

THE INFORMATION IN THIS BOX IS NOT A PART OF THE CONTRACT AND IS FOR COUNTY USE ONLY

Contract Number

2.91

SAP Number

## San Bernardino County Fire Protection District

Department Contract Representative  
Telephone Number

Dan Munsey  
387-5779

Contractor  
Contractor Representative  
Telephone Number  
Contract Term  
Original Contract Amount  
Amendment Amount  
Total Contract Amount  
Cost Center

CalOES  
Karen Jones  
916-845-8155  
36 months  
Not to exceed \$999,221

**Briefly describe the general nature of the contract:** *Application to apply for the California Governor's Office of Emergency Services (CalOES) Federal Grant Program pertaining to the 2020 Hazard Mitigation Grant Program administered by the Federal Emergency Management Agency (FEMA).*

**FOR COUNTY USE ONLY**

Approved as to Legal Form

► 

Scott Runyan, Deputy County Counsel

Date 2/3/21

Reviewed for Contract Compliance

►

Date

Reviewed/Approved by Department

►

Dan Munsey, Fire Chief/Fire Warden

Date

# HAZARD MITIGATION GRANT PROGRAM PROJECT SUBAPPLICATION

**DISASTER NUMBER:**

FM-5325

**JURISDICTION NAME:**

San Bernardino County Fire Protection  
District

**PROJECT TITLE:**

Community Fire Hazard Mitigation Project

**PROJECT NUMBER:**

PA-00000337

PROJECT NUMBER IS THE CONTROL NUMBER RECEIVED AT TIME OF SUCCESSFUL NOI SUBMITTAL



# *Cal* OES

**GOVERNOR'S OFFICE  
OF EMERGENCY SERVICES**

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## Subrecipient-Application

HMGP Project Subapplication - Fillable Template\_Final\_part2

# HAZARD MITIGATION GRANT PROGRAM (HMGP)

## INTRODUCTION

### INTRODUCTION

As a result of a major disaster declaration by the President of the United States, the State of California is eligible for HMGP funding. The State has established priorities to accept project subapplications from subapplicants state-wide including, state agencies, Federally Recognized Tribes, local governments, and Private Non-Profits consistent with Title 44 of the Code of Federal Regulations (44CFR), Part 206.2.

Eligible hazard mitigation activities are intended to reduce or eliminate damages to life and improved property. Activities include cost effective hazard mitigation projects, and hazard mitigation planning activities approvable by the Federal Emergency Management Agency (FEMA).

### PUBLIC ASSISTANCE

HMGP does not fund repairs for damages that result after a disaster. If your project proposes repairing a damaged facility resulting from a disaster, contact the Public Assistance (PA) Program at [disasterrecovery@caloes.ca.gov](mailto:disasterrecovery@caloes.ca.gov).

### TIME EXTENSIONS

Time extensions may be requested, and will be evaluated on a case-by-case basis. To request additional time to submit a subapplication, send an email to the [HMA@caloes.ca.gov](mailto:HMA@caloes.ca.gov) mailbox. The subject line must include: "Subapplication Time Extension Request (include Disaster Number and Project Control Number)". The body of the message must include justification and specific details supporting why more time is needed and how much additional time is requested.

### QUESTIONS

Submit all HMGP subapplication questions to the following mailbox: [HMA@caloes.ca.gov](mailto:HMA@caloes.ca.gov)

# HAZARD MITIGATION GRANT PROGRAM REGULATIONS

## REGULATIONS

Federal funding is provided under the authority of the [Robert T. Stafford Emergency Assistance and Disaster Relief Act \(Stafford Act\)](#) through FEMA and the California Governor's Office of Emergency Services (Cal OES). Cal OES is responsible for identifying program priorities, reviewing subapplications and forwarding recommendations for funding to FEMA. FEMA has final approval for activity eligibility and funding.

The federal regulations governing HMGP are found in Title 44 of the Code of Federal Regulations (44CFR), Part 201 (Planning) and Part 206 (Projects) and in Title 2 of the Code of Federal Regulations (2CFR), Part 200 (Uniform Administrative Requirements).

The Council on Environmental Quality (CEQ) has developed regulations to implement the National Environmental Policy Act (NEPA). These regulations, as set forth in Title 40, Code of the Federal Regulations (CFR) Parts 1500-1508, require an investigation of the potential environmental impacts of a proposed federal action, and an evaluation of alternatives as part of the environmental assessment process. The FEMA regulations that establish the agency-specific process for implementing NEPA are set forth in 44 CFR Part 10. FEMA will undertake the NEPA clearance process.

The subapplicant is responsible for complying with the regulations set forth in the California Environmental Quality Act (CEQA) (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387) and any other state/local permits or requirements.

## FEMA GUIDANCE

FEMA requires that all projects adhere to the [Hazard Mitigation Assistance Unified Guidance 2015](#).

## HAZARD MITIGATION GRANT PROGRAM ELIGIBILITY CHECKLIST

Before completing the subapplication, review the following HMGP eligibility checklist to ensure project meets the requirements for HMGP funding.

- ☒ **Construction/Ground Breaking:** No construction or ground breaking activities are allowed prior to FEMA approval. HMGP does not fund projects that are in progress or projects that have already been completed.
- ☒ **Approved Notice of Interest:** Subapplicant must have an approved Notice of Interest (NOI) to submit a subapplication for HMGP funding. Only activities approved through the NOI process can be submitted for HMGP funding consideration. The approved NOI must be consistent with the subapplication submitted.
- ☒ **Scope of Work:** The project scope of work (SOW) must be consistent with the SOW provided in the approved Notice of Interest (NOI).
- ☒ **Benefit Cost Analysis:** Benefit Cost Analysis (BCA) Toolkit Version 6.0 must be used to conduct the BCA. FEMA will only consider subapplications that use a FEMA-approved BCA methodology. Documentation to support BCA must be included in subapplication. Projects with a benefit cost ratio (BCR) of less than 1.0 will not be considered. BCA will be verified by FEMA and Cal OES upon subapplication submittal. 5% Initiative Projects do not need a BCA.
- ☒ **Subapplicant Eligibility:** Subapplicant must be an eligible State Agency, Local Government (City, County, Special Districts), Federally Recognized Tribe or Private Nonprofit (PNP) Organization. PNP is defined as private nonprofit educational, utility, emergency, medical, or custodial care facility, facilities providing essential governmental services to the general public and such facilities on Indian reservations (see 44 CFR Sections 206.221(e) and 206.434(a)(2)).
- ☒ **LHMP/MJHMP:** Subapplicant must have a FEMA approved and adopted Local Hazard Mitigation Plan (LHMP), or be participating in a Multi-Jurisdictional LHMP, to be eligible for HMGP funding. If a jurisdiction has its own governing body, jurisdiction must be covered under its own plan. LHMP/Multi-Jurisdictional LHMP's expire five years after FEMA approval. Failure to update plan before expiration date may cause project deobligation.
- ☒ **Cost Share:** Local funding match of 25% of the total project cost is required by the subapplicant. HMGP matching funds must be from a non-federal source. State does not contribute to local funding match.
- ☒ **Period of Performance:** Projects must be completed (including close-out) within the 36 month Period of Performance (POP). POP begins upon FEMA approval of the subapplication.

**HAZARD MITIGATION GRANT PROGRAM  
ELIGIBILITY CHECKLIST  
(continued)**

- ☒ **Complete Subapplication:** Failure to include all required documentation will delay the processing of your subapplication and may result in denial of project. The SOW, cost estimate, cost estimate narrative, work schedule and BCA must accurately mirror each other to be considered for funding. The budget narrative must include a detailed description of every cost estimate line-item, including the methodology used to estimate each cost.
- ☒ **Regulations:** Subapplications that are inconsistent with state and federal HMGP regulations, or do not meet eligibility criteria will not be considered.



**SUBAPPLICANT MUST BE ABLE TO CHECK EVERY BOX TO QUALIFY FOR HMGP FUNDING.**

## SUBAPPLICATION FORMAT INSTRUCTIONS

Cal OES requires the following format to be used for all HMGP subapplications. Two complete subapplications must be submitted to Cal OES. Each subapplication must be on two separate CD-RWs. The first copy is logged and retained for Cal OES records. The second copy will be forwarded to FEMA for review and final determination.

### COMPLETE SUBAPPLICATION PACKAGE CONSISTS OF THE FOLLOWING:

☒ **TWO** identical CD-RWs must include functional electronic versions of all subapplication documents/attachments

- Attachments must be in one of the following formats: Microsoft Word Version 2007 (or newer), Microsoft Excel or Adobe PDF
- Benefit Cost Analysis (BCA) 6.0 must be included in a .zip file format
- All electronic attachments must be clearly titled

### ORGANIZATION OF THE SUBAPPLICATION MUST BE IN THE FOLLOWING FORMAT:

0. Table of Contents
1. Subapplication
2. Scope of Work
3. Designs
4. Studies
5. Maps
6. Photos
7. Schedule (Additional documentation work schedule components, Gantt chart, etc.)
8. Cost Estimate ([HMGP Cost Estimate Spreadsheet](#) and cost estimate narrative)
9. Match ([Local Match Commitment Letter Template](#))
10. BCA Report ([BCA Version 6.0](#) report and BCA supporting documentation)
11. Maintenance ([Project Maintenance Letter Template](#))
12. Environmental ([FEMA's Site Information, Environmental Review and Checklist](#) and all other environmental documentation)
13. Authorization ([Agent Resolution Form](#))
14. Supporting Docs (Any additional supporting documentation)

### MAIL OR DELIVER COMPLETED SUBAPPLICATIONS TO:

California Governor's Office of Emergency Services  
Hazard Mitigation Grants Program Unit  
Attention: HMGP  
3650 Schriever Avenue  
Mather, CA 95655

# PROJECT SUBAPPLICATION FORM

## SUBAPPLICANT INFORMATION

1.	<b>SUBAPPLICANT:</b>	San Bernardino County Fire Protection District				
		<small>NAME OF STATE AGENCY, TRIBAL GOVERNMENT, LOCAL GOVERNMENT, PRIVATE NON-PROFIT OR SPECIAL DISTRICT APPLYING FOR FUNDING</small>				
2.	<b>TYPE:</b>	<small>STATE/LOCAL GOVERNMENT</small> <input checked="" type="checkbox"/>	<small>FEDERALLY RECOGNIZED TRIBE</small> <input type="checkbox"/>	<small>PRIVATE NON-PROFIT</small> <input type="checkbox"/>	<small>SPECIAL DISTRICT</small> <input type="checkbox"/>	
3.	<b>FIPS #:</b>	071-00000	<small>IF YOU DO NOT KNOW YOUR FEDERAL IDENTIFICATION PROCESSING SYSTEM NUMBER (FIPS #), REQUEST BY EMAILING THE <a href="mailto:HMA@CALOES.CA.GOV">HMA@CALOES.CA.GOV</a> MAILBOX</small>			
4.	<b>DUNS #:</b>	027766398	<small>IF YOU DO NOT KNOW YOUR DATA UNIVERSAL NUMBERING SYSTEM (DUNS) #, CALL DUN &amp; BRADSTREET (D&amp;B) @ 1-866-705-5711 FOR INFORMATION</small>			
5.	<b>COUNTY:</b>	San Bernardino		<small>THE NAME OF THE COUNTY WHERE THE PROPOSED PROJECT IS LOCATED</small>		
6.	<b>POLITICAL DISTRICT NUMBERS:</b>	<small>CONGRESSIONAL:</small>	8	<small>PROVIDE ONLY THE NUMBERS OF THE POLITICAL DISTRICTS FOR THE SUBAPPLICANT</small>		
		<small>STATE ASSEMBLY:</small>	33			
		<small>STATE LEGISLATIVE:</small>	23			
7.	<b>PRIMARY CONTACT:</b>	<small>POINT OF CONTACT FOR YOUR PROJECT. CAL OES WILL CONTACT THIS PERSON FOR QUESTIONS AND/OR REQUESTS FOR INFORMATION</small>				
	<b>NAME:</b>	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	<b>FIRST:</b>	Dianne	<b>LAST:</b>	Mendez-Cantu
	<b>TITLE:</b>	Staff Analyst II				
	<b>ORGANIZATION:</b>	San Bernardino County Fire Protection District				
	<b>ADDRESS:</b>	157 W. 5 <sup>th</sup> St. 2 <sup>nd</sup> floor				
	<b>CITY:</b>	San Bernardino	<b>STATE:</b>	CA	<b>ZIP CODE:</b>	92415
	<b>TELEPHONE:</b>	909-387-9620	<b>FAX:</b>			
	<b>EMAIL:</b>	dmendez-cantu@SBCFire.org				
8.	<b>ALTERNATIVE CONTACT:</b>	<small>BACK-UP POINT OF CONTACT FOR YOUR PROJECT. CAL OES WILL CONTACT THIS PERSON IF PRIMARY CONTACT IS UNAVAILABLE</small>				
	<b>NAME:</b>	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	<b>FIRST:</b>	Shane	<b>LAST:</b>	Glaze
	<b>TITLE:</b>	Division Chief				
	<b>ORGANIZATION:</b>	San Bernardino County Fire Fire Protection District				
	<b>ADDRESS:</b>	157 W. 5 <sup>th</sup> St. 2 <sup>nd</sup> Floor				
	<b>CITY:</b>	San Bernardino	<b>STATE:</b>	CA	<b>ZIP CODE:</b>	92415
	<b>TELEPHONE:</b>	909-501-1359	<b>FAX:</b>			
	<b>EMAIL:</b>	sglaze@sbcfire.org				



## LOCAL HAZARD MITIGATION PLAN INFORMATION

### 9. LOCAL HAZARD MITIGATION PLAN (LHMP) REQUIREMENT:

- i** A FEMA approved and locally adopted LHMP is required to receive federal funding for all project subapplication activities. Subapplicants for HMGP funding must have a FEMA-approved Mitigation Plan in place at the time of sub-award. Subapplication will be reviewed to ensure that the proposed activity is in conformance with subapplicant's plan.

**A. NAME/TITLE OF YOUR LHMP:**

San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan

**B. LOCAL SINGLE JURISDICTIONAL  
MULTIHAZARD MITIGATION PLAN:**

DATE SUBMITTED TO CAL OES:

DATE APPROVED BY FEMA:

DATE ADOPTED BY LOCAL AGENCY:

OR

**LOCAL MULTI JURISDICTIONAL  
MULTIHAZARD MITIGATION PLAN:**

DATE SUBMITTED TO CAL OES:

DATE APPROVED BY FEMA:

DATE ADOPTED BY LOCAL AGENCY:

LEAD AGENCY: San Bernardino County

7/13/17

**C. IF YOUR PROJECT IS REFERENCED IN YOUR LHMP, INDICATE WHERE THE PROPOSED PROJECT CAN BE FOUND; USE N/A FOR NOT APPLICABLE BOXES:**

CHAPTER	PART	SECTION	PAGE
N/A	N/A	6 Mitigation Strategy	186-188



**DO NOT INCLUDE A COPY OF YOUR PLAN WITH SUBAPPLICATION.**

**D. PROVIDE A SHORT NARRATIVE DETAILING HOW YOUR PROJECT ALIGNS WITH THE RISK AND HAZARD ASSESSMENTS, STRATEGIES, GOALS AND/OR OBJECTIVES OF YOUR PLAN:**

The proposed activity is a community based fuels reduction project intended to create defensible space around structures and to perform hazardous fuels reduction in and around the mountain communities listed on non-federal, private and/or public property.

## COMMUNITY INFORMATION

### 10. COMMUNITY PARTICIPATION:

**A. CHECK BOX(ES) IF YOUR COMMUNITY PARTICIPATES IN ANY OF THE FACTORS BELOW:**

Select a column appropriate to your type of project. Acronyms include: Community Wildfire Protection Plan (CWPP), California Environmental Quality Act (CEQA), Community Rating System (CRS) Plan and Unreinforced Masonry (URM) Participation.

FIRE
<input checked="" type="checkbox"/> CWPP, FIRE WIRE, FIRE SAFE
<input checked="" type="checkbox"/> CURRENT CEQA ACTIVITY
<input checked="" type="checkbox"/> DEFENSIBLE SPACE

FLOOD
<input type="checkbox"/> CRS PLAN
<input type="checkbox"/> CURRENT CEQA ACTIVITY
<input type="checkbox"/> HYDROLOGY STUDY

EARTHQUAKE
<input checked="" type="checkbox"/> SHAKEOUT DRILL PARTICIPATION
<input type="checkbox"/> CURRENT CEQA ACTIVITY
<input type="checkbox"/> URM PARTICIPATION

**B. PROVIDE A NARRATIVE DESCRIPTION OF ALL OF FACTORS SELECTED FROM LIST ABOVE:**

There is limited FireSafe Council activity within the proposed communities; however, active participation from the community will be encouraged and education will be on-going. All proposed activities will comply with environmental regulations as it pertains to creating defensible space and performing hazardous fuels reduction.

**C. IS YOUR JURISDICTION REQUIRED TO PROVIDE PUBLIC NOTICE OF THIS PROJECT?**

☐ Yes ☒ No If yes, provide details:

**PROJECT INFORMATION**

**11. PROJECT TITLE:** Community Fire Hazard Mitigation Project

MUST USE THE SAME PROJECT TITLE ORIGINALLY USED IN THE APPROVED NOTICE OF INTEREST (NOI). IF YOU NEED TO CHANGE YOUR PROJECT TITLE, CONTACT CAL OES AT [HMA@CALOES.CA.GOV](mailto:HMA@CALOES.CA.GOV)

**12. PROJECT LOCATION:**

**A. IDENTIFY THE COUNTY/COUNTIES WHERE THE ACTIVITY WILL OCCUR:**

San Bernardino

**B. LATITUDE/LONGITUDE COORDINATES:**

FEMA requires that all projects be geo-coded using latitude and longitude (lat/long) using NAD-83 or WGS-84 datum. The lat/long coordinates must be expressed in degrees including five or more decimal places (e.g., latitude 36.999221, longitude -109.044883).

LATITUDE
34.08333

LONGITUDE
-116.904905

**STOP** IF THERE ARE MORE THAN ONE SET OF LAT/LONG COORDINATES, PROVIDE ON SEPARATE DOCUMENT AND ADD TO MAP SECTION.

**C. STRUCTURE COORDINATES:**

- For projects that protect buildings or other facilities, provide coordinates for each structure at either the front door of the structure or the intersection of the public road and driveway that is used to access the property.
- For large activity areas, such as detention basins or vegetation management projects, the location must be described by three or more coordinates that identify the boundaries of the project.
- The polygon created by connecting the coordinates must encompass the entire project area.

N/A

**D. STAGING AREA:**

Describe the project staging area. This is the area where the project equipment, materials and/or debris will be staged. Include a vicinity map with the proposed staging area(s) in the map section.

Equipment, while not in use, will be stored at a secured facility within the general vicinity.

**STOP** AERIAL MAP(S) OF STAGING AREA(S) MUST BE INCLUDED IN SUBAPPLICATION.

**E. SEA LEVEL RISE (SLR):**

1. Is the risk to the project increased by SLR due to project location and project activity type? Yes ☐ No ☒
2. Was SLR considered and included in the mitigation measures implemented in this project? Yes ☐ No ☒

**F. SITE PHOTOS:**

- ☒ A minimum of three ground photos per project site are required. Include in photo section.

**G. MAPPING REQUIREMENTS:**

Provide the following mapping elements in the map section:

- ☒ If project area has been mapped using GIS software, include the completed Shapefiles on CD-RW.
- ☒ Include a vicinity map of the general area showing major roads. Aerial photographs may be used as vicinity maps.
- ☒ Prominently mark the project location on the vicinity map.
- ☒ Provide a detailed project map that clearly identifies the project boundaries.
- ☒ Project map must show all lat/long coordinates provided in the project description.
- ☒ Vicinity map and the project map must both have a north arrow and scale.

**i DO NOT SEND ROLLED MAPS – MAPS MUST BE FOLDED UNTIL 8.5" x 11" IN SIZE.**

**H. PUBLIC ASSISTANCE (PA) PROGRAM FUNDING:**

List any Public Assistance Disaster Survey Reports (DSR) or Project Worksheets (PWs) that were completed at the project location from previous disasters. List all current engagement with PA for this current disaster and include date(s) if known:

Multi-Jurisdictional Hazard Mitigation Plan - 2017

**I. DEED RESTRICTIONS THAT LIMIT FEDERAL FUNDING:**

Is there a deed restriction or permanent conservation easement on the property at the project site that would prohibit federal disaster funding (e.g., a previously FEMA funded acquisition of a structure on this property)? If yes, describe in detail.

N/A

**13. PROJECT DESCRIPTION:**

**A. APPLICATION TYPE:**

- ☒ Project ☐ 5% Activity

*5% activities are defined as mitigation actions that are consistent with your local hazard mitigation plan and meet all HMGP requirements, but may be difficult to conduct a standard BCA to prove cost-effectiveness. Examples: early earthquake warning system, back-up generators for critical facilities, public awareness campaign, mitigation specific community outreach activities.*

**B. PROJECT TYPE:**

Select at least one project type; select as many as needed to accurately describe project.

<input type="checkbox"/> EARTHQUAKE	<input checked="" type="checkbox"/> FIRE	<input type="checkbox"/> FLOOD	<input type="checkbox"/> OTHER
-------------------------------------	--	--------------------------------	--------------------------------

<input type="checkbox"/> CODE ENFORCEMENT	<input checked="" type="checkbox"/> DEFENSIBLE SPACE	<input type="checkbox"/> ACQUISITION	<input type="checkbox"/> CRITICAL FACILITY GENERATOR(S)
<input type="checkbox"/> NON-STRUCTURAL	<input type="checkbox"/> FIRE RESISTANT BUILDING MATERIALS	<input type="checkbox"/> DRY FLOOD PROOFING	<input type="checkbox"/> DROUGHT <input type="checkbox"/> TSUNAMI
<input type="checkbox"/> STRUCTURAL	<input checked="" type="checkbox"/> FIRE VEGETATION MANAGEMENT	<input type="checkbox"/> FLOOD CONTROL	<input type="checkbox"/> WIND
<input type="checkbox"/> NON-STRUCTURAL & STRUCTURAL	<input type="checkbox"/> SOIL STABILIZATION	<input type="checkbox"/> ELEVATION	
<input type="checkbox"/> <a href="#">CLIMATE RESILIENCY MITIGATION ACTION</a> (CRMA): Projects that mitigate risk through restoration of the natural environment			

**C. DESCRIBE PROBLEM/HAZARDS/RISKS:**

Describe the problem this project is attempting to solve and the expected outcome. Describe the hazards and risks to life, safety and any improvements to property in the project area for at least the last 25 years. Describe in detail how the project reduces hazard effects and risks.

High fuel loads in the hills, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. During the May to October fire season the dry vegetation and hot and sometimes windy weather, combined with continued growth in the wildland/urban interface areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become large and out-of-control. Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Generally, there are three major factors that sustain wildfires and predict a given area's potential vulnerability to burn. These factors are fuel, topography, and weather.

Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches, to dead standing trees, live trees, brush, and cured grasses. Manmade structures are also considered a fuel source, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control.

By modifying, removing or otherwise reducing the accumulation and availability of vegetative fuel, fire intensity can be mitigated. The proposed project intends to reduce hazardous fuels in and around structures and enhance defensible space. Defensible space is needed to slow or stop the spread of wildfire and it helps protect homes from ignition during wildfire —either from direct flame contact or radiant heat. Defensible space is also important for the protection of the firefighters defending your home.

**D. DESCRIBE RECENT EVENTS THAT INFLUENCED THE SELECTION OF THIS PROJECT:**

Describe recent events (e.g. changes in the watershed, discovery of a new hazard, zoning requirements, inter-agency agreements, etc.) that influenced the selection of this project.

Apple Fire 2020, El Dorado Fire 2020

**E. SCOPE OF WORK (SOW):**



STATE EXACT SOW DOCUMENT TITLE:

1. Describe the entire SOW of the project in clear, concise, ample detail.
2. Must provide a thorough description of **all tasks and activities** to be undertaken.
3. Must be written in sequential order from start to finish of the project.
4. Describe any land acquisition activities, and/or right-of-way or access easements that need to be obtained.
5. If structural, discuss how the structure/building/facility will be constructed or retrofitted.
6. Include building or structure dimensions, material types, depth and width of excavations, volume of materials excavated, type of equipment to be used, staging and parking areas, and any phasing of the project.
7. If any tunneling is proposed, describe the method and any temporary trenches or pits.
8. Describe any demolition activities that need to occur prior to construction or retrofitting.



☒ **INSERT THIS DOCUMENT IN THE SOW SECTION.**

**F. HAS YOUR JURISDICTION PREVIOUSLY RECEIVED HMGP FUNDING?**

☐ Yes ☐ No ☒ Unknown If yes, provide disaster number(s):

**G. HAS YOUR JURISDICTION RECEIVED ANY OTHER FUNDING?**

Describe all other funding received for this project and all other recent projects. Identify the funding source (i.e., Federal, State, Private, etc.).

**H. RELATED PROJECTS:**

Describe any other projects or project components (whether or not funded by FEMA), which may be related to the proposed project, or are in (or near) the proposed project area. FEMA must look at all projects to determine a cumulative effect. FEMA reviews all interrelated projects under NEPA regulations.

The community of Angelus Oaks has a proposed fuel break located on private property. The fuel break is positioned West of HWY 38 and the community. The work schedule nor funding source have been identified at this time.

**I. HAZARD ANALYSIS TYPE:**


Select the hazard(s) below that this project will protect against. Select as many as needed.

- |  |  |   |   |
|--|--|---|---|
| <input type="checkbox"/> BIOLOGICAL      | <input type="checkbox"/> EARTHQUAKE      | <input type="checkbox"/> LAND SUBSISTENCE | <input type="checkbox"/> TERRORIST        |
| <input type="checkbox"/> CHEMICAL        | <input checked="" type="checkbox"/> FIRE | <input type="checkbox"/> MUD/LANDSLIDE    | <input type="checkbox"/> TORNADO          |
| <input type="checkbox"/> CIVIL UNREST    | <input type="checkbox"/> FISHING LOSSES  | <input type="checkbox"/> NUCLEAR          | <input type="checkbox"/> TOXIC SUBSTANCES |
| <input type="checkbox"/> COASTAL STORM   | <input type="checkbox"/> FLOOD           | <input type="checkbox"/> SEA LEVEL RISE   | <input type="checkbox"/> TSUNAMI          |
| <input type="checkbox"/> CROP LOSSES     | <input type="checkbox"/> FREEZE          | <input type="checkbox"/> SEVERE ICE STORM | <input type="checkbox"/> WINDSTORM        |
| <input type="checkbox"/> DAM/LEVEE BREAK | <input type="checkbox"/> HUMAN CAUSE     | <input type="checkbox"/> SEVERE STORM(S)  |   |
| <input type="checkbox"/> DROUGHT         | <input type="checkbox"/> HURRICANE       | <input type="checkbox"/> SNOW             |   |

**J. DESIGN PLANS:**

☐ If your project requires design plans, plans should be prepared to supplement the SOW and attached in the design section. If the project involves ground disturbance, (e.g. enlarging ditches or culverts, diversion ditches, detention basins, storm water improvements, etc.) include the following:

1. **Scale:** Plans should be drawn to scale (e.g. 1" to 100' or 1" to 200') depicting the entire land parcel, showing buildings, improvements, underground utilities, other physical features, dimensions and cross sections.
2. **Identification:** Indicate agency name, land owner, civil engineer, soil engineer, geologist, map preparer, and date of map preparation. Also, indicate the name of the project.
3. **Legend/Orientation:** Include a legend explaining all lines and symbols. Identify property acreage and indicate direction with a north arrow (pointing to top or right hand side of the plan).

4. **Dimensions:** Show property lines and dimensions. Also, show boundary lines of project and their dimensions if only a portion of the property is being utilized for the project.
  5. **Structures:** Identify all existing and proposed buildings and structures including storm drains, driveways, sidewalks and paved areas.
  6. **Utilities:** Indicate names and location of utilities on property (water, sewage, gas, electric, telephone, cable).
  7. **Roads/Easements:** Indicate location, names, and centerline of streets and recorded roads. Identify any utility, drainage or right-of-way easements on the property.
  8. **Drainage:** Show the location, width and direction of flow of all drainage courses on site.
  9. **Grading/Topographic Information:** Show existing surface contours on-site and bordering the property.
  10. **Parking:** Show all construction parking and staging areas and provide dimensions.
  11. **Cross Sections:** Provide cross sections of proposed buildings, structures or other improvements, and any trenches, temporary pits or catchment basins.
- ☐ If applicable, provide studies and engineering documentation, including any Hydrology and Hydraulics (H&H) data.
- ☐ If applicable, provide drawings or blueprints that show the footprint and elevations.
-  **DO NOT SEND PRINTED COPIES OF DESIGN PLANS, DRAWINGS OR BLUE PRINTS LARGER THAN 8.5' x 11" SIZE. DO NOT SEND ROLLED COPIES (FOLD TO OBTAIN 8.5" x 11" SIZE).**

**K. PROJECT ALTERNATIVES:**

Identify three project alternatives:

**1. ALTERNATIVE #1 – NO ACTION:**

Describe the No Action alternative below. The No Action alternative evaluates the consequences of taking no action and leaving conditions as they currently exist.

Possible Catastrophic future wildfire: life loss, property damage, and overall degradation of our natural environment

**2. ALTERNATIVE #2 – PROPOSED ACTION:**

Describe the Proposed Action alternative below. The Proposed Action alternative is the proposed project to solve the problem. Explain why the proposed action is the preferred alternative. Identify how the preferred alternative will solve the problem, why the preferred alternative is the best solution for the community, why and how the alternative is environmentally preferred and why the project is the economically preferred alternative.

Creating defensible space around structures and reducing the abundance of available fuel directly modifies the only element of the fire environment within human control. Proactively performing hazardous fuels reduction work in mountain/forested communities enhances resiliency to the impacts and effects of wildfire. In the event of wildfire: less available fuel results in fires burning with more manageable intensity.

**3. ALTERNATIVE #3 – SECOND ACTION ALTERNATIVE:**

Describe the Second Action alternative below. The Second Action alternative described must also solve the described problem. State why this alternative wasn't chosen. It must be a viable project that could be substituted in the event the proposed action is not chosen.

Similar the scope of work for alternative #2, with the addition of post-fire hazard mitigation activities such as soil stabilization and reforestation projects.

## WORK SCHEDULE INFORMATION

### 14. PROJECT WORK SCHEDULE:

The intent of the work schedule is to provide a realistic appraisal of the time and components required to complete the project.

- Describe each of the major work elements and milestones in the description section below.
- Project subapplication examples are: construction, architectural, design, engineering, inspection, testing, permits, project management, mobilization and de-mobilization.
- State the total timeframe anticipated for each of the work elements.
- State the total timeframe anticipated to complete the project.
- Work schedule must mirror SOW, budget and BCA.OPTIONAL:
- Provide the work schedule in GANTT chart form as supplemental documentation in the work schedule section, include this information as an example.

WORK SCHEDULE EXAMPLE		
#	DESCRIPTION	TIMEFRAME
1.	Kick-off, 90% design meetings	3 months
2.	Final contract drawing development	5 months
3.	Open bids and award contract	4 months
4.	Construction – Mobilization	5 months
5.	Construction – Demolition	4 months
6.	Construction – Concrete and conduit work	2 months
7.	Construction – Trenching	2 weeks
8.	Construction – Utility relocation	4 months
9.	Construction – Electrical Installation	1 month
10.	Construction – Site Restoration	1 week
11.	Construction – Complete punch list	2 months
12.	Construction – Demobilization	1 week
13.	Project Close-out and record drawings	2 months
14.	Grant Close out	3 months
TOTAL MONTHS:		36 months



**TOTAL PROJECT DURATION (INCLUDING CLOSE-OUT) MUST NOT EXCEED A 36 MONTH PERIOD OF PERFORMANCE (POP).**

#	DESCRIPTION	TIMEFRAME
1.	Planning	3 months
2.	Outreach and gain participation	3 months
3.	Begin Fire Hazard Recognition Surveys	4 months
4.	Fuel Mitigation Plan Implementation	18 months
5.	Annual Maintenance	2 months
6.	Project Close-out	3 months
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.	Project Close-out	3 month
19.	STANDARD VALUE (DO NOT CHANGE) Grant Close-out	3 months
TOTAL MONTHS:		36 months

If more lines are needed than provided, indicate the title of document in box 1 and attach a separate work schedule in the schedule section.



## COST ESTIMATE INFORMATION

### 15. HMGP COST ESTIMATE SPREADSHEET:

#### A. COST ESTIMATE INSTRUCTIONS:

☒ Using the [HMGP Cost Estimate Spreadsheet](#), provide a detailed cost estimate breakdown.

- Cost estimate describes the anticipated costs associated with the SOW for the proposed mitigation activity. Cost estimates must include detailed estimates of cost item categories.
- Only include costs that are directly related to performing the mitigation activity. If additional work, such as remodeling, additions, or improvements are being done concurrently with the mitigation work, do not include these costs in the submitted budget.
- Documentation that supports the budget must be included to the subapplication in the budget section.
- Total costs must be consistent with the requested federal share plus the matching funds and must be consistent with the project cost in the Benefit Cost Analysis (BCA), SOW and work schedule.

HMGP COST ESTIMATE SPREADSHEET EXAMPLE					
#	ITEM NAME	Unit Qty	UNIT	UNIT COST	COST EST TOTAL
1.	Pre-Award Costs: Develop BCA	4	HR	\$150	\$600
2.	Temp. Inlet Filter Rolls	4	EA	\$250	\$1000
3.	Temp. Fiber Roll	1850	LF	\$3	\$5550
4.	Hydraulic Mulch	1000	SQYD	\$2	\$2000
5.	Plane Asphalt Concrete Pavement	650	SQYD	\$22	\$14300
6.	Street Sweeping for 30 days	30	EA	\$350	\$10500
7.	Roadway Excavation	70	CY	\$40	\$2800
8.	Aggregate Base, Class 2	210	CY	\$75	\$15750
9.	Remove Concrete Pavement	650	SQYD	\$340	\$10540
10.	Asphalt Concrete, Type B	180	TON	\$150	\$27000
11.	Asphalt Concrete, Leveling	10	TON	\$300	\$3000
12.	Asphalt Concrete Dike, Type A	235	LF	\$15	\$3525
13.	Asphalt Concrete Dike, Type F	125	LF	\$8	\$120
14.	Place Asphalt Concrete	15	SQFT	\$8	\$120
15.	18" Corrugated Steel Pipe Riser	5	LF	\$125	\$625
16.	24" Reinforced Concrete Pipe	275	LF	\$170	\$46750
17.	84" Reinforced Concrete Pipe Install	572	LF	\$400	\$228800
18.	Precast Triple Concrete Box Culvert	44	LF	\$1500	\$66000
19.	Curb Inlet - Type B-1 (L=9')	1	EA	\$6000	\$6000
20.	Curb Inlet - Type B-1 (L=13')	1	EA	\$6300	\$6300
21.	Curb Inlet - Type B-1 (L=15')	1	EA	\$6800	\$6800
22.	Storm Drain Cleanout - Type A-8	3	EA	\$7500	\$22500
23.	8" PVC Sewer	89	LF	\$100	\$8900
24.	Cellular Block (Precast)	4100	SQFT	\$20	\$82000
25.	Project Identification Sign	2	EA	\$1000	\$2000
Total Project Cost Estimate:					\$573480

#### B. INELIGIBLE COSTS:

The following are ineligible line items:

- Lump Sums
- Contingency Costs
- Miscellaneous Costs
- "Other" Costs
- Cents (must use whole dollar amounts, round unit prices up to whole dollars)

#### C. PRE-AWARD COSTS:

Eligible pre-award costs are costs incurred after the disaster date of declaration, but prior to grant award. Pre-award costs directly related to developing the application may be funded.

- Developing a BCA
- Preparing design specifications
- Submission of subapplication
- Gathering environmental and historic data
- Workshops or meetings related to development



Subapplicants who are not awarded funds will not receive reimbursement for pre-award costs.

#### D. COST ESTIMATE NARRATIVE:

FEMA requires a cost estimate narrative that explains all projected expenditures in detail. The cost-estimate narrative is intended to mirror the cost estimate spreadsheet and should include a full detailed narrative to support the cost estimates listed in the HMGP Project Cost Estimate Spreadsheet. If your cost estimate includes City, County, or State employees' time (your agency), include personnel titles and salary/hourly wages plus benefits for a total hourly cost. Detailed timesheets must be retained.

☒ Title the document "Cost Estimate Narrative" and include in the budget section.

## 16. FEDERAL/NON-FEDERAL SHARE INFORMATION:

### A. FUNDING RESTRICTIONS:

There is no restriction or cap on the federal share that may be requested for each project subapplication. FEMA will contribute no more than 75 percent of the total project cost. A minimum of 25 percent of the total eligible costs must be provided from a non-federal source. State does not contribute to local cost share.

**For example:** for a \$10,000,000 total project cost, the federal requested share (75 percent) would be \$7,500,000. The non-federal match share (25 percent) provided would be \$2,500,000.

\*The sum of the federal and non-federal shares must equal the total project cost.

\*The federal share **MUST NOT** exceed 75 percent.

### B. TOTAL PROJECT COST ESTIMATE:

999,221

Enter total cost formulated on the  
[HMGP Cost Estimate Spreadsheet](#)

ENTER \$ IN BOX ABOVE

<b>FEDERAL SHARE</b> (75% MAXIMUM)	REQUESTED AMOUNT:	749,416
		ENTER \$ IN BOX ABOVE
	PERCENTAGE AMOUNT:	75
		ENTER % IN BOX ABOVE
<b>NON-FEDERAL SHARE</b> (25% MINIMUM)	REQUESTED AMOUNT:	249,805
		ENTER \$ IN BOX ABOVE
	PERCENTAGE AMOUNT:	25
		ENTER % IN BOX ABOVE



VERIFY ALL  
AMOUNTS  
ENTERED ARE  
ACCURATE.

INCORRECT  
AMOUNTS  
WILL DELAY  
PROCESSING  
OF YOUR  
SUBAPPLICATION.

### C. NON-FEDERAL MATCH SOURCE: MATCH COMMITMENT LETTER:

- ☒ Use the Local Match Commitment Letter Template to complete this section and add completed letter to the match section.
- A signed Match Commitment Letter must be provided on agency letterhead.
  - The non-federal source of matching funds must be identified by name and type.
  - If "other" is selected for funding type, provide a description.
  - Provide the date of availability for all matching funds.
  - Provide the date of the Funding Match Commitment Letter.
  - The funds must be available at the time of submission unless prior approval has been received from Cal OES.
  - If there is more than one non-federal funding source, provide the same information for each source on an attached document.
  - Match funds must be in support of cost items listed in the cost estimate spreadsheet.
  - Requirements for donated contributions can be found in 2 CFR 200.306.

## BENEFIT/COST EFFECTIVENESS INFORMATION


### 17. BENEFIT/COST EFFECTIVENESS INFORMATION

#### A. BCA INSTRUCTIONS:

FEMA will only consider subapplications from subapplicants that use a FEMA-approved methodology to conduct the Benefit Cost Analysis (BCA). BCA must be legible, complete and well-documented.

- Project BCAs must demonstrate cost-effectiveness through a Benefit Cost Ratio (BCR) of 1.0 or greater.
- Projects with a BCR of less than 1.0 will not be considered for funding.
- Total project cost must be used in the BCA.
- Maintenance of a completed HMGP project is not an eligible reimbursement activity, but must be included in the BCA.

- ☒ BCA Version 6.0 is the only software that is allowed to conduct a BCA. Some project types may qualify for pre-calculated benefits. Additional information on the BCA Toolkit is available at: <https://www.fema.gov/benefit-cost-analysis>.

-  The FEMA BCA Technical Assistance Helpline is available to provide assistance with FEMA's BCA software by calling 1-855-540-6744 or via email at [BCHelpLine@FEMA.dhs.gov](mailto:BCHelpLine@FEMA.dhs.gov). The FEMA helpline is only to be utilized for technical assistance questions. The FEMA helpline will not verify the accuracy of your BCA.

#### B. BCA INFORMATION:

Once the BCA is completed, enter information requested below.

1. NET PRESENT VALUE OF PROJECT BENEFITS: 20,823,858

2. TOTAL PROJECT COST ESTIMATE: 999,221

3. BENEFIT COST RATIO: 20.84

#### C. ANALYSIS TYPE:

- |  |  |   |                                     |
|--|--|---|-------------------------------------|
| <input type="checkbox"/> FLOOD                             | <input checked="" type="checkbox"/> WILDFIRE | <input type="checkbox"/> EXEMPT (5% PROJECTS) | <input type="checkbox"/> EARTHQUAKE |
| <input type="checkbox"/> HURRICANE WIND                    | <input type="checkbox"/> DROUGHT             | <input type="checkbox"/> PRE-CALCULATED       | <input type="checkbox"/> LANDSLIDE  |
| <input type="checkbox"/> DAMAGE FREQUENCY ASSESSMENT (DFA) |  |   |                                     |

D. ANALYSIS DATE (date BCA was conducted): 1/21/21

#### E. PROVIDE BCA HARD AND SOFT COPIES IN FORMAT DESCRIBED BELOW:

- ☒ Copy the exported BCA in a .zip file format and add to the CD-RW.
- ☐ Provide a hard copy of the report in the BCA section.

## MAINTENANCE ASSURANCE INFORMATION

### 18. PROJECT MAINTENANCE INFORMATION:

#### A. MAINTENANCE ASSURANCE LETTER:

- ☒ Using the [Project Maintenance Letter Template](#), identify all maintenance activities required to preserve the long-term mitigation effectiveness of the project.
- Examples of maintenance include: inspection of the project, cleaning and grubbing, trash removal, replacement of worn out parts, etc.
  - Attach a maintenance schedule, estimated annual costs, and a signed maintenance commitment letter for the useful life of the project.

## NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

### 19. NFIP INFORMATION:

#### **i** CONTACT YOUR COUNTY OR LOCAL FLOODPLAIN ADMINISTRATOR FOR NFIP INFORMATION.

#### A. NFIP PARTICIPATION:

1. Is the jurisdiction where the project is located participating in the NFIP? YES ☒ NO ☐
- a. If yes, are they in good standing? YES ☒ NO ☐
- b. If no, explain:

#### B. PROJECT LOCATION:

1. Is this project located in a floodplain or floodway designated on a FEMA Flood Insurance Rate Map (FIRM)? YES ☒ NO ☐
- ☐ a. Mark the project location on the FIRM and attach to subapplication in the maps section.
2. Provide the following information for the location of the project:
- a. FIRM panel number:
- b. FIRM zone designations:
- c. NFIP community ID number:

- C. LAST [COMMUNITY ASSISTANCE VISIT \(CAV\)](#) DATE:

## ENVIRONMENTAL INFORMATION

### 20. ENVIRONMENTAL INFORMATION:

#### A. FEMA ENVIRONMENTAL CHECKLIST:

- ☒ Complete the [FEMA Site Information, Environmental Review, and Checklist](#) and attach to the environmental section. Provide a detailed response to each question. Attach supporting documentation in compliance with [FEMA's frontloading requirements](#).

