

Burn Area Recovery Task Force (BARTF) Report Orange County Santiago Fire



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Executive Summary

The Santiago Fire perimeter burned 28,464 acres within the Santa Ana Foothills of Orange County. Property owners within the burn area include Cleveland National Forest, US Government (El Toro Marine Base), Orange County Parks, The Irvine Company, local schools, water districts, large property owners, and individual small parcel owners. The significant issues identified in this report are summarized as follows:

- The denuded slopes within the burn area present a direct threat to several communities and associated infrastructure from mudflows, flooding and debris flows. The greatest risk to lives is in the area of Modjeska, Williams, and Silverado Canyons;
- Infrastructure including roads and bridges within Modjeska, Williams, and Silverado Canyons is at high risk for debris flow and flooding, or washing out;
- Removal of debris, cleaning culverts, and erosion control measures may reduce the risk to public and private property;
- Funding for debris removal and erosion control measures may fall under the purview of the NRCS;
- Several listed species are located within the risk areas. These species may require consultation with the Department of Fish and Game (DFG) and US Fish and Wildlife Service (USFWS); and
- Environmental permits may be required for many of the proposed projects identified in subsequent reports. Many of these proposed projects can be completed under emergency conditions or under the waiver process identified in State Executive Order (S-13-07).

Purpose

This BARTF report briefly identifies proposed emergency protective measures associated with the Santiago Fire. The Santiago Fire is one of the numerous Southern California wildfires included in the Presidential Disaster Declaration DR-1731, which occurred in October 2007. The purpose of this report is to address post-fire flooding, erosion, and debris flow hazards within and downstream of the fire perimeter. This report will also identify gaps in funding, potential funding sources for all projects, and potential conflicts that may slow or interfere with the proposed emergency protective measures.

Information has been derived from the State's Burn Area Emergency Response (BAER) report, the USDA-Forest Service Burned-Area Report, Post-Fire Hazard Awareness

Maps, local government requests for public assistance, and Natural Resources Conservation Service (NRCS) funding lists.

Introduction

The Santiago Fire burned approximately 28,464 acres within Orange County in the Santa Ana foothills and Cleveland National Forest. Land affected by the fire is owned by several public and private owners.

Approximately 35 percent of the fire perimeter had a moderate to high burn severity. There are five watersheds Hydrologic Unit Code (HUC-6) classification within the fire perimeter which include the Santiago Creek/Silverado Canyon Watershed, Santiago Creek/Irvine Lake, San Diego Creek, Upper Aliso Creek, and Arroyo Trabuco.

The greatest threat to lives occurs in Modjeska Canyon, Williams Canyon, and the upper reaches of Silverado Canyon where 1,000 residents are at risk from potential mudslides, debris flows and flooding as a result of the fire. In addition, the Santiago Post-Fire Hazard Awareness Map identifies communities at risk from debris flow hazards south of the fire perimeter including the cities of Irvine, Tustin, Orange, Lake Forest, and Portola Hills. Public and private roadways some of which are the only evacuation route—are at risk from flooding and debris flows. Culverts, debris and retarding basins, fire stations, and a water supply reservoir have also been identified by the map as at risk from post-fire hazards.

Environmental permits may be required for many of the proposed projects identified in the BARTF report and the BARTF project matrix. Many of these proposed projects can be completed under emergency conditions or under the waiver process identified in State Executive Order (S-13-07). Projects that do not fall under these classifications would need to follow the regular permit process (see Environmental Permitting Requirements Appendix).

This report summarizes the major issues identified by the BAER reports in addition to issues identified from other sources. The report is organized by HUC-6 watersheds. Threats to life, safety, and infrastructure will be discussed under each HUC-6 watershed identified within the fire perimeter and areas covered in the Post-Fire Hazard Awareness Maps. Proposed emergency protective measures identified will be evaluated along with any issues that may impede the progress of these measures. Potential funding sources will be discussed and gaps in funding will be identified.

For any cultural resource concerns refer to the Archaeological Appendix.

Santiago Creek/Silverado Canyon

Background

Values at risk in the Santiago Creek/Silverado Canyon Watershed include the communities of Silverado, Modjeska, and Williams Canyon. Homes of approximately 1,000 residents are at risk due to potential flooding, debris flows, and rock falls.

The community of Modjeska is located at the mouth of Harding and Modjeska Canyons where the potential sediment yield is the extreme. The only escape route for Modjeska Canyon residents is a narrow tree-lined road.

The community of Williams Canyon is located north of Modjeska Canyon. The entire upper watershed of the canyon was severely burned leaving the small community along the creek at high risk for flooding and debris flow.

