Interagency State Burned Area Emergency Response (BAER) Report Harris Fire

CA-MVU-010427

Affecting Watersheds in the County of San Diego California

NON CONFIDENTIAL

DRAFT

November 20, 2007

Executive Summary

State BAER Team 11 was assigned to evaluate potential effects to assets within the area affected by the Harris Fire in southern San Diego County. This fire which started on October 21st, 2007, consumed over 90,000 acres of land. The team was composed of individuals from multi-state agencies to address the effects of fire on public Safety, Health, and Resources. This team examined houses, infrastructure, roads, reservoirs, watersheds, and other natural and cultural resources within or near the fire boundary, in order to determine if there are significant risks to assets and offer treatments/mitigations to the agencies and entities assigned with protecting them. The land targeted included State Responsibility Lands (SRA). Team 11 offers this summary report and the associated technical reports as a result of that field investigation. Maps reprinted may not be at original scale.

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Purpose and Background

Burned Area Emergency Response (BAER) operations are conducted to prioritize post-fire damage prevention and mitigation efforts in the following way:

- Identify immediate threats to human life resulting from the fire.

- Identify immediate threats to property resulting from the fire.

- Identify threats to resources. Such threats include: erosion, reduced water quality, wildlife and fisheries, botanical values, and cultural resources.

Technical specialist reports should be reviewed thoroughly before any decisions are made on treatments to be carried out.

Acknowledgements

This effort represents the first time the State of California has undertaken large scale BAER operations as part of a post-fire program. This report is a combined effort by personnel from several departments within The Resources Agency. The following departments were represented: Forestry and Fire Protection (CAL FIRE), Water Resources (DWR), Fish and Game (DFG), and California Geological Survey (CGS). Several additional federal, state, and local government agencies also participated with and provided information to the state BAER Team. They include: Natural Resources Conservation Service (USDA), Bureau of Land Management (BLM - Dept. of Interior), California Department of Transportation (CAL TRANS), San Diego Regional Water Quality Control Board (SDRWQCB), County of San Diego Public Works (SDPW), County of San Diego Planning and Land Use (SDPLU), San Diego County Flood Control District (SDFC), California State Parks (CA DRP), Sweetwater Authority.

The Team members are:

- Herb Dallas, CAL FIRE, Team Leader/Archaeologist
- Jon Mulder, DWR, Engineer/Geologist
- Glen Gordon, DWR, Geologist
- Jennifer Parker, DPR (State Parks), Archaeologist
- Derick Louie, DWR, Hydrology
- Robert Fastenau, DWR, Soils
- Ed Perez, DWR, Engineer / Flood Plain Management
- Erinn Wilson, DFG, Wildlife Biologist
- L. Breck McAlexander, DFG, Environmental Scientist / Botany
- Mike Fuller, CGS, Geologist
- Fred Postler, CAL FIRE, GIS Specialist
- Dave Forwalter, DWR, Engineer
- Rich Eliot, CAL FIRE, Safety
- Kelly Strecker, CAL FIRE, Computer Data Entry Recorder

Additionally, many other entities were consulted in the process of field evaluation and report preparation.

The team members who prepared this report worked very well as a team and shared information and expertise without reservation. It is their hope that this document will be of use to public agencies and private land owners in preventing further threats to life and property following the wildfire, and that it will additionally be useful in helping to protect the natural resources within this burned area for the next generation.

The analysis by this BAER team focused on areas of moderate and high burn severity with closely correlated potential threats to life and property. Other locations and situations were noted and recommendations made when they were observed.

Additional Contacts Made by State BAER Team 11, Harris Fire				
Agency	**Name**	**Expertise**	**Office Phone**	**Cell Phone**
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City of SD Water Department	Jeff Pasick	Watershed	619-533-7599	
CA State Parks	Ronie Clark	Dist.Super.	619-688-3260	
Dept. of Interior BAER Team - NPS	Chris Holbeck			
Dept. of Interior BAER Team - USFS	Jessica Gould	Hydrologist		
Dept. of Interior BAER Team - BLM-USFS	Shauna Jensen	Hydrologist		
Dept. of Interior BAER Team - FWS	Ken Griggs	Biologist		
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SD County Flood Control District	Jason Smith	Engineer		
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SD Regional Water Quality Control Board	Bob Morris	Watershed	858-467-2962	
San Miguel Consolidated Fire Protection District	Andy Menschek	Battalion Chief	619-760-0500	
Sweetwater and Loveland Reservoirs	Peter Famolaro	Biologist	619-409-6814	
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Mexican Government	Oscar Romo		Contact was not reciprocated.	

BAER Report Executive Summary

General Area Description and Resource Conditions Assessment

The Harris Fire (CA-MVU-010427) burned 90,440 acres between October 21 and October 31, 2007 in the southern section of San Diego County (See Harris Fire Location Map). There were 459 structures destroyed, 293 outbuildings destroyed and 587 vehicles destroyed due to this fire. However 1450 residences/structures were saved in the fire perimeter and secondary fire perimeter (San Diego County Report, 10/2007, p.6). There were five civilian deaths, 21 civilian injuries and 34 firefighter injuries (ibid).

The ten Hydrologic Unit Classification 6 (HUC 6) watersheds represented in the burn area are the Sweetwater Marsh sub-watershed, Sweetwater Reservoir, Otay Reservoir, Jamul Creek, Otay River sub-watersheds, Lower Pine Valley, Cottonwood Creek/Lake Morena, Cottonwood Creek/McAlmond Canyon, Cottonwood Creek/Potrero Creek, Campo Creek.

The macro-vegetative resource in the burned area consists of several vegetation types, including chaparral, chaparral with widely scattered oaks, Coastal sage scrub, riparian oak-sycamore woodland, Coast live oak woodland, mixed conifer forest and grass land.

The burn area contains near-urban areas including highly diverse landscaping choices by property owners. Nearly the entire burn area is rural, with pockets of wildland-urban interface (WUI). The area also contains small amounts of agricultural vegetation including floricultural species, avocado, citrus, and other agricultural resources.

Topography within the burn area ranges from gentle alluvial valleys to very steep headwater basins. Topographic relief is moderate to high. Some of the slopes are very steep, up to 167 percent. The elevation range is 245-3885 feet above sea level. Most of the burn area burned at a low to moderate burn severity. The affected soils are generally hydrophobic on the surface. The Harris fire burn area is underlain by Cretaceous gabbroic, tonalitic, and granitic plutonic rock and minor metamorphic inclusions. The gabbroic rock is dark colored, fragmented, and deeply weathered. It decomposes to a reddish brown sandy-clayey soil. Surficial soil deposits of alluvium and colluvium overlie most of the bedrock on gentle slopes. The tonalitic and granitic rock consists of hard, boulder-sized, core-stones in a matrix that is heavily weathered, broken, and friable.

