery puncturebract, club-haired Mariposa lily, slender Mariposa lily, San Gabriel Mountains sunflower, San Gabriel linanthus, Robbins' Nemacladus, chickweed starry puncturebract, rigid fringepod

### *Animals*

The following sources were reviewed to determine which species had the potential to occur within the project area:

- The USGS 7.5 minute topographic quadrangles for the project area;
- California Department of Fish and Game's (CDFG) California Natural Diversity Data Base (CNDDDB) (CDFG 2004a) records of plant and wildlife species occurrences for quadrangles within the ANF and
- ANF biological Geographic Information System (GIS) layers (USDA Forest Service 2010) containing occurrence data for wildlife species that have been documented to occur in the area.

Based on pre-survey review, the following Forest Service sensitive wildlife species are either confirmed to occur in the project area or have potential to occur based on range and habitat suitability:

San Bernardino Mtn. kingsnake, pallid bat, Townsend's big-eared bat, fringed myotis

### **Survey Results**

#### *Plants*

Full botanical surveys could not be completed due to the following conditions: the opportunity for conducting surveys occurred outside the floristic survey window for FS sensitive species and this season represented extreme drought conditions during which some plants did not express themselves. Botanical surveys were conducted in August 2015 with the primary objective of detecting invasive plant species and dominant native vegetation and obtaining a general overview of the plant communities present at the geotechnical drill sites. Botanical surveys were conducted in the project area by HSR contracted botanists and ANF botanist, Katie VinZant.

During the survey, the botanists did not observe any federally listed or FS sensitive plant species. Design features are included to minimize impacts to native flora within the project area.

#### *Wildlife*

Focused wildlife surveys were not conducted for all FS wildlife species. In September 2015, HSR contracted biologists conducted a visual search to locate potential bat roosts in proximity of the geotechnical drill sites. Apart from snags with cavities and sloughing bark, this search did not result in the detection of any potential bat roosts in close proximity of the geotechnical drill sites. Design features are included to minimize impacts to native wildlife within the project area.

**Tables 1 and 2** summarize the field/literature evaluation for Forest Service sensitive species within the project area. The potential for project effects was determined based upon the probability of direct, indirect, and cumulative effects related to the proposed activities. Species will not be carried forward through the effects discussion if the site does not contain suitable habitat, there is no record of occurrence, the species has been extirpated, or other circumstances exist which preclude potential occupancy.

### **Table 1. Forest Service Sensitive Plant Species**

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
Abram's flowery puncturebract ( <i>Acanthoscyphus parishii</i> var. <i>abramsii</i> )	FSS	In chaparral on soils derived from sandy or shale substrates at elevations of 3,750– 6,750 feet	Y	Y	N	Suitable habitat for this species is present in the project area. Focused surveys for FSS species were not conducted and individuals were not observed in the project area, but there is potential for occurrence.
San Gabriel Manzanita ( <i>Arctostaphylos glandulosa ssp.gabrielensis</i> )	FSS	Rocky outcroppings, chaparral around 1500 m. Often associated with gneiss outcroppings.	N	N	N	Suitable habitat for this species not present in project area.
Interior manzanita ( <i>Arctostaphylos parryana</i> ssp. <i>tumescens</i> )	FSS	Primarily found in montane chaparral, but may also be seen in riparian corridors, willow scrub and adjacent upland forest, ridgetops, ecotones between chaparral and woodland, Yellow Pine Forest, and Pinyon, Juniper, and Joshua Tree Woodland. 5500-7580'.	N	N	N	Suitable habitat for this species not present in project area.
Crested Milk-vetch ( <i>Astragalus bicristatus</i> )	FSS	Open, rocky areas in coniferous forests. 5,500-9000'. Los Angeles, Riverside and San Bernardino Counties.	N	N	N	Suitable habitat for this species not present in project area.
San Antonio Milk- vetch ( <i>Astragalus lentiginosus</i> var. <i>antoniuss</i> )	FSS	Open slopes in pine forest, 5,000-8,500', San Gabriel Mtns.	N	N	N	Suitable habitat for this species not present in project area.
Scalloped Moonwort ( <i>Botrychium crenulatum</i> )	FSS	Bogs and fens, lower montane coniferous forest, meadows and seeps, and marshes & swamps (freshwater). 4,900-10,800'.	N	N	N	Suitable habitat for this species not present in project area.
Club-haired mariposa lily ( <i>Calochortus clavatus</i> var. <i>clavatus</i> )	FSS	Chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland at 75-1300 meter elevations	Y	Y	N	Suitable habitat for this species is present in project area. Focused surveys for FSS species were not conducted and individuals were not observed in the project area, but there is potential for occurrence.
Slender Mariposa Lily ( <i>Calochortus clavatus</i> var. <i>gracilis</i> )	FSS	Chaparral on slopes or in canyons below 1200 m, south base of San Gabriel and Sierra Pelona mountains.	Y	Y	N	Suitable habitat for this species is present in project area. Focused surveys for FSS species were not conducted and individuals were not observed in the project area, but there is potential for occurrence.
Late-Flowered Mariposa Lily ( <i>Calochortus fimbriatus</i> )	FSS	Dry, open coastal woodland; chaparral, 400-1500 m, locally up to 2500 m. Often in serpentine soil. Coast ranges, Ventura county west.	N	N	N	Not know to occur on the ANF and soil type not found in project area. Suitable habitat for this species not present in project area.
Palmer's Mariposa Lily ( <i>Calochortus palmeri</i> var. <i>palmeri</i> )	FSS	Meadows, vernal moist places in pine forest or chaparral. 3,500-7,250'.	N	N	N	Suitable habitat for this species not present in project area.
Alkali Mariposa Lily ( <i>Calochortus striatus</i> )	FSS	Alkaline meadows and seeps, moist creosote bush scrub, and chenopod scrub. 200-	N	N	N	Suitable habitat for this species not present in project area.