The community of Silverado Canyon is located on the northern extent of the watershed. Most of the Silverado Canyon was untouched by the fire; however, two significant steep canyons (Halfway and Pine Canyon) were burned leaving the community at potential high risk for flood and debris flow despite the relatively unburned state of the canyon.

Values at Risk identified in the State BAER report, Post-Fire Hazard Awareness Maps, and local jurisdictions include:

- Approximately 1,000 residents and city infrastructure (i.e., fire stations, schools) are at risk in the canyon communities;
- An extreme risk exists to the lives of residents in Modjeska, Williams, and Silverado Canyon from possible flooding and debris flows;
- The maps identify two fire stations at risk from potential debris flows;
- Roadways and bridges that are the only escape route in the canyons are at risk from mudslides, flooding and debris flows;
- Several culverts were deemed in need of repair or clearing;
- Seven major roads were identified as values at risk;
- One daycare center is identified in the Post-Fire Hazard Awareness Maps as at risk to debris flows or flooding;
- The narrow Modjeska Canyon Road is the only evacuation route for Harding and Williams Canyon communities and evacuation of these residences could take several hours;
- Modjeska Reservoir Dam has no capacity for storing water; therefore debris flows into the Dam will cause capacity issues;
- Two sensitive fish species populations, land-locked steelhead trout (*Oncorhynchus mykiss*) and Santa Ana speckled dace (*Rhinichthys osculus*), are known to occur in Harding Canyon above Modjeska Dam.

- Upland habitats support several sensitive bird species including the federally endangered California gnatcatcher (*Poliophtila californica californica*) and coastal cactus wren (*Campylorhynchus brunneicapillus*); and
- Federally listed arroyo toad (*Bufo californica*) is known to occur within Silverado Creek.

Analysis

- Extreme hazards to human life and safety exist for residence of Modjeska Canyon should the bridges along Modjeska Canyon Road, be lost or damaged by debris;
- Critical repair of two bridges, Harding Bridge and Markuson Bridge, along Modjeska Canyon are at high risk for washout. Repairs to these bridges need to occur to maintain safe evacuation routes for the canyon;
- Extreme risk exists for residences of Silverado Canyon due to debris flows and flooding from eroded slopes above the canyon;
- The lack of storage capacity of Modjeska Reservoir poses a risk to life and property downstream should debris infiltrate the reservoir;
- Dead and living vegetation within the stream channels may impede the flow of debris leading to snags and dams; and
- Impact to sensitive species could occur during post fire recovery work.

Potential Emergency Protective Measures

- Early warning system with various monitoring points in Modjeska and Silverado Canyon upstream of the confluence to each respective peak is recommended. A funding source for the early warning systems has not been identified to date;
- Vegetation removal or thinning should occur within creeks and drainages at major choke points and bridges;
- Monitor before, during, and after rain events for debris flow and flooding;
- Campgrounds and hiking trails should be signed and closed for two years to allow land to recover;
- Evacuation plans should be developed for Modjeska and Silverado Canyon;
- Clear hazardous trees from evacuation routes;
- Monitor dirt roads and trails for washouts, flooding, and debris flows;
- County will or had install erosion control (i.e., sand bags, rice bales and K-rails) measures to protect several roadways including; Santiago Canyon, Silverado Canyon, and Modjeska Canyon;
- California Department of Transportation installed erosion control along 40 miles of the 241 Toll Road.
- The downstream channel directly below Harding Dam should be protected with additional riprap to dissipate flow over the crest;
- Orange County Parks will remove possible debris snags in Modjeska Canyon by removing all vegetation greater than three inches in diameter at breast height (dbh) around the Fleming Bridge one quarter mile up from the bridge. At a site

visit with the County it was identified that the Orange County Park's Fleming Bridge is on the Federal Emergency Management Agency (FEMA) funding list from the 2005 flood events. The County Parks has proposed the installation of riprap along the bridge abutments and the clearing of vegetation around the bridge to prevent debris damming and scouring;