The weather in the burn area is sunny approximately 265 days of the year. San Diego County has hot, dry summers and cool, wet winters. Temperatures range from a mean high of 68.1° F to a mean low of 45.0° F. Precipitation ranges from 14 to 35 inches annually. The rainy season is commonly cited as October through April although more than 85% of the region's rainfall occurs in the period between November through March. Rain is infrequent in summer, along with the occurrence of thunderstorms and tropical storms. Occasional amounts of hail occur and snowfall

is rare. Hot, dry winds named after the Santa Ana Canyon commonly occur between October and February. The Santa Ana winds are due to the pressure gradient between high pressure in the plateaus of the Great Basin and lower pressure over the Pacific Ocean (NOAA, 2007b).

The burn area contains habitat for several state and federally listed endangered or threatened species, state species of special concern, and "covered species" identified in the County of San Diego's East County Multiple Species Conservation Plan (SCMSCP). Wildlife species including Quino checkerspot butterfly, Thorne's hairstreak, Arroyo toad, and Least Bell's vireo are at high risk for the area due to loss of habitat and increase in sedimentation. The treatments objectives are to monitor wildlife populations effected by the fire and to identify potential decline in populations and encourage adaptive management.

Field Surveys and Procedures

Prior to entering the field, the team brainstormed the "Assets-at-Risk" for the Harris Fire. Field work commenced on November 11 and ended on November 15th, 2007. Each specialist began synthesizing and collating data at that point. The team decided that the most effective and efficient means of evaluating the effects of the fire was to find representative areas of concern. These areas were targeted for field inspection and evaluated for assets at risk in order to offer suitable treatment/mitigations.

This table of assets (Table 1) included assets such as infrastructure, houses, communication networks, roads, water conveyance systems, transmission lines, watersheds, creeks, and reservoirs. Three major reservoirs are located at the edge of the fire perimeter including Barrett Lake, Lower Otay Reservoir, and the Sweetwater Reservoir. State Route 94 bisects the fire and is the only major east-west transportation corridor that provides access to the communities in the area. There is a historic flume that traverses the steep slopes, bringing water from Barrett Lake to the Lower Otay Reservoir. Three major peaks have access roads leading to them and there are communication towers on the peaks.

There is a network of dirt access roads south of SR 94 that serves Border Patrol and CAL FIRE with access to remote areas near the border. This asset was unique to the Harris Fire. Archaeological data indicated that the area contained archaeological sites. Several significant botanical and wildlife areas were impacted by the fire as well. There are ten watersheds that have significant risk factors affecting them.

These assets were used to target field observation points in order to ascertain whether or not these assets are threatened due to effects of the fire. The BARC, fire severity map, was originally used to prioritize those areas where fire most likely affected assets more likely than areas where fire did not burn vegetation or burned with a low severity. After talking with the IC for the Harris Fire and local fire captains, it became evident that the existing map was inaccurate and did not reflect actual conditions in the field. Therefore, we did not use the BARC map to prioritize targeted assets as originally planned. Instead we utilized an aerial fly-over to

conduct a preliminary reconnaissance for areas of concern, where “assets” were potentially “at risk.”

Specialist teams of four people were created. Two specialist teams were composed of geologists, engineers, hydrologists, and soils experts. Another field team was composed of natural resource specialists. The final team, which formed at the very end of our field time, consisted of an archaeologist. Each team’s goal was to examine specific assets that may be “at risk”. Each team also examined geographical areas in order to more efficiently spend our limited field time. Each team had a camera, a GPS unit, a communication radio, maps, and any specialized tools that were necessary. GPS waypoints and/or tracks were taken in order to note areas of concern, assets at risk, or resources to be examined by another team.

Due to the fact that most of the burn area is rural in nature, access occurred mostly through private and agency dirt roads. Some of these did not offer access as they were locked. Teams attempted to reach the appropriate agency for access wherever possible. For example, Lyon’s Peak was an area with an asset potentially “at risk” but was inaccessible to obtain field observations. However, general observations at other peaks could be used as templates for that area. The goal throughout the survey was to find representative areas whose features could be used and applied to other similar areas.

GPS waypoints were downloaded and added to a map of the area with the fire perimeter, topography, burned houses, roads, and fire severity data. This map was used to keep track of the progress field data collection. GPS points were kept and an attribute template was agreed upon to record issues. Field notes, measurements, field tests (soil hydrophobicity), and pictures were taken at each location or a representative sample for the target areas. Other specialty data was collected as needed, including site slope at target locations.

Each day, after fieldwork was completed, teams returned to the local unit (MVU) to debrief and share data. This technique was used to keep track of progress, build team support, and provide some systematic framework for organizing data collection. Each morning teams would plan a strategy of assets to examine and areas to visit.

The teams decided that the existing burn severity map was not useful (See Appendix 2). It was decided to revise the map and use the teams’ field observations and observations from two aerial flights to create a new fire severity map, which provided a more general outlook of effects of the fire. The differences between the maps are dramatic. However, the resulting map more closely represents the actual effects of the fire and its resulting fire severity. However, the new map should be used as a general reference source only.

The results are organized by resource specialty and presented as individual reports. General information is also presented graphically on maps (which are included herein). Confidential data is included as a special appendix.

On-The-Ground Survey Findings

The Harris Fire had a highly variable burn severity. Much of the burn area burned at low to moderate severity, with some areas burning at high severity. The soil burn severity generally correlates with fire burn intensity although exceptions may occur because "duration plays a critical role in fire effects to soil. A high intensity fire exhibiting extreme fire behavior…might result in low or moderate burn severity. Conversely, a low intensity (smoldering) fire can produce intense heat and long duration, resulting in high soil burn severity." (Parsons 2003). High soil burn severity may produce hydrophobic conditions particularly where coarse-textured soils are found.

Soil hydrophobicity was tested in several locations in the burn area. Usually only a thin layer of soil at or below the mineral soil surface becomes hydrophobic after intense heating. Test results were variable dependent on local fire and soil conditions although there may be a correlation between slope aspect and hydrophobicity. For example in the Campo Creek watershed near the ignition source hydrophobic tests were generally low on the eastern slope of a ridge and dramatically higher on the crest and western slope. This may be because the fire was driven by high winds that rapidly spread the fire up the eastern slope whereas the fire burned more slowly on the crest and lee side of the ridge, allowing volatilized resins a longer time to penetrate into the soil. Note that for some areas the soils may have been hydrophobic prior to the fire and caution should be used in correlating high hydrophobicity as a result of the fire.

Discussion/Summary/Recommendations

Refer to individual reports for discussions and general recommendations to avoid redundancy. Each report concisely summarizes their findings and recommendations.

View of Sweetwater Reservoir

View of trailer park in Cottonwood Creek canyon. Potential erosion area.