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
		4,650'.				
Pygmy Poppy ( <i>Canbya candida</i> )	FSS	Sandy places, 2,000-4,000'. Joshua tree woodland, Mojavean scrub, and pinyon/juniper woodland. Mojave desert adjacent to Sierra Nevada.	N	N	N	Suitable habitat for this species not present in project area.
Mt. Gleason's Paintbrush ( <i>Castilleja gleasonii</i> )	FSS	Granitic substrates in coniferous forest, generally west of Chilao area. 3,800-7,100'.	N	N	N	Suitable habitat for this species not present in project area.
Mojave Indian paintbrush ( <i>Castilleja plagiotoma</i> )	FSS	Dry flats and ridges, Sagebrush Scrub, Joshua Tree Woodland, Pinyon/Juniper Woodland, Yellow Pine Forest. North base of mountains, 300-2500 m.	N	N	N	Suitable habitat for this species not present in project area.
San Fernando Valley Spineflower ( <i>Chorizanthe parryi var. fernandina</i> )	FSS, FC	Sandy places, generally in coastal scrub. 650-4,000', present near Elizabeth Lake in Liebre Mtns. Historically present at southern base of San Gabriel mountains.	N	N	N	Suitable habitat for this species not present in project area.
Parry's Spineflower ( <i>Chorizanthe parryi var. parryi</i> )	FSS	Valley-floor and foothill habitats. Dry, sandy or gravelly soils in washes, alluvial benches, and in foothill microhabitats with unconsolidated soils and low vegetation cover. Coastal sage scrub, chaparral, alluvial fan scrub, and the ecotone between chaparral and oak woodland. 30-1,130 m. (100-3700ft)	N	N	N	Suitable habitat for this species not present in project area.
California saw-grass ( <i>Cladium californicum</i> )	FSS	Alkaline marshes, swamps, springs (including hot springs), perennial streams, and ponds. In sunny or partly shaded areas by riparian trees. Soil is usually moist to wet, often alkaline, and may be clay or gravel. Immediately adjacent vegetation is usually riparian, such as palms or willows, and may be dense. 100-7,000'.	N	N	N	Suitable habitat for this species not present in project area.
Peirson's Spring Beauty ( <i>Claytonia lanceolata var. peirsonii</i> )	FSS	Gravelly conifer woodlands, scree slopes. 5,000-8,500'.	N	N	N	Suitable habitat for this species not present in project area.
Mojave tarweed ( <i>Deinandra mohavensis</i> )	FSS	Washes, seasonal creeks/seeps, openings in chaparral, disturbed areas. Not known from ANF, most occurrences in San Bernardino, San	N	N	N	Suitable habitat for this species not present in project area.