## PRINT THIS PAGE – ORIGINAL SIGNATURE IS REQUIRED

### PROJECT CONDITIONS

Indicate by checking each box below that you will adhere to these listed project conditions.

- ☒ If during implementation of the project, ground-disturbing activities occur and artifacts or human remains are uncovered, all work will cease and FEMA, Cal OES, and the State Historic Preservation Officer (SHPO) will be notified.
- ☒ If deviations from the approved scope of work result in design changes, the need for additional ground disturbance, additional removal of vegetation, or will result in any other unanticipated changes to the physical environment, FEMA will be contacted and a re-evaluation under NEPA and other applicable environmental laws will be conducted.
- ☒ If wetlands or waters of the U.S. are encountered during implementation of the project, not previously identified during project review, all work will cease and FEMA will be notified.
- ☒ Due to the Federally mandated Environmental and Historic Preservation (EHP) review; no construction will occur for this project prior to FEMA and Cal OES approval.

### AUTHORIZATION

The undersigned does hereby submit this subapplication for financial assistance in accordance with the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP) and the State Hazard Mitigation Administrative Plan and certifies that the subapplicant (e.g., organization, city, or county) will fulfill all requirements of the program as contained in the program guidelines and that all information contained herein is true and correct to the best of our knowledge.

Subapplicant Authorized Agent:

NAME: Curt Hagman

TITLE: Chairperson, Board of Directors

ORGANIZATION: San Bernardino County Fire Protection District

SIGNATURE: \_\_\_\_\_

DATE: \_\_\_\_\_



## Scope of Work

The proposed project will support hazard mitigation activities as identified in the San Bernardino County Multi-jurisdictional Hazard Mitigation Plan approved by FEMA July 13, 2017.

Wildfire Mitigation Projects within the FMAG Declared Burn Areas within San Bernardino County will be addressed, specifically the El Dorado Fire burned area. The wildfire mitigation activities include: Defensible Space Measures and Hazardous Fuels Reduction on non-federal, private, and or public property.

Wildfire Mitigation: Projects to mitigate at-risk structures and associated loss of life from the threat of future wildfire through:

**Creation of Defensible Space:** Projects creating perimeters around homes, structures, and critical facilities through the removal or reduction of flammable vegetation.

**Hazardous Fuels Reduction:** Projects that remove vegetative fuels proximate to at-risk structures that, if ignited, pose a significant threat to human life and property, especially critical facilities.

Mitigation action includes cutting and chipping, hazard tree mitigation, forest thinning, treating woody residue, pruning and general wildland fuels reduction in and around the mountain communities of Oak Glen, Mountain Home Village, Forest Falls, and Angelus Oaks.



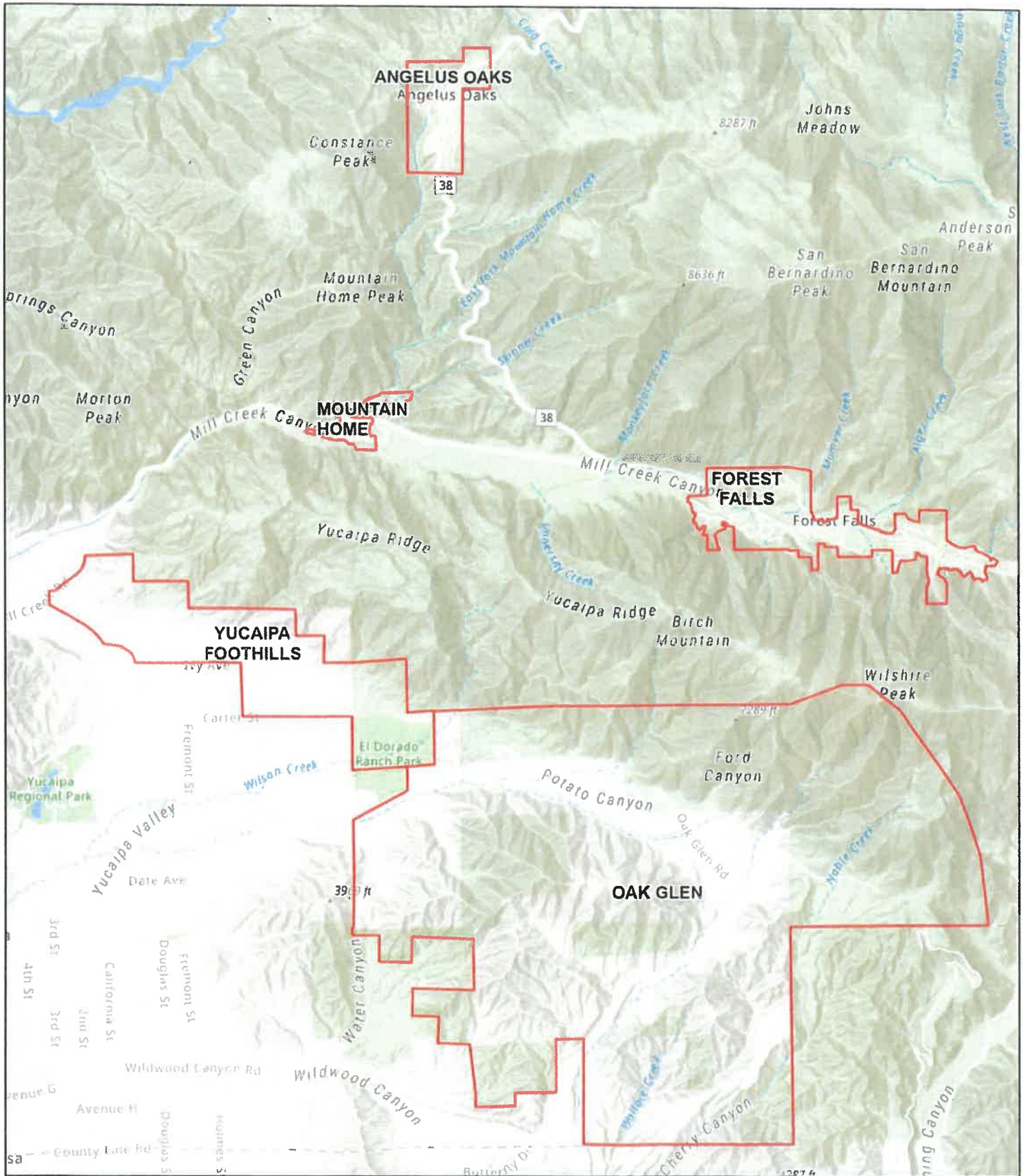
Figure 1: Project Overview

## Designs

Treatment areas, on non-federal land, private, and public property will be assessed to determine the level of risk and the particular fuels treatment that may be needed to improve defensible space around structures.



# San Bernardino County HMGP Communities



 Community Boundaries



0 0.25 0.5 1 Miles

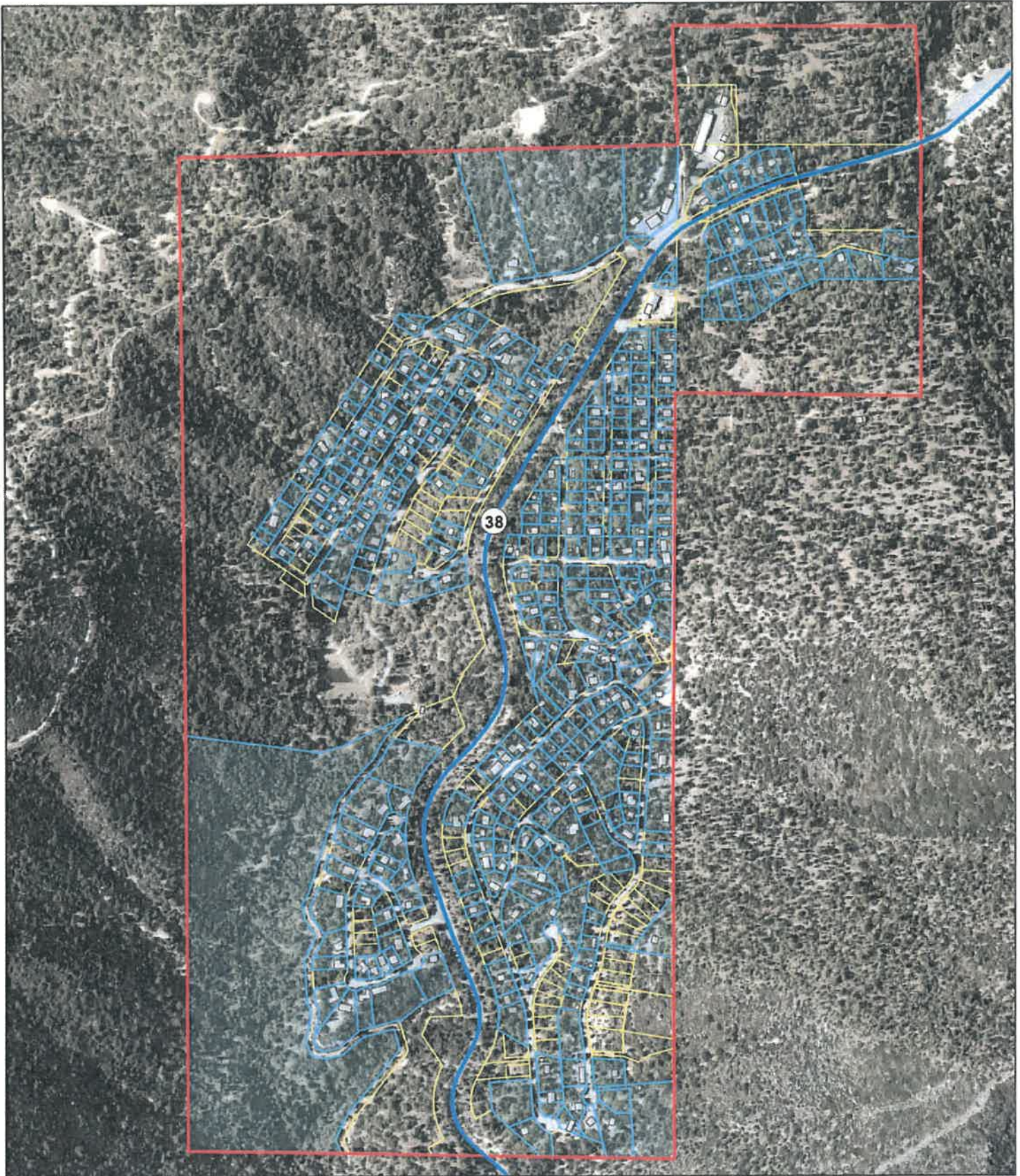
Datum: North American 1983  
EO Edited 20210111





# Angelus Oaks

0.61 Sq. Mi.



- Developed Parcels (340)
- Undeveloped Parcels (191)
- Community Boundaries
- Building Footprints

0 125 250 500 Feet  
Datum: North American 1983  
EO 12860 20216115





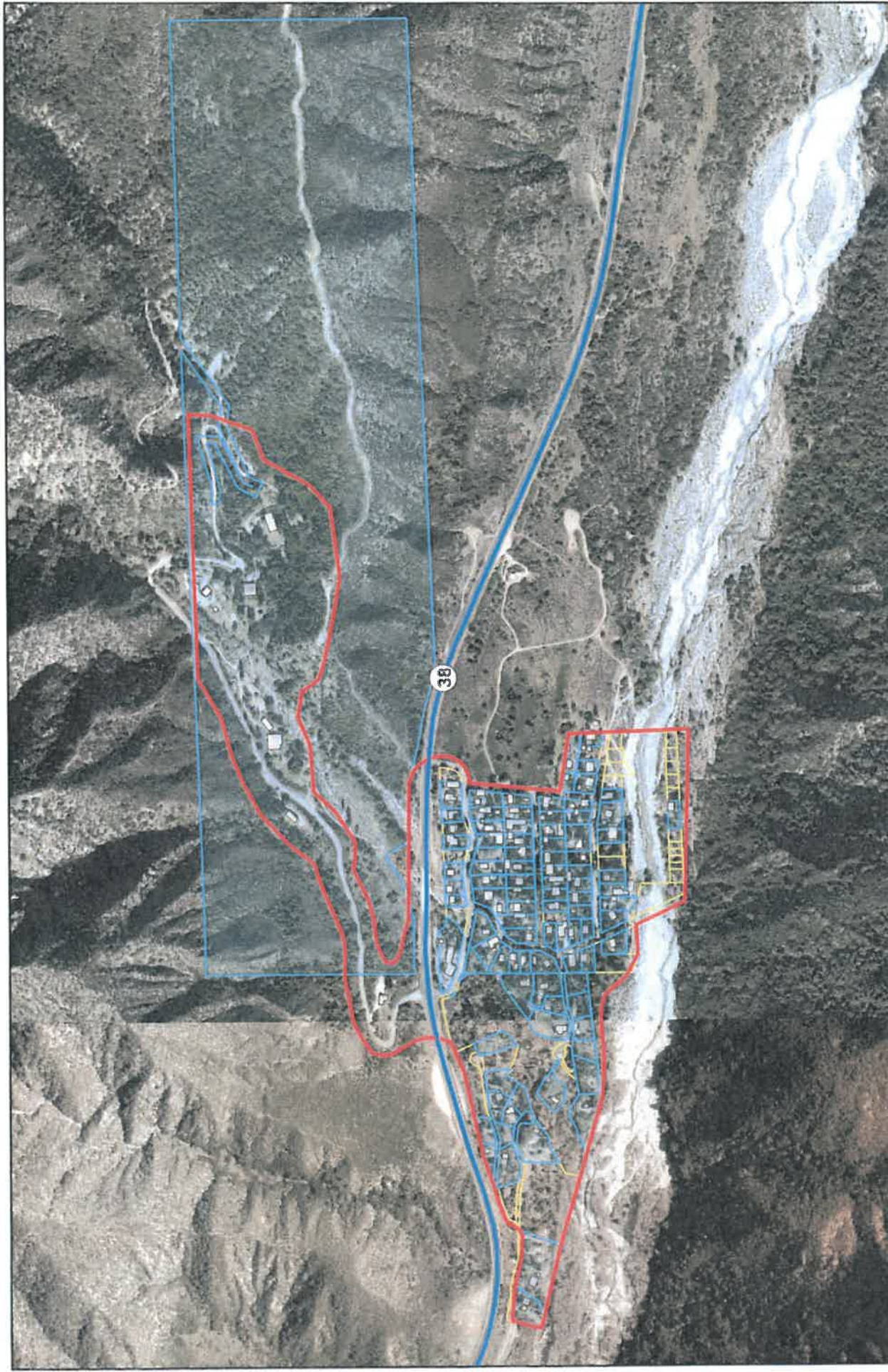
1.37 Sq. Mi.





# Mountain Home Village

0.17 Sq. Mi.



- Developed Parcels (95)
- Undeveloped Parcels (38)
- Community Boundary
- Building Footprints

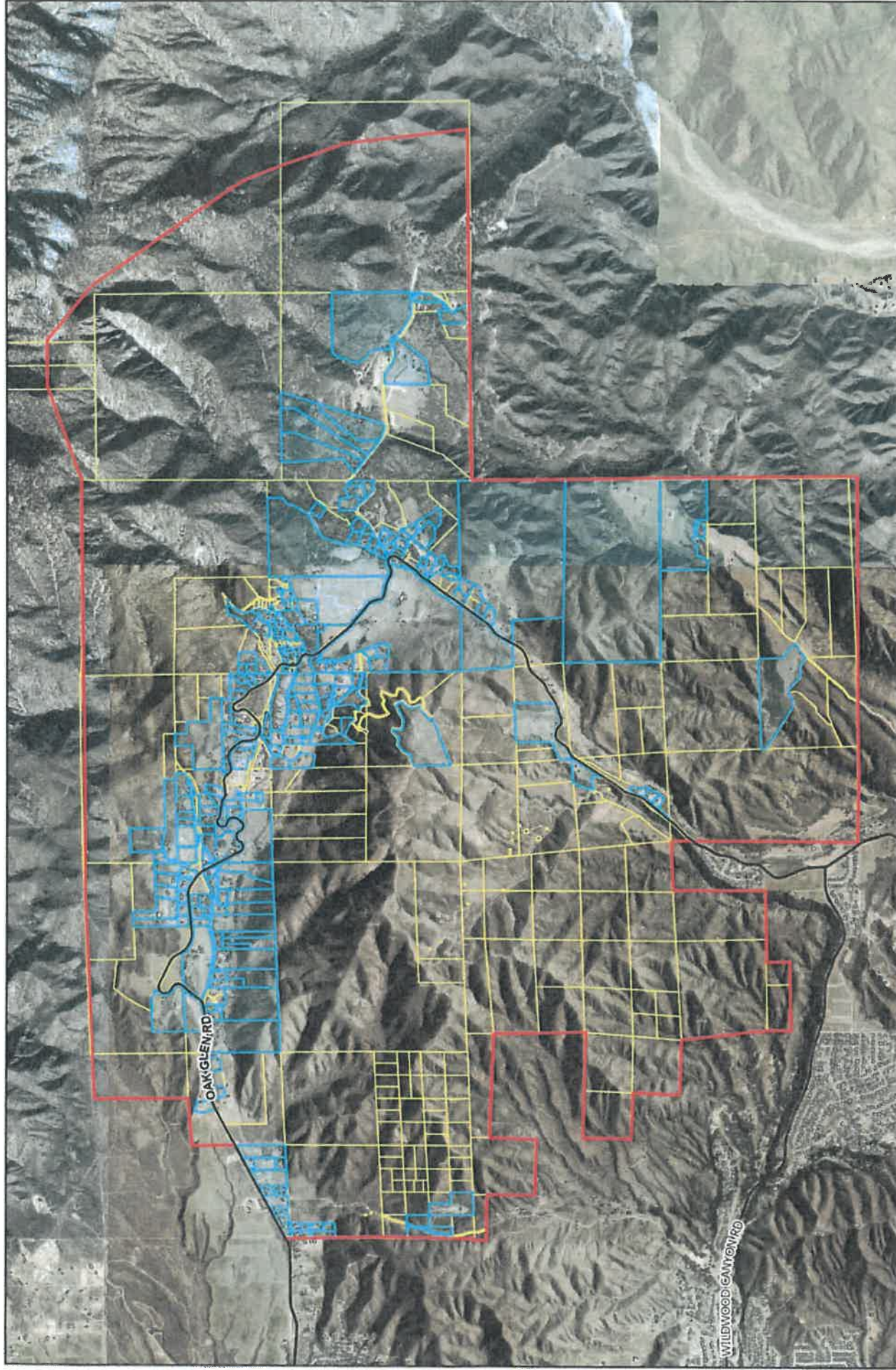


City of Mountain Home, Oregon  
1993  
10/1/2011



# Oak Glen

16.7 Sq. Mi.



- Developed Parcels (250)
- Community Boundaries
- Undeveloped Parcels (333)
- Building Footprints





## 2.52 Sq. Mi.



Undeveloped Parcels (57)

Community Boundary



U.S. DEPARTMENT OF AGRICULTURE  
FOOD SAFETY AND INSPECTION SERVICE

## Photos

### Oak Glen





## Yucaipa Foothills





Mountain Home Village

## Forest Falls





## Angelus Oaks



## WORK SCHEDULE INFORMATION

### 14. PROJECT WORK SCHEDULE:

The intent of the work schedule is to provide a realistic appraisal of the time and components required to complete the project.

- Describe each of the major work elements and milestones in the description section below.
- Project subapplication examples are: construction, architectural, design, engineering, inspection, testing, permits, project management, mobilization and de-mobilization.
- State the total timeframe anticipated for each of the work elements.
- State the total timeframe anticipated to complete the project.
- Work schedule must mirror SOW, budget and BCA.OPTIONAL:
- Provide the work schedule in GANTT chart form as supplemental documentation in the work schedule section, Include this information as an example.

WORK SCHEDULE EXAMPLE		
#	DESCRIPTION	TIMEFRAME
1.	Kick-off, 90% design meetings	3 months
2.	Final contract drawing development	5 months
3.	Open bids and award contract	4 months
4.	Construction – Mobilization	5 months
5.	Construction – Demolition	4 months
6.	Construction – Concrete and conduit work	2 months
7.	Construction – Trenching	2 weeks
8.	Construction – Utility relocation	4 months
9.	Construction – Electrical Installation	1 month
10.	Construction – Site Restoration	1 week
11.	Construction – Complete punch list	2 months
12.	Construction – Demobilization	1 week
13.	Project Close-out and record drawings	2 months
14.	Grant Close out	3 months
TOTAL MONTHS:		36 months



**TOTAL PROJECT DURATION (INCLUDING CLOSE-OUT) MUST NOT EXCEED A 36 MONTH PERIOD OF PERFORMANCE (POP).**

#	DESCRIPTION	TIMEFRAME
1.	Planning	3 months
2.	Outreach and gain participation	3 months
3.	Begin Fire Hazard Recognition Surveys	4 months
4.	Fuel Mitigation Plan Implementation	18 months
5.	Annual Maintenance	2 months
6.	Project Close-out	3 months
7.		
8.		
9.		
10.		
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12.		
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15.		
16.		
17.		
18.	Project Close-out	3 month
19.	STANDARD VALUE (DO NOT CHANGE) Grant Close-out	3 months
TOTAL MONTHS:		36 months

If more lines are needed than provided, indicate the title of document in box 1 and attach a separate work schedule in the schedule section.

## Cost Estimate

### Cost Estimate Narrative

The associated costs with creating defensible space and performing hazardous fuels reduction were determined based on the **San Bernardino County Fire Protection District Fee Schedule (2020/2021)**. These approved rates were used to determine the cost of having hand crews to perform the defensible space measures and hazardous fuels reduction. This work is performed using any combination of manual labor and mechanized equipment (chainsaws, chippers, hand tools, etc.). In addition to the cost of crew(s) performing the mitigation work, administrative support and oversight are also required.

Administrative support and oversight will be provided by one Division Chief, one Battalion Chief, one Crew Superintendent, one Staff Analyst II, and one Office Assistant II.

A county fire hand crew module organization consists of one Engineer Foreman, one Fire Suppression Aide III, two Fire Suppression Aide II, and seven Fire Suppression Aide I. Rates for a chipper and chipper truck were referenced to determine operating cost(s) for performing the selected vegetation management/fuels mitigation work.

Also, based on the board approved fee schedule, a 16.5% Administrative Fee is added to the operational costs. Fee schedule included as supporting documentation. Please refer to the Scope of Work and Designs section for a breakdown of actual cost and work schedule. Refer to the figure below.

Personnel	Qty	Regular Hourly Rate	# of Hrs	Daily Rate
Battalion Chief	1	\$ 153.49	4	\$ 613.96
Captain	1	\$ 140.52	8	\$ 1,124.16
Crew Foreman	1	\$ 2.69	16	\$ 43.04
Crew Superintendent	1	\$ 4.49	8	\$ 35.92
Division Chief	1	\$ 171.17	2	\$ 342.34
Engineer	1	\$ 117.90	16	\$ 1,886.40
FSA I (Extra Help)	7	\$ 14.24	16	\$ 1,594.88
FSA II (Reg)	2	\$ 45.89	16	\$ 1,468.48
FSA III (Reg)	1	\$ 52.65	16	\$ 842.40
Staff Analyst II	1	\$ 59.95	5	\$ 299.75
<b>Total Personnel Cost</b>				<b>\$ 8,251.33</b>
Equipment	Qty	Regular Hourly Rate	# of Hrs	Daily Rate
Brush Patrol		\$ 169.29		\$ -
Chipper (Truck Truck)	1	\$ 63.96	4	\$ 255.84
<b>Total Equipment Cost</b>			<b>4</b>	<b>\$ 255.84</b>
<b>Administrative Fees</b>		<b>PROJECT COST</b>		<b>TOTAL PROJECT COST</b>
<b>Fiscal Administrative Fee (% of Actual Cost)</b>	16.50%	\$ 8,507.17		\$ 9,910.85

Figure 2 Cost Break Down



# HMGP Cost Estimate Spreadsheet

## HMGP Cost Estimate Spreadsheet

DATE	JURISDICTION NAME	DISASTER & PROJECT OR PLANNING #	PROJECT OR PLANNING TITLE
1/22/2021	San Bernardino County Fire Protection District	FM-5325, FM-5293-CA	HMGP2020Community Fire Hazard Mitigation

#	Item Name	Unit Quantity	Unit of Measure	Unit Cost	Cost Estimate Total
1	Fire Hazard Mitigation-Crew Work	100.820918	DAY	\$ 9,910.85	\$ 999,221
2	see cost estimate spreadsheet				\$ -
3					\$ -
4					\$ -
5					\$ -
6					\$ -
7					\$ -
8					\$ -
9					\$ -
10					\$ -
11					\$ -
12					\$ -
13					\$ -
14					\$ -
15					\$ -
16					\$ -
17					\$ -
18					\$ -
19					\$ -
20					\$ -
21					\$ -
22					\$ -
23					\$ -
24					\$ -
25					\$ -
26					\$ -
27					\$ -
28					\$ -
29					\$ -
30					\$ -
31					\$ -
32					\$ -
33					\$ -
34					\$ -
35					\$ -
36					\$ -
37					\$ -
38					\$ -
39					\$ -
40					\$ -
Total Project Cost Estimate:					\$ 999,221



## SAN BERNARDINO COUNTY FIRE PROTECTION DISTRICT

157 W 5<sup>th</sup> Street, 2<sup>nd</sup> Floor • San Bernardino, CA 92415-0451 • (909) 387-5974 • Fax (909) 387-5685

Administration  
Headquarters  
sbcfire.org

Daniel R. Munsey  
Fire Chief/Fire Warden

Thomas Marshall  
Deputy Chief of Operations

Bertral Washington  
Deputy Chief of Administration

### LOCAL MATCH FUND COMMITMENT LETTER

January 26, 2021

California Governor's Office of Emergency Services  
Hazard Mitigation Grants Program Unit  
3650 Schriever Avenue  
Mather, CA 95655

Re: FM-5325 PA 00000337 Subapplication Funding Match Commitment Letter

Dear State Hazard Mitigation Officer:

As part of the Hazard Mitigation Grant Program process, a local funding match of at least 25% is required. This letter serves as San Bernardino County Fire Protection District's commitment to meet the local match fund requirements for the Hazard Mitigation Grant Program.

SOURCE OF NON-FEDERAL FUNDS:	LOCAL AGENCY FUNDING	OTHER AGENCY FUNDING	PRIVATE NON-PROFIT FUNDING	STATE AGENCY FUNDING
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NAME OF FUNDING SOURCE:	San Bernardino County Fire Protection District			
FUNDS AVAILABILITY DATE:	January 26, 2021			
	PROVIDE EXACT MONTH/DATE/YEAR OF AVAILABILITY OF FUNDS			
FEDERAL SHARE AMOUNT REQUESTED:	\$749,416			
	MUST MATCH \$ AMOUNT PROVIDED IN SUBAPPLICATION			
LOCAL SHARE AMOUNT MATCH:	\$249,805			
	MUST EQUAL A MINIMUM OF THE 25% FEDERAL SHARE REQUESTED			
FUNDING TYPE:	Administration, Cash, Force Account Labor, Agency Personnel			

If additional federal funds are requested, an additional local match fund commitment letter will be required.

Please contact Dan Munsey at 909-387-5779 [dmunsey@sbcfire.org](mailto:dmunsey@sbcfire.org) if you have any questions.

Sincerely,

Curt Hagman  
Chairman, Board of Directors  
San Bernardino County Fire Protection District

#### BOARD OF DIRECTORS

Col. Paul Cook (Ret.)  
First District

Janice Rutherford  
Second District

Dawn Rowe  
Vice-Chair  
Third District

Curt Hagman  
Chairman  
Fourth District

Joe Baca Jr.  
Fifth District

Leonard X. Hernandez  
Chief Executive Officer

## BCA Report

### Approach to Analysis

Wildfire and vegetation management projects mitigate at-risk structures and associated loss of life from the threat of future wildfire(s). GIS-based analysis was used as the primary source of data for input into the BCA tool.

The first step was to identify the specific communities that were directly impacted by the wildfires of 2020, specifically the El Dorado Fire. All non-federal parcels were identified and the project areas were calculated by adding each individual parcel size to determine our total project area in acres, to include areas of effectiveness for both defensible space and hazardous fuels reduction.

Next we determined the total number of households within each our impacted communities. Using community demographic data we were able to determine a total population, median home value, total number of households, average household size, and cost(s) per square ft.

A ratio/BCA score was generated and the associated benefit(s) were compared to total project cost. Refer to BCA report attached.

**FEMA**

## Benefit-Cost Calculator

V.6.0 (Rev. 2020/05/2020)



Home



Print (PDF)



Help/Instructions

Event Name: Mitigation Type: 

Mitigation Cost Range:

Mitigation Cost Type:

Reference:  and Project Type: Project Name: Mitigation Type: 

Mitigation Cost Range:

Mitigation Cost Type:

Reference:  and Project Type: 

## Damage Analysis Parameters - Damage Frequency Assessment

Year of Analysis Conducted	2021
Year Property was Built	0
Analysis Duration (years)	30
Use Default: <input checked="" type="radio"/> Yes <input type="radio"/> No	

## Historical Damages Before Mitigation

Damages Before Mitigation

SELECT		DAMAGE YEAR	RECURRENCE INTERVAL (YEARS)	OTHER DAMAGES (\$)	CATEGORY 1-10	OPTIONAL DAMAGES		VOLUNTEER COSTS		DAMAGES (\$)	TOTAL DAMAGES (\$)	INTERRUPTED DAMAGES (\$)
						Category 1-10	Category 1-10	NUMBER OF VOLUNTEERS	NUMBER OF DAYS			
		2021	25	250,000,000	0	0	0	0	0	250,000,000	250,000,000	0
Use Damages Before Mitigation												

## Expected Damages After Mitigation

Damages After Mitigation

SELECT		RECURRENCE INTERVAL (YEARS)	OTHER DAMAGES (\$)	CATEGORY 1-10	OPTIONAL DAMAGES		VOLUNTEER COSTS		DAMAGES (\$)	TOTAL DAMAGES (\$)
					Category 1-10	Category 1-10	NUMBER OF VOLUNTEERS	NUMBER OF DAYS		
		25	25,000,000	0	0	0	0	0	25,000,000	25,000,000
Use Damages After Mitigation										

## Annualized Results - Before Mitigation

Annualized Recurrence Interval (years)		Damages and Losses (\$)		Annualized Damages and Losses (\$)	
20		255,330,960	12,767,502	12,767,502	
		255,330,960	12,767,502	12,767,502	

## Annualized Results - After Mitigation

Annualized Recurrence Interval (years)		Damages and Losses (\$)		Annualized Damages and Losses (\$)	
20		25,000,000	1,245,997	1,245,997	
		25,000,000	1,245,997	1,245,997	

**Project Configuration**

Project Title: FA-00000337

Property Location: 92339 Foxes Falls, California Use Property Location? ☒ Yes

Latitude: 34.08533 Longitude: 118.904905

92339 California San Bernardino

Property Structure Type: Other

Hazard Type: Wildfire

Mitigation Action Type: Defensive Space, Hazardous Fuels Reduction

Property Title: Defensive Space, Hazardous Fuels Reduction @ 92339 Foxes Falls, California

Damage and Frequency Relationship based on: ☒ Historical Damages ☐ Professional Expected Damages

**Cost Estimation**

Enter the Project Useful Life (years): 2

Enter the Initial Project Costs (\$): 991,081

Enter the Number of Maintenance Years: 2 Use Defaults? ☒ Yes

Enter the Annual Maintenance Costs (\$): \$500

Total Mitigation Project Cost (\$): 999,221

**Standard Benefits - Ecosystem Services**

Total Project Area (Acres or sq ft): 1.850 Use Acres? ☒ Yes

Enter the percent land use of the Project Area (Acres): 0

Green Open Space (%): 0

Riparian (%): 0

Recreation (%): 0

Roadway (%): 0

Urban & Suburban (%): 0

Expected Annual Ecosystem Services Benefits (\$): 0

**Benefit-Cost Summary**

Total Standard Mitigation Benefits (\$): \$20,623,918

Total Mitigation Project Benefits (\$): \$20,623,918

Total Mitigation Project Costs (\$): 999,221

Benefit-Cost Ratio (Mitigation): 20.64

Benefit-Cost Ratio (Standard x Score): 20.64



## SAN BERNARDINO COUNTY FIRE PROTECTION DISTRICT

157 W 5<sup>th</sup> Street, 2<sup>nd</sup> Floor • San Bernardino, CA 92415-0451 • (909) 387-5974 • Fax (909) 387-5685

Administration  
Headquarters  
sbcfire.org

Daniel R. Munsey  
Fire Chief/Fire Warden

Thomas Marshall  
Deputy Chief of Operations

Bertral Washington  
Deputy Chief of Administration

### PROJECT MAINTENANCE LETTER

January 26, 2021

California Governor's Office of Emergency Services  
Hazard Mitigation Grants Program Unit  
3650 Schriever Avenue  
Mather, CA 95655

Re: FM-5325 PA 00000337 Subapplication Funding Match Commitment Letter

Dear State Hazard Mitigation Officer:

This is to confirm that San Bernardino County Fire Protection District is committed to perform the necessary maintenance for the entire useful life of this project for four years once completed. The San Bernardino County Fire Protection District is allocating an annual budget of \$5,082,064 which will allow maintenance to occur as needed to ensure the treatment areas remain at reduced risk from fire hazards in good repair and operational.

#### ENTITY RESPONSIBLE FOR THE MAINTENANCE:

San Bernardino County Fire Protection District

#### MAINTENANCE TASKS INVOLVED:

The maintenance tasks will be performed and/or maintained on an on-going basis for four years post the grant period to include the following:

- Annual visual inspection of all treatment areas
- Report potential fire hazards to Land Use for code enforcement notification
- Maintain website presence for fire hazard information and alerts
- Conduct 10 community chipper days annually

#### FUTURE MAINTENANCE SCHEDULE:

Visual Inspections will occur on or about the following dates annually until January 2026:

Angelus Oaks – September 30 – October 15, 2024

Forest Falls – October 21 – November 5, 2024

Mountain Home Village – January 6 – January 21, 2025

Oak Glen – January 27 – February 4, 2025

Yucaipa Foothills – January 27 – February 4, 2025

- Potential fire hazard reporting will occur on an on-going basis as observed by crew members who are working in or near the treatment areas.
- Website reviews/updates to the aforementioned schedule will occur each October, January, April and July until 2026.
- Chipper days will be conducted annually

#### BOARD OF DIRECTORS

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First District

Janice Rutherford  
Second District

Dawn Rowe  
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Curt Hagman  
Chairman  
Fourth District

Joe Baca Jr.  
Fifth District

Leonard X. Hernandez  
Chief Executive Officer



#### **FUTURE COST OF MAINTENANCE**

The annual costs associated with visual inspection consist of:

360 hours of visual inspection by a Fire Suppression Aide III at the approved reimbursement rate of \$52.65 per hour for 10 hours per day which equals \$18,954.

The annual cost of reporting potential fire hazards to code enforcement during the course of visual inspections and/or while conducting other unrelated job performance duties in the vicinity of the treatment areas require phone calls or emails for which the cost is \$ 0.00.

The annual cost of maintaining a website for property owners to be: educated about ways to mitigate fire hazards; informed of San Bernardino County Fire Protection District sponsored chipper days; and alerted to fire hazard advisories is based on a rate of \$300 per update X 4 occurrences which equals \$1,200.

The annual cost of conducting 10 community chipper days consist of 2 Fire Suppression Aide III at the approved reimbursement rate of \$52.65 per hour X 10 hours per day is \$1,053.00; chipping crews based on 6 FSA 1 (Extra Help) X 8 hours per day is \$683.52; and 2 chippers at the approved rate of \$63.96 X 10 hours per day is \$1,279.20. The total annual cost is \$3,015.72 per day X 10 days which equals \$30,157.20.

<b>Activity</b>	<b>Annual Budget</b>	<b>4 year budget</b>
Visual Inspections	\$ 18,954.00	\$ 75,816.00
Reporting Potential Fire Hazards	\$ -	\$ -
Website Maintenance	\$ 1,200.00	\$ 4,800.00
Community Chipper Days	\$ 30,157.20	\$ 120,628.80
Total Post Grant Maintenance	\$ 50,311.20	\$ 201,244.80

#### **SOURCE OF FUTURE MAINTENANCE FUNDS:**

The annual budget associated with the 4-year maintenance cost will be supported by the San Bernardino County Fire Protection District's budget of \$ 5,082,064.

Please contact Dan Munsey at 909-387-5779 [dmunsey@sbcfire.org](mailto:dmunsey@sbcfire.org) if you have any questions.

Sincerely,

Curt Hagman  
Chairperson, Board of Directors  
San Bernardino County Fire Protection District

## Environmental

Any ground disturbing activity that may result from the use of light-heavy equipment, will be minimized by using pre-existing roadways and is not expected as a direct consequence of the proposed fuels reduction activities. No roadways will be constructed during project activities.

This project will likely fall under the Categorical Exemption Class 4, section 15304 "Minor Alterations to Land." Class 4 consists of "minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes. Examples include but are not limited to: (i) Fuel management activities within 30 feet of structures to reduce the volume of flammable vegetation, provided that the activities will not result in the taking of endangered, rare, or threatened plant or animal species or significant erosion and sedimentation of surface waters.

This exemption shall apply to fuel management activities within 100 feet of a structure if the public agency having fire protection responsibility for the area has determined that the 100 feet of fuel clearance is required due to extra hazardous fire conditions." Potential for any environmental impacts will be identified during project development. All necessary surveys are to be completed prior to project implementation (archaeological, wildlife, and water course assessment). Impacts will be mitigated by following the forest practice rules (erosion control measures, stream buffers, tree spacing requirements, etc.) and environmental laws (CEQA, ESA, CWA, FPA, and NEPA). Ideally, there would be no significant environmental impacts anticipated to occur to aesthetics, agriculture, forestland/timberland, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazard and hazardous material, hydrology and water quality, land use planning, mineral resources, noise, population and housing, public services, recreation, transportation/traffic, or to utilities and service systems. Documentation of the environmental review will be kept on file with the San Bernardino County Fire Protection District.

**FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)  
SITE INFORMATION, ENVIRONMENTAL REVIEW, AND CHECKLIST**

**A. PURPOSE:**

Federal agencies are required by law to independently assess the potential environmental impacts resulting from their proposed actions. This form will be used to screen applications for necessary compliance with those laws. It will be used to assess the amount of available information for environmental compliance and the cost burden of environmental compliance relative to the total project cost. It is extremely important that the information provided be in accurate and sufficient detail to permit FEMA to evaluate the environmental conditions and/or features for providing financial assistance to Subapplicants.

Although the information may be obtained from FEMA's own observations, previous environmental studies and/or research must be utilized. Such information is available from the jurisdictional Federal, state and local resource/regulatory agencies responsible for protecting or regulating resources such as wetlands, floodplains, coastal zones, threatened and endangered species, farmland, or properties listed in or considered eligible for listing to the National Register of Historic Places.

This information is designed to obtain an understanding by FEMA of the project site's present environmental condition and the proposed project's elements that may affect the environment. It is important to understand the comprehensive nature of the information requested. Information must be provided for the site and immediate surrounding area that will be directly or indirectly affected by implementation (construction and operation) of the Subapplicant's proposal.

**B. PURPOSE AND NEED:**

FEMA will provide federal financial assistance to State and Local governments and certain non-profit entities to respond to, recover from or help mitigate disasters by providing financial assistance from the grant programs within its jurisdiction.

**C. PROJECT DESCRIPTION:**

<b>APPLICATION ID:</b>	<u>PA-00000337</u>
<b>PROPOSED PROJECT LOCATION:</b>	<u>San Bernardino, CA</u> (ADDRESS, CITY, COUNTY, STATE, ZIP CODE)
<b>LATITUDE/LONGITUDE:</b>	<u>34.08333, -116.904905</u>
<b>PROPOSAL:</b>	<u>Community Fire Hazard Mitigation Project</u>
<b>SITE SIZE:</b>	<u>1800 acres</u>

#### D. PROJECT COORDINATION, PERMITS AND APPROVALS:

Will the proposal require the following agency coordination, permits and/or approvals?

	YES	NO
1. CWA Section 404/RHA Section 10	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Clean Water Act Section 401/402	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. EO 11988 Floodplains 8-step Process	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. EO 11990 Wetlands 8-step Process	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. CZMA CC/Negative Determination	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Section 7 ESA	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. NHPA Section 106	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. FLPA Farmland Conversion Form AD-1006	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. CAA General Conformity Determination	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Migratory Bird Treaty Act	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Fish and Wildlife Coordination Act	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Magnuson-Stevens Fishery & Management Act	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13. Other: _____	<input type="checkbox"/>	<input checked="" type="checkbox"/>

#### E. POTENTIAL ENVIRONMENTAL IMPACT:

Are any of the following land uses or environmental resources located on, or adjacent to the project site, and are directly or indirectly impacted by the proposed project?