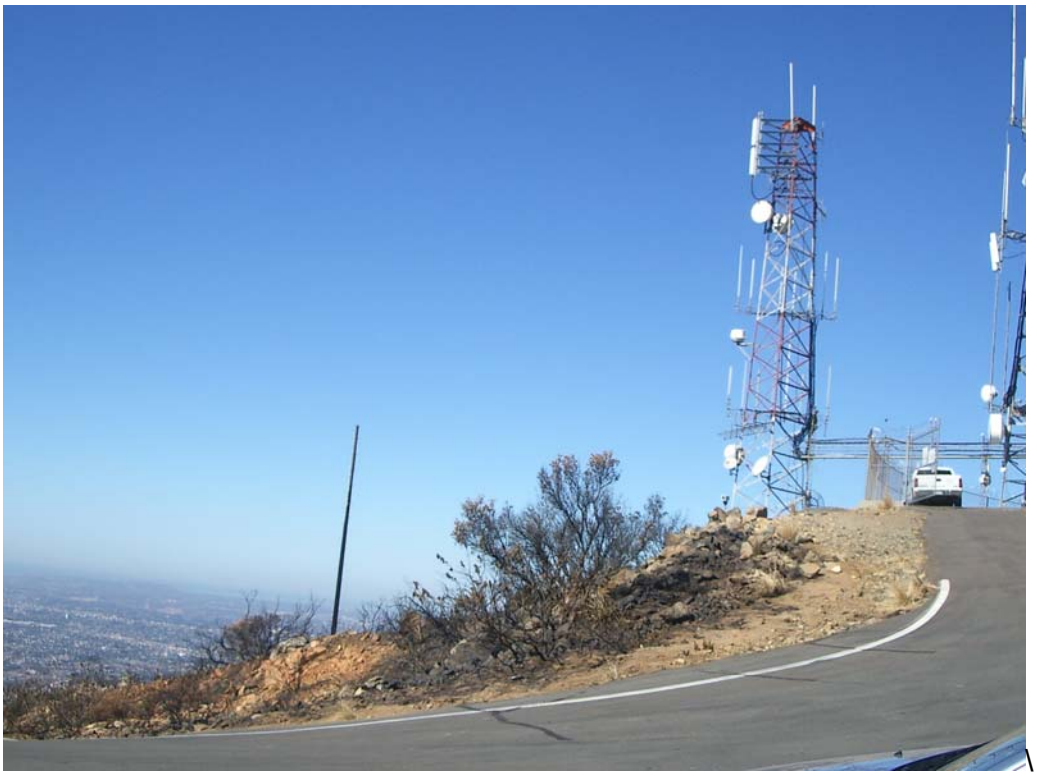
View of Lyon’s Peak with access road and asset, looking east on w. slope.

Aerial view of golfcourse and water-storage ponds (asset) below burn area.

View of riparian area within fire perimeter (note ashy areas of burn).

View of Highway 94 and Potrero Creek drainage.

View from San Miguel Mountains with low-moderate burn intensity.



View of communications tower on peak with burn and road in foreground.

View of historic flume with brush and sediment infiltrating open section of flume. Asset at risk.

Archeological site with high intensity burn (note no vegetation cover).

Historic stage road with stacked rocks.

Culvert and drainage crossing creek.

Burned Area Emergency Response Specialist Report

Resource: Botany

Incident: Harris Fire CA-MVU-010427

Year/Month: November 2007

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Resource Setting

The 90,440-acre Harris Fire burn area encompassed valleys, foothills, and rocky-mountains southeast of the City of San Diego within San Diego County. The burn perimeter includes significant conservation lands owned by state, federal and local jurisdictions (see Harris Fire Ownership Map).

State owned and managed lands within the burn area include Rancho Jamul Ecological Reserve, Hollenbeck Canyon Wildlife Area, and Otay Mountain Ecological Reserve. Federal lands within the burn area include the United States Forest Service's Cleveland National Forest, Fish and Wildlife Services' (USFWS) San Diego National Wildlife Refuge. Bureau of Land Management also owns parcels southeast of Barrett Lake surrounded by USFWS lands and the Otay Mountain Wilderness Area east of Otay Reservoir.

Other large conservation lands within the burn area include the City-owned Corner-stone Lands Conservation Bank, which includes Marron Valley, and Sweetwater Authorities' Riparian easement. Both of these conservation lands also have state management oversight.

The western portion of the burn area, roughly from Barrett Junction west, is within the South San Diego County Multiple Species Conservation Plan (MSCP). The burn area east of Barrett Junction is located within the East County MSCP, which is in draft at this time.

I. Potential Values at Risk

This report assesses the effects of the Harris Fire and the proposed effects of the Burned Area Emergency Response (BAER) treatments to sensitive habitat types and plants species (refer to Table 2). Table 1 below lists approximate acreages of habitats types burned in the Harris Fire. Table 2 includes a list of sensitive plants known to occur within the burn area as listed on the *State and Federally Listed Endangered, Threatened, And Rare Plants Of California* bulletin (CDFG, October

2007). In addition, the California Native Plant Society and San Diego County MSCP status is recorded for these plants (see Harris Fire Sensitive Plant Species Map).

Table 1

Vegetation Type	Acreage
chaparral	46,111
coastal sage scrub	31,752
oak woodlands	2,614
grassland	2,461
riparian	1,701
other wetland	428
cypress forest	725

(County of San Diego, October2007)

Table 2 – Values at Risk
Sensitive Plants

Name	State status	Federal status	CNPS status	SD County MSCP	Life form	Habitat type
Acanthomintha ilicifolia San Diego thorn-mint	SE	FE	1B.1	Group A	annual herb	Vernal pools; chaparral; coastal sage slopes
Ambosia pumila San Diego ambrosia		FE	1B.1	Group A	perennial herb (rhizomatous)	several habitats; disturbed sites
Calochortus dunnii Dunn's mariposa lily	SR		1B.2	Group A	perennial herb (geophyte)	chaparral
Deinandra (Hemizonia) conjugens Otay tarplant	SE	FT	1B.1	Group A	annual herb	coastal scrub; clay soils
Fremontodendron mexicanum Mexican flannelbush	SR	FE	1B.1	Group A	perennial shrub/tree	chaparral
Nolina interrata Dehesa nolina	SE		1B.1	Group A	perennial (monocot)	foothills; gabbro

						soils

Name	State status	Federal status	CNPS status	SD County MSCP	Life form	Habitat type
Packera (Senecio) ganderi Gander's ragwort	SR		1B.2	Group A	perennial herb	chaparral
Cupressus forbesii Tecate Cypress			1B.1	Group A	perennial small tree	Chaparral ; Closed-cone forest

State Endangered (SE); State Threatened (ST); State Rare (SR)
Federally Endangered (FE); Federally Threatened (FE);
California Native Plant Society 1B.1 (greatest risk); 1B.2 (next greatest risk);
San Diego County MSCP - Group A (greatest risk)

Resource Condition Assessment

A. Resource Setting

The Harris Fire burn area is located in the southeast portion of San Diego County, and along the US/Mexico border. Relative impacts to habitats and sensitive plant species vary considerably because of topography, elevation, differences in fuel types, and changes in wind direction. The general extent and severity of the fire's impact to habitats are greatest in the northwest corner, north, and southeast of the burn area (see Harris Fire BAER Team Updated Fire Representational Burn Severity Map). Much of the western half of the fire, delineated roughly by the South County/East County MSCP boundary, consists of sage scrub habitat with grassland at lower elevations. Chaparral occurs in shallow soils and higher elevations. Vernal pools occur in Marron Valley and east of Lower Otay Reservoir. Freshwater marsh is found along Otay and Sweetwater Reservoirs, as well as within pools along perennial streams. The eastern half of the Harris Fire is dominated by xeric chaparral in shallow soils and higher elevation oak woodlands with mixed riparian woodlands along drainages. Habitats affected by the fire include coastal sage scrub, chaparral, vernal pool, riparian and other wetlands.