- The deck of the Arden House Footbridge, located in the upper portion of Modjeska Canyon, is at an elevation below the 100-year flood level. It also has a support post mid-stream at the center of the bridge span. These factors may contribute to debris snags during storm events;
- Orange County will place erosion and sediment control measures for Silverado Road, Santiago Road, Modjeska Canyon Road and Modjeska Grade Road;
- County and City of Lake Forest will place terraced culverts along the slopes above Santiago Canyon Road at Gertner Estates Road to protect Santiago Canyon Road from debris flow;
- Need to close the Arden Footbridge and remove center structural support and replace with a breakaway post. If time allows engineer a breakaway system for the bridge. Riprap will be placed within the drainage along Fleming House to protect structure from erosion;
- NRCS has only targeted one of the private bridges (Harding Bridge) for funding. The proposal is to shore the bridge abutments with riprap. Funding has not been secured by NRCS to date due to lack of sponsorship;
- No funding has been established for the Markuson and Modjeska Bridge as it is privately owned and no sponsor has been identified;
- There is no funding source for erosion control other than NRCS and funds are limited;
- Orange County Parks will hydromulch approximately 400 acres within the burn area (includes San Diego Creek watershed);
- The BAER report identified Williams Canyon Road (private road) as a high risk of erosion, debris flow and flooding, which could endanger lives. No funding source has been identified for emergency protective measures for Williams Canyon Road;
- Orange County has requested funding from the FEMA Public Assistance Program for emergency protective measures for Silverado Canyon Road, Santiago Road, Modjeska Canyon Road and Modjeska Grade Road. Santiago Canyon Road and Silverado Canyon Road may be eligible for Federal Highway Administration (FHWA) funds;
- Notification to wetland permitting agencies for in-stream work should occur prior to conducting emergency and exigent work in all water courses;
- California gnatcatcher and cactus wren habitat (sage scrub) impacts should be avoided or minimized. Unavoidable impacts would require consultation with USFWS and DFG; and
- Surveys for arroyo toad (*Bufo californica*) should occur within areas of suitable habitat prior to ground disturbance activities within Silverado and Santiago Creek.

Santiago Creek/Irvine Lake

Background

Santiago Creek/Irvine Lake is the northern most watershed in the Santiago Fire. The watershed drains the areas of Loma Ridge, Limestone Canyon, and the lower confluence of Santiago Creek with Silverado Creek. Irvine Lake is the only value at risk within the Santiago Creek/Irvine Lake watershed identified in the BAER report or from other sources because most of the watershed is dedicated open space. It is important to note that the community of Silverado Canyon is above Irvine Lake.

Analysis

The BAER report and Post-Fire Hazard Awareness Maps identified Irvine Lake as an area of potential concern from flooding and debris flows. Irvine Lake is a public water source managed by Irvine Ranch Water District.

Potential Emergency Protective Measures

- The BAER report identified a need to monitor the lake for debris flow. Regional Water Quality Control Board is working with the county to place water quality sampling sites within the watershed to monitor possible toxins and heavy metal levels.
- Notification to wetland permitting agencies for in-stream work should occur prior to conducting emergency and exigent work in all water courses.

Upper Aliso Creek

Background

The area of Upper Aliso Creek burned by the Santiago Fire encompassed only a small portion of the upper watershed of Aliso Creek. Burn area within Upper Aliso Creek includes the community of 4S Ranch. The BAER report identified three homes at risk.

Analysis

- The BAER report and the Post-Fire Hazard Awareness Map identified three houses in 4S Ranch with a high risk to life from landslide and debris flows and 27 homes with a low risk to life from debris flows.
- The BAER report identified two culverts in Portola Hills that may cause hazards.
- The Post-Fire Hazard Awareness Maps identified:
 - Residential areas that are potentially at risk in Portola Hills from potential debris flows; and,
 - One fire station is at risk from potential debris flows.

Potential Emergency Protective Measures

- No protective measures are known at this time for the two residences in 4S Ranch.
- The County should use the Post-Fire Hazard Awareness Maps to identify additional measures, if feasible, to protect residences in Portola Hills and critical infrastructure.
- No sensitive resources were identified in the proposed project areas.
- Notification to wetland permitting agencies for in-stream work should occur prior to conducting emergency and exigent work in all water courses.

Arroyo Trabuco

Background

The Arroyo Trabuco watershed is located in the southernmost portion of the burn area within the upper watershed of Trabuco Creek. This area located along Live Oak Canyon Road is characterized by a rural community surrounded mostly by open space.

Analysis

- The BAER reports identified four houses with moderate risk from flooding and debris flows within the Trabuco Creek watershed.

Potential Emergency Protective Measures

- The County of Orange installed K-rails along Live Oak Canyon Road as protection from potential sediment and debris flow.
- No protective measures are known at this time for the two residences identified in the BAER report.
- Orange County has applied for FEMA Public Assistance funding under Category B for Live Oak Canyon Road. Live Oak Canyon Road may qualify for FWHA funding.
- Notification to wetland permitting agencies for in-stream work should occur prior to conducting emergency and exigent work in all water courses.