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
		Jacinto mts. 900-1600 m.				
Ewan's Cinquefoil ( <i>Drymocallis glandulosa</i> ssp. <i>ewanii</i> )	FSS	Seeps, springs, wet areas in central San Gabriel Mountains, 1900-2400 m	N	N	N	Suitable habitat for this species not present in project area.
San Gabriel River Dudleya ( <i>Dudleya cymosa</i> ssp. <i>crebrifolia</i> )	FSS	On exposed granite outcroppings in CSS or chaparral areas. Fish Canyon, Lytle Creek area. 300-1100 m.	N	N	N	Suitable habitat for this species not present in project area.
San Gabriel Mountain Dudleya ( <i>Dudleya densiflora</i> )	FSS	Steep granitic canyon walls adjacent to chaparral, coastal scrub, and coniferous forest. Southeast San Gabriel Mountains. 900-1,700'	N	N	N	Suitable habitat for this species is not present in project area.
Many-stemmed Dudleya ( <i>Dudleya multicaulis</i> )	FSS	Heavy soils, often clayey, coastal plain. Chaparral, coastal scrub, and valley & foothill grassland. <2,000'.	N	N	N	Suitable habitat for this species not present in project area.
Forest Camp Sandwort ( <i>Eremogone macradenia</i> var. <i>arcuifolia</i> )	FSS	Ridgetops in chaparral (openings, granitic, usually oak dominated). 4,000-5,600'.	N	N	N	Suitable habitat for this species is not present in the project area. Only known from the Liebre Mountains.
Southern Alpine Buckwheat ( <i>Eriogonum kennedyi</i> var. <i>alpigonum</i> )	FSS	Alpine boulder and rock fields, subalpine, granitic gravel, found on high peaks and ridgetops. 8,500-11,550'.	N	N	N	Suitable habitat for this species not present in project area.
Johnston's Buckwheat ( <i>Eriogonum microthecum</i> var. <i>johnstonii</i> )	FSS	Rocky, subalpine coniferous forest and upper montane coniferous forest. 8,500-9,500'.	N	N	N	Suitable habitat for this species not present in project area.
San Gabriel Bedstraw ( <i>Galium grande</i> )	FSS	Open, broad-leafed forest, open chaparral, cismontane woodland, and lower coniferous forest. Rocky slopes. 1,450-5,000'. San Gabriel Mtns.	N	N	N	The project is outside the known range for this species. Suitable habitat for this species not present in project area.
Abram's Alumroot ( <i>Heuchera abramsii</i> )	FSS	Rocky crevices in upper montane forest, 2800-3500 m.	N	N	N	Suitable habitat for this species is not present in project area.
Urn-Flowered Alumroot ( <i>Heuchera caespitosa</i> )	FSS	Rocky crevices in montane conifer forest in San Gabriel Mountains, 1500-2500 m	N	N	N	Suitable habitat for this species is not present in project area.
Mesa horkelia ( <i>Horkelia cuneata</i> ssp. <i>puberula</i> )	FSS	Sandy or gravelly areas in coastal sage scrub, chaparral, or oak woodland. 50-850 m.	N	N	N	Suitable habitat is not present in project area. Project is above known elevation range of species.
San Gabriel Mountains sunflower ( <i>Hulsea vestita</i> ssp. <i>gabrtielensis</i> )	FSS	Rocky, subalpine coniferous forest, upper montane coniferous forest, talus slopes or rock outcroppings. 1500-2,900 m.	Y	Y	N	Suitable habitat for this species is present in the project area. Focused surveys were not conducted for FSS species and individuals were not observed in the project area, but there is potential for occurrence. This species is known to occur along the Kagel Truck Road.
Pygmy Alpinegold ( <i>Hulsea vestita</i> ssp. <i>pygmaea</i> )	FSS	Gravelly sites of granitic substrate alpine areas or subalpine forest ; 2800-	N	N	N	Suitable habitat for this species not present in project area.

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
		3900 m				
California Satintail <i>(Imperata brevifolia)</i>	FSS	Occurs in riparian and non riparian areas within chaparral and coastal sage scrub between 300-1500 m..	N	N	N	Suitable habitat for this species not present in project area.
Fragrant Pitcher Sage <i>(Lepechinia fragrans)</i>	FSS	Chaparral areas, including those recovering from recent fire. Mt. Lukens, western Santa Monica Mountains. 20-1350 m.	N	N	N	Suitable habitat for this species not present in project area.
Ross's Pitcher Sage <i>(Lepechinia rossii)</i>	FSS	Rocky outcrops of reddish sedimentary rock, on north to northeast facing slopes; between 305-790 m in elevation. Generally associated with open areas and appears to be in greatest abundance following fire.	N	N	N	Suitable habitat for this species not present in project area.
Short-sepaed Lewisia <i>(Lewisia brachycalyx)</i>	FSS	Seasonally wet habitats within open coniferous forest; specifically in montane meadows or seeps and often in sandy soils	N	N	N	Suitable habitat for this species not present in project area.
Lemon Lily <i>(Lilium parryi)</i>	FSS	Meadows, streams, and springs in montane coniferous forest, riparian scrub. 4,000-9000'.	N	N	N	Suitable habitat for this species not present in project area.
San Gabriel Linanthus <i>(Linanthus concinus)</i>	FSS	Dry, rocky slopes, coniferous forest. 5,000-9,200'. San Gabriel Mtns.	Y	Y	N	Suitable habitat for this species may be present in the project area. Focused surveys for FSS sensitive species were not conducted and individuals were not observed in the project area, but there is potential for occurrence.
Orcutt's Linanthus <i>(Linanthus orcuttii)</i>	FSS	Openings in chaparral, lower montane coniferous forest, and pinyon-juniper woodland at elevations of 3,000-7,050 feet. Usually in vernal moist openings.	N	N	N	Suitable habitat is not present in project area. Historic record for Mt. Wilson quad, but thought to be extirpated. Closest populations in San Diego and San Bernardino Counties.
Peirson's Lupine <i>(Lupinus peirsonii)</i>	FSS	Joshua tree woodland, pinyon/juniper woodland, and montane coniferous forest. 1000-2000 m. Los Angeles County endemic.	N	N	N	Suitable habitat for this species not present in project area.
Jokerst's Monardella <i>(Monardella australis ssp. jokerstii)</i>	FSS	Found at elevations from 4430-5740 ft, with possible waifs as low as 525 ft. On steep scree or talus slopes between breccia, ravines, canyon bottoms, and secondary alluvial benches along drainages and washes. In loamy soil derived from granite or mixed alluvium. In chaparral, montane coniferous	N	N	N	Suitable habitat is not present in project area. Known only from the eastern San Gabriel Mountains of Los Angeles County, in the vicinity of Cucamonga Peak and the western portion of Lytle Creek on SBNF.