Elevation within the burn area varies from approximately 260 to 3800 feet. The foothills are vegetated with coastal sage that transition to nonnative grasslands at the base of hills and in saddles. Higher elevations contain steeper slopes with shallow soils dominated by chaparral. Chaparral and coastal sage scrub are the dominant upland habitats within the burn area (see Harris Fire Sensitive Plant Species Map). Chaparral consists of assemblages that may include chamise (*Adenostoma fasciculatum* and *sparsifolium*), ceanothus (*Ceanothus* spp.), scrub oak (*Quercus berberidifolia*), and manzanita (*Arctostaphylos species*). Sage scrub

includes flat-topped buckwheat (*Eriogonum fasciculatum*), California sage (*Artemisia californica*), black and white sages (*Salvia mellifera and apiana*) and laurel sumac (*Malosma laurina*). *Opuntia* and *Cholla* cactus species sometimes intermix between chaparral and coastal sage vegetation. These chaparral and coastal sage habitat types are home to several sensitive plant species.

Four distinct populations of Tecate cypress are known to occur within Southern California. Three populations occur within San Diego County (Guatay Mountain, Otay Mountain, and Tecate Peak), the fourth occurs in Orange County. Tecate cypress are fire dependant in their reproductive cycle and only reproduce by seed after fire. Mature Tecate cypress typically do not survive fire events; however, the loss of their overstory provides an open environment for seedling recruitment. Tecate cypress do not become mature or cone bearing until a minimum of seven years.

Grasslands within the burn area consist predominantly of nonnative annual grasses with some intermixed perennials. Some grasslands may also contain remnant native perennial bunch grasses.

Oak woodland/savannah (*Quercus agrifolia*) transition from uplands to drainages below into lowland riparian forests along the beds of the drainages.

Lowland habitats within the burn area include wetlands and riparian forests. Riparian areas are dominated by sycamore (*Platanus racemosa*), oaks, willows (*Salix spp*.) and cottonwoods (*Populus fremontii*). Few perennial streams occur within the burn area that are fed year-round by dammed lakes such as Barrett Lake. Willow dominated riparian forest also occurs along the edges of Otay and Sweetwater Reservoirs on the western portion of the burn area. Wetland habitats include vernal pools, perennial streams and freshwater marsh. Vernal pools are ephemeral and often contain sensitive plant species. Vernal pools are located near Otay Reservoir and in the area of Marron Valley. Freshwater marsh habitat within the burn occurs near the Otay and Sweetwater Reservoirs.

Coastal sage scrub east of Sweetwater Reservoir in northwest corner of the burn area. This photograph demonstrates typical coastal California gnatcatcher habitat burned in the fire.

Riparian woodland near Sweetwater Reservoir in northeast corner of burn. This photograph demonstrates least Bell's vireo habitat burned in the fire.

B. Findings of the On-the-Ground Survey

1. Resource condition resulting from the fire

Upland species

Sage scrub and chaparral habitats generally burned at a moderate to high severity with greatest severity in the north, northeast, and southeast portions of the burn area.

Lowland Habitats

Riparian habitats generally varied in severity from low to moderate with some high severity areas within Dulzura Creek, Cottonwood Creek, Rattlesnake Canyon, and Potrero Creek. Vernal pools in Marron Valley and east of Lower Otay reservoir were unburned or sustained low burn severity.

Of the approximately 5,700-acre Rancho Jamul Ecological Reserve, about 5,000 acres burned including sage, grassland and riparian habitat. The burn on Rancho

Jamul Ecological Reserve was generally light to moderate in severity, with some riparian areas burned at a high severity.

Hollenbeck Canyon Wildlife Area adjoins Rancho Jamul Ecological to the north. Of its 5,500 acres of habitat, 4,500 acres burned. This area sustained light to moderate burn severity in similar habitats as Rancho Jamul Ecological Reserve.

Otay Mountain Ecological Reserve sustained light to moderate burn severity throughout sage scrub, grassland and riparian habitats.

Sensitive Plant risk by location (See Harris Fire Sensitive Plant Species Map)

- Mexican flannelbush occurs on the Jamul mountains, which generally burned at a low severity.
- San Diego thorn-mint populations east of Lower Otay Reservoir and south of Sweetwater Reservoir are near the fire perimeters edge (low severity) or outside of burn area.
- San Diego ambrosia north of Upper Otay Reservoir and east of Lower Otay Reservoir either burned at a low severity or was outside of the burn area.
- Dunn's mariposa lily has scattered occurrences in the west and south part of the burn area.
- Otay tarplant occurs south of Lower Otay Reservoir and southwest of Sweetwater Reservoir and on Rancho Jamul Ecological Reserve. These areas sustained low to moderate burn severity.
- *Dehesa nolina* occurs near Barber Mountain and near State Route 94 southeast of Campo. These areas burned at a low to moderate severity.
- Gander's ragwort occurs near Barber Mountain, and Tecate Peak, which burned with moderate severity.
- Approximately 725 acres of Tecate cypress burned on Tecate Peak.

2. Potential Consequences of the fire on values at risk

Chaparral and sage scrub habitats exhibit inherent adaptation to fire. Many plants within these assemblages are adapted to recruit after fire. However, successful regeneration (stump-sprouting) and recruitment (germination of seed) is dependent on the frequency, severity, and/or intensity of the burn. If fires occur too frequently, some plants will not mature enough to seed. If fires burn too hot, resident plants cannot regenerate and the seedbed may be lost for another generation of plants.

Lowland habitats (riparian and wetlands) vary in their abilities to regenerate after fire and germination is not dependent on fire. Lowland habitats generally contain higher water content and less resinous oils and are, therefore, less likely to burn than upland types. Riparian and wetland vegetation types have a high ability to root sprout and a higher overall growth potential than most upland types and will recover quickly given adequate hydrology. Within the burn area there was more variability in the severity of burn to these habitat types.

The greatest threat to upland habitats is type-conversion to non-native grasslands. Such type-conversion (e.g. sage scrub to non-native grasslands) may occur because of increased fire frequency. Non-native grasses grow opportunistically and out-compete native vegetation for resources. This conversion to non-native grassland also increases the fire frequency of the site and perpetuates itself by causing short fire cycles, precluding succession to other habitat types. Non-native grasses are considered a "flashy fuel" and can be ignited easily on a more frequent basis. Habitat conversion is occurring along the U.S. – Mexican border due to increased fire frequency. Areas that burned in the 2003 Otay Fire and have re-burned in the Harris Fire are at extreme risk of habitat conversion, including areas known to be occupied by Tecate cypress.