Physical Characteristics of site(s) or vicinity:	YES	NO	POSSIBLE	EXHIBITS*
1. Flat, rolling, hilly, steep slopes, mountainous?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Soil type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Any surface water bodies (streams, saltwater, lakes, ponds, rivers, wetlands) on or near the project area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Will the project require work over, in or adjacent to waters of the U.S.?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Alter existing drainage pattern of the site, alter course of surface waters?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Create increased stormwater runoff or otherwise degrade water quality?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Source of collection and disposal of storm water runoff?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Will the proposal alter surface water quality?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Affect a sole source aquifer?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Affect a Wild and Scenic River?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Involve construction in the Coastal Zone?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Could the proposal lead to increased erosion by clearing, grading, excavation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Could the proposal cause changes in geological substructures?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Do seismic hazards exist in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		YES	NO	POSSIBLE	EXHIBITS*
15.	Could the proposal increase mudslides, landslides, ground failure, subsidence or liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16.	Located in a non-attainment or maintenance area for criteria air pollutants?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	Increase emission levels of regulated air pollutants and exceed <i>de minimis</i> standards?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	What types of noise would be created by this project (traffic, construction, operation)? Will the source produce short-term or long-term impacts?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	Affect sensitive receptors (residences, institutions, hospitals, schools within ¼ mile of project area)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.	Will views in the immediate vicinity be altered or obstructed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.	Would the proposal result in an aesthetically negative site open to public view?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	Will the proposal produce light or glare?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.	Could light or glare be a safety hazard or interfere with views?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### Biological Characteristics:

		YES	NO	POSSIBLE	EXHIBITS*
1.	Vegetation type? (Deciduous, coniferous, shrubs, grasses, pasture, cropland, hydrophytic)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2.	Wildlife observed on site or known to exist within immediate vicinity (Birds, mammals, fish)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.	Potential for endangered or threatened species and/or critical habitat in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4.	Result in the deterioration of existing or critical habitat?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5.	Have a substantial adverse effect on any riparian habitat?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Interfere substantially with the movement of any migratory fish?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Located in a migratory flyway or migration route?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.	Conflict with any local ordinances protecting resources such as tree preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9.	Introduce or cause the spread of invasive species during construction and/or operation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10.	Affect any national/state/local wildlife/waterfowl refuges on or adjacent to project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

#### Land Use and Socioeconomic Characteristics:

		YES	NO	POSSIBLE	EXHIBITS*
1.	Have a disproportionate impact on low income or minority populations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Physically divide a community?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Induce substantial population growth?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Alter the present or planned use of an area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	YES	NO	POSSIBLE	EXHIBITS*
5. Displace a substantial number of people, housing or businesses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Would the proposal affect existing housing?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Convert important farmland?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Be located within two miles of a public airport?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Has any part of the site been classified an environmentally sensitive area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Displace any existing recreational uses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### Historic and Cultural Characteristics:

	YES	NO	POSSIBLE	EXHIBITS*
1. Result in an effect to historic properties on-site or adjacent to the site listed on or eligible for listing on the National Register of Historic Places?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Is the proposed site on or adjacent to tribal lands?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Result in excavation of soil?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Would the proposal alter or destroy prehistoric or historic archeological sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Result in an effect to properties designated as National Historic Landmarks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Would the proposal result in an adverse physical or aesthetic affect to a historic property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Anticipated level of effort for Section 106 compliance?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

#### Hazardous/Toxic Materials:

	YES	NO	POSSIBLE	EXHIBITS*
1. Does the site presently have known USTs or ASTs?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is there any evidence of existing USTs, such as vent pipes, fill caps, etc.?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Have UST's ever been located on the property?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Do the past uses of the site suggest hazardous or toxic materials may be present at or near the site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are there curb cuts, footings, or other evidence of former buildings on site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Does the site or building contain any of the following: <ul style="list-style-type: none"> <li>• PCB electric transformers?</li> <li>• Urea formaldehyde? Friable asbestos?</li> <li>• Lead-based paints? Radioactivity?</li> <li>• Radon?</li> <li>• Soil contamination?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Is the site on or near an EPA or State Superfund or priority cleanup?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### Energy and Utilities:

	YES	NO	POSSIBLE	EXHIBITS*
1. What kinds of energy (electric, natural gas, oil) will be used to meet the project's needs for construction/operation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



- |  | YES                      | NO                                  | POSSIBLE                 | EXHIBITS*                |
|--|--------------------------|-------------------------------------|--------------------------|--------------------------|
| 2. Are utilities available to the site? What type (electricity, natural gas, water, garbage, telephone, sanitary sewer)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Public Services and Facilities:**

- |   | YES                      | NO                                  | POSSIBLE                 | EXHIBITS*                |
|---|--------------------------|-------------------------------------|--------------------------|--------------------------|
| 1. Will the project result in an increased need for public services (fire, police, health care, schools)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Would the proposal result in a decrease in parks or open space?  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Transportation:**

- |   | YES                      | NO                                  | POSSIBLE                            | EXHIBITS*                |
|---|--------------------------|-------------------------------------|-------------------------------------|--------------------------|
| 1. Will the project change traffic patterns or volumes in the area?                                 | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Does the site have access constraints?   | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Will the project require any new roads or streets, or improvements to existing roads or streets? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |
| 4. Will the proposal result in an increase of vehicular trips per day to the site?                  | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 5. Will the proposal result in increased hazards to motor vehicles, bicyclists or pedestrians?      | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |

**Construction Activities:**

- |  | YES                      | NO                                  | POSSIBLE                 | EXHIBITS*                |
|--|--------------------------|-------------------------------------|--------------------------|--------------------------|
| 1. Would the proposal result in the following?                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| a) increased ambient noise due to equipment?                                       | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) degrade local air quality due to dust, equipment exhaust and/or burning debris? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c) deteriorate water quality from erosion or pollutant runoff?                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d) disrupt off-site and local traffic patterns?                                    | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Alternatives Considered:**

- |   | EXHIBITS*                |
|---|--------------------------|
| 1. Alternative locations (identify):<br><div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> Non-federal, private, and/or public property: to include post fire recovery efforts in the forms of soil stabilization, flood diversion, and reforestation efforts. </div>          | <input type="checkbox"/> |
| 2. Alternative designs (identify):<br><div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> In addition to the proposed actions of creating defensible space and performing hazardous fuels reduction, other post fire recovery efforts would be evaluated and considered. </div> | <input type="checkbox"/> |

**CEQ Significance Factors (40 CFR 1508.27):**

	YES	NO	POSSIBLE	EXHIBITS*
1. Is there anything in the context of the project that would suggest impacts might be significant?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is the intensity of any of the following factors such that the impacts might be significant?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a) Beneficial and adverse impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Human health or safety impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Impacts on unique characteristics of the area, such as historic or cultural resources, park lands, prime farmlands, wetlands, floodplains, wild and scenic rivers, or ecologically critical areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Impacts that are likely to be highly controversial?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Impacts that are highly uncertain or involve unique/unknown risks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) The action establishes a precedent for future actions with potentially significant effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Impacts that are reasonably expected to be cumulative?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Adverse impacts on districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, or impacts that may cause loss or destruction of significant scientific, cultural, or historical resources?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
i) Adverse impacts on threatened or endangered species or its critical habitat as determined under the Endangered Species Act?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
j) The action threatens a violation of Federal, state or local law or requirements imposed for the protection of the environment?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**F. Does the proposal result in FEMA's Extraordinary Circumstances?**

I. Greater scope or size than normal for a particular category of action?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
II. High level of public controversy?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
III. Potential to degrade already poor environmental conditions?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
IV. Use of unproven technology with the potential for adverse effect?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
V. Presence of endangered or threatened species or their critical habitat?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

- VI. Presence of archaeological, cultural or historic properties? ☐ Yes ☒ No
- VII. Presence of hazardous or toxic substances at levels that exceed Federal, state, or local regulations or standards requiring action? ☐ Yes ☒ No
- VIII. Potential to affect adversely special status areas such as wetlands, coastal zones, wildlife refuges, wilderness areas, wild and scenic rivers or sole source drinking water aquifers? ☐ Yes ☒ No
- IX. Potential to adversely affect human health and safety? ☐ Yes ☒ No
- X. Would the project violate federal, state, local laws or tribal law or requirement imposed for the protection of the environment? ☐ Yes ☒ No
- XI. Potential for significant cumulative impact with other RFFAs? ☐ Yes ☒ No
- XI. Potential for significant cumulative impact with other RFFAs? ☐ Yes ☒ No
- If yes, identify: \_\_\_\_\_

G. Is the proposed project for HMA funding part of a larger proposal that would subject the entire project to Federal environmental review? ☒ Yes ☐ No

H. Does the application contain measures to avoid, reduce, minimize, or compensate potential environmental impacts? ☒ Yes ☐ No

If yes, describe: Impacts will be mitigated by following the forest practice rules (erosion control measures, stream buffers, tree spacing requirements, etc.) and environmental laws (CEQA, ESA, CWA, FPA, and NEPA). Ideally, there would be no significant environmental impacts are anticipated to occur.

I. Were mitigation measures included in the proposal's budget? ☐ Yes ☒ No

J. What is the potential EHP cost of compliance relative to the requested federal share (cost of compliance refers to FEMA or FEMA contractor preparation of compliance activities not cost for mitigation measures that the Subapplicant would be responsible for):

- High (>50% of requested Federal share) ☐
- Medium (25-50% of requested Federal share) ☐
- Low (<25% of requested Federal share) ☒

K. What is the anticipated Environmental compliance costs associated with the overall project?

- High (>50% of requested Federal share) ☐
- Medium (25-50% of requested Federal share) ☐
- Low (<25% of requested Federal share) ☐
- Not enough information to determine ☒

**\* IF APPLICABLE, ADDITIONAL INSTRUCTIONS FOR NARRATIVE RESPONSES AND EXHIBITS**



1. **Floodplains** – Provide FEMA FIRM Map with site location clearly marked.
2. **Wetlands** – If the primary site alternative and/or its practicable alternative require a Section 10 of the Rivers and Harbors Act or a CWA Section 404 permit. Provide status of USACE permit receipt. Attach NWI wetlands map, as necessary.
3. **Viewshed** – If the proposed project is located in or adjacent to a residential or historic district, perform and provide a Visual Impact Assessment.
4. **Existing habitat** – Identify and describe any existing, observed in the field, or known or expected to exist flora and fauna species at the project site and immediately surrounding the site.
5. **Endangered/threatened species and/or critical habitat** – Contact local Ecological Services Field Office of the U.S. Fish and Wildlife Service (FWS) and obtain information and listing of any E/T known to exist at the site or in the immediate vicinity.
6. **Migratory Flyway or migration barrier** – If the proposed project is new construction or extension of an existing tower of 30' in height or more complete Tower Site Evaluation Form.
7. **Invasive Species** – Provide information about Subapplicant's plans for re-vegetation and avoidance of spreading invasive species during construction.
8. **Minority of low-income populations** – If the proposed project will impact minority and low-income populations as identified in Executive Order 12898, perform evaluation in accordance with EPA guidance on performing Environmental Justice Analysis.
9. **Farmland** – If alternative would convert or impact important farmland, complete and submit NRCS Form AD 1006 to the Natural Resources Conservation Service for rating. Attached completed and signed form (by NRCS).
10. **Historic and Cultural Characteristics** – Identify any listed, eligible or potentially eligible historic/archaeological resources the APE. Provide CHRIS, data sheets or other sources obtained from State Historic Preservation Officers used to identify such properties.
11. **Hazardous Substances** – Provide a description of any hazardous, toxic materials found at the site.
12. **Roadway and Access** – Provide description of what, where, how, length, width, depth, material, permanent or temporary and drawings including site plan and cross sectional drawing. If roadway is temporary, how will fill material (If CWA fill permit required, see #2 above) or roadway surfacing be removed and site restored.
13. **Alternatives Considered** – Provide a description and a justification for elimination of other proposed project locations and designs considered.

**PREPARED BY:** Jarrod Dowden

**TITLE:** Fire Suppression Aide, Natural Resources Advisor

**TELEPHONE:** 909-380-3873

**DATE:** 1/22/2021

## Authorization

DESIGNATION OF APPLICANT'S AGENT RESOLUTION No. 2018-111  
FOR NON-STATE AGENCIES

BE IT RESOLVED BY THE Board of Directors OF THE San Bernardino County Fire Protection District  
(Governing Body) (Name of Applicant)

THAT Fire Chief/Fire Warden OR  
(Title of Authorized Agent)

Deputy Fire Chief OR  
(Title of Authorized Agent)

Finance Manager  
(Title of Authorized Agent)

is hereby authorized to execute for and on behalf of the San Bernardino County Fire Protection District, a public entity  
(Name of Applicant)

established under the laws of the State of California, this application and to file it with the California Governor's Office of Emergency Services for the purpose of obtaining certain federal financial assistance under Public Law 93-288 as amended by the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, and/or state financial assistance under the California Disaster Assistance Act.

THAT the San Bernardino County Fire Protection District, a public entity established under the laws of the State of California,  
(Name of Applicant)

hereby authorizes its agent(s) to provide to the Governor's Office of Emergency Services for all matters pertaining to such state disaster assistance the assurances and agreements required.

Please check the appropriate box below:

- ☒ This is a universal resolution and is effective for all open and future disasters up to three (3) years following the date of approval below.  
☐ This is a disaster specific resolution and is effective for only disaster number(s) \_\_\_\_\_

Passed and approved this 12th day of June, 2018

Robert A Lovingood, Chairman

(Name and Title of Governing Body Representative)

Curt Hagman, Vice Chairman

(Name and Title of Governing Body Representative)

Janice Rutherford, James Ramos, Josie Gonzales: Directors

(Name and Title of Governing Body Representative)

CERTIFICATION

I, Laura H. Welch, duly appointed and Secretary of the Board of  
(Name) (Title)

San Bernardino County Fire Protection District, do hereby certify that the above is a true and correct copy of a  
(Name of Applicant)

Resolution passed and approved by the Board of Directors of the San Bernardino County Fire Protection District  
(Governing Body) (Name of Applicant)

on the 12th day of June, 2018

[Signature]  
Deputy (Signature)

Secretary to the Board of Directors  
(Title)

## Supporting Documents



**SAN BERNARDINO COUNTY FIRE PROTECTION DISTRICT  
FISCAL YEAR 2020/2021 FEE SCHEDULE**

**Community Safety Division**

**Section A - Construction Permits:**

- (1) Fire Sprinkler Systems:
- (A) Commercial /Industrial National Fire Protection Association (NFPA)  
13 Fire Sprinkler System – Modifications:
- (I) Plan Review – per building or per system ..... \$189.00
  - (II) Inspection, 1-5 fire sprinkler heads, per system ..... \$219.00
  - (III) Inspection, 6-20 fire sprinkler heads, per system ..... \$365.00
  - (IV) Inspection, 21-50 fire sprinkler heads, per system .... \$438.00
  - (V) Inspection, 51-100 fire sprinkler heads, per system .. \$548.00
  - (VI) Inspection, 101-350 fire sprinkler heads, per system \$639.00
  - (VII) Inspection, >350 fire sprinkler heads, per system ..... \$730.00
  - (VIII) Inspection, each additional system (same hazard  
class)..... \$383.00
- (B) Commercial/Industrial NFPA 13 Fire Sprinkler System - New  
System:
- (I) Plan Review per building or per plan type ..... \$662.00
  - (II) Plan Review – each additional plan of the same type . \$63.00
  - (III) Inspection, 1-20 fire sprinkler heads, per system ..... \$365.00
  - (IV) Inspection, 21-50 fire sprinkler heads, per system .... \$438.00
  - (V) Inspection, 51-100 fire sprinkler heads, per system .. \$548.00
  - (VI) Inspection, 101-350 fire sprinkler heads, per system \$639.00
  - (VII) Inspection >350 fire sprinkler heads, per system ..... \$730.00
  - (VIII) Inspection, each additional system (same hazard  
class)..... \$219.00
- (C) Commercial Fire Pump:
- (I) Plan Review ..... \$851.00
  - (II) Inspection ..... \$730.00
- (D) Single/Two Family Residential - NFPA 13D Fire Sprinkler:
- (I) Plan Review - per system or plan type ..... \$425.00
  - (II) Plan Review – each additional plan of the same type . \$32.00
  - (III) Inspection, 1-20 fire sprinkler heads, per system ..... \$438.00
  - (IV) Inspection, 21-30 fire sprinkler heads, per system. ... \$511.00
  - (V) Inspection, 31-40 fire sprinkler heads, per system .... \$657.00
  - (VI) Inspection, 41-50 fire sprinkler heads, per system .... \$803.00
  - (VII) Inspection 50+ fire sprinkler heads, per system ..... \$840.00
  - (VIII) Inspection, Tract homes, per system..... \$383.00
  - (IX) Modifications to existing system (per system) ..... \$292.00
  - (X) Manufactured Home-Factory installed sprinklers ..... \$319.00
  - (XI) Bucket test or pump test..... \$110.00
- (E) Multi-Family Residential Fire Sprinkler, NFPA 13R:

# ATTACHMENT A

	(I)	Plan Review – per system or per plan type .....	\$756.00
	(II)	Plan Review – each additional plan of the same type ..	\$63.00
	(III)	Inspection, 1-50 fire sprinkler heads, per system .....	\$584.00
	(IV)	Inspection, 51-100 fire sprinkler heads, per system ..	\$730.00
	(V)	Inspection, >100 fire sprinkler heads, per system ...	\$1168.00
	(VI)	Each additional system (same plan type) .....	\$602.00
	(VII)	Modification to existing system (per system) .....	\$730.00
(F)		Private Underground Fire Line:	
	(I)	Plan Review .....	\$473.00
	(II)	Inspection, 1-10 valves/hydrants, per system.....	\$657.00
	(III)	Inspection, 11-20 valves/hydrants, per system.....	\$803.00
	(IV)	Inspection, 21-30 valves/hydrants, per system.....	\$876.00
	(V)	Inspection, 31-40 valves/hydrants, per system.....	\$949.00
	(VI)	Inspection, >40+ valves/hydrants, per system.....	\$1022.00
(G)		In-Rack Sprinklers:	
	(I)	Plan Review .....	\$567.00
	(II)	Inspection, 1-10 sprinkler heads, per system .....	\$438.00
	(III)	Inspection, 11-20 sprinkler heads, per system .....	\$584.00
	(IV)	Inspection, 21-30 sprinkler heads, per system .....	\$803.00
	(V)	Inspection, >30 sprinkler heads, per system .....	\$1022.00
(2)		Pre-Engineered Systems/Equipment:	
	(A)	Plan Review- per building or per system.....	\$473.00
	(B)	Inspection, Spray/Dipping/Powder coating booths, per booth .....	\$548.00
	(C)	Inspection, Industrial Ovens, per system .....	\$256.00
	(D)	Inspection, Vapor Recovery, per system.....	\$256.00
	(E)	Inspection, Refrigeration, per system.....	\$548.00
	(F)	Inspection, Dust Collection, per system .....	\$548.00
	(G)	Inspection, Hood and Duct Extinguishing System, per system.....	\$475.00
	(H)	Inspection, Gas System, per system.....	\$548.00
	(I)	Inspection, Smoke Control System, per system.....	\$840.00
	(J)	Inspection, Battery System, per system .....	\$402.00
	(K)	Inspection, Special Extinguishing System, per system .....	\$694.00
	(L)	Inspection, Commercial Solar Power Generating Station ....	\$402.00
	(M)	Inspection, Commercial Structure-Mounted Photovoltaic System .....	\$402.00
	(N)	Inspection, Emergency Responder Radio Coverage System .....	\$694.00
	(O)	Inspection, Marinas with Fueling (serving 5 or more vessels).....	\$548.00
	(P)	Inspection, Generators, per system .....	\$402.00
(3)		High-Piled Combustible Storage:	
	(A)	Plan Review .....	\$473.00

## ATTACHMENT A

- |  |   |           |
|--|---|-----------|
| (B)  | Inspection, 500-10,000 sq. ft.....  | \$402.00  |
| (C)  | Inspection, 10,001-50,000 sq. ft.....   | \$548.00  |
| (D)  | Inspection, 50,001-100,000 sq. ft.....  | \$694.00  |
| (E)  | Inspection, each additional 100,000 sq. ft.....   | \$365.00  |
| <br>(4) Hose Rack/Standpipe Systems:                     |   |           |
| (A)  | Plan Review - per building or per system.....   | \$567.00  |
| (B)  | Inspection, 1-5 Hose Racks/Standpipes .....   | \$438.00  |
| (C)  | Inspection, 6-10 Hose Racks/Standpipes .....  | \$584.00  |
| (D)  | Inspection, each additional hose rack/standpipe (over 10) ....                              | \$73.00   |
| <br>(5) Fire Alarm – New System: Plan Review/Inspection: |   |           |
| (A)  | Waterflow Monitoring System Plan Review per system or per plan type .....                   | \$378.00  |
| (B)  | Waterflow Monitoring System Plan Review – each additional plan of the same type.....        | \$32.00   |
| (C)  | Manual/Automatic Fire Alarm System Plan Review per system or plan type .....                | \$567.00  |
| (D)  | Manual/Automatic Fire Alarm System Plan Review – each additional plan of the same type..... | \$63.00   |
| (E)  | Inspection, 1-10 devices, per system .....  | \$584.00  |
| (F)  | Inspection, 11-50 devices, per system .....   | \$803.00  |
| (G)  | Inspection, 51-100 devices, per system .....  | \$1095.00 |
| (H)  | Inspection, >100 devices, each additional 10 devices, per system.....                       | \$146.00  |
| (I)  | Inspection, each additional system (same hazard class) .....                                | \$548.00  |
| <br>(6) Fire Alarm System Modifications (All Types):     |   |           |
| (A)  | Plan Review – per building or system .....  | \$378.00  |
| (B)  | Inspection, 1-10 devices, per system .....  | \$438.00  |
| (C)  | Inspection, 11-50 devices, per system .....   | \$529.00  |
| (D)  | Inspection, 51-100 devices, per system .....  | \$621.00  |
| (E)  | Inspection >100 devices, each addl.10 devices, per system..                                 | \$91.00   |
| (F)  | Plan review, Fire Alarm Control Panel Upgrade.....  | \$189.00  |
| (G)  | Inspection, Fire Alarm Control Panel Upgrade .....  | \$219.00  |
| <br>(7) Aboveground Storage Tank:                        |   |           |
| (A)  | Plan Review .....   | \$378.00  |
| (B)  | Inspection, 1st tank at location .....  | \$438.00  |
| (C)  | Inspection, each additional tank .....  | \$219.00  |
| <br>(8) Single Family Residential Construction Projects: |   |           |
| (A)  | Plan Review – per building or per plan type .....   | \$189.00  |
| (B)  | Inspection, new construction .....  | \$183.00  |
| (C)  | Inspection, tract home (per lot) .....  | \$128.00  |
| (D)  | Inspection, addition .....  | \$110.00  |

- (9) **Multi-Family Residential Construction Projects:**
- (A) Plan Review – per building or per plan type ..... \$567.00
  - (B) Plan Review – each additional plan of the same type ..... \$63.00
  - (C) Inspection, 1-10,000 sq. ft. per building ..... \$657.00
  - (D) Inspection, 10,001-25,000 sq. ft. per building ..... \$767.00
  - (E) Inspection, 25,001-50,000 sq. ft. per building ..... \$876.00
  - (F) Inspection, >50,000 sq. ft., each additional 10,000 sq. ft. per building ..... \$33.00
  - (G) Each additional building same plan type ..... \$219.00
- (10) **Commercial/Industrial New Construction Projects:**
- (A) Plan Review - per building or per plan type ..... \$567.00
  - (B) Plan Review - each additional plan of the same type ..... \$63.00
  - (C) Inspection, 1-10,000 sq. ft., per building ..... \$438.00
  - (D) Inspection, 10,001-50,000 sq. ft., per building ..... \$748.00
  - (E) Inspection, 50,001-100,000 sq. ft., per building ..... \$913.00
  - (F) Inspection, 100,001-500,000 sq. ft., per building ..... \$1004.00
  - (G) Inspection, 500,001 to 1,000,000 sq. ft., per building ..... \$1168.00
  - (H) Inspection, >1,000,000 sq. ft., each additional 100,000 sq. ft., per building ..... \$511.00
  - (I) Each additional building of the same plan type ..... \$219.00
  - (J) Miscellaneous construction projects ..... \$219.00
- (11) **Commercial Tenant Improvements:**
- (A) Plan Review - per building ..... \$425.00
  - (B) Inspection, 1-10,000 sq. ft. per building ..... \$365.00
  - (C) Inspection, 10,001-50,000 sq. ft. per building ..... \$675.00
  - (D) Inspection, 50,001-100,000 sq. ft. per building ..... \$840.00
  - (E) Inspection, Each additional 10,000 sq. ft. per building ..... \$292.00
  - (F) Miscellaneous tenant improvement projects ..... \$219.00
- (12) **Planning Projects:**
- (A) Site Plan Review ..... \$851.00
  - (B) Revision to an Approved Action ..... \$567.00
  - (C) Conditional Use Permit (CUP) ..... \$1040.00
  - (D) Minor Use Permit ..... \$567.00
  - (E) Fuel Modification Plan (per hour) ..... \$126.00
  - (F) Specific Plans ..... \$1040.00
  - (G) Environmental Impact Report (EIR) per hour ..... \$126.00
  - (H) Subdivisions/Tract Maps/Mobilehome Parks:
    - (I) Tentative Parcel Map (1-4 lots) ..... \$378.00
    - (II) Tentative Tracts Map (5-100 lots) ..... \$614.00
    - (III) Tentative Tracts Map (101-300 lots) ..... \$662.00
    - (IV) Tentative Tracts Map (301 + lots) ..... \$851.00
    - (V) Mobilehome Park Site Plan Review ..... \$851.00



## ATTACHMENT A

(I)	Tenant Review .....	\$126.00
(J)	DSA/OSHPD Site Review .....	\$189.00
(K)	Variance .....	\$189.00
(L)	Temporary Use Permit .....	\$378.00
(13)	Water Improvement - Public Water Line (Plan Review):	
(A)	First 1-10 hydrants .....	\$378.00
(B)	Each additional 10 hydrants .....	\$189.00
(14)	Other Miscellaneous Development Review Fees:	
(A)	Hazardous Material Review - per hour .....	\$126.00
(B)	Technical Analysis/Opinion Report- per hour .....	\$126.00
(C)	Alternate Materials and Methods Request- per hour .....	\$126.00
(15)	Revision of a previously approved plan or As-Builts .....	\$284.00
(16)	Plan re-submittal; each subsequent submittal after 2 <sup>nd</sup> (per hour) ..	\$126.00
(17)	Miscellaneous Plan check – per hour .....	\$126.00
(18)	Re-Inspection after the 2 <sup>nd</sup> failed inspection .....	\$219.00

### Section B – Annual Operational Permits:

(1)	Base Permit Fee – Facility Size:	
(A)	0-5,000 sq. ft. ....	\$170.00
(B)	5,001-10,000 sq. ft. ....	\$222.00
(C)	10,001-50,000 sq. ft. ....	\$275.00
(D)	50,001-100,000 sq. ft. ....	\$419.00
(E)	100,001-500,000 sq. ft. ....	\$534.00
(F)	500,001-1,000,000 sq. ft. ....	\$739.00
(G)	> 1,000,000 sq. ft. ....	\$1,123.00
(2)	Annual Operational Permit – per Permit:	
(A)	Low Hazard:	
(I)	Automobile Wrecking Yards .....	\$35.00
(II)	Cellulose Nitrate Film .....	\$35.00
(III)	Open Flames and Candles .....	\$35.00
(IV)	Places of Assembly 50-299 .....	\$35.00
(B)	Medium Hazard:	
(I)	Carbon Dioxide Enrichment Systems .....	\$70.00
(II)	Carbon Dioxide Systems in Beverage Dispensing .....	\$70.00
(III)	Combustible Fibers .....	\$70.00
(IV)	Covered and Open Mall Buildings .....	\$70.00
(V)	Dry Cleaning .....	\$70.00
(VI)	Fixed Hood & Duct Extinguishing Systems .....	\$70.00
(VII)	Industrial Ovens .....	\$70.00
(VIII)	Liquid or Gas Fuel Equipment in Assembly Buildings ..	\$70.00
(IX)	Lumber Yards and Woodworking .....	\$70.00
(X)	Miscellaneous Combustible Storage .....	\$70.00

## ATTACHMENT A

	(XI)	Motor Vehicle Fuel Dispensing.....	\$70.00
	(XII)	Pyroxylin Plastics .....	\$70.00
	(XIII)	Places of Assembly 300-999 Occupants .....	\$70.00
	(XIV)	Production Facilities .....	\$70.00
	(XV)	Refrigeration Equipment.....	\$70.00
	(XVI)	Rooftop Heliports.....	\$70.00
	(XVII)	Storage of Scrap Tires and Tire Byproducts.....	\$70.00
	(XVIII)	Waste Handling .....	\$70.00
	(XIX)	Wood, Manure, and Organic Product Storage.....	\$70.00
(C)		High Hazard:	
	(I)	Aerosol Products .....	\$105.00
	(II)	Aviation Facilities.....	\$105.00
	(III)	Battery Systems .....	\$105.00
	(IV)	Combustible Dust Producing Operations .....	\$105.00
	(V)	Compressed Gases.....	\$105.00
	(VI)	Cryogenic Fluids.....	\$105.00
	(VII)	Cutting and Welding .....	\$105.00
	(VIII)	Explosives .....	\$105.00
	(IX)	Flammable and Combustible Liquids .....	\$105.00
	(X)	High-piled Combustible Storage .....	\$105.00
	(XI)	Hot Works Operations .....	\$105.00
	(XII)	HPM facilities.....	\$105.00
	(XIII)	Liquefied Petroleum Gasses .....	\$105.00
	(XIV)	Magnesium.....	\$105.00
	(XV)	Organic Coatings.....	\$105.00
	(XVI)	Pallet Yards .....	\$105.00
	(XVII)	Places of Assembly 1,000+ Occupants .....	\$105.00
	(XVIII)	Plant Extraction Systems.....	\$105.00
	(XIX)	Repair Garages .....	\$105.00
	(XX)	Spraying or Dipping .....	\$105.00
	(XXI)	Tire Rebuilding Plants .....	\$105.00

- (3) Total fee charged will be Base Fee + any applicable Annual Operating Permit fee(s).

### Section C – Special Event/Temporary Use Permits:

- (1) Miscellaneous Counter Permit (No inspection required)..... \$51.00  
**NOTE:** This fee is not applicable to model rocket launchings. Instead of being issued a permit, individuals/groups contacting County Fire about the launching of model rockets are directed to the Department's website for an online document that advises the applicant of fire safety requirements associated with model rocketry.
- (2) Application Review:
- |     |   |          |
|-----|---|----------|
| (A) | Minor Special Event/Temporary Use Application .....             | \$103.00 |
| (B) | Major Special Event/Temporary Use/Film Permit Application ..... | \$161.00 |

- (3) Minor Special Event/Temporary Uses – inspection (up to 0.5 hour):
  - (A) Miscellaneous Minor Event (up to 500 attendees) ..... \$152.00
  - (B) Seasonal Sales Lot ..... \$152.00
  - (C) Rocket Launching (high powered or experimental) ..... \$152.00
  - (D) Haunted House/Fun House/Maze ..... \$152.00
  - (E) Bonfire..... \$152.00
  - (F) Tents, canopies and temporary membrane structure ..... \$152.00
    - (I) Each additional tent, canopy and temporary membrane structure ..... \$19.00
- (4) Major Special Event/Temporary Uses – Inspection (up to 2 hours):
  - (A) Miscellaneous Major Event (501+ attendees) ..... \$323.00
  - (B) Fireworks Booth ..... \$323.00
  - (C) Film Shoot with Hazards (First Two Hours)..... \$323.00
- (5) Fireworks Public Display:
  - (A) Minor (up to 2 hours)..... \$437.00
  - (B) Major (over 2 and up to 4 hours) ..... \$779.00
- (6) Inspection – each additional hour ..... \$114.00

**Section D – Occupancies Requiring Mandated Inspections:**

- (1) State Fire Marshal Regulated Occupancies:
  - (A) Organized Camps – Group C Occupancy ..... \$310.00
  - (B) Day Care Facility – Group E Occupancy - 7 or more clients (not requiring assistance) Initial inspection up to 2 hrs..... \$383.00
  - (C) Private Schools – Group E Occupancy ..... \$329.00
  - (D) Health Care Facilities/Nursing homes/Detox Centers – Group I-2 Occupancy – Initial inspection up to 2 hrs..... \$383.00
  - (E) Detention facility - Group I-3 Occupancy – Initial inspection up to 2 hrs ..... \$383.00
  - (F) Day Care Facility (7+ persons) requiring assistance – Group I-4 – Initial inspection up to 2 hrs..... \$383.00
  - (G) Multi-Family housing – (Hotel/Motel/Apartments) Group R-1/R-2
    - (I) 3 dwelling units ..... \$155.00
    - (II) 4-15 dwelling units - base ..... \$155.00
    - (III) 4-15 dwelling units – per unit..... \$2.85
    - (IV) 16-49 dwelling units – base ..... \$189.00
    - (V) 16-49 dwelling units – per unit..... \$1.75
    - (VI) 50-99 dwelling units – base ..... \$248.00
    - (VII) 50-99 dwelling units – per unit..... \$1.62
    - (VIII) 100-199 dwelling units – base ..... \$329.00
    - (IX) 100-199 dwelling units – per unit..... \$1.44
    - (X) 200-499 dwelling units – base ..... \$473.00
    - (XI) 200-499 dwelling units – per unit..... \$1.35
    - (XII) 500 + dwelling units – base ..... \$879.00
    - (XIII) 500 + dwelling units – per unit..... \$.68
    - (XIV) Total fee charged will be base fee + per unit fee(s).

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(H)	Residential Care Facility – Group R-2.1 Occupancy .....	\$402.00
(I)	Family Day Care (large & small) – Group R-3 Occupancy ...	\$237.00
(J)	Residential Care Facility – Group R-3.1 Occupancy .....	\$256.00
(K)	Residential Care Facility – Group R-4 Occupancy .....	\$365.00
(L)	High Rise, Initial inspection up to 2 hrs. ....	\$383.00
(M)	State Fire Marshal Regulated Occupancies – Day Care, Health Care, Detention Facilities, and High Rises, per additional hour after 2 hrs. ....	\$146.00

- (2) Other Required or Mandated Inspections:
- |     |  |          |
|-----|--|----------|
| (A) | General Field Inspection (per inspection)..... | \$219.00 |
| (B) | Business License/Occupancy Inspection .....    | \$122.00 |

### Section E – Miscellaneous Fees:

- (1) Cause and origin reports and related correspondences (each) ..... \$75.00
- (2) Administrative Charges:
- |      |  |                   |
|------|--|-------------------|
| (A)  | Failure to obtain a permit .....                                     | Double Actual Fee |
| (B)  | Failure to renew permit .....  | Double Actual Fee |
| (C)  | Fire extinguisher/demo training propane – up to 1 hour.....          | \$461.00          |
| (D)  | Each additional hour Fire extinguisher/demo training<br>propane..... | \$153.00          |
| (E)  | Juvenile Firesetters Intervention – Program:                         |                   |
| (I)  | Initial Intervention session – per Juvenile .....                    | \$380.00          |
| (II) | Group Intervention – per Juvenile .....                              | \$417.00          |
| (F)  | Time Extension/Permit Renewal .....                                  | \$44.00           |
| (G)  | Archive/File Retention Fee:  |                   |
| (I)  | Large Plans:   |                   |
| (i)  | First page.....  | \$10.00           |
| (ii) | Each additional page .....   | \$5.00            |
| (II) | Regular Sheets (per page) .....                                      | \$1.00            |

### Administrative Services

#### Section F - Administrative Services Fees:

- (1) Duplication fee with certification stamp, per page..... \$0.28
- (2) Duplication fee, per page .....
- |  |        |
|--|--------|
|  | \$0.25 |
|--|--------|
- (3) Release of notice of pendency/release of lien/ special  
assessment.....\$207.00/each
- (4) Delinquency provisions: a thirty-five percent (35%) fee shall be  
added to each of the fees, including applicable State fees which  
become delinquent after thirty (30) days from the invoice date.



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- (5) Hearing fees (Permit suspension or revocation; Abatement appeal; Citation/Billing appeal; and Administrative hearings) ..... \$144.00/hearing
- (6) Court cost:
  - (A) Recover administrative expense for staff court appearances ..... Actual cost
  - (B) Administrative Fee ..... \$64.00
- (7) Payment Plan ..... \$86.00
- (8) Enforcement Payment Plan ..... \$263.00
- (9) Fiscal Administrative Fee ..... 16.5% of Actual cost
- (10) Returned Check Fee:
  - (A) First Returned Check Fee ..... \$25.00
  - (B) Subsequent Returned Check Fee ..... \$35.00
- (11) Human Resources:
  - (A) Record subpoena fee – research/preparation ..... \$16.00/hour
  - (B) Civil subpoena witness fee ..... \$275.00/day
- (12) Annexation Fee for parcels annexed into a Community Facilities District..... Actual Cost (\$5,000.00 deposit required)

### **Hazardous Materials Division**

#### **Section G - Hazardous Materials Division Program Fees:**

- (1) Hazardous waste and hazardous materials program fees:
  - (A) Hazardous waste generator inspection program fees:
    - (I) Conditionally Exempt Small Quantity Generator/Very Small Quantity Generator Special ..... \$266.00
    - (II) Conditionally Exempt Small Quantity Generator/Very Small Quantity Generator ..... \$201.00
    - (III) Small Quantity Generator ..... \$292.00
    - (IV) Large Quantity Generator ..... \$474.00
    - (V) Super Large Quantity Generator ..... \$565.00
    - (VI) Universal Waste Handler Special ..... \$311.00
    - (VII) Universal Waste Handler for facility with another hazardous waste generator or handler fee ..... \$201.00
  - (B) Resource Conservation and Recovery Act (RCRA) Hazardous Waste Inspection Program Fees:
    - (I) RCRA Large Quantity Generator Minimal ..... \$266.00
    - (II) RCRA Large Quantity Generator ..... \$565.00

- (C) **Hazardous substance underground storage tank (UST) program permit fees:**
- (I) Regular UST annual inspection (per tank)..... \$895.00
  - (II) Complex annual inspection – Vacuum Pressure Hydrostatic (VPH) or more than 8 dispensers (per tank) ..... \$1,395.00
  - (III) Abandoned UST annual inspection (per tank)..... \$289.00
  - (IV) Plan check/construction permit fees:
    - (i) Modifications/Repairs without excavation – includes 1 inspection ..... \$526.00
    - (ii) Modifications/Repairs with excavation ..... \$1,974.00
    - (iii) New Installations – up to 4 inspections..... \$3,922.00
    - (iv) Resubmittals/As-Built, each submission ..... \$368.00
    - (v) Temporary Closure (1 year)..... \$710.00
    - (vi) Tank Closure/Removal:
      - (i) First tank ..... \$605.00
      - (ii) Each additional tank at same site ..... \$157.00
    - (vii) Limited plan check for tank linings – First tank lining and multiple tank linings at each site..... \$315.00
  - (V) Hazardous Materials Emergency Business Plan Review/Hazardous Materials Handler Fee:
    - UST only – per year ..... \$157.00
  - (VI) Hazardous Waste Generator Inspection Fee:
    - Incidental to UST operation only – per year ..... \$78.00
- (D) **Onsite treatment fees (Fees are for highest fixed treatment unit per facility):**
- (I) Permit-by-Rule ..... \$441.00
  - (II) Conditional Authorization..... \$395.00
  - (III) Conditional Exemption ..... \$213.00
  - (IV) Commercial Laundry ..... \$213.00
  - (V) Conditional Exemption – Limited ..... \$213.00
- (E) **Hazardous materials chemical handler inspection fees:**
- (I) 1-3 Chemicals Special..... \$220.00
  - (II) 1-3 Chemicals ..... \$155.00
  - (III) 4-10 Chemicals ..... \$246.00
  - (IV) 11-30 Chemicals ..... \$292.00
  - (V) 31-50 Chemicals ..... \$338.00
  - (VI) 51-70 Chemicals ..... \$383.00
  - (VII) 71+ Chemicals..... \$930.00
- (F) **California Accidental Release Prevention Program (CalARP):**
- (I) Risk Management Plan (RMP) Review – per hour .... \$136.00

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- (II) RMP Inspection (Fees are for highest covered process per facility):
  - (i) RMP Program 1 ..... \$156.00
  - (ii) RMP Program 2 ..... \$293.00
  - (iii) RMP Program 3 ..... \$567.00
  
- (G) Aboveground Petroleum Storage Act inspection program fees:
  - (I) TIUGA (Tank in Underground Area) Tanks located below grade but above ground ..... \$178.00
  - (II) Conditionally Exempt (Tank facility located on a farm, nursery, logging site or construction site if no storage of petroleum exceeds 20,000 gallons and the cumulative storage capacity of the tank facility does not exceed 100,000 gallons.) ..... \$156.00
  - (III) 1,320 gallons – 10,000 gallons ..... \$201.00
  - (IV) 10,001 gallons – 100,000 gallons ..... \$430.00
  - (V) 100,001 gallons – 1,000,000 gallons ..... \$612.00
  - (VI) 1,000,001 gallons – 10,000,000 gallons ..... \$658.00
  - (VII) 10,000,001 gallons or greater ..... \$932.00
  
- (2) Unified Program Agency (UPA) Annual Administrative Program Fee:
  - (A) Level 1 ..... \$151.00
  - (B) Level 2 ..... \$378.00
  - (C) Level 3 ..... \$1,513.00
  - (D) Level 4 ..... \$2,875.00
  - (E) Level 5 ..... \$4,843.00
  
- (3) Special Fees:
  - (A) Environmental audit, Phase I/Certified Record Search per hour ..... \$136.00
  - (B) Certificate of occupancy for hazardous materials facility - signoff ..... \$68.00
  - (C) Certificate of occupancy of hazardous materials facility – plan review and signoff ..... \$136.00
  - (D) List of permitted Facilities – Public Service, per hour ..... \$109.00
  - (E) Court Costs ..... Actual costs
  - (F) Special inspection - per hour ..... \$157.00
  - (G) Failure to keep field appointment (48 hour cancellation notice required) ..... \$157.00
  - (H) Same day short notice inspection – per hour ..... \$157.00
  - (I) After hours/overtime
    - (I) Inspection (up to 3 hours) ..... \$604.00
    - (II) Per additional hour after 3 hours ..... \$201.00

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(J)	Failed inspection, requiring a follow-up inspection (after initial and re-inspection) – per hour .....	\$157.00
(K)	Working without an operating or repair/modification permit .....	Double fee
(L)	Failure to obtain a repair/modification permit .....	Double fee
(M)	Voluntary Clean Up Program (VCP)	
	(I) Initial application intake and review .....	\$1,473.00
	(II) Review and inspection, per additional hour .....	\$270.00
(N)	Consulting per hour .....	\$157.00
(O)	Change of Ownership - Administrative .....	\$473.00
(P)	Investigation charges:	
	(I) Material Costs .....	Actual Cost
	(II) Laboratory analysis costs .....	Actual Cost
	(III) Investigation personnel – per hour per person .....	\$157.00
	(IV) Investigation personnel – per hour per person after hours .....	\$473.00
(Q)	Emergency Response Charges:	
	(I) Material/ equipment costs .....	Actual Cost
	(II) Laboratory analysis costs .....	Actual Cost
	(III) Emergency Response Personnel Cost per hour per person .....	\$319.00
	(IV) Emergency Response Personnel Cost per hour per person after hours .....	\$522.00
	(V) Emergency Response Vehicle Costs per hour .....	\$18.00

### Section H - Cost Recovery:

#### (1) Employee Classification Hourly Rates:

Accounting Tech .....	\$40.42
Accounts Representative .....	\$36.10
Admin Secretary I .....	\$37.54
Admin Secretary II .....	\$47.67
Admin Supervisor I .....	\$66.45
Ambulance Operator EMT .....	\$34.36
Ambulance Operator Paramedic .....	\$42.37
Assistant Chief .....	\$206.86
Assistant Emergency Communications Supervisor .....	\$68.53
Assistant Emergency Services Division Mgr .....	\$112.71
Automated Systems Analyst I .....	\$55.16
Automated Systems Analyst II .....	\$70.29
Automated Systems Technician .....	\$47.01
Budget Officer .....	\$85.11
Business System Analyst 3 .....	\$81.72
Call Taker .....	\$35.74
Chief Financial Officer .....	\$127.09
Collections Officer .....	\$44.87
Communications Director .....	\$122.09