San Diego Creek

Background

The Values at Risk in the San Diego Creek watershed include the Cities of Irvine, Lake Forest, Tustin, and Orange. The watersheds include Orange County's Whiting Ranch and Limestone Regional Park. Although the cities themselves were not typically affected by the fire, the open space surrounding the watersheds above the cities were burned. The cities have been identified in the BAER report and the Post-Fire Hazard Awareness Map as at risk for flooding and debris flow.

Analysis

- The BAER report identified three homes as having a high risk to life from landslides and debris flows in the community of Foothill Ranch.
- The BAER report identified 27 homes as low risk to life in the community of Foothill Ranch from potential debris flows.
- The Post-Fire Hazard Awareness Maps identified:
 - Additional residential areas at risk in Irvine and Lake Forest from potential debris flows.
 - Approximately nine debris basins are at risk from potential debris flows.
 - Two water supply reservoirs, Rattlesnake and Siphon, are potentially at risk from potential debris flows.
 - Two fire stations are at risk from potential debris flows.
- Homes in Lake Forest are at risk from erosion within Serrano Creek.
- High risk of flooding along Serrano Creek at 241 Toll Road due to undersized culvert.
- Riparian habitat within San Diego Creek has the potential to be occupied by Least Bell's vireo (*Vireo bellii pusillus*).
- San Diego Creek Watershed is located within the Central/Coastal Natural Communities Conservation Plan (NCCP) for which the County, City of Irvine, and City of Lake Forest are signatory. The NCCP covers state and federal endangered species permitting for several species listed and not listed; including coastal gnatcatcher and cactus wren.

Potential Emergency Protective Measures

- Orange County is proposing to remove sediment and vegetation to increase the capacity of the Round Canyon Retarding Basin, Orchard Estates, East Hicks Canyon, Hicks Canyon, Agua Chinon, and Bee Canyon. Orange County is requesting FEMA Public Assistance Funding, but funding has not been approved as this is considered routine pre-disaster maintenance activities. Orange County will need to show maintenance records in order to be eligible for funding. The County will need to obtain applicable permits for maintenance of Agua Chinon as

the project does not appear to meet the conditions approved under the permit waiver of the Executive Order (S-13-07).

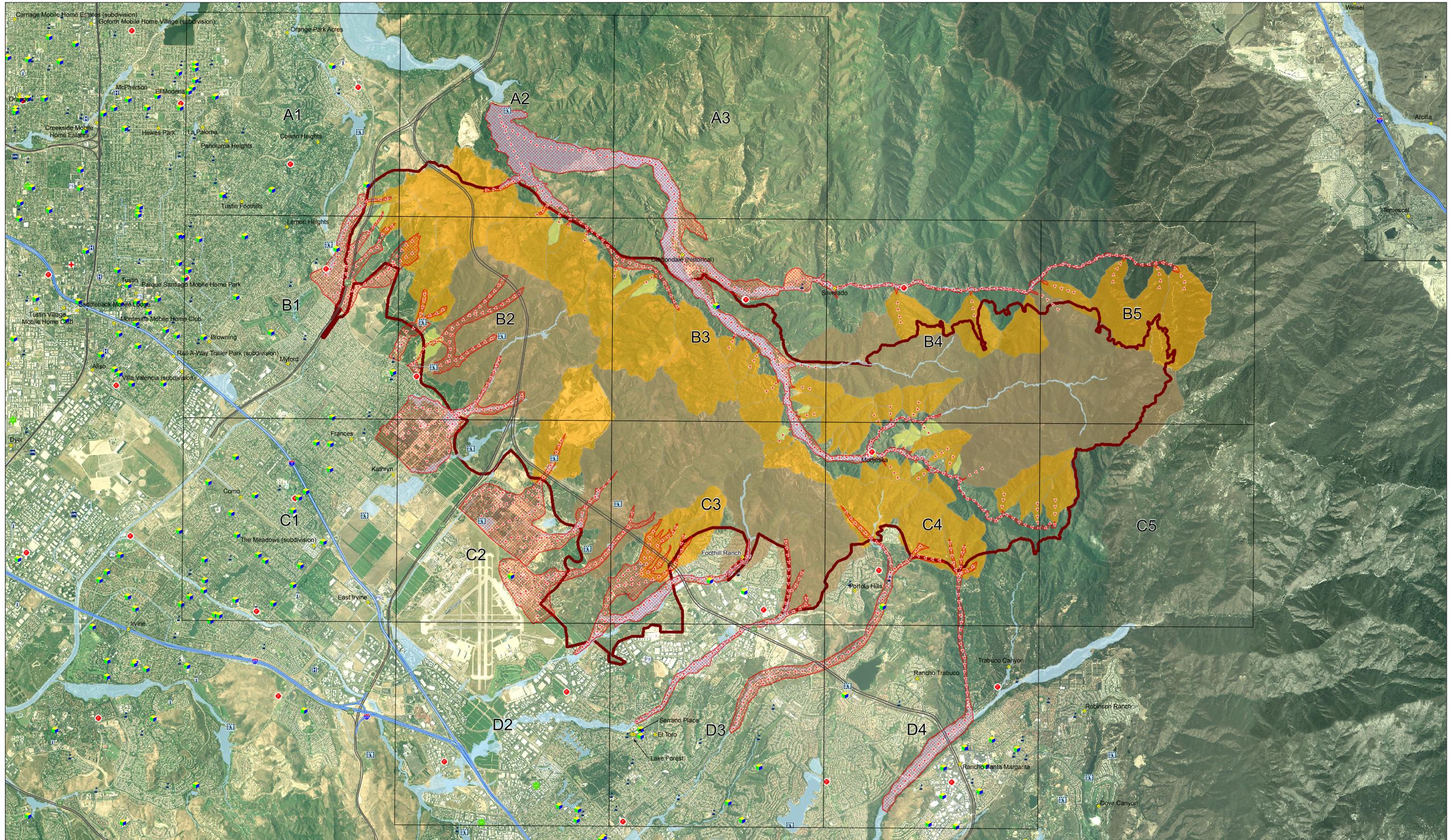
- County parks will hydromulch approximately 400 acres to stabilize slopes (includes Santiago Creek/Silverado Canyon Watershed).
- County is proposing several drop structures (energy dissipaters) and possibly a floodwall within Serrano Creek to remediate flood and erosion within the creek downstream of the burn area.
- County is proposing to replace an undersized culvert at 241 Toll Road with a box culvert to prevent flooding.
- Notification to wetland permitting agencies for in-stream work should occur prior to conducting emergency and exigent work in all water courses.
- The Irvine Company has hydromulched slopes along the urban/wildland interface throughout the City of Irvine.
- Sensitive species habitat including; California gnatcatcher (*Polioptila californica californica*) and cactus wren (*Campylorhynchus brunneicapillus*) (sage scrub) should be avoided or minimized. Projects within the watershed will need coordination with the DFG and USFWS for consistency with the NCCP.