Of the three Tecate cypress populations in San Diego County, two were affected by the fire. The Guatay population was unburned by the fire, However, most, if not all, of the Tecate cypress on Tecate Peak burned in the Harris Fire. The majority of the Otay Mountain population burned in the 2003 Otay Fire, and is currently recruiting 4-year-old seedlings. Several mature trees along the western slopes of Otay peak, not burned in 2003, were burned in the fire. While Tecate cypress can live up to 200 years, they are not adapted to withstand frequent fires. A fire cycle at a minimum of 35 years is considered necessary for population viability (Esser, 1994). At the current fire, recurrence cycle of the Tecate Cypress is at risk of extirpation.

Riparian and wetland lowland habitats are at high risk from the fires, due to opportunistic exotic plants such as *Arundo donax* and other non-native grasses and forbs, which can out-compete natives after fire events.

Risk to the other listed sensitive plants will generally depend on the burn intensity and severity as it relates to seed survival in the seedbed and survival of existing perennial plant rootstocks. In general, annual seed and geophytes (herbaceous plant with an underground storage organ) will survive a fire unless the intensity is severe.

III. Emergency Determination

No emergency responses are recommended regarding the vegetation or sensitive plants within the burn.

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IV. Treatments to Mitigate the Emergency

General (non-emergency) mitigations follow.

A. Treatment Type

Methods of treatments for burn areas include:

- Implement appropriate Best Management Practices (BMPs) upslope of sensitive riparian habitats to minimize erosion and sediment loads.
- Conduct re-vegetation with locally collected native seed or propagules where appropriate to promote rapid recovery of native habitats.
- Conduct post fire habitat and sensitive plant surveys to determine recovery.

- Coordinate local agency activities during maintenance activities to avoid, minimize, and mitigate additional impacts to native habitats and sensitive species.
- Conduct adaptive management of exotic (invasive) plant species in order to control their spread.

B. Treatment Objective

The treatment objectives are to monitor native habitats and known sensitive plant populations and conduct appropriate adaptive management of these habitats and sensitive populations when necessary.

C. Treatment Description

Erosion Control

- Stabilize slopes between 20 and 50 percent, where feasible, with biodegradable matting, weed-free straw mulch or straw wattles to limit slope erosion and further impacts to recovering native vegetation.

- Avoid introducing nonnative seeds with erosion stabilization methods.

- All remaining native vegetation should be avoided to the greatest extent possible.

Control of Invasive plant species

- Use appropriate mechanical or chemical means to reduce the spread of or eradicate invasive nonnative plant species.

Revegetation of Native Habitat

- Revegetate riparian habitats in burn areas to encourage habitat regrowth and reduce erosion. Riparian vegetation will promote soil stabilization as well as provide refugia for wildlife species. Use only locally obtained propagules (cuttings or seeds) for revegetation. Cuttings of local *Cholla* and *Opuntia* species should be used where appropriate.

- Prior to work within the burn area, Wildlife Agencies, (i.e., the Department of Fish and Game and the USFWS) should be consulted regarding the suite of sensitive species that may occur in project areas, appropriate revegetation protocols, and timing of activities.

Habitat and population monitoring

- Monitor habitats and sensitive species for recovery. Use adaptive management for habitats and sensitive species when necessary and appropriate. In particular, Tecate cypress are particularly vulnerable to future fires. Management plans, including seed collection, propagation, and creation of an in situ population should be developed to protect the species from extirpation.

Wildlife Agency Permitting

- If maintenance or mitigation measures require activities that are within a streambed or other wetland, or if these activities would result in impacts to any state, federal or MSCP sensitive species, permits could be required from the appropriate local Resource Agencies. These agencies, include, but are not limited to, California Department of Fish and Game, USFWS, U.S Army Corps of Engineers and the Regional Water Quality Control Board.

Local agency Coordination

- Local agencies and jurisdictions should coordinate their activities in order to avoid, minimize, and mitigate impacts to sensitive species during post-fire recovery efforts.

A comprehensive list of Best Management Practices may be referenced in the Wildlife Section of the BAER report.

V. References

-Vegetation and Conserved Lands Affected by the Witch Creek, Harris and Poomacha Fires, County of San Diego, October 2007.
-Department of Fish and Game, http://www.dfg.ca.gov/
-State and Federally Listed, Endangered And Rare Plants Of California, California Department of Fish and Game, October 2007.
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VI. Maps

Located in the Confidential Section
Harris Fire Sensitive Plant Species Map

Archaeology Addendum

BAER TEAM #11

Harris Fire

Redact Report

Note These appendices contain confidential information regarding archeological site locations, so have been removed from public copies of this report in accordance with the policy of the Office of Historic Preservation as adopted by the State Historical Resources Commission under the authority of Public Resources Code 5020.4.

Burned Area Emergency Response Specialist Report

Resource: Geology

Incident: Harris Fire CA-MVU-010427

Month/Year: November 2007

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The California Geological Survey (CGS) Burn Site Evaluation Summaries present the results of our reconnaissance of sites that may be at risk to life and property from geologic hazards such as landslides, debris flows, rock falls, and localized debris torrents, floods, and hyperconcentrated floods. These summaries do not include an assessment of potential risks from increased surface runoff along the major stream channels, and must be used in combination with hydrologists' assessments of those areas to grasp the magnitude of risks to high-value sites. CGS's expedited reconnaissance evaluations were part of the post-fire emergency response activities. As such, there are likely to be areas within the burn perimeter and other locations of potential values at risk that were not observed or assessed, and other areas where the potential risks are either higher or lower than our initial reconnaissance-level reviews.

I. Resource Condition Assessment

A. Resource Setting

The 90,440 acre Harris fire occurred in San Diego County east of San Diego extending as far east as Tecate. The burned area lies along HWY 94 and extends south to the Mexican border. Portions of the burned area are federal land and are covered by the US Forest Service and the Department of Interior BAER reports.

The Harris fire burn area is underlain by Cretaceous gabbroic, tonalitic, and granitic plutonic rock and minor metamorphic inclusions. The gabbroic rock is dark colored, fragmented, and deeply weathered. It decomposes to a reddish brown sandy-clayey soil. Surficial soil deposits of alluvium and colluvium overlie most of the bedrock on gentle slopes. The tonalitic and granitic rock consists of hard, boulder-sized, core-stones in a matrix that is heavily weathered, broken, and friable. As the matrix decomposes, the core-stones form conspicuous slopes with abundant boulders supported by coarse, sandy, tan-colored soil of decomposed granite (DG) that is locally thick and gullied, and prone to rapid erosion and slope failure.(See Geologic Map Legend below) includes a description of the geologic units within the Harris fire area. Several large alluvial fans occur in the region but are not indicated on the geologic map.