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Communications Technician .....	\$59.25
Computerized Mapping Analyst .....	\$56.93
Computerized Mapping Technician .....	\$43.52
Deputy Fire Chief .....	\$236.24
District Emergency Services Supervisor Dispatcher .....	\$63.61
Emergency Communications Supervisor .....	\$64.73
Emergency Services Dispatch I Technician .....	\$33.59
Emergency Services Dispatcher .....	\$48.36
Emergency Services Manager .....	\$123.29
Emergency Services Officer .....	\$66.04
EMS Nurse Educator .....	\$94.57
EMS Training Officer .....	\$112.04
EMS Training Supervisor .....	\$108.64
Equipment Parts Chaser .....	\$46.72
Executive Assistant .....	\$71.27
Finance Officer .....	\$97.97
Fire Chief .....	\$285.89
Fire Equipment Specialist .....	\$38.63
Fire Equipment Technician 1 .....	\$32.01
Fire Equipment Technician 2 .....	\$39.92
Fiscal Assistant .....	\$34.99
Fiscal Specialist .....	\$44.20
GIMS Coordinator .....	\$74.63
HHW Event Coordinator .....	\$43.60
Human Resources Assistant .....	\$42.85
Human Resources Officer II .....	\$91.96
Information System Analyst 2 .....	\$82.67
Information System Analyst 3 .....	\$94.09
Lead Mechanic .....	\$76.35
Maintenance Specialist .....	\$47.06
Mechanic .....	\$67.07
Nurse Educator .....	\$94.57
Office Assistant I .....	\$25.62
Office Assistant II .....	\$34.55
Office Assistant III .....	\$34.70
Office Specialist .....	\$46.23
Payroll Specialist .....	\$38.50
Personnel Services Supervisor .....	\$57.31
Programmer Analyst I .....	\$48.42
Programmer Analyst II .....	\$63.78
Programmer Analyst III .....	\$98.86
PSE Call Taker (Extra Help) .....	\$20.26
Public Information Officer .....	\$99.16
Public Service Employee .....	\$24.86
SCBA Technician .....	\$51.49
Senior Collections Officer .....	\$58.56

Staff Analyst I.....	\$51.98
Staff Analyst II.....	\$59.95
Supervising Fiscal Specialist .....	\$50.53
Vehicle Parts Specialist .....	\$50.89
Vehicle Services Supervisor .....	\$83.72

**Community Safety/Fire Prevention:**

Deputy Fire Marshal, Community Safety .....	\$129.25
Fire Prevention Officer.....	\$62.09
Fire Prevention Officer/Arson.....	\$91.02
Fire Prevention Specialist .....	\$86.90
Fire Prevention Specialist/Arson.....	\$128.43
Fire Prevention Supervisor .....	\$87.11
Fire Prevention Supervisor/Arson .....	\$163.30
Front Counter Technician .....	\$46.26
Senior Plans Examiner .....	\$75.05

**Hazardous Materials:**

Fire Marshal.....	\$193.70
Deputy Fire Marshal, Hazardous Materials .....	\$129.25
Hazardous Materials Specialist Trainee.....	\$43.13
Hazardous Materials Specialist I.....	\$47.78
Hazardous Materials Specialist II.....	\$71.16
Hazardous Materials Specialist II, HM Response .....	\$98.68
Hazardous Materials Specialist III.....	\$78.48
Hazardous Materials Specialist III, HM Response .....	\$112.89
Hazardous Materials Specialist IV .....	\$87.29
Hazardous Materials Specialist IV, HM Response.....	\$129.19
Supervising Haz Mat Specialist .....	\$96.75
Supervising Haz Mat Specialist, HM Response .....	\$86.06
Training Officer HM RT .....	\$105.68
Environmental Specialist III .....	\$71.35
Environmental Specialist IV, HM Response.....	\$82.61
Hazardous Materials Technician I.....	\$35.83
Hazardous Materials Technician II.....	\$54.19
Environmental Technician III.....	\$60.09

**Suppression:**

Battalion Chief .....	\$165.13
Captain .....	\$154.30
Division Chief.....	\$171.17
Engineer .....	\$129.16
Fire Fighter EMT .....	\$82.29
Fire Fighter Paramedic .....	\$103.99
Fire Fighter PCF .....	\$15.33
Fire Fighter Trainee .....	\$33.72

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Fire Suppression Aide (Extra-help) .....	\$14.24
Fire Suppression Aide II (Extra-help) .....	\$15.65
Fire Suppression Aide III (Extra-help) .....	\$16.86
Fire Suppression Aide II (Regular) .....	\$45.89
Fire Suppression Aide III (Regular) .....	\$52.65

## Suppression Pay Differentials Based on Certifications:

**NOTE:** Depending on the person responding the following hourly rates may be added to the above rates.

Paramedic .....	\$0.82
HAZMAT Full .....	\$1.97
HAZMP .....	\$0.54
USAR Full .....	\$2.16
USARP .....	\$0.59
Training Officer .....	\$2.94
Crew Superintendent .....	\$4.49
Crew Foreman .....	\$2.94
Heavy Equipment Operator .....	\$3.92
Air Rescue Firefighter (ARFF) .....	\$2.16
Flight Crew Captain .....	\$4.90
Flight Paramedic .....	\$2.94
Flight Paramedic, ARFF and Flight Crew Captain (Partial) .....	\$0.59

(2)

## Equipment Rates:

**NOTE: Equipment Rates do not include Staffing.**

	Hourly
Airport Rescue Vehicle .....	\$348.64
Ambulance .....	\$84.71
Boom Truck .....	\$79.68
Brush Patrol .....	\$169.29
Chipper (Includes Truck) .....	\$63.96
Crew Buggy – Vehicle Only .....	\$75.67
Dozer TS (Includes Truck & Trailer) .....	\$313.01
Dump Truck .....	\$53.03
Engine Type I & II .....	\$235.40
Engine Type III .....	\$149.42
Excavator .....	\$62.96
Generator .....	\$46.84
Incident Command Post .....	\$355.23
Incident Command Trailer & Truck .....	\$145.04
Heavy Rescue .....	\$214.29
HM Hazmat Suppression Unit .....	\$239.29
Light Rescue .....	\$108.33
Medic Squad Unit .....	\$108.34
Medium Rescue .....	\$203.01
Mobile Communications Unit .....	\$491.42
Rescue Boat .....	\$277.35

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Skidsteer (Includes Truck & Trailer).....	\$158.54
Snow Cat (Includes Truck & Trailer) .....	\$403.50
Squad Unit .....	\$61.94
Transport Pilot Vehicle .....	\$33.85
Utility Vehicle .....	\$27.96
Water Tender .....	\$245.88
Wheeled Loaders (Includes Truck & Trailer).....	\$190.88

- (3) Administrative Penalties for False or Nuisance Fire Alarms:  
 First, Second, and Third Response ..... No Charge  
 Four to Five Responses.....\$100.00/response  
 Six to Seven Responses.....\$200.00/response  
 Eight or More Responses .....\$500.00/response
- (4) Structure Protection Fees:  
 Residential/Duplex.....\$500.00/response  
 Multiple Units Commercial, Industrial.....\$1,000.00/response
- (5) Administrative Fees:  
 Administrative Overhead per Total Invoice Maximum allowable by  
 CFAA – applies only to major incident response billing (CalFire,  
 USFS, etc) ..... 33.49%  
 Charge non- Hazardous Materials Invoices applied ten (10) days  
 after due date of invoice..... 10%
- (6) Special Event Standby Fees:  
Personnel:

**NOTE:** The special event standby charges for suppression and non-suppression personnel are billed at the same amount as the employee classification hourly rates.

### Equipment:

**NOTE:** Equipment Standby Fees will be billed at 50% of the applicable equipment rate per Federal Highway Administration Guidelines.

## Section I – Ambulance Subscription Fees:

<u>District</u>	<u>Rate Per Year</u>
North Desert Regional Fire Service Zone (Lucerne Valley Ambulance Operating Area):	
Per Household .....	\$65.00



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North Desert Regional Fire Service Zone (Wrightwood/Pinon Hills Ambulance Operating Area):

Per Household ..... \$65.00

South Desert Regional Fire Service Zone (Havasu Ambulance Operating Area):

Per Household..... \$65.00

North Desert Regional Fire Service Zone (Searles Valley Ambulance Operating Area):

Per Household..... \$65.00

Mountain Regional Fire Service Zone (Lake Arrowhead Ambulance Operating Area):

Per Household..... \$65.00

South Desert Regional Fire Service Zone (Yucca Valley Ambulance Operating Area):

Per Household ..... \$65.00

North Desert Regional Fire Service Zone (Hesperia Ambulance Operating Area):

Per Household..... \$65.00

**Section J – Paramedic Pre-Hospital Stabilization Fee:** \$275.00 + applicable ambulance service fee when transport is provided.

**Section K – Ambulance Service Fees:** County Fire utilizes the most current Ambulance Rate Schedule approved by the Inland Counties Emergency Medical Agency (ICEMA) for the purposes of billing ambulance services.

Water Transportation Charges

Water transport charges are at the current Basic Life Support (BLS) Rate approved by ICEMA.

Air Transportation Charges

Air Transport Charges are at the current Advanced Life Support (ALS) Rate approved by ICEMA plus other applicable ambulance fees. These apply in full when ambulance

staff accompanies the flight or when transportation to a landing zone is more than a mile away.

When ambulance staff transports to an airship and does not accompany the flight or when transport to a landing zone is one mile away or less, half the BLS and ALS base rate is applied.

**NOTE:** Multiple patients, all transports – applicable full charges except equal shares of mileage, time, and emergency.

### Household Hazardous Waste Division

#### Section L – Household Hazardous Waste Division Program Fees:

(1)	Very Small Quantity Generator Disposal Fee:	
(A)	Used oil per gallon .....	\$1.67
(B)	Contaminated waste oil gallon .....	\$8.36
(C)	Waste antifreeze gallon.....	\$1.67
(D)	Lead acid batteries each .....	\$1.67
(E)	Latex paint per pound – Non PaintCare Product .....	\$1.67
(F)	Latex sludge and adhesive per pound .....	\$1.67
(G)	Oil Based Paint per pound – Non PaintCare Product.....	\$1.67
(H)	Flammable solids/liquids per pound .....	\$1.67
(I)	Corrosive solids/liquids per pound .....	\$3.35
(J)	Poison solids/liquids per pound.....	\$3.35
(K)	Reactive solids/liquids per pound.....	\$10.87
(L)	Aerosols per pound .....	\$1.67
(M)	Asbestos Roofing Tar per pound.....	\$5.85
(N)	Contaminated soil per pound .....	\$1.67
(O)	NiCad batteries per pound .....	\$3.35
(P)	Alkaline batteries per pound.....	\$2.50
(Q)	Lithium batteries per pound.....	\$6.69
(R)	PCB ballasts per pound .....	\$6.69
(S)	Steel/HDPE drum disposal.....	\$16.73
(T)	Additional handling/travel time per hour .....	\$100.36
(U)	Hazard categorization test each.....	\$33.45
(V)	Chlorinated Oil Test Kit each.....	Actual Cost
(W)	Used Oil filters each .....	\$1.67
(X)	Cathode Ray Tubes each .....	\$13.38
(Y)	Drums each.....	Actual Cost
(Z)	Fluorescent tubes each.....	\$2.51
(AA)	Circular fluorescent lamps each .....	\$2.51
(BB)	Sodium pressure lamps each.....	\$5.02
(CC)	Electronic waste per pound .....	\$0.84
(DD)	Mercury per pound .....	\$25.09
(EE)	Propane cylinders < 5 gallons – per pound.....	\$5.85
(FF)	Propane cylinders 5 gallons or more – per pound.....	\$8.36

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(GG)	Oxidizers solids/liquids per pound.....	\$3.35
(HH)	Non Propane Cylinders:	
	(I) Materials.....	Actual Cost
	(II) Administrative Charges each.....	\$50.18
(II)	Fire Extinguisher:	
	(I) Materials.....	Actual Cost
	(II) Administrative Charges each.....	\$16.73
(JJ)	Extreme Hazardous Waste:	
	(I) Materials.....	Actual Cost
	(II) Administrative Charges each.....	\$50.18
(KK)	Over Pack – 85 Gal Metal/95 Gal Poly:	
	(I) Materials.....	Actual Cost
	(II) Administrative Charges each.....	\$50.18
(LL)	Paint Handling Administrative Fee PaintCare Product – per pound (Latex).....	\$0.28
(MM)	Paint Handling Administrative Fee PaintCare Product – per pound (Oil based).....	\$0.28
(NN)	Miscellaneous – not covered under any other category	
	(I) Materials.....	Actual Cost
	(II) Administrative Charges Each .....	\$16.73

- (2) There is hereby established a hazardous waste management fee which shall be an annual fee per parcel of land within unincorporated San Bernardino County in accordance with the County Assessor's land use code as follows. Where the land use fee for any use code contains a schedule of fees based on size of parcel, but the relevant data base does not disclose sufficient size information to determine the correct size category of a particular parcel, said parcel shall be charged as though it were the second smallest sized parcel if there are three size categories and as though it were the third smallest sized parcel if there are five or six size categories. The fees are submitted to the Auditor-Controller/Treasurer/Tax Collector for collection on the annual property Tax Roll.

(A)	Use Code 510 – Single Family Residence (SFR) (suitable for permanent use).....	\$5.00
(B)	Use Code 511 – Recreational Cabin.....	\$2.50
(C)	Use Code 514 – Residence on Commercial .....	\$5.00
(D)	Use Code 520 – Mobilehome.....	\$5.00
(E)	Use Code 522 – Mobilehome in park .....	\$5.00
(F)	Use Code 525 – Mobilehome in subdivision .....	\$5.00
(G)	Use Code 526 – Manufactured home on permanent foundation .....	\$5.00
(H)	Use Code 530 – Condominium .....	\$5.00
(I)	Use Code 531 – Planned Unit Development (PUD).....	\$5.00
(J)	Use Code 532 – PUD, Deminiums.....	\$5.00
(K)	Use Code 533 – Timeshare .....	\$5.00

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(L)	Use Code 534 – Attached SFR w/common wall.....	\$5.00
(M)	Use Code 535 – Zero lot line SFR .....	\$5.00
(N)	Use Code 599 – Misc. Residential structure .....	\$5.00
(O)	Use Code 600 – Two SFR .....	\$10.00
(P)	Use Code 601 – Three SFR.....	\$15.00
(Q)	Use Code 602 – Four SFR.....	\$20.00
(R)	Use Code 603 – Duplex .....	\$10.00
(S)	Use Code 604 – Triplex .....	\$15.00
(T)	Use Code 605 – Quad .....	\$20.00
(U)	Use Code 610 – Multi-SFR 5-14 units.....	\$25.00
(V)	Use Code 611 – Apartment 5-14 units .....	\$25.00
(W)	Use Codes 612 & 622 – Townhouse-type Apartments .....	\$40.00
(X)	Use Code 620 – Multi-SFR 15+units.....	\$65.00
(Y)	Use Code 621 – Apartment 15+ units .....	\$65.00
(Z)	Use Code 630 – Condominium used as apartment.....	\$5.00
(AA)	Use Code 631 – Government assisted apartment program .	\$380.00
(BB)	Use Code 815 – Industrial/Single Family Residential.....	\$5.00
(CC)	Use Code 816 – Industrial/Multi Family Residential .....	\$25.00
(DD)	Use Code 825 – Admin-Prof/Single Family Residential .....	\$5.00
(EE)	Use Code 826 – Admin-Prof/Multi Family Residential.....	\$25.00
(FF)	Use Code 835 – Commercial/Single Family Residential .....	\$5.00
(GG)	Use Code 836 – Commercial/Multi Family Residential .....	\$25.00
(HH)	Use Code 856, 857, 859 – Single Family Residential .....	\$5.00
(II)	Use Code 867, 869 – Multi Family Residential .....	\$25.00

(3) **Disposal Site Fees – Minimum load charge:**

(A)	Auto.....	\$0.80/vehicle
(B)	Station Wagon.....	\$0.80/vehicle
(C)	Pickup truck .....	\$0.80/vehicle
(D)	Auto with trailer .....	\$0.80/vehicle

### **Section M - Waiver/Refund of Fees:**

- 1) This section is effective the date the ordinance is effective. In the event of a disaster, or other good cause shown to serve a public purpose, the Fire Chief may defer payment of, waive, or refund any fee set forth in this Ordinance or any other fee levied by County Fire provided all of the following conditions are met:
  - a) Exigent conditions exist whereby obtaining Board approval of the fee waiver/refund/deferral would not be immediately feasible; and
  - b) County Fire receives concurrence from the County Chief Executive Officer.
- 2) Except as otherwise provided by law, the Board of Directors, by Board action, can defer payment of, waive, or refund any fee set forth in this Ordinance or any other fee levied by County Fire provided one of the following conditions is met:



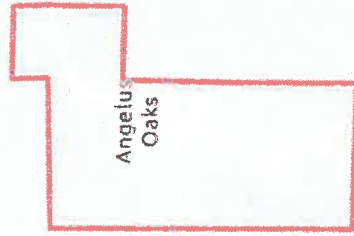
- a) The service for which the fee was levied has not and will not be performed, or
- b) The fee was collected in error, or
- c) For other good cause shown, provided such waiver/refund would serve a public purpose.

**Section N - Annual Increase:**

All annual fees will be subject to an annual increase based on the percentage change in the Consumer Price Index, All Urban Consumers (All items), for the Riverside-San Bernardino-Ontario, California area, with the Standard Reference Base (1982-84=100) as published by the United States Department of Labor, Bureau of Labor Statistics. The "annual average" percentage published by the Bureau of Labor Statistics will be used to determine the maximum annual increase. This percentage, which is calculated at the end of each calendar year, is available in January following the end of the previous calendar year. However, no adjustment shall decrease any fee and no fee shall exceed the reasonable cost of providing services. If reasonable program costs exceed the maximum annual increase, an additional fee increase may be established by resolution of the Board of Directors. Fees will be rounded to the nearest whole dollar.

# POPULATION TRENDS AND KEY INDICATORS

ANGELUS OAKS

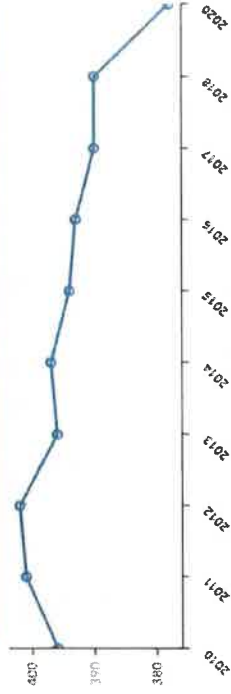


Population	378	163	1.91	47.7	\$87,475	\$371,429	224	140	55
Household									
Age									
Median									
Household Income									
Median									
Household									

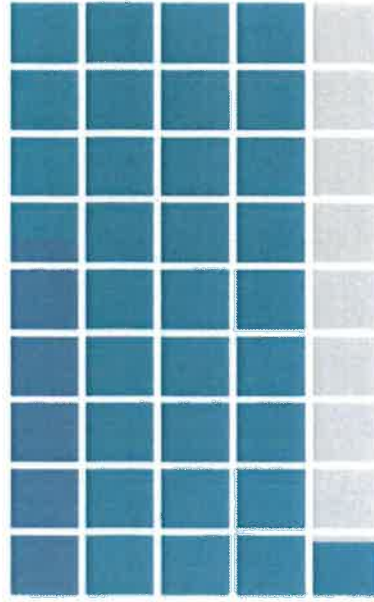
## MORTGAGE INDICATORS



## Historical Trends: Population



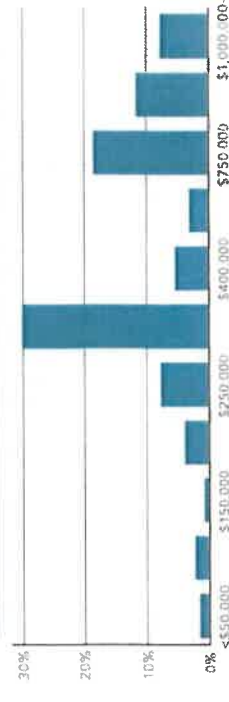
## POPULATION BY AGE



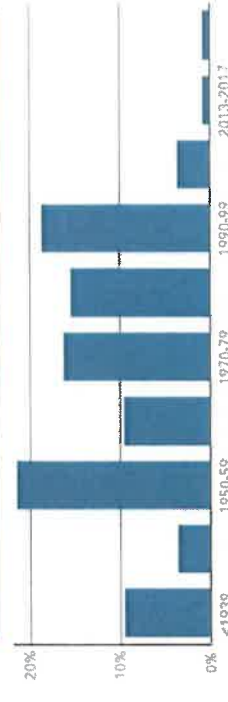
## POPULATION BY GENERATION



## Home Value



## Housing: Year Built



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# POPULATION TRENDS AND KEY INDICATORS

## FOREST FALLS

465 205 2.27 47.2 \$62,065 \$293,590 104 126 55

Population: 465, Median Age: 20.5, Median Income: \$2,270, Median Home Value: \$62,065, Median Rent: \$293,590, Median Commute: 10.4, Median Distance to Work: 12.6, Median Distance to School: 5.5

### MORTGAGE INDICATORS



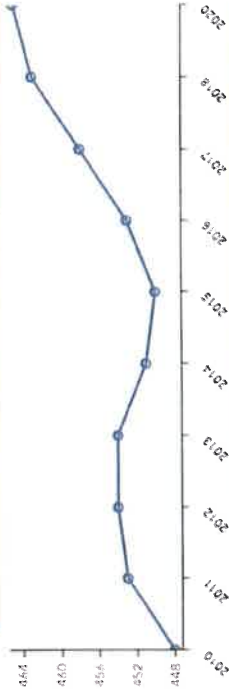
19.8%



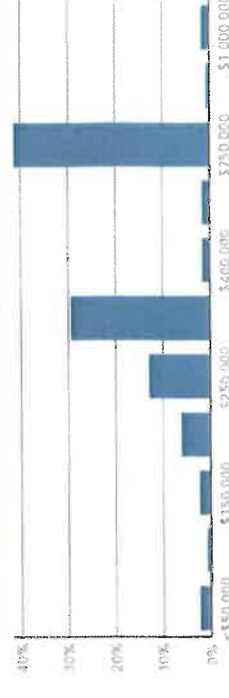
\$11,014

Source: U.S. Department of Housing and Urban Development, 2013

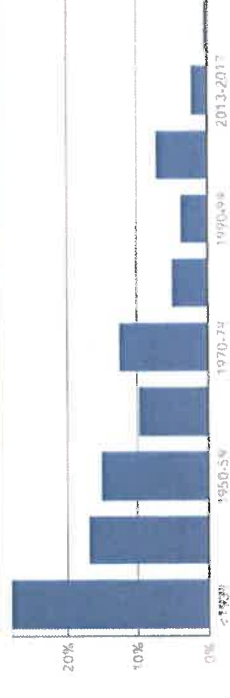
### Historical Trends: Population



### Home Value



### Housing: Year Built



### POPULATION BY GENE RATION



18.1%



33.3%



6.5%



3.7%

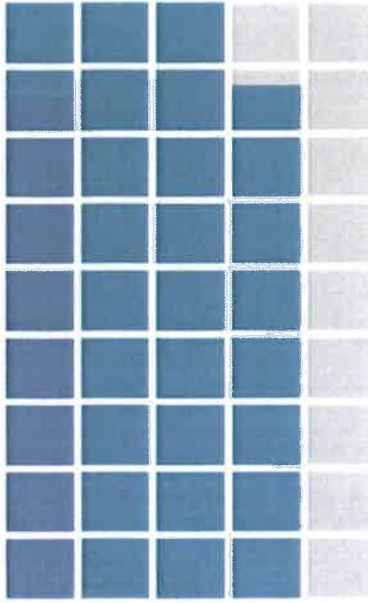


16.8%



21.7%

### POPULATION BY AGE



Under 18 (17%) 18-24 (23%) 25-34 (23%) 35-44 (23%) 45-54 (23%) 55-64 (23%) 65+ (23%)

## POPULATION TRENDS AND KEY INDICATORS

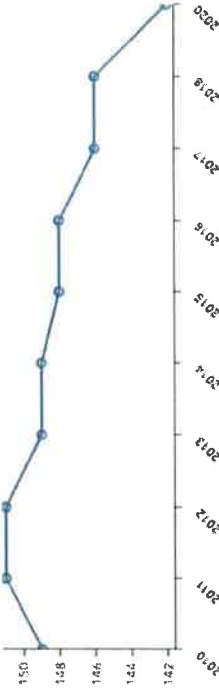
## MOUNTAIN HOME



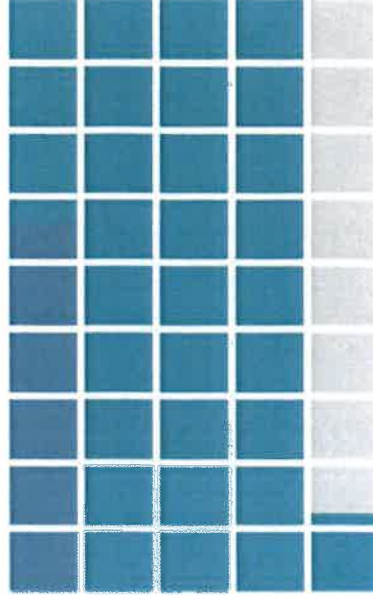
0.0%



\$16,574



3574830170dc



24.6%



29.6%



5.6%



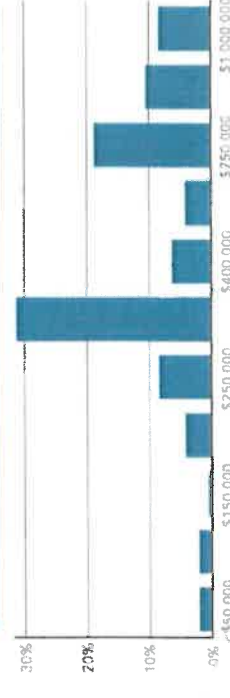
13.4%



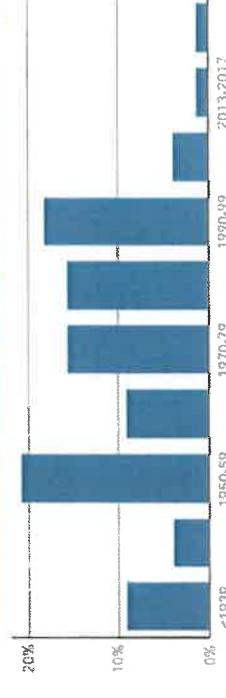
3.5%



23.2%

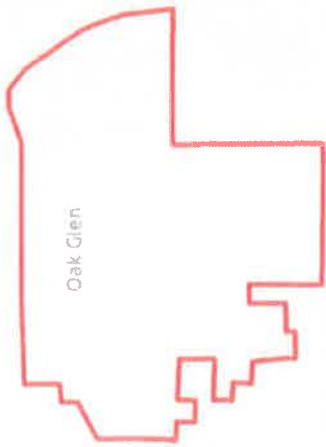


## Housing: Year Built



# POPULATION TRENDS AND KEY INDICATORS

OAK GLEN



625 191 3.10 50.2 \$110,922 \$604,358 296 102 52

Population Countywide Population Countywide Median Age Countywide Median Home Value Countywide Median Year Built Countywide

## MORTGAGE INDICATORS



\$20,971

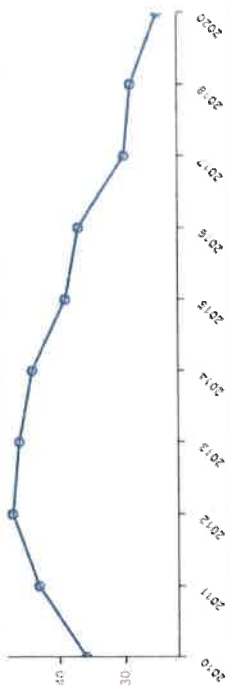
Median Home Value



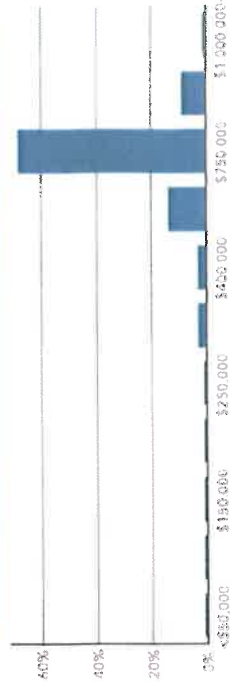
22.8%

Median Home Value

## Historical Trends: Population



## Home Value



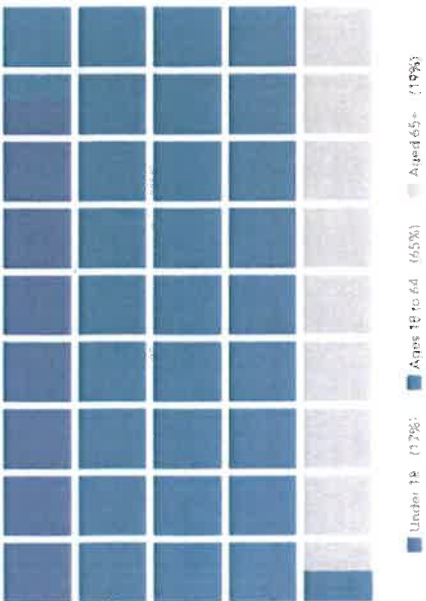
## Housing: Year Built



## POPULATION BY GENERATION



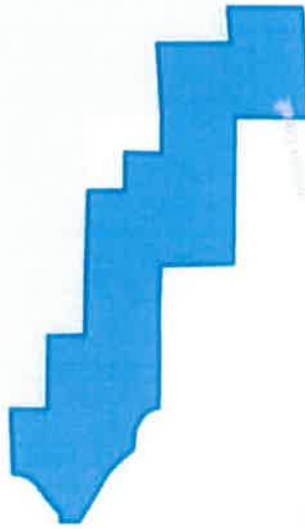
## POPULATION BY AGE





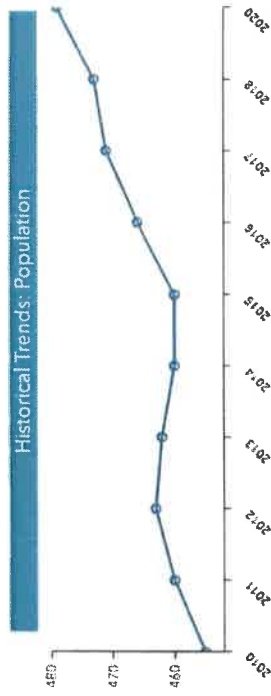
# POPULATION TRENDS AND KEY INDICATORS

## YUCAIPA FOOTHILLS

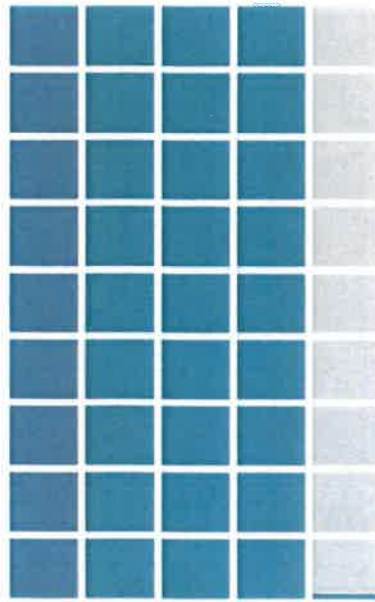


Population	479	150	3.11	48.8	\$116,860	\$609,797	207	106	54
Households									
Average Income									
Median Age									
Median Home Value									
Median Year Built									

### MORTGAGE INDICATORS



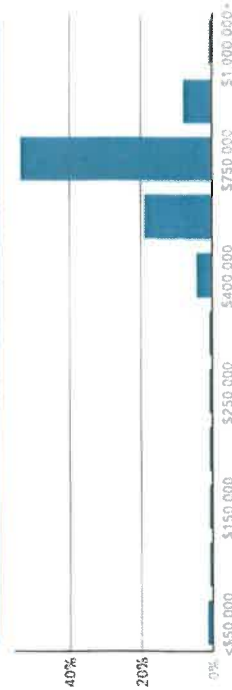
### POPULATION BY AGE



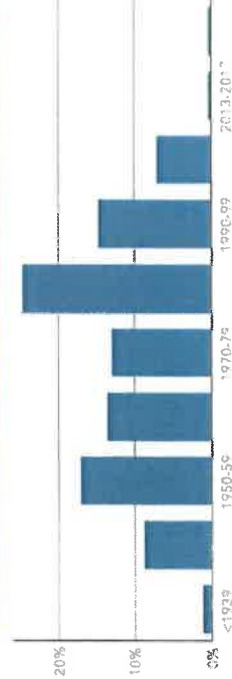
### POPULATION BY GENERATION



### Home Value



### Housing: Year Built



# AT RISK POPULATION

Area 0.63 square miles



## KEY FACTS

378



\$87,475

Median household income

47.7

Unemployment rate

Seniors 65+

12.9%

Adults 15 to 64

77.2%

Children 14 and under

9.9%

## BUSINESS



9

Number of manufacturing jobs



70

Number of employees



54

Population aged 18 and over



0

Number of families with children under 18



0

Number of housing units

## AT RISK

### Population by Language Spoken at Home (ACS)

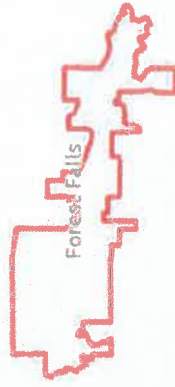
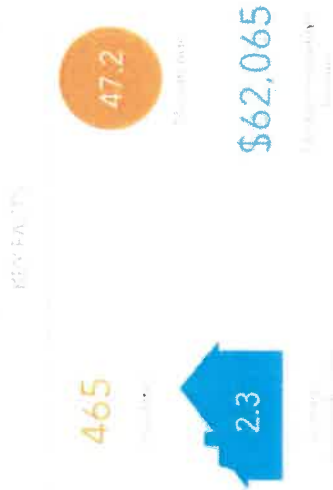
Language Spoken at Home	Total	Percent
Hispanic or Latino (Spanish or other language)	30	0.06
Non-Hispanic White (English)	41	0.09
Non-Hispanic Black (English)	0	0.00
Non-Hispanic Asian or Pacific Islander (English)	0	0.00
Non-Hispanic American Indian or Alaska Native (English)	0	0.00
Non-Hispanic Native Hawaiian or Other Pacific Islander (English)	0	0.00
Non-Hispanic Two or more languages (English)	0	0.00
Non-Hispanic Two or more languages (Other language)	0	0.00
Non-Hispanic Two or more languages (Other language)	0	0.00

This information is based on data from the American Community Survey (ACS) for the year 2019. The data is for the area of 0.63 square miles.

# AT RISK POPULATION



Area 1 - 10 square miles



## RISKS



14



85



67



0



2

## AT RISK

Population by Language Spoken at Home (ACS)	Total	Percentage
Pop 15 and speak Spanish or other language	0	0.0%
Pop 15 and speak English	465	100.0%
Pop 15 and speak Spanish or other language	0	0.0%
Pop 15 and speak Other Language	0	0.0%
Pop 15 and speak English	465	100.0%
Pop 15 and speak Other Language	0	0.0%
Pop 15 and speak English	465	100.0%
Pop 15 and speak Other Language	0	0.0%

\*This infographic contains data provided by American Community Survey (ACS) from 2014-2019. 2020-2021

# AT RISK POPULATION



Area: 11.57 square miles

AT RISK

142

Population

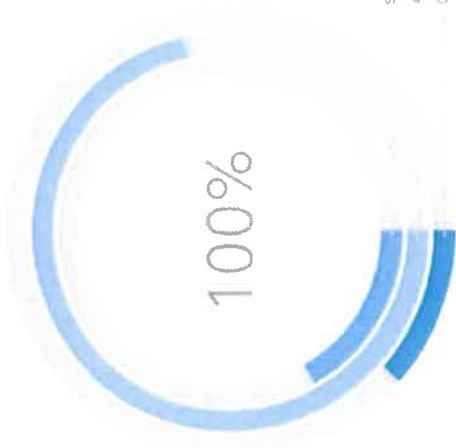


\$89,379

Median household income

47.9

Unemployment rate



Seniors 65+ 17.0%  
Adults 15 to 64 51.6%  
Children 14 and under 31.6%



BUSINESS



1

AT RISK



0



20



8



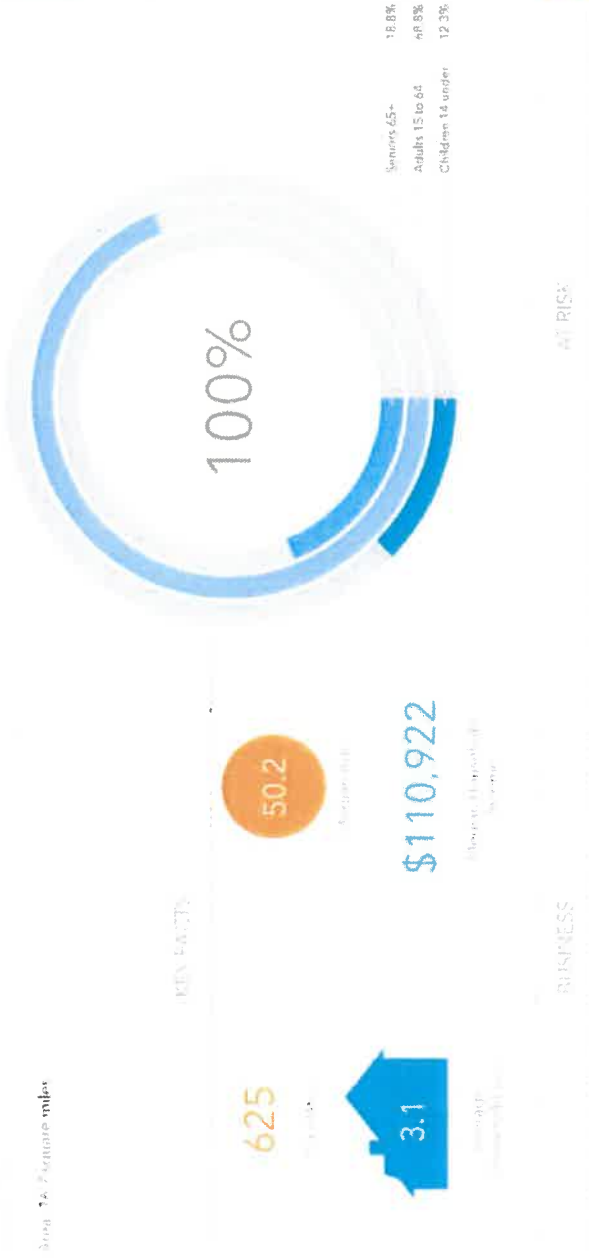
0

Population by Language Spoken at Home (ACS)	Total	Percent
Not a U.S. born citizen (includes U.S. born citizens)	142	100%
English (includes English as a second language)	142	100%
Spanish	0	0.0%
Other languages	0	0.0%
Other languages (includes other languages)	0	0.0%
Other languages (includes other languages)	0	0.0%
Other languages (includes other languages)	0	0.0%

# AT RISK POPULATION



Area 7A Percentage miles



## BUSINESS

## AT RISK



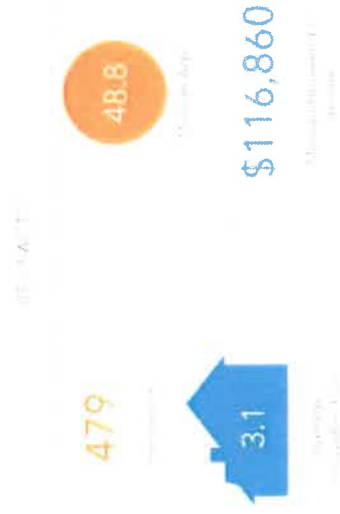
Population by Language Spoken at Home (ACS)	Total	Percent
Total (Black speak Spanish or the language)	0	0.0%
Preschool speak Indo-European & No English	0	0.0%
Preschool speak Spanish or the language	0	0.0%
Preschool speak Other Language & No English	0	0.0%
Preschool speak Asian/Pacific Islander	0	0.0%
Preschool speak Indo-European & No English	0	0.0%
Preschool speak Spanish or the language	0	0.0%
Preschool speak Other Language & No English	0	0.0%

This infographic contains data provided by American Community Survey 2014 for Escondido, CA. The data is for the year 2014.