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
		forest or woodland, or sometimes riparian.				
Hall's Monardella ( <i>Monardella macrantha</i> ssp. <i>hallii</i> )	FSS	Chaparral, broadleaved upland woodland, cismontane woodland, coniferous forest (usually Bigcone Spruce), and valley & foothill grassland. 2,000-6,600'. San Gabriel and San Bernardino Mtns.	N	N	N	Suitable habitat for this species not present in project area.
Rock Monardella ( <i>Monardella viridis</i> ssp. <i>saxicola</i> )	FSS	Broadleaved upland forest, montane chaparral, coniferous forest, and cismontane woodland. Usually in dry, rocky areas. 1,650-6,000'. San Gabriel Mtns.	N	N	N	Suitable habitat for this species not present in project area.
Baja Navarretia ( <i>Navarretia peninsularis</i> )	FSS	Wet areas in open forest or chaparral. 4,950-7,600'.	N	N	N	Suitable habitat is not present in project area. Not known from San Gabriel Mountains.
Robbins' Nemacladus ( <i>Nemacladus secundiflorus</i> var. <i>robbinsii</i> )	FSS	Openings in chaparral, valley grasslands, and foothill grasslands. Often on dry gravelly or sandy slopes. 350 to 1700 m	Y	Y	N	Suitable habitat for this species is present in the project area. Focused surveys for FSS species were not conducted and individuals were not observed in the project area, but there is potential for occurrence.
Short-joint Beavertail ( <i>Opuntia basilaris</i> var. <i>brachyclada</i> )	FSS	Chaparral, Joshua tree woodland, pinyon/juniper woodland, and Mojavean desert scrub. 4000-7500. Northern regions, San Gabriel and San Bernardino Mtns.	N	N	N	Suitable habitat for this species is not present in project area. Project area is not within the known range of the species.
Woolly mountain-parsley ( <i>Oreonana vestita</i> )	FSS	Loose rock, upper montane and subalpine coniferous forest. High ridges of San Gabriel Mountains. 2400-3500 m.	N	N	N	Suitable habitat for this species not present in project area.
Rock Creek Broomrape ( <i>Orobancha valida</i> ssp. <i>valida</i> )	FSS	Chaparral, pinyon`/juniper, decomposed granite. 4,100-6,600'. Topatopa Mtns and San Gabriel Mtns.	N	N	N	Suitable habitat for this species not present in project area.
Rock-loving Oxytrope ( <i>Oxytropis oreophila</i> var. <i>oreophila</i> )	FSS	Open sunny areas; on gravelly or rocky flats, slopes, ridges, or summits; or in alpine boulder fields or fell-fields. Surrounding vegetation is usually composed of alpine cushion plants when above treeline, or subalpine coniferous forest at lower elevations. Soils are usually dry, sandy to rocky. 8860-12500 ft	N	N	N	Suitable habitat for this species not present in project area.
Fringed Grass-Of-Parnassus ( <i>Parnassia cirrata</i> var. <i>cirrata</i> )	FSS	Mesic areas in open, broad-leafed forest, open chaparral, cismontane woodland, and lower	N	N	N	Suitable habitat for this species is not present in the project area.