Topography within the burn area ranges from gentle alluvial valleys to very steep headwater basins. Topographic relief is moderate to high. Most of the burn area burned at a low to

moderate burn severity. The affected soils are generally hydrophobic on the surface. The burn area lies below the elevation generally subject to rain-on-snow events, although snow may occasionally fall near the higher peaks. Although the climate is generally dry, intense rainfall and especially wet years repeatedly occur and usually result in mudflows and flooding.

The values at risk are: 1) possible loss of life and property due to slope-generated landslides, debris flows, rock fall, and associated slope movement and 2) sedimentation in drinking and agricultural water reservoirs.

B. Survey Methods

To evaluate the risk to life and property, road, aerial, and foot reconnaissance inspections were conducted on November 11-17, 2007. Most public roads within the burn area were driven to identify where high-value sites may be present that need additional on-site reviews, concentrating on developed residential areas and drinking water facilities. Road-related features, such as culverts and bridges, were not surveyed.

The California Geological Survey inspected houses and other high-value sites within and down-slope of the burn area to evaluate potential risks from debris flow and other geologic hazards that may not be identified in a regional hydrologic evaluation that we understand is being undertaken by the Department of Water Resources' engineers and geologists. The survey was rapid, limited to easily accessible areas, and based on incomplete and preliminary information. We estimated risk to prioritize sites to expedite the implementation of preventative measures. Closer inspection at some sites may reveal conditions different from our initial estimates. The sites identified as having potential risks to lives or property are summarized in Appendix 6. Other sites with similar concerns probably exist but may have been missed through this rapid survey. **Follow-up efforts to identify issues and to implement remedies are essential to protect the public.**

San Diego County hired a consultant, Geosyntec, Inc. to survey slope hazards along county roads and recommend treatments. We were provided with draft copies of the Geosyntec findings by the Department of Public Works during the course of our field work, and found them to be generally suitable regarding erosion control. Our reconnaissance field assessments indicate that slope stability and flood hazards are also present in the Harris fire area that are not identified in the erosion control assessment by Geosyntec. In cases where rockfall and debris flow, or flood hazards appear exacerbated by the fire, we recommend contact with a Professional Engineer or Professional Geologist for a site specific risk evaluation.

C. Findings of the On-the-Ground Survey

1. General Observations

The principal concern with the Harris fire area is an increase in the potential for in-channel floods, hyperconcentrated floods, debris torrents, debris flows and rock falls. Houses are present in drainage swales at the bottoms of canyons where debris flows and flash floods would be a threat. Several houses lie below burned, steep,slopes that contain numerous boulders. **The magnitude of post-fire damage will be determined by the intensity and duration of storms that impact the area.**

The colluvial and alluvial spoils are the weathered and transported products of long-term bedrock disintegration. Water is the chief agent of erosion. The chaparral vegetation typically slows erosion by removing water through interception and evapotranspiration, reducing the force of raindrop impact, and by providing a network of roots to hold soil in place. Due to the loss of vegetation, runoff is likely to be higher than background conditions until vegetation is re-established. This may result in accelerated erosion especially in the severely burned areas and the most erodible soils. Intense fires may also create hydrophobic soils where waxy substances released by plant materials during hot fires follow thermal gradients into the soil and congeal as semi-impervious surfaces.

The soils in the burn area belong to the La Posa and Tollhouse series. These soils are excessively drained to moderately well-drained sandy loams to silt loams. These are soil textures that are susceptible to the development of hydrophobic conditions.

The increased runoff and erosion will result in higher than usual peak flows along stream channels. Numerous houses occupy floodplains (i.e., Cottonwood Creek and Potrero Creek) below burned watersheds and are consequently at a higher risk of flood and sediment damage until vegetation is re-established.

2. Specific Observations

Specific houses and other high-value features that were identified by our rapid survey are documented in Appendix 6. The appendix contains information which is confidential and so has been removed from public copies of this report.

As discussed above, there may also be an increase risk from floods, hyperconcentrated floods, and in-stream debris flows that are beyond the scope of the CGS survey.

II. Emergency Determination

The values at risk considered in this assessment include the possible loss of life and property due to landsliding, debris flow, rock fall, debris torrents, and flooding from increased surface water runoff. In general, the risk from landslides, debris flows and rock falls are possible where roads, residences or other developments are located on alluvial fans, colluvial footslopes and debris cones. As such, these locations can be pre-identified and mapped prior to emergencies such as wildfire. Flooding and in-stream debris torrent activity adjacent to canyon stream channels may also pose a risk to high-value features that are near those channels. As such, the information provided in the attached summary sheets must be used in combination with the hydrologists' assessments to understand more completely the magnitude of risks to high-value sites in the area.

It should be noted that these hazards are part of the natural processes in this environment, and that these risks were present under pre-fire conditions. Many existing structures in the burn area have been and will continue to be at risk from these hazards. The potential for these processes to be exacerbated by fire is primarily dependent upon burn severity and slope steepness, both of which are variable in the Harris fire area. Risks to cultural, soils and biologic assets are covered in other specialist reports. Areas with moderate to high potential risks to life and property from slope instabilities exist elsewhere in the vicinity of the Harris fire, but the assessment of sites that were not affected by the fire is beyond the scope of this evaluation.