## AT RISK POPULATION

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26



Seniors 65+	19.7%
Adults 15 to 64	76.4%
Children 14 and under	13.9%



Village





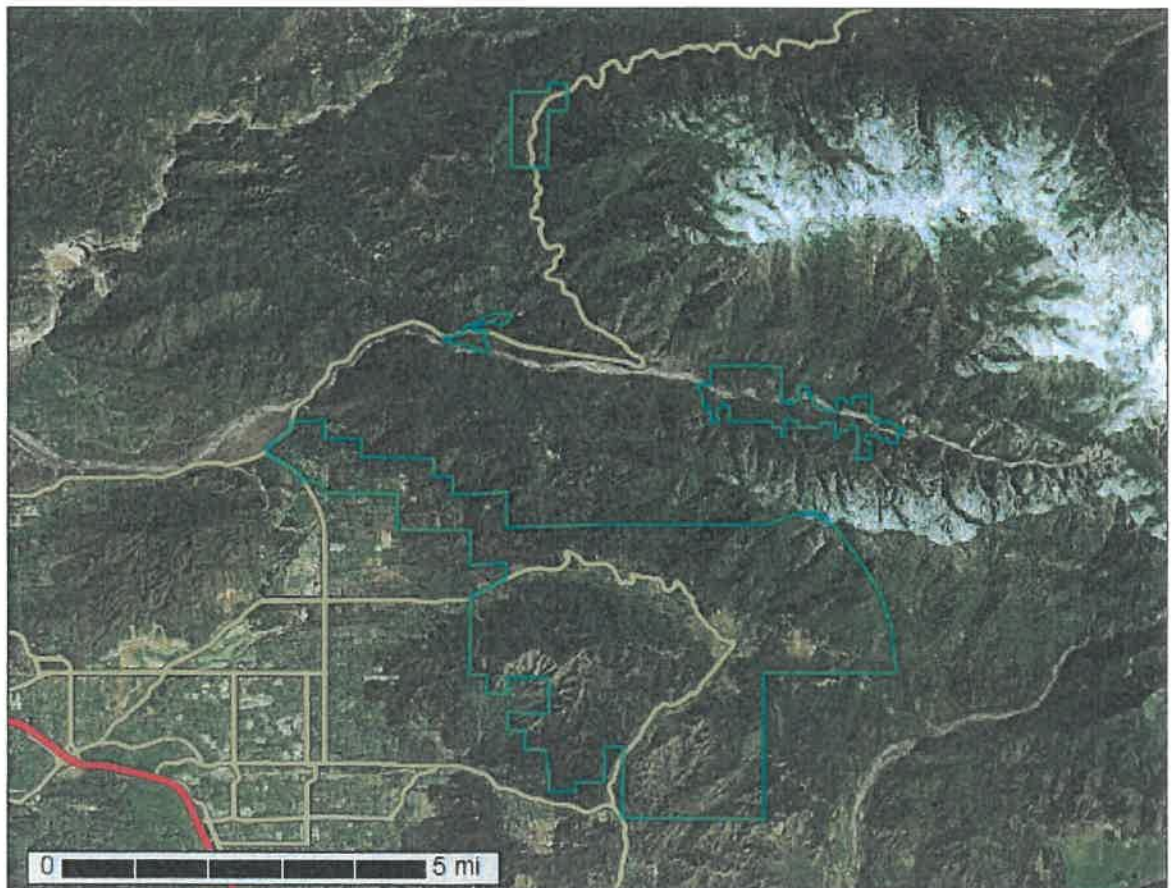
United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# **Custom Soil Resource Report for San Bernardino County Southwestern Part, California, San Bernardino National Forest Area, California, and Western Riverside Area, California Community Boundaries**



January 22, 2021

# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

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Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

## Soil Map

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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



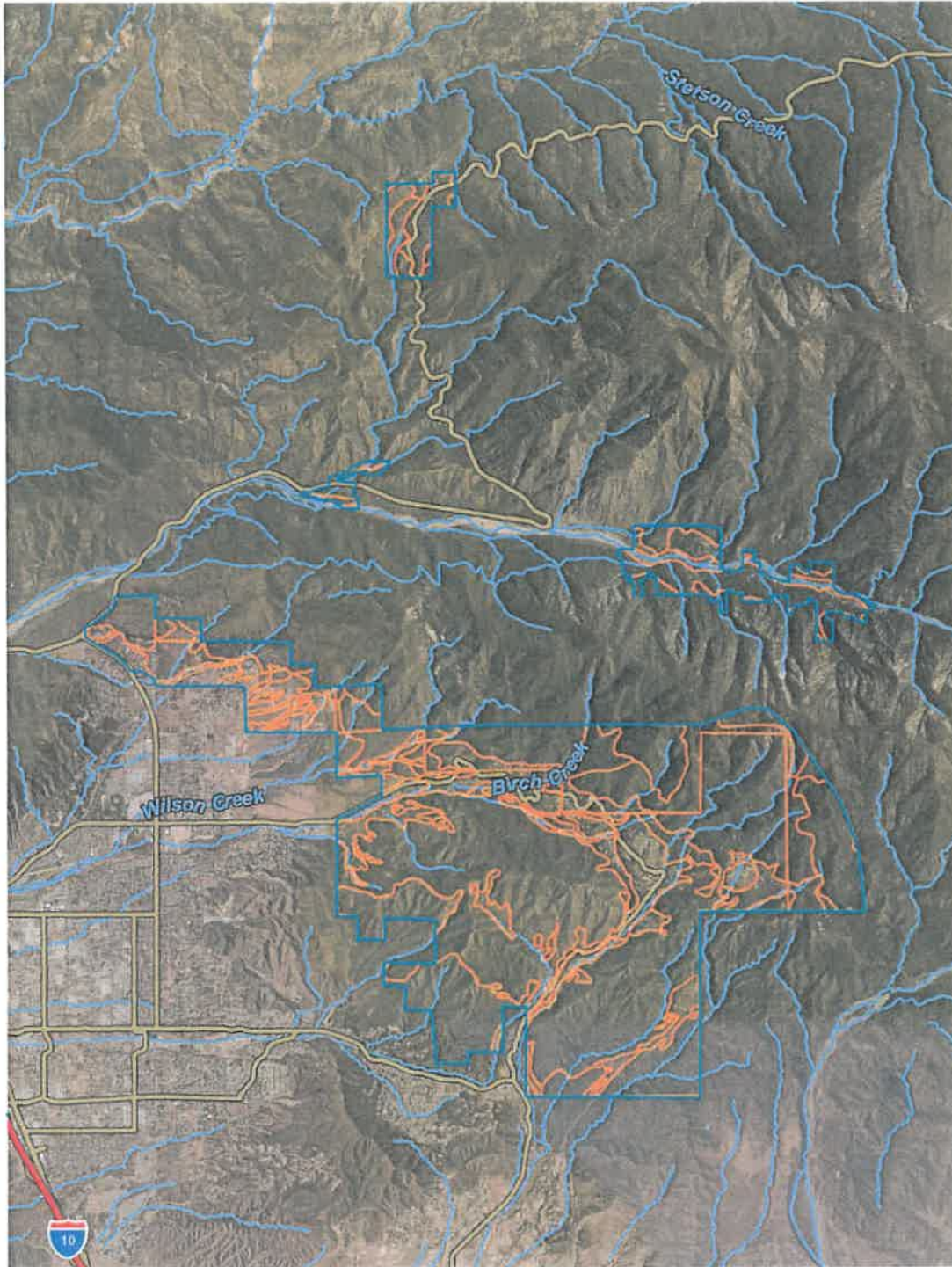
# Custom Soil Resource Report Soil Map

117° 54' 7" W

116° 52' 4" W

34° 10' 43" N

34° 10' 43" N



33° 58' 38" N

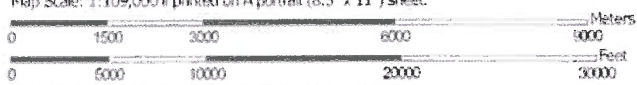
33° 58' 38" N

117° 54' 7" W

116° 52' 4" W



Map Scale: 1:109,000 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Spot Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Spot Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County Southwestern Part, California  
Survey Area Data: Version 12, May 27, 2020

Soil Survey Area: San Bernardino National Forest Area, California  
Survey Area Data: Version 12, May 27, 2020

Soil Survey Area: Western Riverside Area, California  
Survey Area Data: Version 13, May 27, 2020

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

## MAP LEGEND

## MAP INFORMATION

Date(s) aerial images were photographed: Apr 1, 2018—Jul 8, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CnD	Cieneba sandy loam, 9 to 15 percent slopes	32.5	0.2%
Cr	Cieneba-Rock outcrop complex, 30 to 50 percent slopes, MLRA 20	1,237.9	9.0%
Cs2	Crafton-Rock outcrop complex, eroded	465.9	3.4%
GlC	Greenfield sandy loam, 2 to 9 percent slopes	287.5	2.1%
GuD	Greenfield cobbly sandy loam, 5 to 15 percent slopes	156.5	1.1%
HaC	Hanford coarse sandy loam, 2 to 9 percent slopes	25.0	0.2%
OaC	Oak glen sandy loam, 2 to 9 percent slopes	280.1	2.0%
OgD	Oak glen gravelly sandy loam, 9 to 15 percent slopes	1,077.3	7.9%
OgE	Oak glen gravelly sandy loam, 15 to 30 percent slopes	597.2	4.4%
Ps	Psamments, Fluvents and Frequently flooded soils	10.3	0.1%
RmD	Ramona sandy loam, 9 to 15 percent slopes	29.6	0.2%
ShF	Saugus sandy loam, 30 to 50 percent slopes	131.3	1.0%
SoC	Soboba gravelly loamy sand, 0 to 9 percent slopes	92.8	0.7%
SpC	Soboba stony loamy sand, 2 to 9 percent slopes	282.4	2.1%
ToF	Tollhouse sandy loam, 30 to 50 percent slopes	4,974.9	36.4%
TvC	Tujunga gravelly loamy sand, 0 to 9 percent slopes	22.1	0.2%
Subtotals for Soil Survey Area		9,703.2	70.9%
Totals for Area of Interest		13,679.5	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AbD	Soboba-Hanford families association, 2 to 15 percent slopes	12.6	0.1%
BoD	Morical, very deep-Hecker families complex, 2 to 15 percent slopes	180.6	1.3%

# Custom Soil Resource Report

Map Unit Symbol	Map Unit Name	Acres In AOI	Percent of AOI
BoE	Morical, very deep-Hecker families complex, 15 to 30 percent slopes	82.2	0.6%
ChDE	Ramona family-Typic Xerorthents, warm association, 2 to 30 percent slopes	34.4	0.3%
Cs2	Crafton-Rock outcrop complex, eroded	4.5	0.0%
DaF	Pacifico-Wapi families complex, 30 to 50 percent slopes	54.4	0.4%
DdF	Pacifico-Preston families complex, 30 to 50 percent slopes	65.1	0.5%
DeF	Tyee-Tollhouse families complex, 30 to 50 percent slopes	36.7	0.3%
DhG	Lithic Xerorthents-Springdale family-Rubble land association, 50 to 100 percent slopes	594.6	4.3%
DnF	Trigo family-Lithic Xerorthents, warm complex, 30 to 50 percent slopes	19.3	0.1%
DnG	Trigo family-Lithic Xerorthents, warm complex, 50 to 75 percent slopes	35.7	0.3%
FhG	Springdale-Winthrop families complex, 50 to 75 percent slopes	427.9	3.1%
FLG	Springdale family-Lithic Xerorthents association, dry, 50 to 75 percent slopes	385.1	2.7%
FsD	Wilshire-Oak Glen, dry families association, 2 to 15 percent slopes	614.7	4.5%
LdG	Lithic Xerorthents, cool-Rock outcrop complex, 50 to 100 percent slopes	29.3	0.2%
LrG	Lithic Xerorthents-Rock outcrop complex, 50 to 100 percent slopes	64.5	0.5%
OaC	Oak Glen sandy loam, 2 to 9 percent slopes	0.8	0.0%
Rw	Riverwash	150.9	1.1%
SgF	Olete-Kilburn-Goulding families complex, 30 to 50 percent slopes	146.2	1.1%
ShF	Saugus sandy loam, 30 to 50 percent slopes	3.8	0.0%
SoDE	Oak Glen-Morical, very deep families complex, 2 to 30 percent slopes	423.4	3.1%



## Custom Soil Resource Report

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ToF	Tollhouse sandy loam, 30 to 50 percent slopes	5.5	0.0%
TyG	Tollhouse-Olete-Tyee families complex, 50 to 75 percent slopes	609.8	4.5%
WpG	Wapal family-Lithic Xerorthents, cool association, 50 to 75 percent slopes	2.5	0.0%
<b>Subtotals for Soil Survey Area</b>		<b>3,964.8</b>	<b>29.0%</b>
<b>Totals for Area of Interest</b>		<b>13,679.5</b>	<b>100.0%</b>

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CcD2	Calpine sandy loam, 8 to 15 percent slopes, eroded	0.0	0.0%
CsF2	Crafton rocky sandy loam, 25 to 50 percent slopes, eroded	11.1	0.1%
OgD	Oak Glen gravelly sandy loam, 8 to 15 percent slopes	0.1	0.0%
OkD	Oak Glen fine sandy loam, 5 to 15 percent slopes	0.3	0.0%
ShF	Saugus sandy loam, 30 to 50 percent slopes	0.0	0.0%
ToF	Tollhouse sandy loam, 30 to 50 percent slopes	0.0	0.0%
<b>Subtotals for Soil Survey Area</b>		<b>11.6</b>	<b>0.1%</b>
<b>Totals for Area of Interest</b>		<b>13,679.5</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a

## Custom Soil Resource Report

particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

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Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## San Bernardino County Southwestern Part, California

### CnD—Cieneba sandy loam, 9 to 15 percent slopes

#### Map Unit Setting

*National map unit symbol:* hcjl  
*Elevation:* 500 to 4,000 feet  
*Mean annual precipitation:* 12 to 35 inches  
*Mean annual air temperature:* 57 to 64 degrees F  
*Frost-free period:* 200 to 300 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Cieneba and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Cieneba

##### Setting

*Landform:* Hills  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from granite

##### Typical profile

*H1 - 0 to 8 inches:* sandy loam  
*H2 - 8 to 14 inches:* sandy loam  
*H3 - 14 to 18 inches:* weathered bedrock

##### Properties and qualities

*Slope:* 9 to 15 percent  
*Depth to restrictive feature:* 14 to 18 inches to paralithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

#### Minor Components

##### Unnamed

*Percent of map unit:* 10 percent  
*Hydric soil rating:* No

## Custom Soil Resource Report

### Rock outcrop

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

## Cr—Cieneba-Rock outcrop complex, 30 to 50 percent slopes, MLRA 20

### Map Unit Setting

*National map unit symbol: 2tb7z*

*Elevation: 500 to 5,500 feet*

*Mean annual precipitation: 10 to 39 inches*

*Mean annual air temperature: 45 to 64 degrees F*

*Frost-free period: 240 to 365 days*

*Farmland classification: Not prime farmland*

### Map Unit Composition

*Cieneba and similar soils: 60 percent*

*Rock outcrop: 30 percent*

*Minor components: 10 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Cieneba

#### Setting

*Landform: Hillslopes, mountain slopes*

*Down-slope shape: Linear, convex, concave*

*Across-slope shape: Convex, concave*

*Parent material: Residuum weathered from granite*

#### Typical profile

*A - 0 to 8 inches: sandy loam*

*C - 8 to 14 inches: sandy loam*

#### Properties and qualities

*Slope: 30 to 50 percent*

*Surface area covered with cobbles, stones or boulders: 10.0 percent*

*Depth to restrictive feature: 12 to 20 inches to paralithic bedrock*

*Drainage class: Somewhat excessively drained*

*Runoff class: Low*

*Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Maximum salinity: Nonsaline (0.0 to 0.5 mmhos/cm)*

*Available water capacity: Very low (about 1.7 inches)*

#### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 6e*

*Hydrologic Soil Group: D*



## Custom Soil Resource Report

*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Mountain slopes, ridges

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8

*Hydric soil rating:* No

### Minor Components

#### Typic xerorthent, eroded

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### Typic xerorthent, moderately deep

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

## Cs2—Crafton-Rock outcrop complex, eroded

### Map Unit Setting

*National map unit symbol:* hcjp

*Elevation:* 650 to 6,400 feet

*Mean annual precipitation:* 8 to 30 inches

*Mean annual air temperature:* 45 to 52 degrees F

*Frost-free period:* 110 to 200 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Crafton and similar soils:* 60 percent

*Rock outcrop:* 30 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Crafton

#### Setting

*Landform:* Hills

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Concave

*Across-slope shape:* Concave

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*Parent material:* Residuum weathered from metamorphic rock

### Typical profile

*H1 - 0 to 10 inches:* gravelly sandy loam

*H2 - 10 to 26 inches:* gravelly sandy loam

*H3 - 26 to 30 inches:* weathered bedrock

### Properties and qualities

*Slope:* 30 to 50 percent

*Depth to restrictive feature:* 26 to 30 inches to paralithic bedrock

*Drainage class:* Well drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 2.9 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Hills

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Free face

*Down-slope shape:* Concave

*Across-slope shape:* Concave

#### Typical profile

*H1 - 0 to 60 inches:* unweathered bedrock

### Properties and qualities

*Slope:* 30 to 50 percent

*Depth to restrictive feature:* 0 inches to lithic bedrock

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8

*Hydric soil rating:* No

### Minor Components

**Cienega, sandy loam 9-15 % slopes**

*Percent of map unit:* 10 percent

*Hydric soil rating:* No

## **GtC—Greenfield sandy loam, 2 to 9 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* hck0  
*Elevation:* 100 to 3,500 feet  
*Mean annual precipitation:* 9 to 20 inches  
*Mean annual air temperature:* 63 degrees F  
*Frost-free period:* 200 to 300 days  
*Farmland classification:* Prime farmland if irrigated

### **Map Unit Composition**

*Greenfield and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Greenfield**

#### **Setting**

*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from granite

#### **Typical profile**

*H1 - 0 to 16 inches:* sandy loam  
*H2 - 16 to 50 inches:* fine sandy loam  
*H3 - 50 to 60 inches:* sandy loam

#### **Properties and qualities**

*Slope:* 2 to 9 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water capacity:* Moderate (about 7.9 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* 2e  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

## Custom Soil Resource Report

### Minor Components

#### Ramona

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

#### Hanford

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

#### Unnamed

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

### GuD—Greenfield cobbly sandy loam, 5 to 15 percent slopes

#### Map Unit Setting

*National map unit symbol: hck2*

*Elevation: 100 to 3,500 feet*

*Mean annual precipitation: 9 to 20 inches*

*Mean annual air temperature: 63 degrees F*

*Frost-free period: 200 to 300 days*

*Farmland classification: Not prime farmland*

#### Map Unit Composition

*Greenfield and similar soils: 85 percent*

*Minor components: 15 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Greenfield

##### Setting

*Landform: Alluvial fans*

*Landform position (two-dimensional): Backslope*

*Landform position (three-dimensional): Tread*

*Down-slope shape: Concave*

*Across-slope shape: Convex*

*Parent material: Alluvium derived from granite*

##### Typical profile

*H1 - 0 to 16 inches: gravelly coarse sandy loam*

*H2 - 16 to 50 inches: fine sandy loam*

*H3 - 50 to 60 inches: sandy loam*

##### Properties and qualities

*Slope: 5 to 15 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Well drained*

*Runoff class: Low*

*Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)*

## Custom Soil Resource Report

*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water capacity:* Moderate (about 7.7 inches)

### Interpretive groups

*Land capability classification (irrigated):* 4s  
*Land capability classification (nonirrigated):* 4s  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Minor Components

#### **Hanford, coarse sandy loam**

*Percent of map unit:* 10 percent  
*Hydric soil rating:* No

#### **Ramona, sandy loam**

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

## **HaC—Hanford coarse sandy loam, 2 to 9 percent slopes**

### Map Unit Setting

*National map unit symbol:* hck3  
*Elevation:* 150 to 900 feet  
*Mean annual precipitation:* 10 to 20 inches  
*Mean annual air temperature:* 63 degrees F  
*Frost-free period:* 250 to 280 days  
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Hanford and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Hanford

#### Setting

*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 12 inches:* sandy loam  
*H2 - 12 to 60 inches:* fine sandy loam



## Custom Soil Resource Report

### Properties and qualities

*Slope:* 2 to 9 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* Rare  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water capacity:* Moderate (about 7.8 inches)

### Interpretive groups

*Land capability classification (irrigated):* 2e  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Minor Components

#### Greenfield, sandy loam

*Percent of map unit:* 10 percent  
*Hydric soil rating:* No

#### Tujunga, loamy sand

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

## OaC—Oak glen sandy loam, 2 to 9 percent slopes

### Map Unit Setting

*National map unit symbol:* hckd  
*Elevation:* 3,400 to 5,200 feet  
*Mean annual precipitation:* 15 to 25 inches  
*Mean annual air temperature:* 55 degrees F  
*Frost-free period:* 150 to 220 days  
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Oak glen and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Oak Glen

#### Setting

*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Tread

## Custom Soil Resource Report

*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Alluvium derived from granite

### Typical profile

*H1 - 0 to 20 inches:* sandy loam  
*H2 - 20 to 60 inches:* gravelly sandy loam

### Properties and qualities

*Slope:* 2 to 9 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Low (about 5.8 inches)

### Interpretive groups

*Land capability classification (irrigated):* 2e  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Minor Components

#### Crafton

*Percent of map unit:* 10 percent  
*Hydric soil rating:* No

#### Unnamed, gentler slopes

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

## OgD—Oak glen gravelly sandy loam, 9 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* hckf  
*Elevation:* 3,400 to 5,200 feet  
*Mean annual precipitation:* 15 to 25 inches  
*Mean annual air temperature:* 55 degrees F  
*Frost-free period:* 150 to 220 days  
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Oak glen and similar soils:* 95 percent  
*Minor components:* 5 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Custom Soil Resource Report

### Description of Oak Glen

#### Setting

*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 20 inches:* gravelly sandy loam  
*H2 - 20 to 60 inches:* gravelly sandy loam

#### Properties and qualities

*Slope:* 9 to 15 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Low (about 5.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 3e  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Minor Components

#### Unnamed

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

### OgE—Oak glen gravelly sandy loam, 15 to 30 percent slopes

#### Map Unit Setting

*National map unit symbol:* hckg  
*Elevation:* 3,400 to 5,200 feet  
*Mean annual precipitation:* 15 to 25 inches  
*Mean annual air temperature:* 55 degrees F  
*Frost-free period:* 150 to 220 days  
*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Oak glen and similar soils:* 85 percent

## Custom Soil Resource Report

*Minor components: 15 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Oak Glen

#### Setting

*Landform: Alluvial fans*

*Landform position (two-dimensional): Backslope*

*Landform position (three-dimensional): Tread*

*Down-slope shape: Concave*

*Across-slope shape: Convex*

*Parent material: Alluvium derived from granite*

#### Typical profile

*H1 - 0 to 20 inches: gravelly sandy loam*

*H2 - 20 to 60 inches: gravelly sandy loam*

#### Properties and qualities

*Slope: 15 to 25 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Well drained*

*Runoff class: Medium*

*Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water capacity: Low (about 5.4 inches)*

#### Interpretive groups

*Land capability classification (irrigated): 4e*

*Land capability classification (nonirrigated): 4e*

*Hydrologic Soil Group: A*

*Hydric soil rating: No*

### Minor Components

#### Unnamed, cobbly surface

*Percent of map unit: 10 percent*

*Hydric soil rating: No*

#### Unnamed, gravelly surface

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

### Ps—Psamments, Fluvents and Frequently flooded soils

#### Map Unit Setting

*National map unit symbol: hckh*

*Elevation: 10 to 1,500 feet*

*Mean annual precipitation: 10 to 25 inches*

*Mean annual air temperature: 59 to 64 degrees F*

## Custom Soil Resource Report

*Frost-free period:* 250 to 350 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Psamments and similar soils:* 55 percent  
*Fluents and similar soils:* 45 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Psamments

#### Setting

*Landform:* Drainageways  
*Landform position (three-dimensional):* Riser  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Sandy alluvium

#### Typical profile

*A - 0 to 12 inches:* sand  
*C1 - 12 to 48 inches:* fine sand  
*C2 - 48 to 60 inches:* stratified gravelly sand to gravelly loamy sand

#### Properties and qualities

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* FrequentNone  
*Frequency of ponding:* None  
*Available water capacity:* Low (about 4.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4w  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Description of Fluents

#### Setting

*Landform:* Drainageways  
*Landform position (three-dimensional):* Riser  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium

#### Typical profile

*A - 0 to 10 inches:* gravelly sand  
*C1 - 10 to 30 inches:* stratified gravelly sand to gravelly loam  
*C2 - 30 to 60 inches:* stratified gravelly sand to gravelly loam

#### Properties and qualities

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Runoff class:* Very low

## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* FrequentNone

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water capacity:* Moderate (about 6.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4w

*Hydrologic Soil Group:* A

*Hydric soil rating:* Yes

## RmD—Ramona sandy loam, 9 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* hckk

*Elevation:* 250 to 3,500 feet

*Mean annual precipitation:* 10 to 20 inches

*Mean annual air temperature:* 63 degrees F

*Frost-free period:* 230 to 320 days

*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Ramona and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Ramona

#### Setting

*Landform:* Alluvial fans, terraces

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave, linear

*Across-slope shape:* Concave, linear

*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 23 inches:* sandy loam

*H2 - 23 to 32 inches:* loam

*H3 - 32 to 54 inches:* clay loam

*H4 - 54 to 60 inches:* sandy loam

#### Properties and qualities

*Slope:* 9 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Medium



## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Moderate (about 7.9 inches)

### Interpretive groups

*Land capability classification (irrigated):* 3e

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* C

*Hydric soil rating:* No

### Minor Components

#### Greenfield, sandy loam

*Percent of map unit:* 10 percent

*Hydric soil rating:* No

#### Unnamed, gullied

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

## ShF—Saugus sandy loam, 30 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* hcks

*Elevation:* 600 to 2,500 feet

*Mean annual precipitation:* 14 to 20 inches

*Mean annual air temperature:* 63 degrees F

*Frost-free period:* 250 to 280 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Saugus and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Saugus

#### Setting

*Landform:* Hills

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Residuum weathered from sedimentary rock

#### Typical profile

*H1 - 0 to 8 inches:* sandy loam

*H2 - 8 to 40 inches:* loam

## Custom Soil Resource Report

*H3 - 40 to 44 inches: weathered bedrock*

### Properties and qualities

*Slope: 30 to 50 percent*

*Depth to restrictive feature: 40 to 44 inches to paralithic bedrock*

*Drainage class: Well drained*

*Runoff class: High*

*Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)*

*Available water capacity: Moderate (about 6.0 inches)*

### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 7e*

*Hydrologic Soil Group: B*

*Hydric soil rating: No*

### Minor Components

#### Unnamed, gravelly

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

#### San timoteo, loam

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

#### Unnamed, gullied

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

## SoC—Soboba gravelly loamy sand, 0 to 9 percent slopes

### Map Unit Setting

*National map unit symbol: hckt*

*Elevation: 30 to 4,200 feet*

*Mean annual precipitation: 10 to 20 inches*

*Mean annual air temperature: 61 to 63 degrees F*

*Frost-free period: 175 to 250 days*

*Farmland classification: Not prime farmland*

### Map Unit Composition

*Soboba and similar soils: 85 percent*

*Minor components: 15 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Custom Soil Resource Report

### Description of Soboba

#### Setting

*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 12 inches:* gravelly loamy sand  
*H2 - 12 to 36 inches:* very gravelly loamy sand  
*H3 - 36 to 60 inches:* very stony sand

#### Properties and qualities

*Slope:* 0 to 9 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Excessively drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* Rare  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline (0.0 to 1.0 mmhos/cm)  
*Available water capacity:* Low (about 3.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4s  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Minor Components

#### Unnamed

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

#### Delhi, fine sand

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

#### Tujunga, gravelly loam

*Percent of map unit:* 3 percent  
*Hydric soil rating:* No

#### Unnamed

*Percent of map unit:* 2 percent  
*Landform:* Drainageways  
*Hydric soil rating:* Yes

## Custom Soil Resource Report

### SpC—Soboba stony loamy sand, 2 to 9 percent slopes

#### Map Unit Setting

*National map unit symbol:* hckv  
*Elevation:* 960 to 3,690 feet  
*Mean annual precipitation:* 12 to 39 inches  
*Mean annual air temperature:* 60 to 65 degrees F  
*Frost-free period:* 260 to 365 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Soboba and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Soboba

##### Setting

*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from granite

##### Typical profile

*Ap - 0 to 10 inches:* stony loamy sand  
*C1 - 10 to 24 inches:* very stony loamy sand  
*C2 - 24 to 60 inches:* very stony sand

##### Properties and qualities

*Slope:* 2 to 9 percent  
*Surface area covered with cobbles, stones or boulders:* 0.1 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Excessively drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (6.00 to 19.99 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* Rare  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline (0.0 to 1.0 mmhos/cm)  
*Available water capacity:* Low (about 3.8 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

## Custom Soil Resource Report

### Minor Components

#### Hanford

*Percent of map unit:* 5 percent  
*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

#### Ramona

*Percent of map unit:* 5 percent  
*Landform:* Fan remnants  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

#### Tujunga, gravelly loamy sand

*Percent of map unit:* 5 percent  
*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### ToF—Tollhouse sandy loam, 30 to 50 percent slopes

#### Map Unit Setting

*National map unit symbol:* hcl0  
*Elevation:* 2,000 to 8,000 feet  
*Mean annual precipitation:* 10 to 35 inches  
*Mean annual air temperature:* 52 to 57 degrees F  
*Frost-free period:* 160 to 210 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Tollhouse and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Tollhouse

##### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank, side slope  
*Down-slope shape:* Concave

## Custom Soil Resource Report

*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from granite

### Typical profile

*H1 - 0 to 12 inches:* sandy loam  
*H2 - 12 to 16 inches:* weathered bedrock

### Properties and qualities

*Slope:* 30 to 50 percent  
*Depth to restrictive feature:* 12 to 16 inches to paralithic bedrock  
*Drainage class:* Excessively drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water capacity:* Very low (about 1.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

### Minor Components

#### Cieneba

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

#### Rock outcrop

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

#### Unnamed, gentler slopes

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

## TvC—Tujunga gravelly loamy sand, 0 to 9 percent slopes

### Map Unit Setting

*National map unit symbol:* hcl2  
*Elevation:* 10 to 1,500 feet  
*Mean annual precipitation:* 10 to 25 inches  
*Mean annual air temperature:* 59 to 64 degrees F  
*Frost-free period:* 250 to 350 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Tujunga and similar soils:* 85 percent



## Custom Soil Resource Report

*Minor components: 15 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Tujunga

#### Setting

*Landform: Alluvial fans*

*Landform position (two-dimensional): Backslope*

*Landform position (three-dimensional): Tread*

*Down-slope shape: Linear*

*Across-slope shape: Linear*

*Parent material: Alluvium derived from granite*

#### Typical profile

*H1 - 0 to 36 inches: gravelly loamy sand*

*H2 - 36 to 60 inches: gravelly sand*

#### Properties and qualities

*Slope: 0 to 9 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Somewhat excessively drained*

*Runoff class: Very low*

*Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: Rare*

*Frequency of ponding: None*

*Available water capacity: Low (about 3.8 inches)*

#### Interpretive groups

*Land capability classification (irrigated): 4s*

*Land capability classification (nonirrigated): 4e*

*Hydrologic Soil Group: A*

*Hydric soil rating: No*

### Minor Components

#### Unnamed

*Percent of map unit: 5 percent*

*Landform: Drainageways*

*Hydric soil rating: Yes*

#### Soboba, gravelly loamy sand

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

#### Delhi, fine sand

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

## San Bernardino National Forest Area, California

### AbD—Soboba-Hanford families association, 2 to 15 percent slopes

#### Map Unit Setting

*National map unit symbol:* htr5  
*Elevation:* 1,600 to 4,000 feet  
*Mean annual precipitation:* 15 to 25 inches  
*Mean annual air temperature:* 55 to 64 degrees F  
*Frost-free period:* 150 to 200 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Soboba family and similar soils:* 50 percent  
*Hanford family and similar soils:* 30 percent  
*Minor components:* 20 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Soboba Family

##### Setting

*Landform:* Flood plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium

##### Typical profile

*H1 - 0 to 8 inches:* very cobbly loamy sand  
*H2 - 8 to 24 inches:* very cobbly loamy sand  
*H3 - 24 to 60 inches:* stratified very cobbly sand to very cobbly loamy fine sand

##### Properties and qualities

*Slope:* 2 to 10 percent  
*Surface area covered with cobbles, stones or boulders:* 3.0 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Excessively drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.67 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 2.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

#### Description of Hanford Family

##### Setting

*Landform:* Alluvial fans

## Custom Soil Resource Report

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Riser

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium

### Typical profile

*H1 - 0 to 6 inches:* sandy loam

*H2 - 6 to 60 inches:* sandy loam

### Properties and qualities

*Slope:* 5 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Moderate (about 7.8 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

### Minor Components

#### Soboba family, nonskeletal

*Percent of map unit:* 10 percent

#### Riverwash

*Percent of map unit:* 10 percent

## BoD—Morical, very deep-Hecker families complex, 2 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* htrb

*Elevation:* 5,000 to 7,800 feet

*Mean annual precipitation:* 25 to 35 inches

*Mean annual air temperature:* 46 to 54 degrees F

*Frost-free period:* 120 to 175 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Morical family, very deep, and similar soils:* 50 percent

*Hecker family and similar soils:* 25 percent

## Custom Soil Resource Report

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Morical Family, Very Deep

#### Setting

*Landform: Terraces*  
*Landform position (two-dimensional): Foothlope*  
*Landform position (three-dimensional): Riser*  
*Down-slope shape: Linear*  
*Across-slope shape: Linear*  
*Parent material: Alluvium*

#### Typical profile

*H1 - 0 to 6 inches: gravelly loam*  
*H2 - 6 to 36 inches: gravelly clay loam*  
*H3 - 36 to 60 inches: gravelly sandy loam*

#### Properties and qualities

*Slope: 2 to 15 percent*  
*Depth to restrictive feature: More than 80 inches*  
*Drainage class: Well drained*  
*Runoff class: High*  
*Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)*  
*Depth to water table: More than 80 inches*  
*Frequency of flooding: None*  
*Frequency of ponding: None*  
*Available water capacity: Moderate (about 7.4 inches)*

#### Interpretive groups

*Land capability classification (irrigated): None specified*  
*Land capability classification (nonirrigated): 6e*  
*Hydrologic Soil Group: C*  
*Hydric soil rating: No*

### Description of Hecker Family

#### Setting

*Landform: Terraces*  
*Landform position (two-dimensional): Toeslope*  
*Landform position (three-dimensional): Riser*  
*Down-slope shape: Linear*  
*Across-slope shape: Linear*  
*Parent material: Alluvium*

#### Typical profile

*H1 - 0 to 6 inches: gravelly fine sandy loam*  
*H2 - 6 to 50 inches: very gravelly sandy clay loam*  
*H3 - 50 to 60 inches: extremely gravelly sandy loam*

#### Properties and qualities

*Slope: 2 to 15 percent*  
*Depth to restrictive feature: More than 80 inches*  
*Drainage class: Well drained*  
*Runoff class: Medium*  
*Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)*  
*Depth to water table: More than 80 inches*

## Custom Soil Resource Report

*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Low (about 4.2 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* B  
*Hydric soil rating:* No

## BoE—Morical, very deep-Hecker families complex, 15 to 30 percent slopes

### Map Unit Setting

*National map unit symbol:* htrc  
*Elevation:* 5,000 to 7,800 feet  
*Mean annual precipitation:* 25 to 35 inches  
*Mean annual air temperature:* 46 to 54 degrees F  
*Frost-free period:* 120 to 175 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Morical family, very deep, and similar soils:* 50 percent  
*Hecker family and similar soils:* 25 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Morical Family, Very Deep

#### Setting

*Landform:* Terraces  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Riser  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Alluvium

#### Typical profile

*H1 - 0 to 6 inches:* gravelly loam  
*H2 - 6 to 36 inches:* gravelly clay loam  
*H3 - 36 to 60 inches:* gravelly sandy loam

#### Properties and qualities

*Slope:* 15 to 30 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Very high  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None

## Custom Soil Resource Report

*Available water capacity: Moderate (about 7.4 inches)*

### **Interpretive groups**

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 6e*

*Hydrologic Soil Group: C*

*Hydric soil rating: No*

### **Description of Hecker Family**

#### **Setting**

*Landform: Terraces*

*Landform position (two-dimensional): Toeslope*

*Landform position (three-dimensional): Riser*

*Down-slope shape: Concave*

*Across-slope shape: Convex*

*Parent material: Alluvium*

#### **Typical profile**

*H1 - 0 to 6 inches: gravelly fine sandy loam*

*H2 - 6 to 50 inches: very gravelly sandy clay loam*

*H3 - 50 to 60 inches: extremely gravelly loam*

#### **Properties and qualities**

*Slope: 15 to 30 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Well drained*

*Runoff class: High*

*Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high  
(0.57 to 1.98 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water capacity: Low (about 4.2 inches)*

#### **Interpretive groups**

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 6e*

*Hydrologic Soil Group: B*

*Hydric soil rating: No*

## **ChDE—Ramona family-Typic Xerorthents, warm association, 2 to 30 percent slopes**

### **Map Unit Setting**

*National map unit symbol: htrg*

*Elevation: 2,000 to 4,000 feet*

*Mean annual precipitation: 15 to 25 inches*

*Mean annual air temperature: 55 to 64 degrees F*

*Frost-free period: 150 to 200 days*

*Farmland classification: Not prime farmland*



## Custom Soil Resource Report

### Map Unit Composition

*Ramona family and similar soils: 60 percent*

*Typic xerorthents, warm, and similar soils: 20 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Ramona Family

#### Setting

*Landform: Terraces*

*Landform position (two-dimensional): Toeslope*

*Landform position (three-dimensional): Riser*

*Down-slope shape: Concave*

*Across-slope shape: Convex*

*Parent material: Alluvium*

#### Typical profile

*H1 - 0 to 8 inches: sandy loam*

*H2 - 8 to 18 inches: gravelly sandy loam*

*H3 - 18 to 48 inches: cobbly sandy clay loam*

*H4 - 48 to 60 inches: gravelly sandy loam*

*H5 - 60 to 70 inches: gravelly loamy coarse sand*

#### Properties and qualities

*Slope: 2 to 20 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Well drained*

*Runoff class: High*

*Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water capacity: Moderate (about 7.2 inches)*

#### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 4e*

*Hydrologic Soil Group: C*

*Hydric soil rating: No*

### Description of Typic Xerorthents, Warm

#### Setting

*Landform: Terraces*

*Landform position (two-dimensional): Toeslope*

*Landform position (three-dimensional): Riser*

*Down-slope shape: Concave*

*Across-slope shape: Convex*

*Parent material: Residuum weathered from sedimentary rock*

#### Typical profile

*H1 - 0 to 8 inches: sandy loam*

*H2 - 8 to 30 inches: sandy loam*

*H3 - 30 to 34 inches: weathered bedrock*

#### Properties and qualities

*Slope: 10 to 30 percent*

## Custom Soil Resource Report

*Depth to restrictive feature:* 20 to 34 inches to paralithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Low (about 3.9 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* B  
*Hydric soil rating:* No

## Cs2—Crafton-Rock outcrop complex, eroded

### Map Unit Setting

*National map unit symbol:* xgmt  
*Elevation:* 650 to 6,400 feet  
*Mean annual precipitation:* 8 to 30 inches  
*Mean annual air temperature:* 45 to 52 degrees F  
*Frost-free period:* 110 to 200 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Crafton and similar soils:* 60 percent  
*Rock outcrop:* 30 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Crafton

#### Setting

*Landform:* Hills  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from metamorphic rock

#### Typical profile

*H1 - 0 to 10 inches:* gravelly sandy loam  
*H2 - 10 to 26 inches:* gravelly sandy loam  
*H3 - 26 to 30 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent  
*Depth to restrictive feature:* 26 to 30 inches to paralithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* Medium

## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 2.9 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Hills

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Free face

*Down-slope shape:* Concave

*Across-slope shape:* Concave

#### Typical profile

*H1 - 0 to 60 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent

*Depth to restrictive feature:* 0 inches to lithic bedrock

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8

*Hydric soil rating:* No

### Minor Components

**Cieneba, sandy loam 9-15 % slopes**

*Percent of map unit:* 10 percent

*Hydric soil rating:* No

## DaF—Pacífico-Wapi families complex, 30 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* htm

*Elevation:* 5,000 to 8,000 feet

*Mean annual precipitation:* 20 to 35 inches

*Mean annual air temperature:* 46 to 54 degrees F

*Frost-free period:* 120 to 175 days

*Farmland classification:* Not prime farmland

## Custom Soil Resource Report

### Map Unit Composition

*Pacifico family and similar soils: 50 percent*

*Wapi family and similar soils: 20 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Pacifico Family

#### Setting

*Landform: Mountains*

*Landform position (two-dimensional): Backslope*

*Landform position (three-dimensional): Mountainflank*

*Down-slope shape: Concave*

*Across-slope shape: Convex*

*Parent material: Residuum weathered from granodiorite*

#### Typical profile

*H1 - 0 to 3 inches: loamy coarse sand*

*H2 - 3 to 15 inches: loamy coarse sand*

*H3 - 15 to 19 inches: weathered bedrock*

#### Properties and qualities

*Slope: 30 to 50 percent*

*Depth to restrictive feature: 15 to 19 inches to paralithic bedrock*

*Drainage class: Somewhat excessively drained*

*Runoff class: Low*

*Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water capacity: Very low (about 1.0 inches)*

#### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 7e*

*Hydrologic Soil Group: D*

*Hydric soil rating: No*

### Description of Wapi Family

#### Setting

*Landform: Mountains*

*Landform position (two-dimensional): Backslope*

*Landform position (three-dimensional): Mountainflank*

*Down-slope shape: Concave*

*Across-slope shape: Concave*

*Parent material: Residuum weathered from granodiorite*

#### Typical profile

*H1 - 0 to 7 inches: loamy sand*

*H2 - 7 to 10 inches: gravelly loamy sand*

*H3 - 10 to 15 inches: weathered bedrock*

*H4 - 15 to 19 inches: unweathered bedrock*

#### Properties and qualities

*Slope: 30 to 50 percent*

## Custom Soil Resource Report

*Depth to restrictive feature:* 10 to 15 inches to paralithic bedrock; 15 to 19 inches to lithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 0.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

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## DdF—Pacífico-Preston families complex, 30 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* htrt  
*Elevation:* 4,800 to 7,500 feet  
*Mean annual precipitation:* 20 to 35 inches  
*Mean annual air temperature:* 46 to 54 degrees F  
*Frost-free period:* 120 to 175 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Pacífico family and similar soils:* 40 percent  
*Preston family and similar soils:* 35 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Pacífico Family

#### Setting

*Landform:* Mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 3 inches:* loamy coarse sand  
*H2 - 3 to 15 inches:* loamy coarse sand  
*H3 - 15 to 19 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent  
*Depth to restrictive feature:* 15 to 19 inches to paralithic bedrock  
*Drainage class:* Somewhat excessively drained

## Custom Soil Resource Report

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 1.0 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

*Hydric soil rating:* No

### Description of Preston Family

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

*Across-slope shape:* Convex

*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 4 inches:* loamy sand

*H2 - 4 to 19 inches:* loamy sand

*H3 - 19 to 28 inches:* gravelly sand

*H4 - 28 to 32 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent

*Depth to restrictive feature:* 20 to 50 inches to paralithic bedrock

*Drainage class:* Somewhat excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 1.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* A

*Hydric soil rating:* No



## **DeF—Tyee-Tollhouse families complex, 30 to 50 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* htrv  
*Elevation:* 3,400 to 5,600 feet  
*Mean annual precipitation:* 15 to 25 inches  
*Mean annual air temperature:* 46 to 54 degrees F  
*Frost-free period:* 120 to 175 days  
*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Tyee family and similar soils:* 45 percent  
*Tollhouse family and similar soils:* 35 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Tyee Family**

#### **Setting**

*Landform:* Mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from granodiorite

#### **Typical profile**

*H1 - 0 to 4 inches:* gravelly sandy loam  
*H2 - 4 to 11 inches:* sandy loam  
*H3 - 11 to 15 inches:* coarse sandy loam  
*H4 - 15 to 19 inches:* weathered bedrock

#### **Properties and qualities**

*Slope:* 30 to 50 percent  
*Depth to restrictive feature:* 15 to 19 inches to paralithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.7 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

## Custom Soil Resource Report

### Description of Tollhouse Family

#### Setting

*Landform:* Mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 11 inches:* gravelly sandy loam  
*H2 - 11 to 18 inches:* sandy loam  
*H2 - 18 to 22 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent  
*Depth to restrictive feature:* 18 to 22 inches to paralithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