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
		forest. Rocky slopes. 455-1,525 m. San Gabriel Mtns.				
Southern Skullcap ( <i>Scutellaria bolanderi ssp. austromontana</i> )	FSS	Gravelly streambanks and mesic sites, chaparral, cismontane woodland, lower montane conifer forest. 425-2000 m. Mainly in Riverside, San Diego counties.	N	N	N	Suitable habitat is not present in project area. Not known from the San Gabriel Mountains or Los Angeles county.
Parish's checkerbloom ( <i>Sidalcea hickmanii ssp. parishii</i> )	FSS	Chaparral, cismontane woodland, and montane conifer habitat at elevations of 3,300–8,200 feet (1,000–2,500 meters).	N	N	N	Suitable habitat for this species not present in project area.
Salt Spring Checkerbloom ( <i>Sidalcea neomexicana</i> )	FSS	Flat or gently sloped, moist alkaline areas such as springs, marshes, bogs, swamps, or playas. Also hillsides, roadcuts and roadsides, in pastures and fields, and in meadows. 100-5020 ft	N	N	N	Suitable habitat for this species not present in project area.
Chickweed Starry Puncturebract ( <i>Sidothea caryophylloides</i> )	FSS	Sandy or gravelly flats, washes, and slopes, chaparral, montane conifer woodlands; 1300-2600 m	Y	Y	N	Suitable habitat for this species is present in the project area. Focused surveys for FSS species were not conducted and individuals were not observed in the project area, but there is potential for occurrence.
Southern Jewelflower ( <i>Streptanthus campestris</i> )	FSS	Rocky openings in chaparral, conifer forest, oak woodland, 600-2790 m. High variation in habitat and elevation of species. San Diego, Riverside, San Bernardino counties.	N	N	N	Suitable habitat for this species not present in project area.
Mason's neststraw ( <i>Stylocline masonii</i> )	FSS	Dry washes, flats, plains, canyon bottoms, or flats along rivers or streams. Areas are generally flat to gently sloped, and open, often barren. The surrounding vegetation may be chenopod scrub, pinyon-juniper or juniper woodland, or foothill woodland. 330-3940'	N	N	N	Suitable habitat for this species not present in project area.
San Bernardino aster ( <i>Symphyotrichum defoliatum</i> )	FSS	Occurs near ditches, springs and seeps in cismontane woodland, valley foothill grasslands, coastal scrub, lower montane coniferous forest, meadows, swamps and marshes from 2 to 2040 meters. (7-6700 ft)	N	N	N	Suitable habitat for this species not present in project area.
Sonoran Maiden Fern ( <i>Thelypteris puberula var. sonorensis</i> )	FSS	Streams, meadows, and seeps below 550 m.	N	N	N	Suitable habitat for this species not present in project area.
Rigid Fringepod ( <i>Thysanocarpus rigidus</i> )	FSS	Often dry rocky slopes or ridges, or generally open areas. It grows between 1970-7200 ft in	Y	Y	N	Suitable habitat is present in project area. Focused surveys for FSS sensitive species were not conducted and individuals were not observed in

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
		elevation, usually in pine and oak woodlands.				the project area, but there is potential for occurrence.

**Table 2. Forest Service Sensitive Wildlife Species**

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
<b>Birds</b>						
Bald Eagle <i>(Haliaeetus leucocephalus)</i>	FSS	Lakes, reservoirs. Nests in tall trees and cliffs.	N	N	N	Suitable habitat is not present in project area.
Northern Goshawk <i>(Accipiter gentilis)</i>	FSS	Coniferous forest. Large trees, closed canopy, and open understory.	N	N	N	Suitable habitat is not present in project area.
California Spotted Owl <i>(Strix occidentalis occidentalis)</i>	FSS	Mature forest stands, riparian corridors.	N	N	N	Suitable habitat is not present in project area. The proposed drill sites do not overlap any spotted owl territories.
Gray Vireo <i>(Vireo vicinior)</i>	FSS	Pinyon-juniper woodland or montane chaparral dominated by chamise, redshank and ceanothus.	N	N	N	Suitable habitat is not present in project area.
<b>Fish</b>						
Arroyo Chub <i>(Gila orcutti)</i>	FSS	Slow-moving area or backwater of warm to cool streams with mud or sand substrates.	N	N	N	Suitable habitat is not present in project area.
Santa Ana Speckled Dace <i>(Rhinichthys osculus)</i>	FSS	Cool, perennial streams in shallow cobble/gravel riffles. Historically: Santa Ana, LA, and San Gabriel River systems. Mtns. and foothills of Santa Ana and San Gabriel Rivers.	N	N	N	Suitable habitat is not present in project area.
<b>Amphibians</b>						
San Gabriel Mtn. Slender Salamander <i>(Batrachoseps gabrieli)</i>	FSS	Downed woody debris, ferns. Discovered in the San Gabriel Mtns. in 1996. 3,400-5,000'. Known from only 11 locations in San Gabriel: Soldier Ck and Rockbound Cyn.	N	N	N	Species is only known from higher elevation areas of San Gabriel Canyon. Strong association with talus areas. Suitable habitat is not present in project area.
Yellow-Blotched Salamander <i>(Ensatina eschscholtzii croceater)</i>	FSS	Oak/conifer woody debris. Rather generalized: black/blue/canyon oak to pine and fir.	N	N	N	Suitable habitat is not present in project area. This species has not been found in the San Gabriel Mountains
<b>Reptiles</b>						
California Legless Lizard <i>(Anniella pulchra)</i>	FSS	Chaparral, pine-oak woodland, riparian, <3,500'. Sandy loose loamy soils under debris, prefers soils with high moisture content.	N	N	N	Suitable habitat is not present in project area.