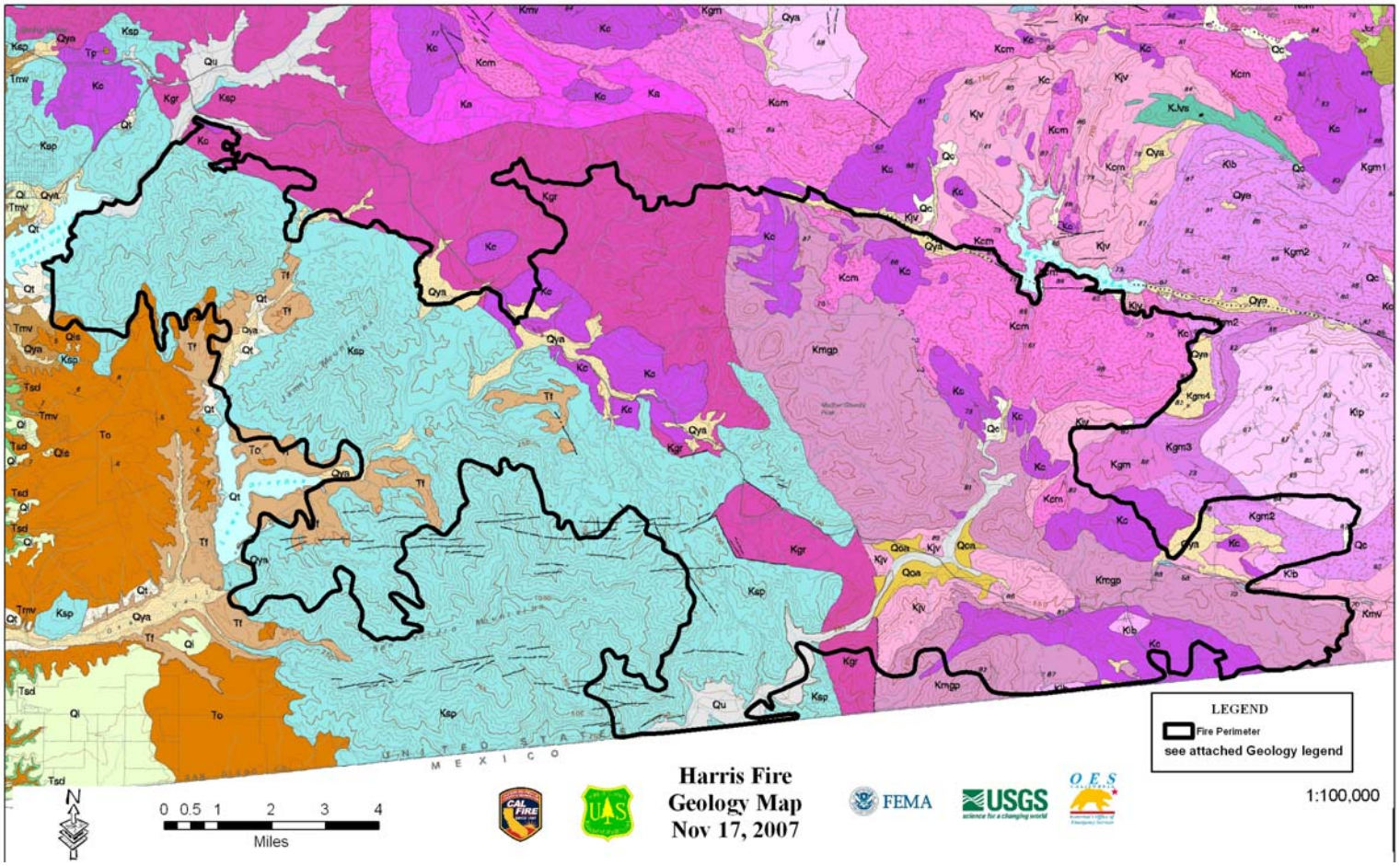
III. References

Todd, V.R., 2004, Preliminary Geologic Map of the El Cajon 30’ x 60’ Quadrangle, southern California, US Geological Survey, Open File Report 2004-1361, scale 1:100,000.

IV. Appendices

Confidential:

Appendix 6: Site Risk Table



GEOLOGIC MAP FOR THE HARRIS FIRE, adapted from Todd, V.R., 2004.

LEGEND (units within the fire perimeter)

Qya	younger alluvium of Quaternary age
Qoa	older alluvium of Quaternary age
Tf	fan deposits of Tertiary age
To	Sandstone and claystone of Miocene Age
Ksp	Santioga Peak Metavolcanics of Early Cretaceous Age
Kc	Cuyamaca Gabbro of Early Cretaceous age
Kcm	Corte Madre monzogranite of Early Cretaceous age
Kjv	Japatul Valley tonalite of Early Cretaceous age
Kmgp	Monzogranite of Mother Grundy Peak of Early Cretaceous age
Kgm	Tonalite of Granite Mountain of Early Cretaceous age

Burned Area Response Specialist Report

Resource: Engineering

Incident: Harris Fire CA-MVU-010427

Month/Year: November 2007

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I. Potential Values-at-Risk (identified prior to on-the-ground survey)

An inspection of the burn region indicated the following sites that were considered to be in need of evaluation to determine risk due to increased runoff:

- Three water supply reservoirs located adjacent to the fire perimeter
- Residential and non-residential structures located adjacent to and within the Special Flood Hazard Areas (SFHA).
- Flooding of State and County highways and local roads where culvert crossings and sediment catch basins exist.

Lives and property are potentially at risk at sites located in flood prone areas, or on roads where flash flooding causes washouts due to runoff in excess of culvert capacity. Water quality of the regional water supply is potentially at risk due to loss of control of water on hill slopes.

II. Resource Condition Assessment

A. Resource Setting

The Harris Fire burned in the lower central portion of San Diego County from October 21 through October 31, 2007. The fire is located within three main watershed areas that consist of the Sweetwater to the north, Otay to the southwest and Tijuana to the southeast. The main, large sub-watersheds that burned within the respective watersheds are:

1. Sweetwater - Sweetwater Marsh
2. Otay - Jamul Creek, Otay Reservoir, Otay River
3. Tijuana – Cottonwood Creek/Lake Morena, Cottonwood Creek/McAlmond Canyon, Cottonwood Creek/Potero Creek, Campo Creek, Lower Pine Valley

Rapid modeling of estimated changes in peak discharge rates and surface soil erosion pre and first year post-fire were generated to provide context for expected impacts to identified values-at-risk and are provided in the Hydrology specialist report.

Large parts of the burned area lie within the Southern California Mountains', also known as the peninsular range. The topography consists of dominantly steep and very steep terrain, with small drainage meadows and narrow and broad mountain valleys. The fire burned very rapidly and produced mostly low and moderate burn severity, with few areas left unburned within the fire perimeter.

Overall, for the entire fire area of 90,440 acres, 0.1% was rated as high burn severity, 36.5% as moderate severity, 59.2% as low severity, and 4.15% was unburned (within the burn perimeter). Modifications were made to the original Burned Area Reflectance Classification (BARC) maps produced at the Remote Sensing Applications Center in Salt Lake City. The modifications made by the team specialists were based on field inspections and are made to reflect actual ground conditions.

B. Findings of the On-The-Ground Survey

1. Resource conditions resulting from the fire

The state Burned Area Emergency Response (BAER) team assigned to the Harris Fire inspected the burned area November 12 through November 17, 2007, both as an entire team the first day and as specialist groups over the next five days. All the significant portions of the burn area were observed for potential impacts to structures, roads, soil and water resources, as well as identified values-at-risk. Areas inspected included Barrett Lake, Lower Otay and Sweetwater Reservoirs, and their surrounding watersheds. The sites visited all had drainage facilities in place to handle storm runoff under normal conditions. Watershed response to precipitation events is expected to increase in the regions inspected during the recovery period. Ash and sediment may be entrained and mobilized with initial precipitation events compounding flooding due to blockage of hydraulic structures such as drains and culverts.

Numerous structures (residential and non-residential) were inspected for damages and evaluated for risk based on flooding if it was located within or adjacent to a SFHA as defined by the County of San Diego Flood Insurance Rate Maps. The risk for potential flooding across the State and County highways, and local roads was also inspected for potential flooding and overtopping of debris where culverts and sediment catch basins existed along the various roads within the burn area. Hill slope stability conditions at these sites are addressed within the Hydrology section of the report.

2. Potential Consequences of the fire on assets at risk

The main consequence of the fire is expected to be flooding due to overwhelming of on-site drainage facilities not only from increased runoff, but also from increased sediments, ash and debris that will impact riverine systems, roadway culverts and low lying structures. The flooding also may affect water quality at specific sites and downstream along the draining waterway, creating significant secondary concerns. The BAER team engineering specialist determined that the areas with highest potential risk to values were the Barrett Lake, Lower Otay and Sweetwater

Reservoirs, structures adjacent or within a SFHA, and culvert sediment basins located on major State, County or local roads.