### DhG—Lithic Xerorthents-Springdale family-Rubble land association, 50 to 100 percent slopes

#### Map Unit Setting

*National map unit symbol:* htrw  
*Elevation:* 4,000 to 7,500 feet  
*Mean annual precipitation:* 24 to 43 inches  
*Mean annual air temperature:* 46 to 54 degrees F  
*Frost-free period:* 120 to 175 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Lithic xerorthents and similar soils:* 35 percent  
*Springdale family and similar soils:* 20 percent  
*Rubble land:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Custom Soil Resource Report

### Description of Lithic Xerorthents

#### Setting

*Landform:* Mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 18 inches:* very gravelly loamy sand  
*H2 - 18 to 22 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 60 to 90 percent  
*Depth to restrictive feature:* 18 to 22 inches to lithic bedrock  
*Drainage class:* Excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

### Description of Springdale Family

#### Setting

*Landform:* Mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 7 inches:* very gravelly loamy sand  
*H2 - 7 to 30 inches:* extremely gravelly loamy sand  
*H3 - 30 to 34 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 50 to 70 percent  
*Depth to restrictive feature:* 30 to 34 inches to lithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.8 inches)

## Custom Soil Resource Report

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Description of Rubble Land

#### Setting

*Landform:* Talus slopes  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Colluvium derived from granodiorite

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8e  
*Hydric soil rating:* No

## DnF—Trigo family-Lithic Xerorthents, warm complex, 30 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* htry  
*Elevation:* 1,790 to 6,400 feet  
*Mean annual precipitation:* 10 to 20 inches  
*Mean annual air temperature:* 55 to 64 degrees F  
*Frost-free period:* 150 to 200 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Trigo family and similar soils:* 60 percent  
*Lithic xerorthents, warm, and similar soils:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Trigo Family

#### Setting

*Landform:* Hills  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 3 inches:* coarse sandy loam  
*H2 - 3 to 12 inches:* coarse sandy loam

## Custom Soil Resource Report

*H3 - 12 to 16 inches: weathered bedrock*

### Properties and qualities

*Slope: 30 to 50 percent*

*Depth to restrictive feature: 12 to 16 inches to paralithic bedrock*

*Drainage class: Somewhat excessively drained*

*Runoff class: Medium*

*Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water capacity: Very low (about 1.5 inches)*

### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 6e*

*Hydrologic Soil Group: D*

*Hydric soil rating: No*

## Description of Lithic Xerorthents, Warm

### Setting

*Landform: Hills*

*Landform position (two-dimensional): Backslope*

*Landform position (three-dimensional): Side slope*

*Down-slope shape: Concave*

*Across-slope shape: Convex*

*Parent material: Residuum weathered from granodiorite*

### Typical profile

*H1 - 0 to 18 inches: gravelly sandy loam*

*H2 - 18 to 22 inches: unweathered bedrock*

### Properties and qualities

*Slope: 30 to 50 percent*

*Depth to restrictive feature: 18 to 22 inches to lithic bedrock*

*Drainage class: Excessively drained*

*Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water capacity: Very low (about 1.4 inches)*

### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 6e*

*Hydrologic Soil Group: D*

*Hydric soil rating: No*

## Custom Soil Resource Report

### **DnG—Trigo family-Lithic Xerorthents, warm complex, 50 to 75 percent slopes**

#### **Map Unit Setting**

*National map unit symbol:* htrz  
*Elevation:* 1,790 to 6,400 feet  
*Mean annual precipitation:* 10 to 20 inches  
*Mean annual air temperature:* 55 to 64 degrees F  
*Frost-free period:* 150 to 200 days  
*Farmland classification:* Not prime farmland

#### **Map Unit Composition**

*Trigo family and similar soils:* 50 percent  
*Lithic xerorthents, warm, and similar soils:* 20 percent  
*Minor components:* 30 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### **Description of Trigo Family**

##### **Setting**

*Landform:* Hills  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from granodiorite

##### **Typical profile**

*H1 - 0 to 3 inches:* coarse sandy loam  
*H2 - 3 to 12 inches:* coarse sandy loam  
*H3 - 12 to 16 inches:* weathered bedrock

##### **Properties and qualities**

*Slope:* 50 to 75 percent  
*Depth to restrictive feature:* 12 to 16 inches to paralithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.5 inches)

##### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No



## Custom Soil Resource Report

### Description of Lithic Xerorthents, Warm

#### Setting

*Landform:* Hills  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 18 inches:* gravelly sandy loam  
*H2 - 18 to 22 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 50 to 75 percent  
*Depth to restrictive feature:* 18 to 22 inches to lithic bedrock  
*Drainage class:* Excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

#### Minor Components

##### Rock outcrop

*Percent of map unit:* 8 percent

##### Unnamed, shallow fine sandy loam soils

*Percent of map unit:* 8 percent

##### Springdale family

*Percent of map unit:* 7 percent

##### Ramona family

*Percent of map unit:* 7 percent

### FhG—Springdale-Winthrop families complex, 50 to 75 percent slopes

#### Map Unit Setting

*National map unit symbol:* htsh  
*Elevation:* 4,000 to 7,000 feet  
*Mean annual precipitation:* 20 to 35 inches

## Custom Soil Resource Report

*Mean annual air temperature:* 46 to 54 degrees F

*Frost-free period:* 120 to 175 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Springdale family and similar soils:* 40 percent

*Winthrop family and similar soils:* 30 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Springdale Family

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 7 inches:* very gravelly loamy sand

*H2 - 7 to 30 inches:* extremely gravelly loamy sand

*H3 - 30 to 34 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 50 to 75 percent

*Depth to restrictive feature:* 30 to 34 inches to lithic bedrock

*Drainage class:* Somewhat excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 1.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

### Description of Winthrop Family

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

*Across-slope shape:* Convex

*Parent material:* Residuum weathered from granite

#### Typical profile

*H1 - 0 to 10 inches:* very gravelly loamy coarse sand

*H2 - 10 to 26 inches:* very gravelly loamy coarse sand

*H3 - 26 to 31 inches:* weathered bedrock

## Custom Soil Resource Report

### Properties and qualities

*Slope:* 50 to 75 percent

*Depth to restrictive feature:* 26 to 31 inches to paralithic bedrock

*Drainage class:* Somewhat excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 1.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

## FLG—Springdale family-Lithic Xerorthents association, dry, 50 to 75 percent slopes

### Map Unit Setting

*National map unit symbol:* htsc

*Elevation:* 3,000 to 7,000 feet

*Mean annual precipitation:* 15 to 25 inches

*Mean annual air temperature:* 46 to 54 degrees F

*Frost-free period:* 120 to 175 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Springdale family, dry, and similar soils:* 40 percent

*Lithic xerorthents, dry, and similar soils:* 35 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Springdale Family, Dry

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Residuum weathered from granite

#### Typical profile

*H1 - 0 to 5 inches:* gravelly loamy coarse sand

*H2 - 5 to 25 inches:* very gravelly loamy sand

*H3 - 25 to 45 inches:* very gravelly coarse sand

*H4 - 45 to 49 inches:* unweathered bedrock

## Custom Soil Resource Report

### Properties and qualities

*Slope:* 50 to 70 percent

*Depth to restrictive feature:* 45 to 49 inches to lithic bedrock

*Drainage class:* Somewhat excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 2.5 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

### Description of Lithic Xerorthents, Dry

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

*Across-slope shape:* Convex

*Parent material:* Residuum weathered from granite

#### Typical profile

*H1 - 0 to 18 inches:* very gravelly loamy sand

*H2 - 18 to 22 inches:* unweathered bedrock

### Properties and qualities

*Slope:* 60 to 75 percent

*Depth to restrictive feature:* 18 to 22 inches to lithic bedrock

*Drainage class:* Excessively drained

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 1.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

*Hydric soil rating:* No

**FsD—Wilshire-Oak Glen, dry families association, 2 to 15 percent slopes**

**Map Unit Setting**

*National map unit symbol:* htsg  
*Elevation:* 3,800 to 6,000 feet  
*Mean annual precipitation:* 10 to 25 inches  
*Mean annual air temperature:* 55 to 64 degrees F  
*Frost-free period:* 150 to 200 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Wilshire family and similar soils:* 50 percent  
*Oak glen family, dry, and similar soils:* 25 percent  
*Minor components:* 25 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Wilshire Family**

**Setting**

*Landform:* Flood plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium

**Typical profile**

*H1 - 0 to 5 inches:* very gravelly coarse sand  
*H2 - 5 to 15 inches:* extremely cobbly coarse sand  
*H2 - 15 to 60 inches:* stratified loamy fine sand to very gravelly coarse sand

**Properties and qualities**

*Slope:* 2 to 10 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* Very high (19.98 to 99.90 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

## Custom Soil Resource Report

### Description of Oak Glen Family, Dry

#### Setting

*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Riser  
*Down-slope shape:* Concave  
*Across-slope shape:* Convex  
*Parent material:* Alluvium

#### Typical profile

*H1 - 0 to 14 inches:* sandy loam  
*H2 - 14 to 23 inches:* coarse sandy loam  
*H3 - 23 to 60 inches:* sandy loam

#### Properties and qualities

*Slope:* 5 to 15 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Moderate (about 7.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

#### Minor Components

##### Avawatz family

*Percent of map unit:* 9 percent

##### Unnamed, high precip soils

*Percent of map unit:* 8 percent

##### Oak glen family, skeletal

*Percent of map unit:* 8 percent

### LdG—Lithic Xerorthents, cool-Rock outcrop complex, 50 to 100 percent slopes

#### Map Unit Setting

*National map unit symbol:* htss  
*Elevation:* 7,000 to 10,000 feet

## Custom Soil Resource Report

*Mean annual precipitation:* 30 to 40 inches  
*Mean annual air temperature:* 43 to 46 degrees F  
*Frost-free period:* 100 to 150 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Lithic xerorthents, cool, and similar soils:* 50 percent  
*Rock outcrop:* 30 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Lithic Xerorthents, Cool

#### Setting

*Landform:* Mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum

#### Typical profile

*H1 - 0 to 18 inches:* very gravelly loamy sand  
*H2 - 18 to 22 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 50 to 75 percent  
*Depth to restrictive feature:* 18 to 22 inches to lithic bedrock  
*Drainage class:* Excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Convex  
*Parent material:* Residuum

#### Typical profile

*H1 - 0 to 4 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 50 to 100 percent  
*Depth to restrictive feature:* 0 to 4 inches to lithic bedrock  
*Drainage class:* Excessively drained



## Custom Soil Resource Report

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8e

*Hydric soil rating:* No

## LrG—Lithic Xerorthents-Rock outcrop complex, 50 to 100 percent slopes

### Map Unit Setting

*National map unit symbol:* htst

*Elevation:* 4,000 to 6,940 feet

*Mean annual precipitation:* 25 to 35 inches

*Mean annual air temperature:* 46 to 54 degrees F

*Frost-free period:* 125 to 175 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Lithic xerorthents and similar soils:* 50 percent

*Rock outcrop:* 25 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Lithic Xerorthents

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Residuum

#### Typical profile

*H1 - 0 to 18 inches:* very gravelly loamy sand

*H2 - 18 to 22 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 50 to 75 percent

*Depth to restrictive feature:* 18 to 22 inches to lithic bedrock

*Drainage class:* Excessively drained

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 1.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

## Custom Soil Resource Report

*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

*Across-slope shape:* Convex

*Parent material:* Residuum

#### Typical profile

*H1 - 0 to 4 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 50 to 100 percent

*Depth to restrictive feature:* 0 to 4 inches to paralithic bedrock

*Drainage class:* Excessively drained

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8e

*Hydric soil rating:* No

## OaC—Oak Glen sandy loam, 2 to 9 percent slopes

### Map Unit Setting

*National map unit symbol:* xgmy

*Elevation:* 3,400 to 5,200 feet

*Mean annual precipitation:* 15 to 25 inches

*Mean annual air temperature:* 55 degrees F

*Frost-free period:* 150 to 220 days

*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Oak glen and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Oak Glen

#### Setting

*Landform:* Alluvial fans

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 20 inches:* sandy loam

## Custom Soil Resource Report

*H2 - 20 to 60 inches: gravelly sandy loam*

### Properties and qualities

*Slope: 2 to 9 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Well drained*

*Runoff class: Low*

*Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water capacity: Low (about 5.8 inches)*

### Interpretive groups

*Land capability classification (irrigated): 2e*

*Land capability classification (nonirrigated): 3e*

*Hydrologic Soil Group: A*

*Hydric soil rating: No*

### Minor Components

#### Crafton

*Percent of map unit: 10 percent*

*Hydric soil rating: No*

#### Unnamed, gentler slopes

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

## Rw—Riverwash

### Map Unit Setting

*National map unit symbol: htt3*

*Elevation: 1,600 to 6,000 feet*

*Mean annual precipitation: 10 to 35 inches*

*Mean annual air temperature: 46 to 64 degrees F*

*Frost-free period: 120 to 200 days*

*Farmland classification: Not prime farmland*

### Map Unit Composition

*Riverwash: 80 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Riverwash

#### Setting

*Landform: Flood plains*

*Landform position (two-dimensional): Toeslope*

*Landform position (three-dimensional): Talf*

*Down-slope shape: Linear*

## Custom Soil Resource Report

*Across-slope shape:* Linear

*Parent material:* Alluvium

### Properties and qualities

*Slope:* 2 to 10 percent

*Frequency of flooding:* FrequentOccasionalNone

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8w

*Hydric soil rating:* Yes

## SgF—Olete-Kilburn-Goulding families complex, 30 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* htt5

*Elevation:* 5,000 to 8,000 feet

*Mean annual precipitation:* 15 to 30 inches

*Mean annual air temperature:* 46 to 54 degrees F

*Frost-free period:* 120 to 175 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Olete family and similar soils:* 35 percent

*Kilburn family and similar soils:* 25 percent

*Goulding family and similar soils:* 15 percent

*Minor components:* 25 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Olete Family

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

*Across-slope shape:* Convex

*Parent material:* Residuum weathered from gneiss

#### Typical profile

*H1 - 0 to 3 inches:* very cobbly sandy loam

*H2 - 3 to 26 inches:* very cobbly sandy loam

*H3 - 26 to 30 inches:* unweathered bedrock

### Properties and qualities

*Slope:* 30 to 50 percent

*Depth to restrictive feature:* 26 to 30 inches to lithic bedrock

*Drainage class:* Well drained

*Runoff class:* High

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

## Custom Soil Resource Report

*Frequency of ponding:* None

*Available water capacity:* Very low (about 2.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* C

*Hydric soil rating:* No

### Description of Kilburn Family

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Residuum weathered from schist

#### Typical profile

*H1 - 0 to 15 inches:* gravelly loam

*H2 - 15 to 30 inches:* very gravelly loam

*H3 - 30 to 35 inches:* very gravelly loam

*H4 - 35 to 39 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent

*Depth to restrictive feature:* 35 to 39 inches to lithic bedrock

*Drainage class:* Well drained

*Runoff class:* High

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Low (about 3.8 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* C

*Hydric soil rating:* No

### Description of Goulding Family

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Residuum weathered from gneiss

#### Typical profile

*H1 - 0 to 3 inches:* gravelly sandy loam

*H2 - 3 to 12 inches:* very gravelly loam

*H3 - 12 to 16 inches:* unweathered bedrock

## Custom Soil Resource Report

### Properties and qualities

*Slope:* 30 to 50 percent

*Depth to restrictive feature:* 12 to 16 inches to lithic bedrock

*Drainage class:* Well drained

*Runoff class:* High

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 1.2 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* D

*Hydric soil rating:* No

### Minor Components

#### Unnamed, high elevation soils

*Percent of map unit:* 9 percent

#### Rock outcrop

*Percent of map unit:* 8 percent

#### Hodgson family

*Percent of map unit:* 8 percent

## ShF—Saugus sandy loam, 30 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* 1hb90

*Elevation:* 600 to 2,500 feet

*Mean annual precipitation:* 14 to 20 inches

*Mean annual air temperature:* 63 degrees F

*Frost-free period:* 250 to 280 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Saugus and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Saugus

#### Setting

*Landform:* Hills

## Custom Soil Resource Report

*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from sedimentary rock

### Typical profile

*H1 - 0 to 8 inches:* sandy loam  
*H2 - 8 to 40 inches:* loam  
*H3 - 40 to 44 inches:* weathered bedrock

### Properties and qualities

*Slope:* 30 to 50 percent  
*Depth to restrictive feature:* 40 to 44 inches to paralithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water capacity:* Moderate (about 6.0 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* B  
*Hydric soil rating:* No

### Minor Components

#### Unnamed, gravelly

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

#### San timoteo, loam

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

#### Unnamed, gullied

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

## SoDE—Oak Glen-Morical, very deep families complex, 2 to 30 percent slopes

### Map Unit Setting

*National map unit symbol:* htt7  
*Elevation:* 4,000 to 5,600 feet  
*Mean annual precipitation:* 25 to 30 inches  
*Mean annual air temperature:* 46 to 54 degrees F



## Custom Soil Resource Report

*Frost-free period: 120 to 175 days*

*Farmland classification: Not prime farmland*

### Map Unit Composition

*Oak glen family and similar soils: 60 percent*

*Morical family, very deep, and similar soils: 20 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Oak Glen Family

#### Setting

*Landform: Alluvial fans*

*Landform position (two-dimensional): Toeslope*

*Landform position (three-dimensional): Riser*

*Down-slope shape: Linear*

*Across-slope shape: Linear*

*Parent material: Alluvium*

#### Typical profile

*H1 - 0 to 15 inches: sandy loam*

*H2 - 15 to 30 inches: sandy loam*

*H3 - 30 to 60 inches: loamy sand*

#### Properties and qualities

*Slope: 2 to 30 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Well drained*

*Runoff class: Low*

*Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water capacity: Moderate (about 7.9 inches)*

#### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 4e*

*Hydrologic Soil Group: A*

*Hydric soil rating: No*

### Description of Morical Family, Very Deep

#### Setting

*Landform: Alluvial fans*

*Landform position (two-dimensional): Footslope*

*Landform position (three-dimensional): Riser*

*Down-slope shape: Concave*

*Across-slope shape: Convex*

*Parent material: Alluvium*

#### Typical profile

*H1 - 0 to 6 inches: gravelly loam*

*H2 - 6 to 36 inches: gravelly clay loam*

*H3 - 36 to 60 inches: gravelly sandy loam*

#### Properties and qualities

*Slope: 2 to 30 percent*

## Custom Soil Resource Report

*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Moderate (about 7.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* C  
*Hydric soil rating:* No

## ToF—Tollhouse sandy loam, 30 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* xgn1  
*Elevation:* 2,000 to 8,000 feet  
*Mean annual precipitation:* 10 to 35 inches  
*Mean annual air temperature:* 52 to 57 degrees F  
*Frost-free period:* 160 to 210 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Tollhouse and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Tollhouse

#### Setting

*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank, side slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from granite

#### Typical profile

*H1 - 0 to 12 inches:* sandy loam  
*H2 - 12 to 16 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent  
*Depth to restrictive feature:* 12 to 16 inches to paralithic bedrock  
*Drainage class:* Excessively drained  
*Runoff class:* Medium

## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water capacity:* Very low (about 1.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

*Hydric soil rating:* No

### Minor Components

#### Cleneba

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### Rock outcrop

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### Unnamed, gentler slopes

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

## TyG—Tollhouse-Olete-Tyee families complex, 50 to 75 percent slopes

### Map Unit Setting

*National map unit symbol:* htt9

*Elevation:* 4,000 to 5,200 feet

*Mean annual precipitation:* 20 to 25 inches

*Mean annual air temperature:* 46 to 54 degrees F

*Frost-free period:* 120 to 175 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Tollhouse family and similar soils:* 30 percent

*Olete family and similar soils:* 25 percent

*Tyee family and similar soils:* 25 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Tollhouse Family

#### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave

## Custom Soil Resource Report

*Across-slope shape:* Concave

*Parent material:* Residuum weathered from granodiorite

### Typical profile

*H1 - 0 to 11 inches:* gravelly sandy loam

*H2 - 11 to 18 inches:* sandy loam

*H2 - 18 to 22 inches:* weathered bedrock

### Properties and qualities

*Slope:* 50 to 75 percent

*Depth to restrictive feature:* 18 to 22 inches to paralithic bedrock

*Drainage class:* Somewhat excessively drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 1.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

*Hydric soil rating:* No

## Description of Olete Family

### Setting

*Landform:* Mountains

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Residuum weathered from gneiss

### Typical profile

*H1 - 0 to 3 inches:* very cobbly sandy loam

*H2 - 3 to 26 inches:* very cobbly sandy loam

*H3 - 26 to 30 inches:* unweathered bedrock

### Properties and qualities

*Slope:* 50 to 65 percent

*Depth to restrictive feature:* 26 to 30 inches to lithic bedrock

*Drainage class:* Well drained

*Runoff class:* High

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Very low (about 2.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* C

*Hydric soil rating:* No

## Custom Soil Resource Report

### Description of Tyee Family

#### Setting

*Landform:* Mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 4 inches:* gravelly sandy loam  
*H2 - 4 to 11 inches:* sandy loam  
*H3 - 11 to 15 inches:* coarse sandy loam  
*H4 - 15 to 19 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 50 to 75 percent  
*Depth to restrictive feature:* 15 to 19 inches to paralithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 1.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

### WpG—Wapal family-Lithic Xerorthents, cool association, 50 to 75 percent slopes

#### Map Unit Setting

*National map unit symbol:* httc  
*Elevation:* 7,000 to 10,500 feet  
*Mean annual precipitation:* 30 to 40 inches  
*Mean annual air temperature:* 43 to 46 degrees F  
*Frost-free period:* 100 to 150 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Wapal family and similar soils:* 50 percent  
*Lithic xerorthents, cool, and similar soils:* 20 percent

## Custom Soil Resource Report

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Wapal Family

#### Setting

*Landform:* Mountains  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 3 inches:* very gravelly sandy loam  
*H2 - 3 to 27 inches:* very gravelly loamy coarse sand  
*H3 - 27 to 40 inches:* extremely gravelly loamy coarse sand  
*H4 - 40 to 44 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 20 to 65 percent  
*Depth to restrictive feature:* 40 to 44 inches to paralithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 2.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Description of Lithic Xerorthents, Cool

#### Setting

*Landform:* Mountains  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Concave  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*H1 - 0 to 18 inches:* very gravelly loamy sand  
*H2 - 18 to 22 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 60 to 75 percent  
*Depth to restrictive feature:* 18 to 22 inches to lithic bedrock  
*Drainage class:* Excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None

## Custom Soil Resource Report

*Frequency of ponding:* None

*Available water capacity:* Very low (about 1.1 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

*Hydric soil rating:* No



## Western Riverside Area, California

### CcD2—Calpine sandy loam, 8 to 15 percent slopes, eroded

#### Map Unit Setting

*National map unit symbol:* hcs4

*Elevation:* 4,800 to 5,500 feet

*Mean annual precipitation:* 10 to 20 inches

*Mean annual air temperature:* 48 to 50 degrees F

*Frost-free period:* 80 to 100 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Calpine and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Calpine

##### Setting

*Landform:* Alluvial fans

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from granite

##### Typical profile

*H1 - 0 to 7 inches:* sandy loam

*H2 - 7 to 33 inches:* sandy loam

*H3 - 33 to 60 inches:* stratified coarse sand to loamy fine sand

##### Properties and qualities

*Slope:* 8 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Low (about 5.8 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 3e

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* A

*Ecological site:* R020XD033CA - LOAMY UPLANDS

*Hydric soil rating:* No

#### Minor Components

##### Bull trail

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

## Custom Soil Resource Report

### **Oak glen**

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

### **Mottsville**

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

## **CsF2—Crafton rocky sandy loam, 25 to 50 percent slopes, eroded**

### **Map Unit Setting**

*National map unit symbol: hcsn*

*Elevation: 2,500 to 6,400 feet*

*Mean annual precipitation: 17 to 30 inches*

*Mean annual air temperature: 52 degrees F*

*Frost-free period: 160 to 200 days*

*Farmland classification: Not prime farmland*

### **Map Unit Composition**

*Crafton and similar soils: 85 percent*

*Minor components: 15 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Crafton**

#### **Setting**

*Landform: Mountains*

*Landform position (two-dimensional): Backslope*

*Landform position (three-dimensional): Mountainflank*

*Down-slope shape: Concave*

*Across-slope shape: Convex*

*Parent material: Residuum weathered from gneiss and/or schist, unspecified*

#### **Typical profile**

*H1 - 0 to 18 inches: sandy loam*

*H2 - 18 to 26 inches: sandy loam*

*H3 - 26 to 30 inches: weathered bedrock*

#### **Properties and qualities**

*Slope: 25 to 50 percent*

*Depth to restrictive feature: 26 inches to lithic bedrock*

*Drainage class: Well drained*

*Runoff class: Medium*

*Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water capacity: Very low (about 2.9 inches)*

## Custom Soil Resource Report

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* B

*Ecological site:* R020XD033CA - LOAMY UPLANDS

*Hydric soil rating:* No

### Minor Components

#### Mottsville

*Percent of map unit:* 10 percent

*Hydric soil rating:* No

#### Oak glen

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

## OgD—Oak Glen gravelly sandy loam, 8 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* hcxk

*Elevation:* 3,400 to 5,200 feet

*Mean annual precipitation:* 15 to 25 inches

*Mean annual air temperature:* 55 degrees F

*Frost-free period:* 150 to 225 days

*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Oak glen and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Oak Glen

#### Setting

*Landform:* Alluvial fans

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from metamorphosed granitic rock

#### Typical profile

*H1 - 0 to 29 inches:* gravelly sandy loam

*H2 - 29 to 48 inches:* gravelly fine sandy loam

*H3 - 48 to 60 inches:* gravelly loamy sand

#### Properties and qualities

*Slope:* 8 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Low

## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Low (about 5.0 inches)

### Interpretive groups

*Land capability classification (irrigated):* 3e

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* A

*Ecological site:* R020XD033CA - LOAMY UPLANDS

*Hydric soil rating:* No

### Minor Components

#### Mottsville

*Percent of map unit:* 10 percent

*Hydric soil rating:* No

#### Calpine

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

## OkD—Oak Glen fine sandy loam, 5 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* hcxm

*Elevation:* 3,400 to 5,200 feet

*Mean annual precipitation:* 15 to 25 inches

*Mean annual air temperature:* 55 degrees F

*Frost-free period:* 150 to 225 days

*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Oak glen and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Oak Glen

#### Setting

*Landform:* Alluvial fans

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from metamorphosed granitic rock

#### Typical profile

*H1 - 0 to 29 inches:* fine sandy loam

*H2 - 29 to 60 inches:* fine sandy loam

## Custom Soil Resource Report

### Properties and qualities

*Slope:* 5 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Moderate (about 7.2 inches)

### Interpretive groups

*Land capability classification (irrigated):* 3e

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* A

*Ecological site:* R020XD033CA - LOAMY UPLANDS

*Hydric soil rating:* No

### Minor Components

#### Riverwash

*Percent of map unit:* 3 percent

*Landform:* Channels

*Hydric soil rating:* Yes

#### Unnamed

*Percent of map unit:* 3 percent

*Hydric soil rating:* No

#### Calpine

*Percent of map unit:* 3 percent

*Hydric soil rating:* No

#### Mottsville

*Percent of map unit:* 3 percent

*Hydric soil rating:* No

#### Unnamed

*Percent of map unit:* 3 percent

*Hydric soil rating:* No

## ShF—Saugus sandy loam, 30 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* sgpy

*Elevation:* 600 to 2,500 feet

*Mean annual precipitation:* 14 to 20 inches

*Mean annual air temperature:* 63 degrees F

*Frost-free period:* 250 to 280 days

*Farmland classification:* Not prime farmland

## Custom Soil Resource Report

### Map Unit Composition

*Saugus and similar soils: 85 percent*

*Minor components: 15 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Saugus

#### Setting

*Landform: Hills*

*Landform position (two-dimensional): Backslope*

*Landform position (three-dimensional): Side slope*

*Down-slope shape: Concave*

*Across-slope shape: Concave*

*Parent material: Residuum weathered from sedimentary rock*

#### Typical profile

*H1 - 0 to 8 inches: sandy loam*

*H2 - 8 to 40 inches: loam*

*H3 - 40 to 44 inches: weathered bedrock*

#### Properties and qualities

*Slope: 30 to 50 percent*

*Depth to restrictive feature: 40 to 44 inches to paralithic bedrock*

*Drainage class: Well drained*

*Runoff class: High*

*Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)*

*Available water capacity: Moderate (about 6.0 inches)*

#### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 7e*

*Hydrologic Soil Group: B*

*Hydric soil rating: No*

### Minor Components

#### Unnamed, gravelly

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

#### San timoteo, loam

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

#### Unnamed, gullied

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

## Custom Soil Resource Report

### ToF—Tollhouse sandy loam, 30 to 50 percent slopes

#### Map Unit Setting

*National map unit symbol:* sgqf

*Elevation:* 2,000 to 8,000 feet

*Mean annual precipitation:* 10 to 35 inches

*Mean annual air temperature:* 52 to 57 degrees F

*Frost-free period:* 160 to 210 days

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Tollhouse and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Tollhouse

##### Setting

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank, side slope

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Parent material:* Residuum weathered from granite

##### Typical profile

*H1 - 0 to 12 inches:* sandy loam

*H2 - 12 to 16 inches:* weathered bedrock

##### Properties and qualities

*Slope:* 30 to 50 percent

*Depth to restrictive feature:* 12 to 16 inches to paralithic bedrock

*Drainage class:* Excessively drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water capacity:* Very low (about 1.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* D

*Hydric soil rating:* No



## Custom Soil Resource Report

### Minor Components

#### **Cieneba**

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

#### **Rock outcrop**

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

#### **Unnamed, gentler slopes**

*Percent of map unit: 5 percent*

*Hydric soil rating: No*

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## El Dorado Fire 2020



Picture of the Oak Glen Area

Date of Report: October 6, 2020**BURNED-AREA REPORT****PART I - TYPE OF REQUEST****A. Type of Report**

- ☒ 1. Funding request for estimated emergency stabilization funds  
☐ 2. No Treatment Recommendation

**B. Type of Action**

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)  
☐ 2. Interim Request # \_\_\_\_\_  
☐ Updating the initial funding request based on more accurate site data or design analysis

**PART II - BURNED-AREA DESCRIPTION****A. Fire Name: El Dorado****B. Fire Number: CA-BDU-012925****C. State: California****D. County: San Bernardino****E. Region: 05 Pacific Southwest****F. Forest: San Bernardino****G. District: Front Country and Mountaintop****H. Fire Incident Job Code: 1502 PNNJ4B****I. Date Fire Started: 9/5/2020****J. Date Fire Contained: 12/31/2020 (expected)****K. Suppression Cost: \$60,000,000 (projected)****L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. Fireline repaired (miles): 0 (No suppression repair has occurred as of this report)  
2. Other (identify):

**M. Watershed Numbers:***Table 1: Acres Burned by Watershed*

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180702030202	Deer Creek-Santa Ana River	31,504	4,925	15.6%
180702030401	Little San Gorgonio Creek	18,070	3,319	18.4%
180702030402	Yucaipa Creek	29,266	5,106	17.4%
180702030501	Mill Creek	27,138	8,487	31.3%
180702030507	Santa Ana Wash-Santa Ana River	25,458	1,145	4.5%
181002010102	Headwaters San Gorgonio River	30,330	0.2	<0.1%

#### **N. Total Acres Burned:**

*Table 2: Total Acres Burned by Ownership*

<b>OWNERSHIP</b>	<b>ACRES</b>
<b>NFS</b>	<b>19,163</b>
<b>OTHER FEDERAL (LIST AGENCY AND ACRES)</b>	<b>0</b>
<b>STATE</b>	<b>0</b>
<b>PRIVATE</b>	<b>3,819</b>
<b>TOTAL</b>	<b>22,982</b>

#### **O. Vegetation Types:**

Lower elevation communities (3,200-5,560ft) on exposed southern slopes were comprised of mature lower montane, chamise, and manzanita chaparral and scrub oak shrublands with limited recent fire history. North facing slopes and canyons at these elevations support interior live oak and black oak woodlands and Coulter pine and bigcone Douglas-fir forests. Interior live oak, scrub oak, and pine forests dominate the middle elevations from 5,500 – 6,500 ft and transition into upper montane chaparral and mixed conifer and subalpine forests growing up to San Bernardino Peak at 10,650 ft. The lowest elevations along the wildland urban interface consist of annual exotic and California buckwheat dominated communities.

#### **P. Dominant Soils:**

Most of the fire (more than 50%) is made up of very steep slopes, and soils with little development due to high natural erosion rates. 3 soils occur in these areas, all are coarse textured and formed from granitic or gneiss rocks. Lithic Xerorthents are shallow and have the highest rock content, Springdale (mid elevation) and Wapal (high elevation) are deeper, with variable rock content. Below these soils, depositional and toe slopes include Tigo and Pacifico soils, and Greenfield in Alluvium above river washes. Finally, Tollhouse occurs southeast of Oak Glen, in the only portion of the fire that formed on residual slopes (lacking frequent erosion or deposition), it formed on granitic parent material, and has dark-colored surface horizons.

#### **Q. Geologic Types:**

The San Bernardino National Forest (SBNF) includes parts of, two major geologic-geomorphic provinces of western North America - the Transverse Ranges and the Peninsular Ranges provinces. The San Gabriel and San Bernardino Mountains are part of the eastern Transverse Ranges and the San Jacinto and Santa Rosa Mountains, Thomas Mountain, and Coahuila Mountain are part of the northern Peninsular Ranges. The geology of the two provinces is vastly different one from the other (Matti & Morton, 2000).

The San Bernardino Mountains were elevated within and north of the San Andreas fault zone. They form a rectangular upland about 65 miles long east-west and about 20 miles wide. The major part of this mountain highland is designated as the north block of the San Bernardino Mountain uplift, which includes an elevated surface of low relief, or a broad plateau. The north block includes the highest peak in southern California at Mount San Gorgonio that rises to an altitude of 11,500 feet above sea level. The southernmost part of this uplift is composed of basement rocks and was elevated or partly elevated as two slices between strands of the San Andreas fault zone. This block was designated as the south block (Dibblee, 1968) and lacks the plateau surface characteristic of the north block.

The El Dorado Fire occurred on the southeast end of the San Bernardino Mountain Range in the area designated as the south block of the San Bernardino Mountain uplift. Physiography of the burned area is dominated generally by extremely steep and rugged terrain, dissected ridge lines and drainages. Major drainages in the burned area include portions of the Deer-Creek-Santa Ana River, portions of the Santa Ana Wash-Santa Ana River, portions of the Mill Creek, and portions of the Yucaipa Creek. Elevations in the burn area range from about 2,500 feet above sea level at the south end of the fire to San Bernardino Peak at 10,649 feet above sea level at the north end of the fire.

The San Gabriel as well as the San Bernardino Mountains are some of the most tectonically active and rapidly uplifting mountains in the United States. The forces lifting the mountains are being countered by opposing forces tearing them down. Forces such as gravity, moving water, wind, earthquakes and human activities interact and combine to bring down small particles to whole hillsides at a time. The fluvial geomorphic processes which have shaped and are currently shaping these ever-changing mountains include land-sliding of various types, rock-fall, dry ravel, sheet and rill erosion by water and wind, flooding and debris flows.

Several strands of the San Andreas Fault Zone traverse the southeastern San Bernardino Mountains. These faults include: Mill Creek-North Branch San Andreas Fault and San Andreas Fault. From the geomorphology of this area it is evident that the San Bernardino Mountains were elevated unevenly in Quaternary time, with the greatest amount of uplift and disruption along the San Andreas fault zone (within the south block of the mountain range that includes the burn area of the El Dorado Fire).

Bedrock within the El Dorado Fire burned area mainly consists of crystalline basement terranes composed of distinctive metamorphic rocks, several different plutonic igneous rocks, and limited occurrences of nonmarine sedimentary rocks.

#### R. Miles of Stream Channels by Order or Class:

*Table 3: Miles of Stream Channels by Order or Class*

<b>STREAM TYPE</b>	<b>MILES OF STREAM</b>
<b>PERRENIAL</b>	<b>76.65</b>
<b>INTERMITTENT</b>	<b>116.88</b>
<b>EPHEMERAL</b>	<b>273.29</b>
<b>OTHER</b>	<b>0</b>
<b>(DEFINE)</b>	

#### S. Transportation System:

**Trails:** National Forest (miles): 24.46

**Other (miles):** 0

**Roads:** National Forest (miles): 10.34

**Other (miles):** 8.51 (State Hwy 38)

### PART III - WATERSHED CONDITION

#### A. Burn Severity (acres):

*Table 4: Burn Severity Acres by Ownership*

Soil Burn Severity	NFS	Other Federal	State	Private	Total	% within the Fire Perimeter
<b>Unburned</b>	1,609	0	0	150	1,759	7.7%
<b>Low</b>	3,876	0	0	990	4,866	21.2%
<b>Moderate</b>	10,278	0	0	2,382	12,660	55.1%
<b>High</b>	3,400	0	0	297	3,697	16.0%
<b>Total</b>	19,163	0	0	3,819	22,982	100%

#### B. Water-Repellent Soil (11,410 acres, 50% of the fire):

Hydrophobic soil conditions were strong and widespread in high soil burn severity, ranging from 3-6 cm thick, present in 90% of high sampled areas, and repelling water for a minute or more. Within moderate burn severity, repellency was less common, present in 60% of samples, from 2-3 cm thick, and repelling water for ~30 seconds. Repellency was present in some low sbs, but may be due to natural, pre-fire repellency, and probably won't contribute much to watershed response.

#### C. Soil Erosion Hazard Rating:

Percent of fire area:

Severe: 63% Moderate: 25% Slight: 11% Not rated: 1% (Rock outcrop and riverwash)

#### D. Erosion Potential:

4.3 tons/acre (2-year runoff event) – Pre-fire 0.2 tons/acre

13 tons/acre (5-year runoff event) – Pre-fire 1.5 tons/acre

Slope and burn severity are the dominant drivers of erosion rates in this fire, overriding differences in soil types. Moderate burn severity under conifer forest and some dense oak has potential for needlecast to mitigate erosion response, but moderate burn in chaparral will have high erosion potential. Erosion results by pourpoint are shown in the table below (table 5).

*Table 5: Modeled Erosion Rates*

Name	Acres	2 year runoff event		10 year runoff event	
		Pre Fire (t/ac)	Post fire (t/ac)	Pre Fire (t/ac)	Post fire (t/ac)
Whole Fire Average	22982.8	0.2	4.3	3.4	21.0
PP1- Forsee Creek	26181.7	0.2	6.4	6.1	23.8
PP2- JohnsMeadow	8811.9	0.0	6.8	3.7	27.7
PP3- Stetson Creek	8035.6	0.3	7.0	8.3	26.1
PP4- Schnider Creek	8281.5	0.4	7.3	8.2	23.6
PP5- University Creek	9617.7	0.5	9.1	4.1	42.9
PP6- Mountain Home Creek	12967.5	0.4	7.3	6.4	28.9
PP7- Skinner Creek	9421.9	0.4	9.7	6.3	43.4
PP8- Mill Creek	47132.9	0.4	7.1	4.7	33.1
PP9- Oak Glen Area	9526.2	0.6	12.6	6.2	71.6



## **E. Debris Flow Potential:**

The US Geological Survey (USGS) - Landslide Hazards Program, has developed empirical models for forecasting the probability and the likely volume of post-fire debris flow events. To run their models, the USGS uses geospatial data related to basin morphometry, burn severity, soil properties, and rainfall characteristics to estimate the probability and volume of debris flows that may occur in response to a design storm (Staley, 2016). Estimates of probability, volume, and combined hazard are based upon a design storm with a peak 15-minute rainfall intensity of 12 – 40 millimeters per hour (mm/h) rate. We selected a design storm of a peak 15-minute rainfall intensity of 24 millimeters per hour (mm/h) rate to evaluate debris flow potential and volumes since based for three reasons:

1. Post-fire debris flows are most often triggered by high-intensity, short-duration bursts of rain.
2. A 24 mm/h rain burst is likely to happen in most areas of the western U.S. (i.e. a 1-5-year recurrence interval).
3. A 24 mm/h rain burst is known to trigger debris flows at USGS monitoring sites in burn areas.

Based on USGS debris flow modeling it appears that under conditions of a peak 15-minute rainfall intensity storm of 24 millimeters per hour (0.95 inch/hr.), the probability of debris flows occurring is very high (80-100%) in a majority of the channels/creeks in the El Dorado fire burn area, especially in the Yucaipa Creek and San Geronio River watersheds. Under these same conditions, predicted volumes in these channels are expected to range from 1K-10K cubic meters in some channels to 10K-100K cubic meters in other channels. Based on the very high probabilities of debris flow initiation and high predicted volumes of debris flows, a majority of creeks in the burn area appear to present a high combine hazard.

The El Dorado Fire overlapped the very recently burned Apple Fire (August 2020) in the Headwaters San Geronio River watershed. The USGS re-calculated the debris flow model for the Apple Fire and included it with the Eldorado Fire because of the increased burn severity in the overlapped area. This report considers the overlapped area as the El Dorado Fire but does not re-assess the debris flow for the majority of the Apple Fire which was evaluated in the Apple Fire BAER report.

## **F. Sediment Potential:**

Rowe, Countryman, and Storey (1949) developed estimates of annual erosion rates for watersheds in the burn area based on measurements of sedimentation in reservoirs. On average, across the burn area, annual sediment delivery is estimated to increase 19 times greater than normal with an average of 28,118 cubic yards per square mile. These estimates are in line with field observations of dry ravel, existing unstable slopes made worse by fire effects, amount of bedload in washes and tributaries, and evidence of past debris flows.

### **G. Estimated Vegetative Recovery Period (5-40 years):**

Chaparral and oak communities comprise 55% of the burned area. These communities are expected to recover in 5-40 years in moderate and high severity burned areas unless they reburn or are invaded by non-native invasive plants. Conifer forests comprise 39% of the burned area and experienced primarily moderate and low severity fire effects. Patches of higher severity stand replacing fire in the headwaters of East Fork Mountain Home Creek were intermediate in size and forest stands are likely to recover passively through natural regeneration.

### **G. Estimated Hydrologic Response (brief description):**

#### **Watershed Response**

Annual precipitation ranges between 29 to 34 inches, primarily arriving between December and April although summer thundershowers are common in August and early fall. A significant portion of the burn area in the San Geronio Wilderness is located above 7,000 ft, which may result in precipitation accumulating more as snow versus rain during winter. The burn area on Yucaipa Ridge is mostly within the rain-snow transition zone (3,500-6,500 ft). Snow accumulation versus rainfall affects the magnitude of post-fire watershed response, slowing runoff and favoring infiltration. It is important to note, however, that rain-on-snow events are common in this area and have caused flooding even in pre-fire conditions (ex. February 14, 2019).