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
Western Pond Turtle ( <i>Actinemys marmorata</i> )	FSS	<4,000', river/streams with deep pools. Slow-moving waters, permanent aquatics.	N	N	N	Suitable habitat is not present in project area.
San Bernardino Ringneck Snake ( <i>Diadophis punctatus modestus</i> )	FSS	Moist habitats in forest, chaparral, woodland, grassland, farms, and gardens. Under debris with moist microsites.	N	N	N	Suitable habitat is not present in project area.
San Bernardino Mtn. Kingsnake ( <i>Lampropeltis zonata parvirubra</i> )	FSS	Illuminated canyons with rocky outcrops or talus. Associated with bigcone Douglas fir and canyon chaparral at low elevations and black oak/pine at high elevations. 1,200-8,000'.	Y	Y	N	Suitable habitat is present in project area.
Coastal Rosy Boa ( <i>Lichanura trivirgata</i> )	FSS	<4,000', desert, arid scrub, rocky chaparral covered hillsides and canyons where moisture is available as around springs, streams and canyon floors.	N	N	N	Suitable habitat is not present in project area.
Two-Striped Garter Snake ( <i>Thamnophis hammondi</i> )	FSS	Perennial streams bordered by willow thickets or dense vegetation. Also utilizes stock ponds and other aquatic habitats if densely vegetated.	N	N	N	Suitable habitat is not present in project area.
<b>Mammals</b>						
Nelson's Bighorn Sheep ( <i>Ovis canadensis nelsoni</i> )	FSS	Steep slopes (>80%) with abundant rock outcrops and sparse shrubs for escape terrain. Escarpment chaparral w/ ceanothus mtn mahogany associations for foraging. Range from 3,000 to 10,000 feet.	N	N	N	Suitable habitat is not present in project area.
Pallid Bat ( <i>Antrozous pallidus</i> )	FSS	Roosts include rock crevices, tree hollows, mines, caves, and structures. Open, lowland areas, < 6,600'.	Y	Y	N	Suitable habitat present in project area.
Townsend's Big-Eared Bat ( <i>Corynorhinus townsendii</i> )	FSS	Humid coastal regions, limestone caves, lava tubes, etc. Will only roost in open, hanging from walls and ceilings.	Y	Y	N	Suitable habitat is present in project area.
Fringed myotis ( <i>Myotis thysanodes</i> )	FSS	Low desert scrub to high-elevation coniferous forests. Roosts include rock crevices, tree hollows, mines, caves, and structures.	Y	Y	N	Suitable habitat is present in project area.
Tehachapi Pocket Mouse ( <i>Perognathus alticolus inexpectatus</i> )	FSS	Arid grass/scrub, pine woodland. 3,500'-6,000'. Tehachapi Pass to Elizabeth Lake in San Gabriel Mtns.	N	N	N	Suitable habitat is not present in project area.
<b>Invertebrates</b>						
San Gabriel Mountains Blue Butterfly ( <i>Plebejus saepiolus</i> )	FSS	Requires host plant clover <i>Trifolium wormskioldii</i> . Only	N	N	N	Big Pines is only known occurrence on ANF and species is believed to be extirpated from this site. Suitable

Common Name <i>Scientific Name</i>	Status	General Habitat Description for ANF area	Presence of Suitable Habitat Within the Project Area	Potentially Affected by Project?	Viability Threat?	Comments
<i>aureoles</i> )		known from a single wet meadow near Big Pines.				habitat is not present in project area.
San Gabriel Mountains Elfin ( <i>Callophrys mossii hidakupa</i> )	FSS	North facing slopes where the required host plant <i>Sedum spathulifolium</i> occurs. Host plant occurs on rock outcrops, usually in shade, at elevations between 170 to 8,200 feet.	N	N	N	Suitable habitat is not present in project area.
San Emigdio Blue Butterfly ( <i>Plebulina emigdionis</i> )	FSS	Closely associated with saltbush ( <i>Atriplex canescens</i> ). Habitat generally includes dry river courses, intermittent streambanks, and adjacent flats.	N	N	N	Suitable habitat is not present in project area.

**Federal Status:**

FSS Forest Service Sensitive

**Presence of Species within the Site**

P Potential

Y Y e s

N N o

Species accounts for all Forest Service sensitive plants and wildlife on the Angeles National Forest (ANF) are available on the FS website:

[http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/76364\\_FSPLT2\\_123930.pdf](http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/76364_FSPLT2_123930.pdf)

## V. EFFECTS ANALYSIS

### Forest Service Sensitive Species

The following section will focus specifically on the effects of the proposal on Forest Service Sensitive plants and animals and the design features used to reduce or eliminate impacts.

### Forest Service Sensitive Plants

For purposes of this effects analysis, it is assumed that if individual plants occur within the project area, the effects will be similar for all species. The potential for these impacts to occur is unknown since the botanical survey for this project was not done during an optimal precipitation year, nor at the best time of year to locate FS sensitive plants (survey done in August/September instead of April-June). Although no FS sensitive plants were observed in the project area, their potential for occurrence cannot be ruled out.

If present, Abram's flowery puncturebract, club-haired mariposa lily, slender mariposa lily, San Gabriel Mountains sunflower, San Gabriel linanthus, Robbin's nemacladus, chickweed starry puncturebract and rigid fringedpod may be directly affected by injury or mortality as a result of the proposed project activities. Clearing, staging, access and drilling activities in the

Project area may result in direct mortality of plants and degrading or removal of habitats by crushing, disruption of soil horizons, and/or uprooting.