Table 1 – Possible Funding Sources

Yes	No	Funding Sources
X		FEMA/OES Public Assistance Emergency Work (Cat A & B)
	X	FEMA/OES Public Assistance Permanent Work (Cat C-G)
	X	406 Hazard Mitigation
	X	404 Hazard Mitigation
X		Natural Resource Conservation Service (NRCS)
	X	U.S. Fish & Wildlife Service
X		U.S. Army Corps of Engineers
	X	National Marine Fisheries Service (NMFS)
X		California Disaster Assistance Act
X		Federal Highway Association (FHWA)
	X	Other funding

Appendices

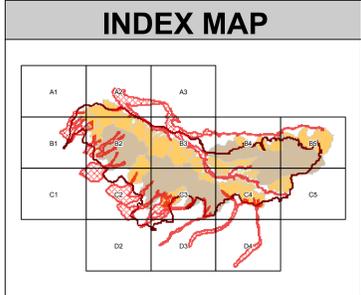
- Appendix A – Environmental Permitting Requirements
- Appendix B – Archaeological
- Appendix C – Descriptions of State and Federal Program Funding
- Appendix E – Preliminary Suggested Projects



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LEGEND	
	Populated Places
	Bus Stations
	Daycare Facilities
	EMS
	Hospital
	School
	Fire Station
	Police
	Dam
	Red Cross
	Colleges Universities
	FEMA Flood Hazard Areas
	Fire Perimeters
	FEMA Potential Debris Flow Risk Areas
	Santiago Debris Flow Lines
USGS Potential Debris Volume	
	0-1,000 cubic meters
	1,001 to 10,000 cubic meters
	10,000 to 100,000 cubic meters



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MAPS FOR ADVISORY PURPOSES ONLY. NOT FOR INSURANCE RATING PURPOSES. For insurance rating purposes, please refer to the Flood Insurance Rate Map currently in effect. Debris flow information is PRELIMINARY. Debris flow volumes calculated in response to a 10 year recurrence based on 3 hour duration storm producing 1.75 inches of rainfall. Volumes based on a model currently being tested. Debris flow behavior is highly unpredictable and this map shows the best available information at the time of printing. Populations estimated using 2000 Census data and are calculated for those areas only within the grid index.