**Damaging Storms:** Although not the only types of storms that could occur, two common storm types that could cause significant damage within the burn area are monsoonal thunderstorms and storms related to atmospheric rivers. Short duration, high intensity storms (such as a monsoonal thundershowers) frequently trigger debris flows. The second storm type is a long duration storm, commonly linked to atmospheric rivers. Major flooding events have occurred across Southern California due to atmospheric rivers which contain large amounts of water vapor. One such weather system is known as the "Pineapple Express," which moves subtropical moisture from the latitudes of the Hawaiian Islands to Southern California. These types of storms are especially catastrophic if they occur over snowpack, commonly referred to as a rain-on-snow event. Warm rains rapidly melt snowpack and can result in catastrophic runoff.

**Hydrologic Processes:** The last major fire in the El Dorado burn perimeter was the Mitchell Canyon Fire in 1977, in the San Geronio Wilderness. It's possible snags and down wood from this fire contributed to high soil burn severity in that portion of the burn. Parts of Yucaipa Ridge haven't had a recorded fire since 1900, which may have resulted in the development of mature brush communities and thick duff accumulation. Availability of this fuel load contributed to the subsequent high percentage of moderate and high soil burn severity on parts of the ridge (Table 6). Fire causes impacts to several hydrologic processes including reduction in interception, transpiration, and infiltration, and increases in soil moisture and the rate of runoff (due to lack of litter and decreased surface roughness). Removal of vegetation and changes to soil such as increases in hydrophobicity, changes in soil structure, and removal of duff, organic matter, and roots alters these processes and ultimately lead to increases in runoff, peak flows and erosion. These alterations are typical of soils classified as having incurred moderate to high soil burn

severity. Given the large percentage of moderate and high soil burn severity in the El Dorado Fire and steep slopes, watershed response will be high to extreme in some catchments (Table 6). Increases in runoff and bulking of flows across the burn area at selected pour points are expected to be 138% to 540% compared to normal. Dry ravel is pre-loading channels and existing latent sediment will be mobilized in post-fire flows increasing runoff volume.

Table 6: Modeled pre- and post-fire flows at select pour points for the 2 yr and 10 yr peak flows (normal flow is equal to 100%).

RCS Watershed	PP#	Modeled Pour Point	% of Mod & High SBS	2 yr. RI Peak Flow				10 yr. RI Peak Flow			
				Pre-Fire Q (CFS)	Post-Fire Q (CFS)	Post-Fire Bulk Q (CFS)	Percent of Q (bulk)	Pre-fire Q (CFS)	Post-Fire Q (CFS)	Post-fire Bulk Q (CFS)	Percent of Q (bulk)
Santa Ana River	PP1	Forsee Creek Habitat	50%	149	197	256	172%	987	1,165	1,513	153%
Santa Ana River	PP2	Johns Meadow Camping	53%	32	44	59	182%	167	200	270	161%
Santa Ana River	PP3	Stetson Creek Rec Res.	84%	37	58	85	229%	192	251	368	192%
Santa Ana River	PP4	Schnider Creek Habitat	41%	42	53	66	157%	218	249	310	142%
Santa Ana River	PP5	University Creek roads	74%	43	66	96	226%	223	295	430	193%
Mill Creek	PP6	Mountain Home Crk. Rec Res	45%	180	264	339	188%	1,210	1,562	2,004	166%
Mill Creek	PP7	Skinner Crk. Rec Res	41%	63	86	109	173%	354	433	548	155%
Mill Creek	PP8	Mill Creek Thurman Flats	21%	598	719	815	136%	5,000	5,623	6,368	127%
Potatoe Creek	PP9	Oak Glen Area FS Roads	100%	49	154	261	536%	261	621	1,055	404%
Cherry Creek	PP10	Road crossing on Noble Crk.	78%	84	227	359	430%	496	1,045	1,655	334%

Channel crossings, floodplains, and depositional fans have an inherent risk of flooding which will be exacerbated by the fire. Increased runoff and sediment delivery (ex. surface erosion, sediment-laden flows, and debris flows) can lead to channel migration and braiding across washes in flood events. Lateral channel migration can erode cut banks and undercut slopes and banks. Aggradation can increase probability of channel migration and flooding.

Changes in hydrologic processes can also lead to slope instability and result in post-fire debris flows, mudflows, and other mass wasting (as described under geologic response). Alluvial fans at the base of burned slopes have evidence of past debris flows, with some drainages more active than others. In areas with defined debris flow runout paths, the existing stream channel is confined within the debris flow levees. Fan areas lacking entrenched channels or debris flow levees, have hummocky rocky surfaces where annual runoff disperses in vegetated swales. These are the depositional zones for debris flows and sediment-laden flows. Fans are depositional areas where flows can change course in large runoff events, especially as a result of debris flows or sediment laden flows. Dormant channels may be reactivated in post-fire runoff events. This makes prediction of hazardous flow paths on alluvial fans difficult and results in a hazardous zone, versus point or line.

Watershed response in the burn area will pose a very high risk to life, safety, and infrastructure. The combination of increased flows, sediment loads, and woody debris increase the volume of post-fire flows, which could negatively impact culverts, constructed channel ways, and other infrastructure designed to pass “normal” flows. It is important to note that downstream areas that experience regular flooding or difficulty controlling drainage during small storms will be very likely to experience flooding and/or failure in post-fire storms. Bulking and increased flows may cause channels to flood, divert, or migrate to areas that do not usually flood.

**Water Quality:** Wildfires primarily affect water quality through increased sedimentation. As a result, the primary water quality constituents or characteristics affected by this fire include color, sediment, suspended material, and turbidity. Floods and debris flows can entrain large material, which can physically damage infrastructure associated with beneficial uses of water (e.g., water conveyance structures; hydropower structures; transportation networks). The loss of riparian shading and the sedimentation of channels by floods and debris flows may increase stream temperature. Fire-induced increases in mass wasting along with extensive vegetation mortality can result in increases in floatable material such as large woody debris. Post-fire delivery of organic debris to stream channels can potentially decrease dissolved oxygen concentrations in streams. Fire-derived ash inputs can increase pH, alkalinity, conductivity, and nutrient flux (e.g. ammonium, nitrate, phosphate, and potassium), although these changes are generally short lived.

## **PART V - SUMMARY OF ANALYSIS**

### **Introduction/Background**

The El Dorado Fire is located on the San Bernardino National Forest on the Front Country and Mountaintop Ranger Districts. The Fire was human caused and started on Saturday September 5<sup>th</sup>, 2020 north east of Yucaipa, CA. As September 30<sup>th</sup>, the El Dorado Fire was being reported as 93% contained and stable at 22,744 acres.

The final soil burn severity (SBS) shows 71.1% of the burned area experienced high and moderate effects to soils. The rest of the fire was either low soil burn severity or unburned.

Based on historic precipitation patterns, it can be expected that fall storms have a high probability in occurring within the weeks following the El Dorado Fire. The risk of flooding, debris flow and erosion events will increase as a result of the fire, creating hazardous conditions within and downstream of the burn area.

The fire was divided into sub-watersheds with “pourpoints” established at the bottom of the burned watersheds or where critical values are located. Watershed runoff response is referenced to these points.

#### **A. Describe Critical Values/Resources and Threats (narrative):**

A BAER team began assessing the area for post-fire emergencies on September 21, 2020. In that time the team has identified the following critical values and post-fire threats. The full list of critical values analyzed and risk determinations for these values is included in Appendix 3. Critical Values described in the sections below were identified by the assessment team as those with risk ratings appropriate for further evaluation and treatment recommendation.

Interim reports may be submitted as additional assessments are completed.

The risk matrix below (Table 7), Exhibit 2 of Directive No.: 2500-2020-1 was used to evaluate the Risk Level for each value identified during Assessment.

Table 7: Critical Value Matrix

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	<b>RISK</b>		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

## 1. Human Life and Safety (HLS):

### General Burned Area Safety

Based on the potential for debris flows, flooding, rock falls, etc., the BAER team identified a serious risk to the public, employees, special use permittees, and cooperators in and downstream of the El Dorado Fire area. Multiple FS critical values are located on rocky, alluvial fans at the base of steep, unstable slopes or in the steep unstable headwaters that are also at risk of post-fire debris flows, rock fall, increased runoff, and hazard trees. These areas have evidence of past debris flows, rock fall, and flooding in the pre-fire environment. Risk of flooding, sediment laden flows, debris flows, and rock fall occurring will be exacerbated by the fire. These post-fire watershed responses may not threaten all infrastructure downstream and downslope of the burn area; however, it is very likely to impact ACCESS roads. Impacts to access could leave FS employees and forest users stranded, possibly exposed to poor weather, in areas with poor cell coverage, and/or areas subject to rockfall, flooding, and debris flows, especially if they try to evacuate or pass through during storms. Impacts from the post-fire environment on human life and safety is considered **VERY LIKELY** with **MAJOR** consequences. This results in a **VERY HIGH** risk to human life and safety from post-fire threats.

### Roads

There is a **very high** risk to human life from travelling on roads 1N53, 1N82, 1N86 and 1N86B during rainstorms due to the **high probability** of debris flows, rockfall and flooding that could have **major** consequences associated with road washout, blocked ingress/egress, and lead to serious injury or death of road users. 1N53 is the primary access to the San Bernardino Peak trailhead. 1N82 is the main access for Camp Round Meadow organization camp and Forsee Creek trailhead. 1N86 is the main access for the Stetson Creek Recreation Residence tract. 1N86B also provides access to recreation residences.

### Trails

It is **possible** (Santa Ana River Trail) to **very likely** that flooding, debris flow, sediment laden flows and/or rock fall will occur on 5 trails in and downstream of the fire area. If people are exposed to this threat while recreating or working on these trails, the consequences will be **major** because death and/or serious injury will occur. Watershed response in the fire environment is **high** (Santa Ana trail) to **very high** risk to human life and safety on trails 1E16, 1E06, 1W08 and 1W20.

## **2. Property (P):**

### **Roads:**

The National Forest transportation system consists of approximately 14 miles of National Forest System Roads (NFSR) within the fire perimeter. Some roads are suitable for passenger cars, while others are more suited for high-clearance vehicles. Of these roads, several are utilized for administrative use only. The majority of the NFS roads in and downstream of the burned area are at a **very likely** probability of debris flows and flooding during rainstorms as a result of the changed watershed condition. Debris flows and flooding are likely to cause a **moderate to major** magnitude of damage to these roads. The resulting risk of road failures in and downstream of the burned area is **very high**.

Of the NFSR miles in the burned area, 9.7 miles of road are proposed for treatments due to their overall risk rating of **intermediate to very high**. These roads include: 1S09, 1N53, 1N86, and 1N86B. These roads exhibit an unacceptable risk to property, which constitutes a BAER emergency and treatments are recommended. The purpose of road treatments are to protect roads against loss of water control, soil erosion, flooding, debris flow, loss of road tread and total failure.

## **3. Natural Resources (NR):**

### **Hydrologic Function:**

Fire impacts proper functioning of hydrologic processes with the greatest and longest lasting impacts occurring from high soil burn severity and anthropogenic activities (such as failure of drainage control on roads). Fire impacts within moderate, low, and very low burn areas are recoverable and expected to diminish as vegetation reestablishes. The greatest threats to recovery are threats from mass wasting, OHV incursion, and failure of infrastructure to control drainage (including roads and trails). Slope failure, increased sediment delivery, and mobilization of woody debris increase the risk of channel diversions down roads and ditches. Channel diversion could lead to complete road prism (or infrastructure) loss and irrecoverable damage to hillslopes (ex. 1S09).

### **Soil Productivity:**

It is **likely** that soil productivity will be impacted in larger storms (5-year or greater runoff event) due to elevated surface erosion on steep slopes in high and moderate soil burn severity. The magnitude of consequence of this soil loss is **moderate** because the modeled erosion rates will temporarily exceed soil formation rates, but the loss will not cause irreversible damage. The overall risk to soil productivity is **high**.

While a threat to soil productivity exists in portions of the El Dorado Fire, hillslope stabilization treatments are not being proposed. Suitable areas are very limited due to land ownership, wilderness designation, and steep slopes. Areas of high and moderate burn severity not limited

by the above, are usually interspersed with steep slopes, or located in lower positions within the watershed, below where runoff and rill erosion would initiate. Hillslope treatments would not result in effective slope stabilization because the available areas are so small. See soil specialist report for additional details.

### Botany

It is expected that the native vegetation communities are adapted to the first order fire effects of the El Dorado Fire and would recover if weed invasions are minimized. The potential introduction and dispersal of invasive weeds into areas disturbed by fire suppression and rehabilitation activities may lead to the establishment of large and persistent weed populations. The proximity of existing invasive plant populations adjacent to the burned area creates high probability that new infestations will establish in the burned area.

#### *Vegetation Recovery in Burned Area*

Probability of damage or loss is **likely** because the burned area is vulnerable to colonization of tamarisk and other weeds. These species are within dispersal distance of species that respond rapidly in the burned environment. The magnitude of damage will be **major** because conversion of high quality native riparian communities or chaparral could type convert to tamarisk or Spanish broom and annual exotic grasslands resulting in loss of native biodiversity, altered fire regimes, and ecosystem structure and function. It is for these reasons that risk to vegetation recovery in the overall burned area is **very high**. Therefore, this is a BAER emergency and treatments are recommended.

#### *Vegetation Recovery on Suppression Features*

No equipment washing occurred during fire suppression operations and equipment intersected known invasive plant populations near the forest boundary. It is **very likely** that fire suppression resources spread existing and introduced new weed species to the burned area. Potential for type conversion of high quality native chaparral to Spanish broom or annual exotic grassland and introduction of new fuel types in conifer forests is high. The magnitude weed threats is **major** because chaparral communities outside the burned area are vulnerable to type conversion and associated degradation ecosystem structure and function, biodiversity loss, and altered fire regimes. The risk to vegetative recovery is **very high** where suppression activities occurred and within the greater burned area as a result of suppression operations. Therefore, this is a BAER emergency and treatments are recommended.

### Wildlife-Threatened and Endangered Species

Federally listed wildlife species include two endangered and one threatened within and near the burned area. Endangered species are Southwestern Willow Flycatcher and Mountain Yellow-Legged Frog. Threatened species are Santa Ana Sucker. Threats to threatened and endangered species are hillslope erosion, flooding, debris flow, habitat loss and non-native invasive plants. Threatened and endangered species: Mountain Yellow-Legged Frog habitat is just outside the fire perimeter and sediment and debris flows pose a very low threat. Southwestern Willow Flycatcher habitat downstream of burn areas in the Santa Ana River and Mill Creek will experience increased debris flows and flooding; habitat may be temporarily affected. Santa Ana Sucker habitat downstream of the burn area may experience an increase in turbidity and a reduction in overall water quality but the habitat is unoccupied. Fish can be found about 20 miles downstream,

just past the Rialto Infiltration/Extraction site. Effects to fish should be minimal and temporary. With implementation of a BAER treatment to survey and treat non-native plants within the fire area, the risk of adverse impacts from non-native invasive plants will be significantly reduced (see botany section).

#### **4. Cultural and Heritage Resources:** Heritage

The BAER archaeology team identified nine cultural resources within the El Dorado burn perimeter and a further 34 sites within a 1-mile buffer of the burn. Through mapping, discussions with specialists, and site record information, the archaeology team identified 14 sites for further BAER assessment. Most of these sites are historic and relate to recreation use on the Forest from the late 19<sup>th</sup>-century onward.

These fourteen sites were noted to be at risk from predicted storm induced watershed response and hazard tree damage that may alter or destroy their heritage values.

Since the modeled flows are so great and discussions with BAER team specialists determined that any proposed treatment, e.g., K-rails, may exacerbate the effects, a heritage treatment to protect sites from debris flows and flooding has not been proposed.

It is **possible** debris flows, flooding, rockfall and hazard trees will impact the Barton Flats Recreation Residence Tract. The magnitude of consequence is **major** because the loss of historic cabins in the tract will adversely affect the cabins that contribute to the tract's eligibility for the National Register of Historic Places. Therefore, a **high** risk to the tract occurred from increased hazard tree and debris flows.

It is **very likely** debris flows, flooding, rockfall and hazard trees will impact the Camp Round Meadow and Round Cienega Recreation Residence Tract. The magnitude of consequence is **major** because the loss of historic cabins, buildings and features in the tract and camp will adversely affect the contributors to the camp and tract's eligibility for the National Register of Historic Places. Therefore, a **very high** risk to the tract and camp occurred as a result of modeled hazard trees and debris flows.

#### **B. Emergency Treatment Objectives:**

- Protect life and safety within and affected by the El Dorado Fire.
- Protect and stabilize NFS roads/trails at risk of damage from loss of water control, soil erosion, flooding, debris flow, and loss of road tread.
- Mitigate public safety hazards along NFS roads from hazard trees, debris flow, flooding, and rockfall.
- Protection for critical cultural resources subject to hazard tree damage resulting from changed environmental conditions.
- Detect, eradicate and map new infestations of non-native invasive plants introduced during suppression activities to prevent degradation or loss of ecosystem structure and function.



- Detect, eradicate and map non-native invasive plant establishment and spread in the burn area to prevent loss of ecosystem structure and function.
- Coordinate post-fire response with other agencies and interested parties.

**C. Probability of Completing Treatment Prior to Damaging Storm or Event:**

Land: 80

Channel: N/A

Roads/Trails: 60

Protection/Safety: 80

**D. Probability of Treatment Success**

*Table 8: Probability of Treatment Success*

	<b>1 year after treatment</b>	<b>3 years after treatment</b>	<b>5 years after treatment</b>
<b>Land</b>	80	90	100
<b>Channel</b>	N/A	N/A	N/A
<b>Roads/Trails</b>	70	80	80
<b>Protection/Safety</b>	90	90	100

**E. Cost of No-Action (Including Loss):** Potential lost market value plus assessment cost.

This does not include a monetary value on loss or harm to human life.

**F. Cost of Selected Alternative (Including Loss):** Potential lost market value plus assessment costs plus treatment costs. This does not include a monetary value on loss or harm to human life.

**G. Skills Represented on Burned-Area Survey Team:**

- |  |  |   |  |   |
|--|--|---|--|---|
| <input checked="" type="checkbox"/> Soils                          | <input checked="" type="checkbox"/> Hydrology  | <input checked="" type="checkbox"/> Engineering | <input checked="" type="checkbox"/> GIS      | <input checked="" type="checkbox"/> Archaeology |
| <input checked="" type="checkbox"/> Weeds                          | <input checked="" type="checkbox"/> Recreation | <input type="checkbox"/> Fisheries              | <input checked="" type="checkbox"/> Wildlife | <input checked="" type="checkbox"/> Geology     |
| <input checked="" type="checkbox"/> Other: Interagency Coordinator |  |   |  |   |

**Team Leader:** Christopher Stewart

**Email:** christopher.s.stewart@usda.gov

**Phone(s):** (360) 746-4251

**Forest BAER Coordinator:** Kim Boss/Drew Farr

**Email:** kim.boss@usda.gov/drew.farr@usda.gov

**Phone(s):** (909) 382-2936/909-382-2816

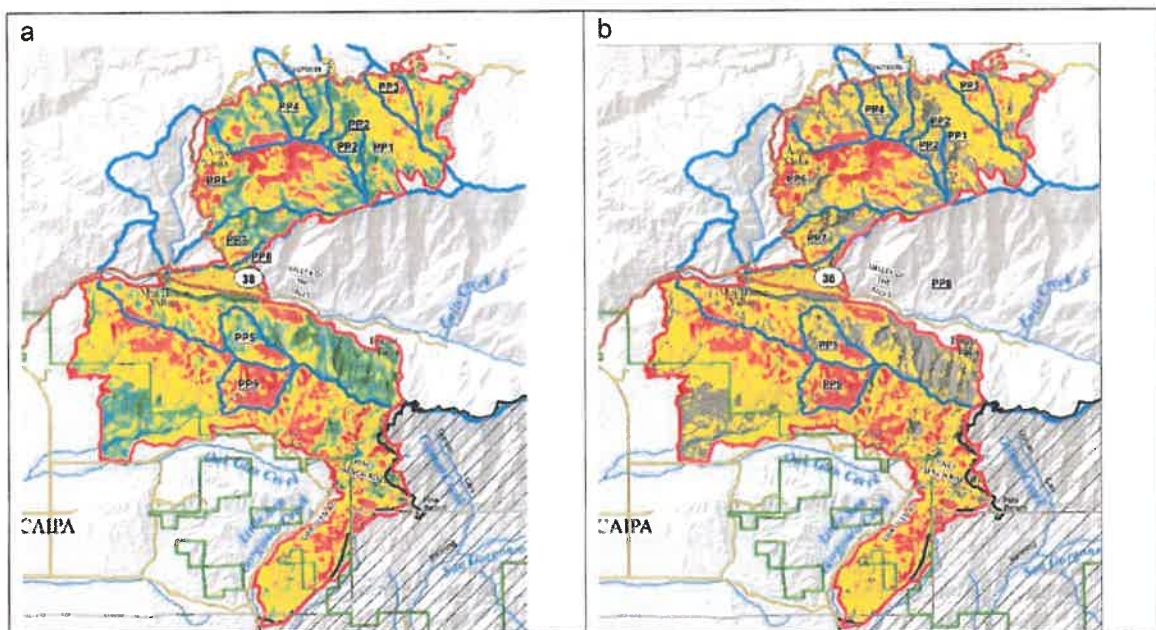
**Team Members:** *Table 9: BAER Team Members by Skill*

<b>Skill</b>	<b>Team Member Name</b>
<b>Team Lead(s)</b>	Chris Stewart, Carly Gibson
<b>Soils</b>	Curtis Kvamme
<b>Hydrology</b>	Emily Fudge
<b>Engineering</b>	Joshua Direen
<b>GIS</b>	Celia Yamagiwa
<b>Archaeology</b>	Jay Marshall, Eraina Nossa
<b>Weeds</b>	Emma Williams, Lauren Quon
<b>Geology</b>	Barton Wills
<b>Wildlife</b>	Kirsten Winter, Rari Marks (T)
<b>Other</b>	Todd Ellsworth and Katie VinZant

## H. Treatment Narrative:

### Land Treatments:

Figure 1 below shows limitations that restrict the area available to hillslope treatments, such as aerial mulching. Figure 1A shows soil burn severity within the El Dorado Fire. Low and very low burn severities are greyed out in 1B because these SBS classes typically retain ground cover and erosion rates are low. 1C blacks out slopes that are steeper than 60%, where hillslope treatments are not effective, and less than 10% where runoff energy is low and treatments are not necessary. Finally, 1D grays out non-Forest Service lands and wilderness where the forest service can not recommend treatments. The remaining areas, shown in red and yellow on 1D are slopes where hillslope treatments such as aerial mulching could technically be beneficial in reducing hillslope erosion. Remaining areas are small percentage of watershed, and broken up by steep slopes. Hillslope treatments are unlikely to be effective at reducing erosion rates



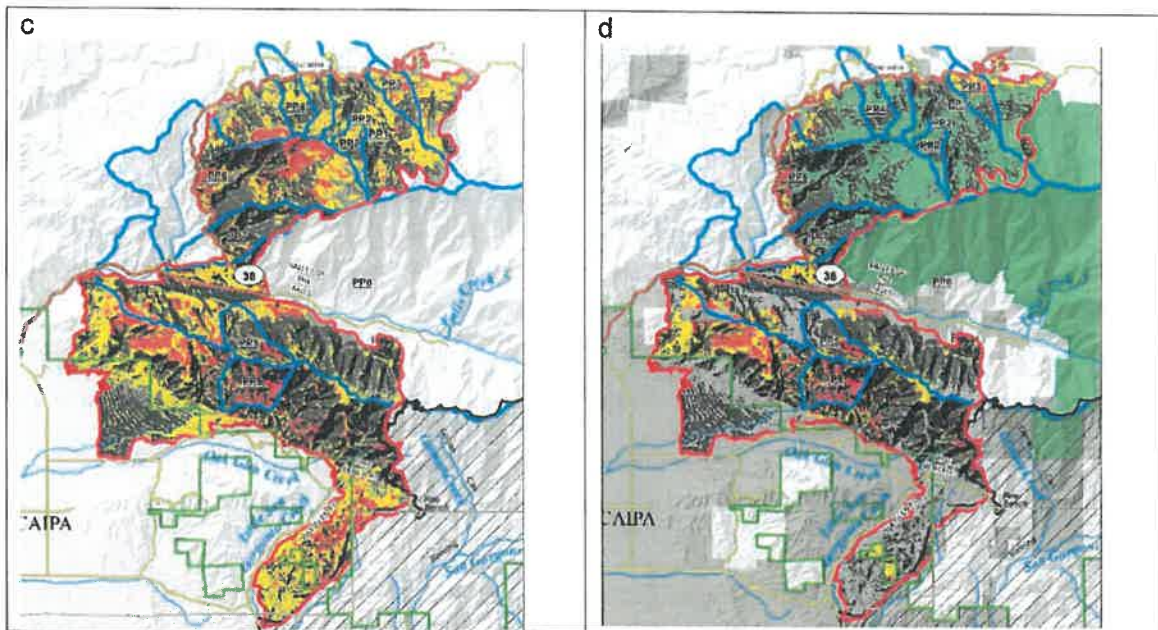


Figure 1- Limitations to hillslope treatments on Forest Service Lands

Heritage Site Protection: To mitigate the loss of heritage values within the Barton Flats Recreation Tract and the Camp Round Meadow/ Round Cienega Recreation Tract from hazard tree damage, The BAER archaeology team is proposing hazard tree felling to protect the historic cabins in these tracts.

### EDRR

Suppression repair and burned area non-native invasive plant detection surveys are recommended to begin in early spring of 2021 during the flowering periods of invasive species. Because of differences in rainfall and flowering times for all potential species, two visits may be required. If plants are detected, and control is warranted, a supplemental request for BAER funds will be made for eradication under the existing NEPA analysis and decisions. Documentation of new infestations include mapping perimeter of new infestations, completing invasive plant occurrence forms, and entering data into USFS Natural Resource Information System (NRIS) database. If removal is performed, documentation will include mapping treatment area, filling out invasive plant eradication form, and entering data into USFS FACTS database.

### *Suppression Feature EDRR*

Early invasive plant detection and rapid response (EDRR) are proposed to determine whether ground disturbing activities related to fire suppression have resulted in new introductions or spread of existing invasive plant infestations on approximately 43 miles of dozer lines, 6 miles of handline, 4 drop points, 5 helispots, safety zones, and a spike camp (Figure 1). The number and size of features are likely to increase as mapping continues over the course of the incident. Features created by unwashed heavy equipment, particularly dozer lines, would be prioritized.

### ***Burned Area EDRR***

Invasive plant detection work is proposed for the first year following the fire to document post-fire invasive plant introductions or spread in the burned area. There are 12 miles of state highway, 22 miles of trails, and 18 miles of riparian corridors that are vectors for weed seed movement and are the highest likelihood for introduction of new infestations or spread of existing infestations into the burned area. Stream and highway corridors would be prioritized due to invasion potential from nearby wind disperse species. Native vegetation is expected to recover from fire if invasive plant invasions are minimized.

### **Channel Treatments:**

No channel treatment is prescribed.

### **Roads and Trail Treatments:**

#### **Roads:**

***Storm Inspection/Response:*** Storm inspection/response will keep culvert and drainage features functional by cleaning sediment and debris from in and around features between or during storms to help protect against loss of water control, soil erosion, and loss of road tread. This work also includes post-winter inspections for 1S09 and other roads that may be too hazardous to inspect during the rainy season. This work will be accomplished through force account workforce (if available) or contractor equipment and labor.

Locations: NFSR 1N53, 1N82, 1N86, 1N86B, 1S09

***Road Stormproofing:*** Road stormproofing involves cleaning or armoring of existing drainage structures to help ensure road drainage performs optimally and to stabilize roads at risk of damage from loss of water control, soil erosion, flooding, debris flow, and loss of road tread. A berm along this road was in place prior to suppression actions and needs treatment to improve drainage (see photo below). This work will be accomplished through contractor equipment and labor utilizing existing IDIQ contract.





Locations: NFSR 1S09

*Road Drainage Structure Replacement/Improvements:* Road drainage structure improvements involves replacing existing deficient structures and installation of additional drainage structures to help protect against loss of water control, soil erosion, and loss of road tread. This work will be accomplished with contractor equipment and labor utilizing existing IDIQ contract. Contract preparation and administration using local forest staff.

Locations: NFSR 1S09, 1N86B

#### Trails:

Clean existing rolling dips, install new dips in anticipation of post-fire increased runoff; remove trail berms to increase outboard drainage where possible, and armor key ephemeral drainages to prevent undercutting and loss of trail tread. This will require the placement of rock in a rip-rap fashion below drainages to dissipate the energy of off trail water flows and decrease the possibility of down bank erosion. All trail runoff work would be focused on midslope trails in areas of moderate to high burn intensity. In addition, this treatment includes felling of hazard trees in forested areas that pose a threat to crews where crews will be stationary for moderate periods of time (includes staging area at trailheads). Storm inspection and response will be done following winter season or before opening to public use to correct post-fire damages that may occur. This work is proposed on segments of four national forest system non-motorized trails. These trails include 1E16, 1E17, 1W01, and 1W07.

#### **Protection/Safety Treatments:**

##### Closure Enforcement

Closure of the burn area and at-risk downstream areas are recommended to prevent long-term

exposure to risk and protect life and safety. Installation of burned area warning signs is recommended to warn users passing through the area on main roads of the potential hazard. Because of the **VERY HIGH** risk of these post-fire threats, it is recommended that the burned area closure applies to the public, all recreation residences tracts within identified hazard zones, FS staff before and during storm events, and trails and roads leading into the burn area. Anyone who attempts to access channels and low-lying areas within the burned area prior to or during a storm is at a **VERY HIGH** risk of injury or death. Risks associated within the burned area should be re-evaluated prior to lifting the closure. Area patrol is necessary to ensure closure barriers are not compromised, warning signs remain in place and visible, and monitor closure violations to hazardous areas accessed from non-USFS controlled locations (e.g., Highway 38, Jenks Lake Road) and wilderness trails that will remain open (e.g., majority of San Bernardino Ridge Trail). All work will be accomplished by Force Account staff.

#### Road Warning Signs

This treatment will install burned area warning signs at key road entry points to caution forest users about the potential hazards from hazard trees, debris flow, flooding, and rockfall that exist within the burned area. This work will be accomplished using contractor equipment and labor.

Locations: 1N53, 1N82, 1S09, 1N86, 1N87, 1S04, 1S08, 1N75, Jenks Lake Road

#### Road Closure

This treatment will install road closure gates to provide public safety on roads at the highest risk of hazards along NFS roads from hazard trees, debris flow, flooding, and rockfall. This treatment will compliment existing gates that will be closed and also help with enforcement of burned area and trail closures to prevent vehicle access to popular trails. This work will be accomplished using contractor equipment and labor.

Locations: 1N53, 1N82, 1N86,

#### Trail & Recreation Warning Signs & Closure

This treatment will establish hazard warning signs at trail junctions along the San Bernardino Peak trail, Santa Ana River Trail access points, known undeveloped recreation areas (e.g., Frustration Creek Climbing area, Glen Martin Creek access to yellow post sites, old road Mountain Home Creek), and Thurman Flat Picnic Area. This work will be accomplished using a combination of contract and Force Account labor.

#### Private Property and Other Jurisdictions:

Federal and private landownership are checkerboarded throughout the fire area. The fire burned in, around, and adjacent to the communities of Angelus Oaks, Oak Glen, north Yucaipa, Mountain Home Village, Barton Flats, and Forest Falls. The Round/Cienega (aka Willow Glen), Barton Flats, Camp Angelus Oaks, and Mountain Home Forest Service Recreation Residence Tracts are also within the burn area. All above listed communities/recreation tracts are down stream of the fire area.

There are several roads managed by Caltrans and San Bernardino County that traverse the fire area on National Forest lands, including Highway 38 and multiple residential county roads.

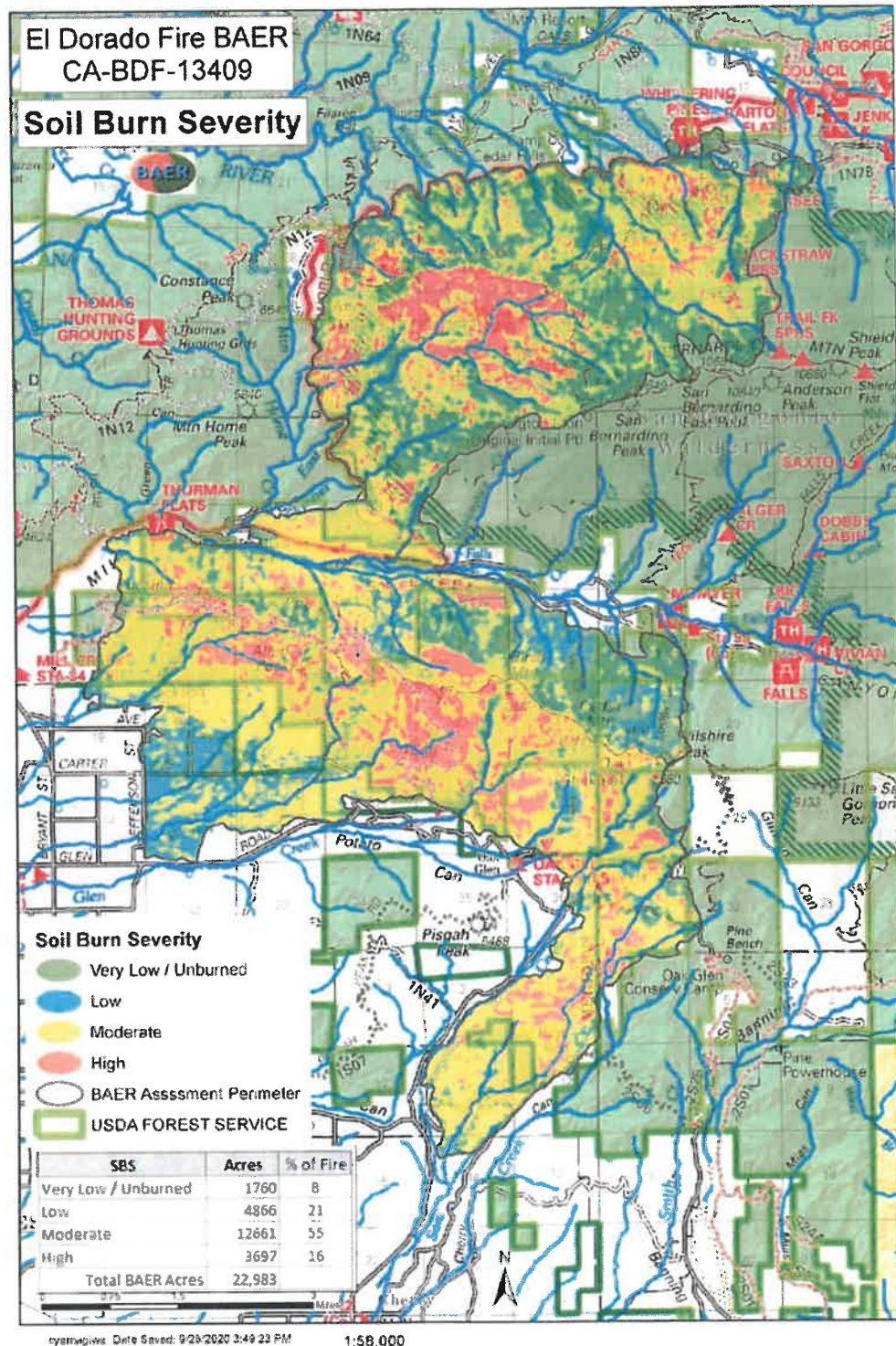
The BAER Team shared information on watershed response and potential threats to non-Forest assets with affected entities and responsible agencies such as San Bernardino County, Cal Trans, Natural Resources Conservation Service, National Weather Service and U S Army Corp. of Engineers. Non-Forest assets are addressed by the respective responsible agencies. are addressed by the respective responsible agency.

This treatment will educate USFS staff who are at risk of compromised evacuation routes, serious injury and/or death due to their duty station/work center location in relation to burned area hazards. The Forest BAER coordinator will educate staff at USFS Glen Oak Station about burned area threats and assist in the development of a flood/debris flow evacuation plan. The Forest BAER Coordinator will also work with USFS staff at whose life/safety and work site are at risk of direct impacts from flooding and debris flows at USFS Angelus Oaks Work Center. The Forest BAER Coordinator and Forest Public Affairs Officer will work to develop and distribute press releases and maintain current information on USFS external website, facebook page, etc. regarding the very high risk to life and safety in and adjacent to the burned area. The Forest BAER Coordinator and Special Uses staff will work together to notify permittee holders (e.g., recreation residence tracts and organizational camps) of closure and associated impacts to occupancy and access. In addition, there are numerous organizational camps and recreation resident tracts under Forest Service special use permits that will require follow-up from the Interagency coordinator and Special Use Administrator. The threat to life and property requires coordination with many agencies. The Forest Service plans on conducting meetings with permittees (including organizational camps and recreational residence cabin owners) in the very near future. The amount of coordination with the organizational camps and recreational residences cannot be overemphasized. Letters and/or follow up coordination will occur for all affected permittee holders. Recreation technicians will patrol the burned area to ensure forest visitors and permittees do not violate closure of the burned area and downstream lands.

#### **Monitoring Narrative:**



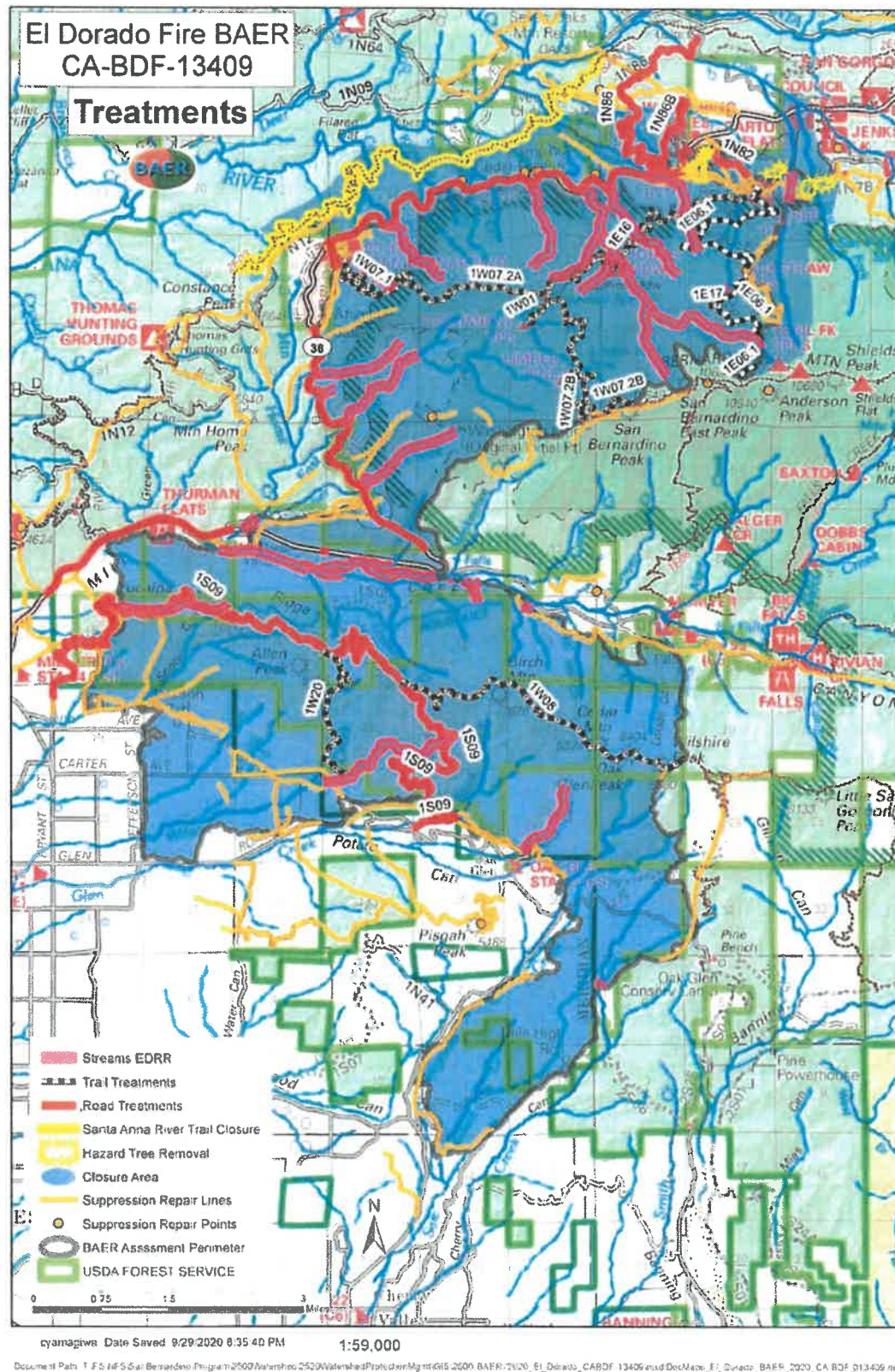
Figure 1: El Dorado Soil Burn Severity Map



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Figure 2: El Dorado Proposed Treatments



**Date of Report: August 24, 2020****Note: Costs and certain locations have been redacted to prevent further potential damage to resources****BURNED-AREA REPORT****PART I - TYPE OF REQUEST****A. Type of Report**

- ☒ 1. Funding request for estimated emergency stabilization funds  
☐ 2. No Treatment Recommendation

**B. Type of Action**

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)  
☐ 2. Interim Request #\_\_\_\_  
☐ Updating the initial funding request based on more accurate site data or design analysis

**PART II - BURNED-AREA DESCRIPTION****A. Fire Name:** Apple**B. Fire Number:** CA-RRU-096640**C. State:** CA**D. County:** Riverside/San Bernardino**E. Region:** Pacific Southwest**F. Forest:** San Bernardino**G. District:** Front Country**H. Fire Incident Job Code:** 1502 PNNCU3**I. Date Fire Started:** July 31, 2020**J. Date Fire Contained:** Unknown**K. Suppression Cost:** [REDACTED]**L. Fire Suppression Damages Repaired with Suppression Funds (estimates):****1. Fireline repaired (miles):**

Completed Dozer Line	49.50
Completed Hand Line	3.44

**2. Other (identify):**

Road	21.27 miles
Fence Damage	3 locations
Stream Crossing	1 location

**M. Watershed Numbers:***Table 1: Acres Burned by Watershed*

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
<b>181002010102</b>	<b>Headwaters San Geronio</b>	<b>30,306</b>	<b>18,375</b>	<b>60.6%</b>

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180702030401	Little Gorgonio Creek	18,055	3,516	19.5%
180702030501	Mill Creek	27,116	48	0.2%
181002010101	Smith Creek	20,858	1,359	6.5%
181002010301	South Fork Whitewater River	39,035	4,930	12.6%
181002010104	Upper San Gorgonio River	22,894	3,310	14.5%

**N. Total Acres Burned:***Table 2: Total Acres Burned by Ownership*

OWNERSHIP	ACRES
NFS	22,110
MORONGO TRIBAL LAND	7,387
NON-FEDERAL	3,713
TOTAL	33,209

- O. Vegetation Types:** lower and upper montane chaparral, chamise chaparral, canyon live oak, scrub oak, black oak, interior live oak, bigcone douglas-fir, Jeffrey pine forest, mixed conifer pine and fir forests, subalpine conifers, riversidean alluvial scrub, California sycamore, and baccharis riparian.
- P. Dominant Soils:** The highest elevation, steepest slopes include Springdale-Winthrop Families and Lithic Xerorthents, all coarse textured, generally skeletal soils with little horizon development, formed from granitic, gneiss or metamorphic rocks. Mid-slope, upland soils are commonly Crafton, found on more moderate slopes, coarse-loamy in texture, formed from similar rocks as residuum or colluvium from steeper slopes above. Lowest elevations are mostly Oak Glen or Wilshire soils formed on alluvial fans at the toe of canyon walls (of Springdale or similar soils). Fans are very broad, coarse-loamy or sandy-skeletal, and dominate the Banning Canyon bottoms above active channel washes.
- Q. Geologic Types:** Bedrock within the Apple Fire burned area mainly consists of crystalline basement terranes composed of fairly distinctive metamorphic gneiss rocks and several different granitic plutonic rocks. At the surface, dissecting these metamorphic and plutonic rock units are surficial deposits, mostly unconsolidated alluvium and landslide debris deposits.