Indirect effects could include soil compaction, which decreases water absorption and increases water runoff and may decrease the ability of native species to become established or survive; non-native vegetation may become established and exclude native species; dust and mud splatter generated by vehicles may land on vegetation adjacent to roads and parking areas and reduce plant vigor; and disturbance areas with a lack of vegetation may allow for increased unauthorized OHV travel. In turn, OHV traffic often prohibits or reduces the vigor of native vegetation regrowth, while allowing for the spread of non native species.

The highly invasive plant species yellowstar thistle and Spanish broom were found within the Project area. The population of yellowstar thistle occurs within the site boundaries of E1-B2 and its associated access road (3N32) and Spanish broom is located along access road (3N17) to sites E1-B1, FS-B1 and E3-B2. It is definitive that seeds of yellowstar thistle and Spanish broom are in the access road footprints and could be transported into other areas of the project. Equipment/vehicle wash stations will all help mediate this spread, but post-construction weed surveying and eradication will be imperative for ensuring yellowstar thistle and Spanish broom do not infest the newly disturbed areas and negatively impact native plant regrowth and surrounding vegetation.

In addition, the Design Features and Best Management Practices listed in the Project description above will be implemented to avoid and minimize direct and indirect impacts to FS Sensitive plants.

*Determination Statement:* It is my determination that the proposed action may affect individuals, but will not result in a trend toward federal listing or loss of viability for the following plant species: Abram's flowery puncturebract, club-haired Mariposa lily, slender Mariposa lily, San Gabriel Mountains sunflower, San Gabriel linanthus, Robbins' Nemacladus, chickweed starry puncturebract and rigid fringedpod

### **Forest Service Sensitive Animals**

#### **San Bernardino Mountain Kingsnake**

Project activities may affect individuals due to the presence of personnel, vehicles, noise and vibration in the area. Direct impacts may include injury or mortality as a result of vehicles and pedestrians crushing individuals within the project area. Short term displacement and/or disturbance of feeding and breeding activities due to noise, vibration and project associated activities are other possible direct effects. If displaced individuals are unable to locate alternate locations with suitable habitat for foraging and cover, they may experience an increased rate of depredation.

Indirect effects include changes to the vegetative structure and soil compaction. Suitable habitat may be altered during project activities. Soil compaction, erosion, and sedimentation resulting from project activities can impact understory and overstory plant species. For wildlife species that require friable soils, soil compaction can lead to a reduction in habitat suitability. Removal of vegetation will result in less cover and will lead to changes in the microsite conditions such as temperature and humidity. Activities that reduce the amount of leaf litter and down woody material may affect both cover and foraging habitat.

If vegetation, down wood, duff/leaf litter or rock outcrops are disturbed by project activities, this may impact microsite conditions important for the San Bernardino Mountain Kingsnake. If project activities result in accelerated erosion, this may negatively impact habitat suitability and microsite conditions.

Project activities have the potential to contribute to accelerated erosion, increased soil compaction and increased spread of invasive plants if the project design features are not properly implemented. Monitoring will help ensure proper implementation of design features and avoidance or minimization of impacts to soil and plant resources.

*Effects Determination:* It is my determination that the proposed project may affect individual San Bernardino Mountain kingsnakes but will not result in a trend toward federal listing or loss of viability.

### **Pallid Bat, Townsend's Big Eared Bat and Fringed Myotis**

Project activities may affect individual bats due to the presence of personnel, vehicles, noise and vibration in the area. If individuals are roosting in the immediate vicinity of the project area they may be disturbed by the noise generated by project activities. This could result in temporary displacement of individuals. If individuals are unable to locate a suitable alternate roost site, they may experience an increased rate of depredation. Impacts resulting from displacement would be greatest during the maternity and the winter roosting seasons.

Bat roost surveys were conducted in the project area and no hard rock roosts were located in proximity of the drill sites. No large roosts with capacity to support colonies were detected in the project area. Potential roosts located in the project area include snags with cavities and sloughing bark. Because of the size and condition of these trees, they would not be able to support roosting opportunities for more than a few individuals. Based on the distance of these snags from the actual drill sites, none will be directly affected by project activities and it is possible that noise, disturbance and vibrations from project activities would have no effect on bats that might be using these as a roost. Because the geotechnical drilling activities will be restricted to daytime, no impacts to foraging activities are anticipated.

Project activities have the potential to contribute to an increased spread of invasive plants if the project design features are not properly implemented. Displacement of native vegetation by invasive plants species would degrade foraging habitat and affect the native prey base. Proper implementation of project Design Features and monitoring will help ensure avoidance or minimization of impacts to soil and plant resources.

*Effects Determination:* It is my determination that the proposed project may affect individual pallid bats, Townsend's big eared bats and fringed myotis but will not result in a trend toward federal listing or a loss of viability.