**R. Miles of Stream Channels by Order or Class:***Table 3: Miles of Stream Channels by Order or Class*

STREAM TYPE	MILES
PERENNIAL	3.1
INTERMITTENT	24.1
EPHEMERAL	68.8
OTHER (DEFINE)	

**S. Transportation System:**

Trails: National Forest (miles): 13.45      Other (miles):  
 Roads: National Forest (miles): 30.7      Other (miles):



### **PART III - WATERSHED CONDITION**

#### **A. Burn Severity (acres):**

*Table 4: Burn Severity Acres by Ownership*

Soil Burn Severity	NFS	Morongo Tribal	Non-Federal	Total	% within the Fire Perimeter
<b>Very Low/Unburned</b>	1,040	290	341	1,671	5%
Low	4,035	1,381	1,212	6,628	20%
<b>Moderate</b>	<b>10,558</b>	<b>4,027</b>	<b>1,903</b>	<b>16,488</b>	<b>49.6%</b>
High	6,478	1,689	256	8,423	25.4%
<b>Total</b>	<b>22,110</b>	<b>7,387</b>	<b>3,713</b>	<b>33,209</b>	

#### **B. Water-Repellent Soil (acres): 17,290 acres (52% of fire)**

Hydrophobic soil conditions were strong and widespread in high soil burn severity, ranging from 5-10 cm thick, present in 80-100% of high sampled areas, and repelling water for a minute or more. Within moderate burn severity, repellency was less common, present in 60-70% of samples, from 2-5cm thick, and repelling water for ~30 seconds. Repellency was present in some low soil burn severity, but may be due to natural, pre-fire repellency, and probably won't contribute much to watershed response.

#### **C. Soil Erosion Hazard Rating:**

Percent of fire area:

Severe: 28%      Moderate: 54%      Slight: 13%      Not rated (rock outcrop & scree slopes): 5%

#### **D. Erosion Potential:**

7.0 tons/acre (2 year runoff event) – Pre-fire 0.2 tons/acre

19.1 tons/acre (5 year runoff event) – Pre-fire 1.1 tons/acre

#### **E. Sediment Potential:**

Rowe, Countryman, and Storey (1948) developed estimates of annual erosion rates for watersheds in the burn area based on measurements of sedimentation in reservoirs. On average, across the burn area, annual sediment delivery is estimated to increase 27 times greater than normal with an average of 24,400 cubic yards per square mile. These estimates are in line with field observations of dry ravel, existing unstable slopes made worse by fire effects, amount of bedload in washes and tributaries, and evidence of past debris flows.

#### **F. Estimated Vegetative Recovery Period: (0-150 years)**

Chaparral and oak communities comprise 71% of the burned area. These communities are expected to recover in 5-40 years in moderate and high severity burned areas unless re-burned or non-native plants densely establish. Conifer forests comprise 21% of the burned area and large areas of high fire severity are not expected to recover to mature forest within the next 50-150 years and have potential to type convert to shrub lands. Low severity and small areas of moderate fire severity areas of conifer forest are expected to recover in 0 – 30 years.

#### **G. Estimated Hydrologic Response (brief description):**

##### **1. Estimated Erosion Response**

Combustion of vegetation and organic surface layers was remarkably uniform in all of the high and most moderate burn severity within the Apple Fire. In moderate severity, less than 20% of the sampled locations had any potential for needlecast or litterfall that would increase surface cover before the first damaging storm, leaving surface rock as the only ground cover. Throughout the fire, consumption of organic layers weakened surface soil structure, and dry ravel is widespread. This effect seemed particularly pronounced on soils within pourpoint 8, Banning Canyon, on slopes below Little San

Gorgonio Peak and Galena Peak. These factors combined with the very steep slopes in this part of the fire are represented in the erosion modeling results below; showing the highest erosion rates (in tons per acre) are found in the Banning Canyon. If a storm initiates runoff in the first year after the fire, erosion rates in Banning Canyon could average 10 tons/acre (2 year runoff event), or 31.4 tons/acre (5 year runoff event); individual hillslopes could exceed these rates. The Erosion Risk Management Tool (ERMIT) was used to predict hillslope erosion.

Other portions of the fire that saw similar consumption of vegetation and surface organics have elevated erosion rates, but generally are not expected to have as high of an erosion response when compared to Banning Canyon. This is partly because slopes are less consistently steep in other parts of the fire, and some soil properties make areas outside Banning Canyon less erodible. Crafton soils dominate mountain slopes in the southern half of the fire, and Morical are found on forested benches in the upper portion of the Whitewater River drainage. Both these soil types have more developed A horizons, and seem less affected by structure loss due to soil heating. Average erosion rates for popurpoints outside Banning Canyon range from 3 to 8 tons/acre (2 year runoff event), and from 11.3 to 20.8 tons/acre in a 5 year runoff event.

Table 5: Pre and Post-fire, Predicted Erosion Rates

Watershed	Modeled Pour Point	Acres within fire	2 yr. Runoff Event		5 yr. Runoff Event	
			Pre Fire (tons/acre)	Post Fire (tons/acre)	Pre Fire (tons/acre)	Post Fire (tons/acre)
Whitewater River	P1. SF Dam Diversion	1,160.6	0.1	5.5	1.6	15.9
Whitewater River	P2. YL Frog Habitat	813.4	0.1	3.4	1.7	11.3
Whitewater River	P3. WR Preserve	5,285.5	0.1	5.0	1.3	16.1
Portrero Creek	P4. MR Dam Diversion	446.7	0.2	7.3	1.0	20.8
Portrero Creek	P5. Wood Creek	2,251.6	0.3	6.3	0.8	16.5
Hathaway Creek	P6. Fire Boundary	1,910.5	0.3	8.0	0.9	19.5
Banning Canyon	P7. Big Pine Creek Flume	582.6	0.2	10.6	1.2	31.4
Banning Canyon	P8. 2S06 Crossing	7,933.6	0.2	9.7	1.6	27.5
Millard Creek	P9. Road Crossing	3,260.7	0.3	6.8	0.9	17.7
Cherry Canyon	P10. Noble Ck. Crossing	955.6	0.2	7.1	0.9	19.4

## 2. Watershed Response

Because of the variability in elevation, aspect, and general topography, annual precipitation and pattern is variable across the fire area. Annual precipitation ranges between 24 to 44 inches, primarily arriving between December and March although summer thundershowers are common in August and early fall. A significant portion of the burn in Banning Canyon and Whitewater Canyon is located above 6,000 ft, which may result in precipitation accumulating more as snow versus rain during winter. Snow accumulation versus rainfall affects the magnitude of post-fire watershed response, slowing runoff and favoring infiltration. It is important to note, however, that rain-on-snow events are common in this area as well.

**Damaging Storms:** Although not the only types of storms that could occur, two common storm types that could cause significant damage within the burn area are monsoonal thunderstorms and storms related to atmospheric rivers. Short duration, high intensity storms (such as a monsoonal thundershowers) frequently trigger debris flows. The second storm type is a long duration storm, commonly linked to atmospheric rivers. Major flooding events have occurred across Southern California due to atmospheric rivers which contain large amounts of water vapor. One such weather system is known as the "Pineapple Express," which moves subtropical moisture from the latitudes of the Hawaiian Islands to Southern California. These types of storms are especially catastrophic if

they occur over snowpack, commonly referred to as a rain-on-snow event. Warm rains rapidly melt snowpack and can result in catastrophic runoff.

**Hydrologic Processes:** Most of the burn area had not burned in recorded history, resulting in the development of mature brush communities and thick duff accumulation. Availability of this fuel load contributed to the subsequent high percentage of moderate and high soil burn severity (Table 6). Fire causes impacts to several hydrologic processes including reduction in interception, transpiration, and infiltration, and increases in soil moisture and the rate of runoff (due to lack of litter and decreased surface roughness). Removal of vegetation and changes to soil such as increases in hydrophobicity, changes in soil structure, and removal of duff, organic matter, and roots alters these processes and ultimately lead to increases in runoff, peak flows and erosion. These alterations are typical of soils classified as having incurred moderate to high soil burn severity. Given the large percentage of soil burn severity in the Apple Fire, watershed response will be significant (Table 6). Increases in runoff and bulking of flows across the burn area are expected to increase approximately 38% to 234% above normal. (Two modeled sites have significantly lower estimates due to their distance from the burn area and the acreage that burned in those catchments.)

Table 6: Comparison of Pre- and Post-fire Peak Flow Related to the 2, 5, and 10 Year Return Interval

Watershed	Modeled Pour Point	% of Mod & High SBS	2 yr. RI Peak Flow			5 yr. RI Peak Flow			10 yr. RI Peak Flow		
			Pre-Fire Q (CFS)	Post-Fire Bulk Q (CFS)	Increase above Pre-fire Q	Pre-fire Q (CFS)	Post-Fire Bulk Q (CFS)	Increase above Pre-fire Q	Pre-fire Q (CFS)	Post-Fire Bulk Q (CFS)	Increase above Pre-fire Q
Whitewater River	P1. SF Dam Diversion	53%	16	24	51%	93	137	46%	235	337	43%
Whitewater River	P2. YL Frog Habitat	3%	35	36	3%	205	212	3%	515	531	3%
Whitewater River	P3. WR Preserve	11%	75	82	10%	438	477	9%	1,100	1,193	8%
Portrero Creek	P4. MR Dam Diversion	23%	14	21	48%	81	114	41%	203	280	38%
Portrero Creek	P5. Wood Creek	51%	23	51	117%	135	270	100%	341	652	91%
Hathaway Creek	P6. Fire Boundary	97%	18	60	234%	105	310	195%	263	727	177%
Banning Canyon	P7. Big Pine Creek Flume	87%	10	28	191%	57	152	166%	143	359	151%
Banning Canyon	P8. 2506 Crossing	82%	37	100	171%	214	534	149%	540	1,273	136%
Millard Creek	P9. Road Crossing	30%	37	64	72%	215	349	62%	542	844	56%
Cherry Canyon	P10. Noble Ck. Crossing	49%	84	201	141%	275	590	115%	496	986	99%

Channel crossings, depositional fans, and floodplains have an inherent risk of flooding which will be exacerbated by the fire. Increased runoff and sediment delivery (ex. surface erosion, sediment-laden flows, and debris flows) will cause channel migration and braiding across the wash in flood events. Lateral channel migration can erode cut banks and undercut slopes and banks. Aggradation can increase probability of channel migration and flooding. Changes in hydrologic processes can also lead to slope instability and result in post-fire debris flows, mudflows, and other mass wasting (as described under geologic response). Watershed response in the burn area will pose a very high risk to life, safety, and infrastructure. The combination of increased flows, sediment loads, and woody debris increase the volume of post-fire flows, which could negatively impact culverts, constructed channel ways, diversion infrastructure, and other infrastructure designed to pass "normal" flows. It is important to note that downstream areas that experience regular flooding or difficulty controlling drainage during small storms will be very likely to experience flooding and/or failure in post-fire storms. Bulking and increased flows may cause channels to flood, divert, or migrate to areas that do not usually flood.

**Water Quality:** Wildfires primarily affect water quality through increased sedimentation. As a result, the primary water quality constituents or characteristics affected by this fire include color, sediment, suspended material, and turbidity. Floods and debris flows can entrain large material, which can physically damage infrastructure associated with beneficial uses of water (e.g., water conveyance structures; hydropower structures; transportation networks). The loss of riparian shading and the sedimentation of channels by floods and debris flows may increase stream temperature. Fire-induced increases in mass wasting along with extensive vegetation mortality can result in increases

in floatable material such as large woody debris. Post-fire delivery of organic debris to stream channels can potentially decrease dissolved oxygen concentrations in streams. Fire-derived ash inputs can increase pH, alkalinity, conductivity, and nutrient flux (e.g. ammonium, nitrate, phosphate, and potassium), although these changes are generally short lived.

### 3. Geology/Geologic Response

Within the burned area of the Apple Fire, evidence of mass wasting as debris slides, debris flows and rock fall are widespread. In addition, numerous slopes and drainages in the burn area have large amounts of stored material, significant drainage areas, defined channels and steep gradients. It is estimate that in case of high intensity storms (>20 mm/hr.) that tend to initiate/trigger debris flows, including summer thunder-storms, as well as rain-on-snow events, the probabilities of debris flows are very high especially in the San Gorgonio River watershed. In addition, based on ground surveys and air recon, Landslides and rock-fall are very likely along numerous steep burned slopes within the burn area of the Apple Fire.

Now, as a result of the removal of vegetation by the fire, soils are exposed and have become weakened, hydrophobic conditions have changed and rocks on slopes have lost their supporting vegetation. Due to these post-fire new conditions, roads, trails and water systems are at risk from numerous geological hazards as rolling rocks, debris flows, debris slides and hyper-concentrated floods. Risks to human life, infrastructure, facilities, roads, trails, water systems, natural and cultural resources is elevated in most areas in and downstream of the Apple Fire.

The US Geological Survey (USGS) - Landslide Hazards Program, has developed empirical models for forecasting the probability and the likely volume of post-fire debris flow events. To run their models, the USGS uses geospatial data related to basin morphometry, burn severity, soil properties, and rainfall characteristics to estimate the probability and volume of debris flows that may occur in response to a design storm (Staley, 2016). Estimates of probability, volume, and combined hazard are based upon a design storm with a peak 15-minute rainfall intensity of 12 – 40 millimeters per hour (mm/h) rate. We selected a design storm of a peak 15-minute rainfall intensity of 28 millimeters per hour (mm/h) rate to evaluate debris flow potential and volumes since based on the NOAA Atlas 14 Point Precipitation Frequency Estimates, this magnitude of storm seems likely to occur in any given year.

Based on USGS debris flow modeling it appears that under conditions of a peak 15-minute rainfall intensity storm of 28 millimeters per hour (1.1 inch/hr.), the probability of debris flows occurring is very high (80-100%) in a majority of the channels/creeks in the Apple Fire burn area, especially in the San Gorgonio River watershed. Under these same conditions, predicted volumes in these channels are expected to range from 1K-10K cubic meters in some channels to 10K-100K cubic meters in other channels. Based on the very high probabilities of debris flow initiation and high predicted volumes of debris flows, most creeks in the burn area appear to present a high combine hazard.

## **PART V - SUMMARY OF ANALYSIS**

### **Introduction/Background:**

The Apple Fire started on July 31, 2020 near the communities of Oak Glen and Cherry Valley, CA. The fire grew quickly, driven by the low moisture content of the vegetation in the area combined with high temperatures and low relative humidity. Most of the fire burned in areas with no recent fire history. A Type 1 Incident Management Team took over the fire on August 2. At its height, nearly 2,900 firefighters and support personnel were assigned to the fire. Land ownership within the fire area is checkerboarded, including private lands, National Forest wilderness and non-wilderness, and the Morongo Band of Mission Indian Reservation. The fire is considered to be 95% contained as of August 19, 2020.

The Apple Fire burned within the watersheds of Whitewater River, Portrero Creek, Hathaway Creek, Banning Canyon, Millard Creek, and Cherry Canyon. The area is characterized by steep, rocky mountainous canyons and ridges, to alluvial valleys of the San Bernardino Mountain Range.



## A. Describe Critical Values/Resources and Threats (narrative):

Table 7: Critical Value Matrix

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

### 1. Human Life and Safety (HLS):

Based on the potential for debris flows, flooding, rock falls, etc., the BAER team identified a serious risk to public, employees, and cooperator staff in the Apple Fire area.

### 2. Property (P): Roads and Trails:

#### Overview

The National Forest transportation system consists of approximately 31 miles of National Forest System Roads (NFSR) within the fire perimeter. All these roads are suitable for high-clearance vehicles and are administrative use only (maintenance level 1-2). Some of the NFS roads within the burned area are maintained by cooperators (SCE, City of Banning, State, Private). Other roads have shared maintenance responsibility between cooperators and the forest. The majority of the NFS Roads throughout the burned watersheds are likely to be impacted by runoff, sediment, and debris derived from burned areas.

#### Risk Assessment

National Forest System roads were assessed in order to determine the probability and magnitude of road damage or loss as a result of the changed watershed condition. User safety on roads in the burned area is also an equally important consideration. The table below shows the risk assessment for each road based on the probability of damage or loss and the magnitude of consequences.

Roads: BAER Risk Ratings

Low	Intermediate	High	Very High
2S25 2S07	None	None	2S24 2S06 2S04 2S01/A/B 2S23

Of the NFSR miles in the burned area, 9.7 miles of road are proposed for treatment and have a risk rating of very high. These roads include: 2S24, 2S06, 2S04, and 2S23. Roads proposed for treatment exhibit an unacceptable risk of failure that warrant specific treatments to help mitigate this risk. The forest has a vested interest in preserving access on these roads for the administration of National Forest lands. Because an existing license/permit exists with Southern California Edison (SCE), which includes road maintenance responsibilities on 2S01/A/B, information will be shared with SCE on the very high-risk rating associated with this road and suggested treatment recommendations to help mitigate this risk.

Forest Service Property: Beyond the roads and trails, there is little Forest Service property within the fire area. There is one developed wildlife water system at [REDACTED]. The [REDACTED] drinker was the only documented wildlife water development affected by the fire. The fire burned about 5ft of pipe which stopped the flow of water from the spring. The

post-fire affects from the hillsides above the water development include increased sedimentation which may bury the drinker.

- b. Private Property: The fire burned in, around, and adjacent to the communities of Oak Glen, Cherry Valley, Banning, and Banning Bench. The southern portion of the fire burned on Morongo Band of Mission Indians Reservation. Federal and private landownership are checkerboarded throughout the fire area.

The Banning Canyon Water Conveyance system is owned by SCE and is entirely within the fire perimeter in Banning Canyon and the upper South Fork Whitewater River watershed. The system spans both private and NFS lands. The system operates under a combination FERC license and FS Special Use Permit. Infrastructure includes water diversions, pipelines, flume, powerhouses, and water tanks.

SCE powerlines are present in the Banning Canyon area on both private and NFS lands. [REDACTED]. The Oak Glen Conservation Camp is on NFS lands under permit to CalFire. The camp consists of buildings, outbuildings, wells, water tanks, and access roads. The City of Banning owns and operates wells in Banning Canyon on private lands.

The BAER worked closely with State WERT and Department of Interior BAER Team sharing information on watershed response and potential threats to non-Forest assets. Non-Forest assets are addressed in their reports, respectively.

### 3. **Natural Resources (NR):**Water Quality for Municipal and Domestic Use:

Fire can negatively impact both physical and chemical constituents of water quality. Chemical impacts will be relatively short as ash is flushed through the system. Increased sediment delivery can be expected to continue until vegetation reestablishes and erosion is slowed. [REDACTED]. Hazmat resulting from burned infrastructure (on private lands or under permit on FS lands) could pose a risk to water quality if mobilized. Most observed hazmat is in low-lying areas subject to flooding. Changes to water quality will need to be considered prior to use and how increased sediment may impact treatment facilities.

#### b. Hydrologic Function:

Fire impacts proper functioning of hydrologic processes. These impacts are recoverable and expected to diminish as vegetation reestablishes. The greatest threats to recovery are threats from incursion of OHV and [REDACTED], and failure of infrastructure (including roads, water conveyance systems, and trails). Slope failure, increased sediment delivery, and mobilization of woody debris increase the risk of channel diversions down roads and ditches. Channel diversion could lead to complete road prism (or infrastructure) loss and irrecoverable damage to hillslopes (ex. 2S01).

#### c. Soil Productivity:

Soil productivity loss from soil erosion is likely and magnitude of consequences moderate. The risk level is high. While a threat to soil productivity exists in portions of the Apple Fire, *hillslope stabilization treatments are not being proposed*. Suitable areas are very limited due to land ownership, wilderness designation, and steep slopes. Areas of high and moderate burn severity not limited by the above, are usually interspersed with steep slopes, or located in lower positions within the watershed, below where runoff and rill erosion would initiate. Hillslope treatments would not result in effective slope stabilization because the available areas are so small. See soil specialist report for additional details.

**Risk Assessment: Probability: Likely:** Intense rainfall may be more than a 5-year rainfall event could result in severe surface erosion. **Magnitude: Moderate:** Loss of surface soil could reduce productivity or delay recovery of pre-fire vegetation types. **Risk: High**

d. Wildlife Resources:

There are four federally listed species within and downstream of the fire area; southwestern willow flycatcher, mountain yellow-legged frog, California red-legged frog and arroyo toad. In addition, mountain yellow-legged frog Critical Habitat occurs downstream of the fire area. The following watersheds were addressed for post-fire threats to federally listed wildlife:

*Headwaters San Geronio:*

Banning Canyon has suitable habitat for arroyo toad within and downstream of the fire area in federal and non-federal lands. In addition, there is a southwestern willow flycatcher territory that burned over during the fire. Modeling of this drainage shows that there will be an increase of 140-200% over normal flows. In addition, about 10 tons per acre of sediment are expected. Post-fire effects to southwestern willow flycatcher habitat may include increased flows, sediment and debris delivery that may further scour riparian vegetation. Post-fire effects to arroyo toads may include death/injury due to being buried during debris flows or drowning. In addition, water quality from fine/sediment and ash may also lead to death/injury if animals are present in the water. Over the long term, the deposition of sediment may improve habitat for the arroyo toad.

*Little San Geronio Creek:*

Mountain yellow-legged frog suitable habitat is known to occur on Sawmill Canyon and Burnt Canyon. Those areas are not known to be occupied. Modeling of this drainage shows that there will be an increase of 150-200% over normal flows. In addition, about 10.6 tons per acre of sediment are expected. Post-fire effects to mountain yellow-legged frogs may include death/injury due to being buried during debris flows and/or fine sediment/ash impacting the water quality. In addition, increased deposition may fill up pools of water with sediment which means that the pools would not hold water long enough for individuals to complete metamorphosis (2 years).

Southwestern willow flycatcher habitat is present in Noble Creek. Post-fire effects to the habitat may include increased flows, sediment and debris delivery that may further scour riparian vegetation.

*South Fork Whitewater:*

Designated Critical Habitat for mountain yellow-legged frog occurs downstream of the fire in Middle Fork Whitewater River. This area is not known to be occupied. The site is expected to see about a 3% increase in watershed runoff. *Post-fire effects are not expected to be detrimental to the Primary Constituent Elements for the Critical Habitat.* Normal flush watershed processes are expected to occur. Increases in floatable debris, fine sediment/ash and impacts to water quality will occur which may cause death to animals present in the water.

Occupied California red-legged frog habitat occurs in the [REDACTED] on private land [REDACTED], over [REDACTED] miles downstream of the fire. The frogs [REDACTED] not directly on the stream channel but still receive their water from [REDACTED] the river wash. The increase flow in this area is estimated to be 10%. The water chemistry may change as there will be more floatable debris and sediment despite minor increases in runoff volume. Turbidity and water quality (ash, fine sediment) may be impacted which may impact the water quality of the ponds. This may lead to injury/death of red-legged frogs present in that water.

*Treatments are not recommended for T+E species or critical habitat.*

e. Botanical Resources:

An emergency exists with respect to vegetative recovery as a result of the threat of post-fire weed introduction and spread. The potential introduction and dispersal of invasive weeds into areas disturbed by fire suppression and rehabilitation activities may lead to the establishment of large and persistent weed populations. There is a high probability that extant weed infestations along constructed fire lines will increase in the burn area due to mechanical soil disturbance



and their release from competition with native plant species. [REDACTED]. The introduction and expansion of weed populations could affect the structure and habitat function of native plant communities within the burn area. It is expected that most native vegetation adapted to moderate or infrequent high severity fire would recover if weed invasions are minimized.

**Risk Assessment:** *Probability: Likely:* Given the WUI and density of non-native invasives (NNI) near boundary high potential along vectors of trails, roads, riparian, and [REDACTED]. Known extant NNI at fire camp, on access roads, and in patches within dozer lines. *Magnitude: Major:* Known occurrences of tamarisk near burned area spreading into riparian and potential inhibition of native veg community recovery. Potential type conversion of chaparral where many of the dozer lines are. **Risk: VERY HIGH**

There is a documented occurrence of the federally listed endangered plant species *Astragalus tricarlinatus* approximately five miles downstream of the burn area within the [REDACTED]. Much of the population occurs on rocky slopes above the floodplain and will not be impacted by potential flooding and sedimentation. Occasionally seedlings can become established within the wash and experience flooding and displacement. Loss of these individuals in the wash is not considered a threat to the upslope populations because these small wash populations tend to be ephemeral and are not thought to contribute to the long term viability of the species.

#### 4. Cultural and Heritage Resources: [REDACTED] Emergency Treatment Objectives:

- Provide for public safety
- Limit damage to property
- Limit loss of soil productivity and provide for natural vegetative recovery
- Early detection and rapid response of nonnative invasive plants
- Road and trail treatments to protect investment in infrastructure and limit post-fire watershed response
- Conserve threatened and endangered species habitat

#### C. Probability of Completing Treatment Prior to Damaging Storm or Event:

Land: N/A

Channel: N/A

Roads/Trails: 85%

Protection/Safety: 90%

#### D. Probability of Treatment Success

Table 8: Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	n/a	n/a	n/a
Channel	n/a	n/a	n/a
Roads/Trails	80	90	100
Protection/Safety	90	90	100

**E. Cost of No-Action (Including Loss):** [REDACTED] plus loss of value to nonmarket resources such as nonnative invasive weeds impacting vegetative recovery and potential for type conversion, additional impacts to soil loss/productivity and lack of post-fire coordination with partners and post-fire flood response preparation.

**F. Cost of Selected Alternative (Including Loss):** Using VAR lite tool: [REDACTED] Expected benefit/cost ratio for market resources; continued Interagency coordination to assist with property and life protection and benefits to nonmarket resources due to non-native invasive detection and eradication and vector prevention.

#### G. Skills Represented on Burned-Area Survey Team:

- |   |   |   |  |   |
|---|---|---|--|---|
| <input checked="" type="checkbox"/> Soils               | <input checked="" type="checkbox"/> Hydrology | <input checked="" type="checkbox"/> Engineering | <input checked="" type="checkbox"/> GIS      | <input checked="" type="checkbox"/> Archaeology |
| <input checked="" type="checkbox"/> Weeds               | <input type="checkbox"/> Recreation           | <input checked="" type="checkbox"/> Fisheries   | <input checked="" type="checkbox"/> Wildlife |   |
| <input checked="" type="checkbox"/> Other: Geology, PIO |   |   |  |   |

**Team Leader:** Todd Ellsworth  
**Email:** todd.ellsworth@usda.gov

**Phone(s):** [REDACTED]

**Forest BAER Coordinator:** Robert Taylor  
**Email:** robert.taylor2@usda.gov

**Phone(s):** [REDACTED]

**Team Members:** Table 9: BAER Team Members by Skill

Skill	Team Member Name
Team Lead(s)	Todd Ellsworth
Soils	Curtis Kvamme
Hydrology	Emily Fudge and Robert Taylor
Engineering	Josh Direen
GIS	Tracy Tennant
Archaeology	Karin Klemic
Weeds	Emma Williams and Lance Woolley (T)
Recreation	
Other	Yonni Schwartz, Cathleen Thompson, Kim Boss

#### H. Treatment Narrative:

##### Land Treatments:

##### 1) Early Detection, Rapid Response – Related to Burned Area:

An emergency exists with respect to native vegetative community recovery as a result of the threat of post-fire weed introduction and spread and unauthorized off-road vehicle (OHV) use. Invasive plant populations may affect the structure and habitat function of native plant communities especially in arid and riparian ecosystems by aggressive colonization, reduction of water availability, and outcompeting native species causing type conversion and changes in fire regimes. Localities within the burn area have a history of concentrated unauthorized OHV use and [REDACTED] from areas with known weed infestations. Suppression repair features have a high likelihood of new weed introductions from equipment transported from out of the area or transport of seeds from existing infestations to new areas. However, native vegetation is expected to recover from fire if invasive plant invasions are minimized.

Early Detection and Rapid Response treatments are requested to prevent within the burned area with high probability for non-native invasive species introductions or expansion. Existing authorized roads (18 miles) and trails (7 miles), unauthorized routes (7 miles), and riparian areas (18 miles) are vectors for weed seed movement and are the highest likelihood for new infestations. Wind dispersed species in the vicinity have high potential for establishing in sensitive riparian areas post fire. Closing the burned area to public access is recommended, however over 90% of the burned area on FS land is within 1 mile of the San Bernardino National Forest boundary, causing a high likelihood for unauthorized off trail hiking or OHV use where previously dense vegetation prohibited these vectors of weed spread. Several awned or spined species are known to the vicinity and readily disperse on clothing or fur. Two visits would be needed to capture bloom seasons in the early spring and summer. The San Bernardino National Forest would leverage existing partnership agreements with Rancho Santa Ana Botanical Garden and Southern California Mountains Foundation to complete the weed treatments.

Land Treatment #1: Early Detection, Rapid Response – Related to Burn Area				
Item	Unit	Unit Cost	# of Units	Cost
<b>Invasive Plant Detection &amp; Treatment</b>				
4 Weed Technicians	Days	[REDACTED]	25	[REDACTED]
<b>Administration, Travel, and Materials</b>				
1 GS-9 Botanist, Coordination	Days	[REDACTED]	5	[REDACTED]
1 GS-11 Botanist, Agreements	Days	[REDACTED]	2	[REDACTED]

Vehicle Mileage	Miles	[REDACTED]	2500	[REDACTED]
Supplies	Each	[REDACTED]	1	[REDACTED]
<b>Total Cost</b>				[REDACTED]

**2) Early Detection, Rapid Response – Related to Fire Suppression:**

Early Detection and Rapid Response treatments are requested on suppression related disturbance features including dozer lines (7 miles), hand lines (4 miles), roads bladed for containment lines (18 miles), helistops, drop points, and spike camps. Since it is impossible to know if all suppression equipment was adequately cleaned prior to entering the burn area, there is a risk that weed seed from areas outside the region was introduced via suppression equipment as vectors of weed seed dispersal. It is highly likely that introduced or existing invasive plant infestations will quickly spread and expand onto freshly disturbed ground related to fire suppression activities.

<b>Land Treatment #2: Early Detection, Rapid Response – Related to Fire Suppression</b>				
Item	Unit	Unit Cost	# of Units	Cost
<b>Invasive Plant Detection &amp; Treatment</b>				
4 Weed Technicians	Days	[REDACTED]	30	[REDACTED]
<b>Administration, Travel, and Materials</b>				
1 GS-9 Botanist, Coordination	Days	[REDACTED]	5	[REDACTED]
1 GS-11 Botanist, Agreements	Days	[REDACTED]	2	[REDACTED]
Vehicle Mileage	Miles	[REDACTED]	2500	[REDACTED]
Supplies	Each	[REDACTED]	1	[REDACTED]
<b>Total Cost</b>				[REDACTED]

**3) Vector Exclusion Fencing on Vulnerable Wilderness Boundary Locations:**

[REDACTED]. Fencing is recommended in specific locations [REDACTED]. The San Bernardino National Forest would leverage its partnership agreement with the Southern California Mountains Foundation to construct fencing and install gates. San Bernardino National Forest would provide all fencing and gate materials from existing inventory.

<b>Land Treatment #3: Vector Exclusion on Vulnerable Wilderness Boundary Locations</b>				
Item	Unit	Unit Cost	# of Units	Cost
1 GS-09 Botanist	Day	[REDACTED]	2	[REDACTED]
1 GS-09 Archeologist	Day	[REDACTED]	2	[REDACTED]
Urban Conservation Corps Crew w/ Supervisor	Day	[REDACTED]	6	[REDACTED]
Vehicle Mileage	Miles	[REDACTED]	600	[REDACTED]
<b>Total Cost</b>				[REDACTED]

**Channel Treatments:** None

**Roads and Trail Treatments:**

Road drainage features are at risk from adjacent burned watersheds. Increased runoff and sediment from the burned areas can negatively affect the road prism, damaging the road, eroding land downslope of the road and routing flow and sediment directly to stream channels. Road failure can also contribute to failure of infrastructure downstream. Culverts associated with these roads are at risk of plugging from debris carried down channels from burned watersheds. Proposed road treatments include: drainage structure cleaning, reestablishing rolling dips and leadoff ditches, installation of overside drains, culvert removal and upsizing, reshaping low water crossings, installation of riprap armoring and spillways, culvert inlet basin cleaning, berm removal, outsloping, and riprap armoring at strategic locations.

Treatment Objectives: The primary objectives of the road and infrastructure treatments are to:



- a. Protect and stabilize Forest Service infrastructure at risk of damage as a result of increased sedimentation, stream diversion, and erosion from the fire.
- b. Reduce risk to water quality and other natural resources by reducing risk of infrastructure contamination, damage, and failure.
- c. Mitigate public safety hazards along NFS roads.
- d. Reduce risk to downstream infrastructure where possible.
- e. Protect road crews from the threat of falling trees.

#### 1) Road Storm-Proofing:

Road stormproofing involves cleaning or armoring of existing drainage structures to help ensure road drainage performs optimally. This work will be accomplished through contractor equipment and labor. In addition, this treatment includes felling of hazard trees in forested areas that pose a threat to crews.

Locations: FSR 2S24, 2S06, 2S04, 2S23

Roads and Trail Treatments #1: Road Storm-Proofing				
Item	Unit	Unit Cost	# of Units	Cost
Mobilization – 10% standard for this area	Lump Sum	[REDACTED]	1	[REDACTED]
Restore Drainage Function- existing drainage structures - 2S04/2S06/2S23/2S24	Mile	[REDACTED]	8.6	[REDACTED]
Outslope Road, remove berm - 2S04	Mile	[REDACTED]	0.4	[REDACTED]
Installation of new drainage dips with leadout ditches -2S04/2S23	Each	[REDACTED]	50	[REDACTED]
Vegetation removal @ Noble Creek	LSQ	[REDACTED]	1	[REDACTED]
Cleanout and reshape existing grouted rock LWC - 2S06	Each	[REDACTED]	4	[REDACTED]
Reshape native LWC	Each	[REDACTED]	2	[REDACTED]
Fire Crew Overtime (Hazard Tree Felling)	LS	[REDACTED]	1	[REDACTED]
<b>Total</b>				[REDACTED]

#### 2) Road Drainage Structure Replacements/Improvements:

Road drainage structure improvements involves replacing existing deficient structures and installation of additional drainage structures to help ensure road drainage performs optimally. This work will be accomplished with contractor equipment and labor.

Locations: FSR 2S24, 2S06, 2S04, 2S23

Roads and Trail Treatments #2: Road Drainage Structure Replacements/Improvements				
Item	Unit	Unit Cost	# of Units	Cost
Mobilization – 10% - standard for this area	Lump Sum	[REDACTED]	1	[REDACTED]
Install 18" Overside Drain w/ 20' flume – 2S04/2S23/2S24	Each	[REDACTED]	11	[REDACTED]
Install 24" Overside Drain w/ 20' flume – 2S06	Each	[REDACTED]	6	[REDACTED]
24 inch culvert removal, install low water crossing @ Smith Ck. - 2S06	Each	[REDACTED]	1	[REDACTED]
12 inch and 24inch culvert removal, install LWC with rock spillway- 2S06	Each	[REDACTED]	1	[REDACTED]
Install 24 inch CMP tee with grate, culvert inlet modification - 2S06	Lump Sum	[REDACTED]	1	[REDACTED]
Riprap downstream of grouted rock LWC – large riprap to protect road and [REDACTED]	CY	[REDACTED]	20	[REDACTED]



<b>Total</b>	[REDACTED]
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**3) Storm Inspection/Response:**

Storm inspection/response will keep culvert and drainage features functional by cleaning sediment and debris from in and around features between or during storms. This work will be accomplished through contractor equipment and labor.

Locations: FSR 2S24, 2S06, 2S04, 2S23

<b>Roads and Trail Treatments #3: Storm Inspection/Response</b>				
Item	Unit	Unit Cost	# of Units	Cost
Storm Response	Days	[REDACTED]	5	[REDACTED]
Storm Inspection	Days	[REDACTED]	5	[REDACTED]
<b>Total</b>				[REDACTED]

**4) Contract Preparation and Administration:**

Preparation, administration and oversight of road work contracts.

<b>Roads and Trail Treatments #4: Contract Administration</b>				
Item	Unit	Unit Cost	# of Units	Cost
GS11 Engineer	Day	[REDACTED]	20	[REDACTED]
<b>Total</b>				[REDACTED]

**5) [REDACTED] Cultural Monitor:**

The [REDACTED] features along [REDACTED] were determined to be at risk from road treatments (#1-3 above). As such, monitoring by a qualified heritage specialist will be required for the 1-2 weeks that road work will be conducted on [REDACTED]. Due to existing workload and reduced staffing levels, the recommendation is to bring a cultural monitor from off-Forest to serve in this capacity.

<b>Roads and Trail Treatments #5: [REDACTED] Cultural Monitor</b>				
Item	Unit	Unit Cost	# of Units	Cost
GS12 Archaeologist	Hour	[REDACTED]	8	[REDACTED]
GS09 Archaeologist	Hour	[REDACTED]	100	[REDACTED]
Per Diem	Day	[REDACTED]	10	[REDACTED]
Mileage	Mile	[REDACTED]	1200	[REDACTED]
<b>Total</b>				[REDACTED]

**Protection/Safety Treatments:****1) Interagency/Partner/Permittee Coordination:**

Many non-Forest Service entities, partners and permittees (e.g., Southern California Edison, City of Banning, Banning Heights Mutual Water Company, CalFire, County of San Bernardino, County of Riverside, BLM, BIA, Morongo Band of Mission Indians, NRCS, private landowners, etc.) that have infrastructure in the fire area are actively repairing damaged infrastructure and/or implementing mitigations to reduce post-fire damage. The BAER team's findings will be shared with those entities so that they can plan measures to protect/prepare infrastructure from post-fire watershed response events. This cost is to get the Forest started with coordination and facilitation of emergency treatments from partners and permittees. The Forest will pursue cost recovery for large projects and proposals from partners and permittees.

Above and beyond facilitating protection measures for non-Forest Service entities threats to life, property and water quality requires continued coordination with many agencies.

The Forest Service plans on continuing to collaborate and communicate with partnering agencies, other entities and organizations and the public.

Protection/Safety Treatment #1: Interagency/Partner/Permittee Coordination Treatment				
Item	Unit	Unit Cost	# of Units	Cost
GS-12 BAER Coordinator/Forest Hydrologist	[REDACTED]	[REDACTED]	10	[REDACTED]
<b>Total Cost</b>				[REDACTED]

## 2) Burned Area Closure and Warning Signs:

The Forest has issued a closure area within the Apple Fire (Order No. 05-12-00-20-13) and expires September 1, 2020. It is recommended that this closure stays in place and the risk associated with the burn scar are reevaluated prior to lifting the closure. Signs placed at strategic locations outside and within the fire perimeter are recommended to close the burned area. A Forest Order will be maintained to authorize the closure. This treatment will keep Forest users out of the burn area during major storm events. As only a small portion of the Viviane Creek Trail was within the fire perimeter, the BAER team does not recommend closure of this popular trail.

NFS roads within the burn area may be impacted flooding, debris flow, hazard trees, rockfall, dry ravel, etc. Signs will be placed strategically along roads that access the fire area. In addition, a warning sign will be placed at the Viviane Creek Trailhead as well as where the trail briefly intersects with the burned area. The warning signs will identify the types of hazards to watch out for on roads and Viviane Creek Trail. The purchase and installation of signs at each of the identified locations will be consistent with Forest Engineering Standards at these locations.

Enforcing the area closure is considered essential to ensuring critical values including human life and safety, hydrologic function, soil productivity and native plant communities. Monitoring will take place at road and trail entrances to the fire to monitor for trespass and effects to critical values at risk within into the closure area and assess need for additional enforcement and/or implementation of barriers.

Protection/Safety Treatment #2: Burned Area Closure and Warning Signs				
Item	Unit	Unit Cost	# of Units	Cost
Contract Mobilization – Roadside Warning Signs	LS	[REDACTED]	1	[REDACTED]
Roadside Warning Signs (aluminum panels and posts)	Each	[REDACTED]	4	[REDACTED]
Replacement Roadside Warning Signs	Each	[REDACTED]	4	[REDACTED]
Trailside Warning Signs (includes installation)	Each	[REDACTED]	3	[REDACTED]
Replacement Trailside Warning Signs	Each	[REDACTED]	3	[REDACTED]
Closure Signs (includes installation)	Each	[REDACTED]	5	[REDACTED]
Replacement Closure Signs	Each	[REDACTED]	5	[REDACTED]
Recreation Technician (GS-5) sign installation and patrol	Day	[REDACTED]	20	[REDACTED]
<b>Total Cost</b>				[REDACTED]

## 3) [REDACTED]

## I. Monitoring Narrative:

**Treatment Effectiveness Monitoring**

Effectiveness Monitoring: Monitoring the effectiveness of the other BAER treatments (as described above) will be used to determine if additional treatments are needed.

1) Vector Exclusion Effectiveness Monitoring:

Monitoring of the vector exclusion fence is considered essential to ensure that critical values are being protected.

Monitoring Treatment #1: Vector Exclusion Effectiveness Monitoring				
Item	Unit	Unit Cost	# of Units	Cost
GS-09 Botanist	Day	[REDACTED]	2	[REDACTED]
Mileage	LS	[REDACTED]	1	[REDACTED]
<b>Total Cost</b>				[REDACTED]

**PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS****[TABLE REDACTED]****PART VII - APPROVALS**

1.	Jody Noiron	8/25/2020
	_____ Forest Supervisor	_____ Date