### **Cumulative Effects of Proposed Action**

#### **Cumulative Effects**

The cumulative effects spatial boundary considered in this analysis includes the project area and those areas within the Pacoima and Little Tujunga watersheds. The temporal boundary is the period of project implementation.

#### ***Forest Service Projects***

Table 5 shows the recent past and future ANF projects in the cumulative effects analysis area.

Project	Project Description and Treatment Type	Occurred or Planned When?
Tehachapi Renewable Transmission Project	Powerline construction project	Ongoing
FS Road 3N17	Use and maintenance	Ongoing
North Fork Station	Use, occupancy and maintenance	Ongoing
Fuelbreak Maintenance and Fuels Reduction projects	Prescribed fire, hand treatments, discing, and mastication.	Ongoing
Invasive Weed Treatment Projects	Manual, mechanical, fire wilting and application of herbicides.	Ongoing
Special Use Permits (communication sites, apiary sites, filming permits, etc...)	Short and long term permits allowing for occupancy, site modification, fuel reduction, maintenance	Ongoing
Pacoima Dam sediment removal project	Removal of sediment from the Pacoima Reservoir	In the next five years

***Other Projects Proposed by State, County and Private Landowners***

There are other projects proposed by the State of California, Los Angeles County and private landowners that are located adjacent to ANF land. These projects are listed in Table 6.

**Table 6: Recent past and foreseeable future projects within the analysis area.**

Project	Location	Project Description and Treatment Type	Occurred or Planned When?
Little Tujunga Canyon Road	Little Tujunga Canyon	Use and maintenance	Ongoing.
Miscellaneous private inholdings and associated residences	Little Tujunga Canyon	Development, occupancy, maintenance	Ongoing.
Pacoima Dam sediment removal project	Pacoima Canyon	Removal of sediment from the Pacoima Reservoir	In the next five years

The activities listed in Table 5 and Table 6 have impacts including but not limited to vegetation modification, increased noise and disturbance, introduction of invasives, and creation of barriers to movement and dispersal.

***Recreation*** The Angeles National Forest experiences high levels of developed and dispersed recreation. Recreation use includes hiking, biking, fishing, hunting, camping, OHV use as well as other forms of outdoor recreation. Recreation is expected to continue to occur across the forest and will likely increase as population in the Los Angeles area continues to grow.

***Special Use Permits*** There are a multitude of special use activities occurring across the Forest. Examples of special use permits include but are not limited to apiary sites, communication sites, recreation residence cabins, county roads, filming permits and forest

product collection. Special use permits that include facilities are required to reduce fuels around their structures for protection from wildfire.

Non-federal actions most likely to impact botany/wildlife species and their habitat in the same time or space as the proposed action are associated with the additional recreation use, water consumption and traffic that accompanies continued growth and expansion of neighboring communities. Projects proposed and under construction in these areas include housing and commercial developments. Areas in proximity of the drill sites include Santa Clarita, Pacoima, San Fernando, Sylmar and other communities located in the San Fernando Valley. As commercial and residential development continues, demands on adjacent public lands, especially those with riparian and aquatic habitats, are expected to increase. This will bring more people and higher levels of impacts to those sites, especially those with easy access. Since development rates depend on the economy and many other factors, it is impossible to predict the future rate of growth or quantify the level of expected effects.

In addition to growth and development of neighboring communities, there are numerous private inholdings that occur within the Forest boundary. On these private inholdings, there is always the potential for development. However, there is no way to know when and where this development might occur. Multiple private inholdings occur in Little Tujunga Canyon and include both residential and commercial developments.

All of the activities described above will have impacts to plants, wildlife and their habitat including changes to vegetation, water quality/quantity and both short and long term disturbance. The proposed project will add to these impacts and the overall cumulative effects associated with the project area. The short duration of activities and the small area to be treated will reduce the potential scope of impacts resulting from the proposed action.

### **Cumulative Effects Summary**

All of the projects and activities listed in this section could affect special status plants and animals and their habitat. The proposed project would cumulatively increase disturbance effects when combined with other projects/activities. Adverse effects would be temporary and the long-term effects of removing invasives and restoring habitat would be beneficial to native species including threatened and endangered species.

## **VI. DETERMINATION SUMMARY**

### **Forest Service Sensitive Plants**

It is my determination that the proposed action may affect individuals, but will not result in a trend toward federal listing or loss of viability for the following plant species: Abram's flowery puncturebract, club-haired mariposa lily, slender mariposa lily, San Gabriel Mountains sunflower, San Gabriel linanthus, Robbin's nemacladus, chickweed starry puncturebract and rigid fringedpod.

### **Forest Service Sensitive Animals**

It is my determination that the proposed action may affect individuals, but will not result in a trend toward federal listing or loss of viability for the following animal species: San Bernardino Mtn. kingsnake, pallid bat, Townsend's big-eared bat and fringed myotis.

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