Barrett Lake

Barrett Lake, a municipal watershed for the City of San Diego, is located in the Upper Cottonwood Creek and Pine Valley Creek watersheds. The reservoir has a capacity of 45,000 acre-feet and its watershed encompasses 131 mi^2. Barrett Dam is located downstream of Pine Valley Creek, Corral Canyon and Wilson Creek, and upstream of Rattlesnake Canyon. Water is also conveyed from the Barrett Reservoir to the Lower Otay Reservoir via the Dulzura conduit, to provide drinking water to the municipalities of the City of San Diego, Chula Vista, National City and the surrounding area.

The reservoir lies within an area surrounded by high steep slopes, deep canyons and mountainous terrain. Based on visual inspection the total area of watershed burned above Barrett Lake is about 5% of the total watershed tributary to Barrett Lake. Of this, 3% burned at a moderate to high burn severity. The main concern due to the fire is water quality impacts to the reservoir if initial storms in the near term are intense events with significant precipitation. Peak flow increases from the fire will also be bulked by ash, debris and other floatable and transportable material within the channel areas, especially within Wilson Creek. There is a probability that post-fire flows from the first runoff producing rain events will see a concentration of ash discharged into Barrett Lake. There is a potential to affect a portion of the municipal water supply in Barrett Lake. The potential for adverse water quality effects, post fire flooding, and increased sediment yield is high.

A secondary concern determined at this site would be downstream impacts due to runoff of sediments and debris within the Cottonwood Creek. The impacts may be increased sediment, nutrients and turbidity in the drainage from the reservoir, which could lead to water quality impacts and contribute to local flooding to downstream communities and/or structures that lie adjacent to or within the County of San Diego's Special Flood hazard Areas (SFHA).

Lower Otay Reservoir

The Lower Otay Reservoir is located eight miles east of the City of Chula Vista and lies within three mountainous regions that consist of the San Miguel Mountains to the north, Jamul Mountains to the northeast, and the Otay Mountains to the south. The reservoir has a capacity of 49,500 acre-feet and its watershed encompasses 99 mi^2. Additional inflow is also conveyed via the Dulzura conduit that delivers 40 million gallons per day to service the local water supply for the local municipalities in the area.

Based on visual inspection the mountainous areas surrounding the Lower Otay Reservoir were partially burned with light to moderate burn areas. Based on field tests conducted at various sites, no hydrophobic soils were determined to exist within the area, therefore the main concern due to the fire is water quality impacts to the reservoir if initial storms in the near term are intense events with significant precipitation. Such events could overwhelm the facilities drainage

system due to runoff, particularly increased runoff laden with heavy sediment and debris. The current drainage facility has sufficient capacity to handle a one hundred year precipitation event under normal conditions; however increased runoff could strain the system.

A secondary concern determined at this site is water quality impacts to the reservoir's local water supply that service the local municipalities. The impacts may be increased sediment, nutrients, and turbidity in the reservoir, which may lead to water quality impacts and contribute to local flooding.

Sweetwater

The Sweetwater Authority owns and operates the Sweetwater Reservoir in Spring Valley, along with the Loveland Reservoir near Alpine, and wells in National City and Chula Vista. The Sweetwater Reservoir is located three miles east of the City of Chula Vista and lies at the base of the northern slope of the San Miguel Mountains. The Sweetwater watershed encompasses 182 mi^2 and the reservoir has a storage capacity of 28,079 acre-feet. The river that conveys water to the reservoir is the Sweetwater River.

In addition, the Sweetwater Authority has also constructed the Urban Runoff Diversion System, located immediately adjacent to the north side of Sweetwater Reservoir. The diversion system is used to capture first flush storm flows and low flow runoff before the water enters Sweetwater Reservoir. When water contains high salt loads (total dissolved solids - TDS) it is diverted downstream into the river, where it joins the underground alluvium and becomes a source of supply for the Richard A. Reynolds Groundwater Desalination Facility. Water with acceptable TDS levels is routed into the reservoir and treated at the Robert A. Perdue Water Treatment Plant.

Based on visual inspection, the mountain areas surrounding the Sweetwater Reservoir were partially burned with light to moderate burn areas. Site inspection of the area identified significant fire damage to the Sweetwater Marsh National Wildlife Refuge, which is outlined in the Wildlife section of this report.

The main concern due to the fire is water quality impacts to the reservoir if initial storms in the near term are intense events with significant precipitation. Such events could overwhelm the diversion facilities drainage system due to runoff, particularly increased runoff bulked with sediment, ash and debris. The current drainage facility has sufficient capacity to handle a one hundred year precipitation event under normal conditions; however increased runoff could strain the system.

III, a. Emergency Determination

The sites inspected do not qualify as immediate threats; however that may change if storm events of high intensity are to occur during an initial precipitation. An emergency to human life, property, and water quality could occur due to the loss of control of excess water, increased runoff, and sedimentation. Because the

reservoirs' impacts discussed above are similar in nature, the treatments outlined below are considered to be applicable to each reservoir discussed.

IV, a. Treatments to Mitigate the Emergency

Barrett Lake, Lower Otay and Sweetwater Reservoirs

Treatment Type, Objectives and Description

1. Perform maintenance of drainage channels

Objective: To insure that the current drainage channels are clear of obstructions prior to a storm event.
Description: The City of San Diego Water Department staff should inspect all drainage facilities such as channels, canals, culverts and drain inlets. Any obstructions or debris should be removed and any repairs scheduled for completion should be performed

2. Monitor after every event.

Objective: To insure that the drainage channels are clear after a storm event in anticipation of the next storm event.
Description: After every significant storm event, staff can inspect all drainage facilities to note for any obstructions or damage to the system. Maintenance and repair can then be scheduled before the next storm event.

3. Additional treatments are covered in the Geology and Hydrology reports: Residential and non-residential structures located adjacent to and within the SFHA

Based on the figures provided, the Harris Fire destroyed or damaged 459 residential and 293 non-residential structures throughout the burn area. A majority of the structures inspected were determined to be completely demolished or partially damaged to some degree. Inspections made by the specialist team were completed to evaluate the potential for risk to safety, life and property as the result of a high intensity storm that may cause significant runoff within the rivers, streams and creeks and cause flood damage.

III, b. Emergency Determination

During the inspection, it was noted that a number of structures within the burn area lie adjacent to or within the Federal Emergency Management Agency (FEMA) SFHAs or what is known as FEMA's floodplains or floodways. Structures existing in these low lying drainage areas are subject to flood risk based on the FEMA Flood Insurance Rate Maps (FIRM) developed for the County of San Diego. If the watersheds was damaged by the Harris Fire, the watercourses and structures constructed within them are now subject to higher flood risk because of the lack of vegetation, potential increase of sediment, ash, and debris within the channels that could cause increase flood heights and overtopping of levees, berms and channels.

Examples of structures noted throughout the burn area subject to potential risk are located at:

1. Latitude 32.61246 and longitude -116.61905

2. Latitude 32.62168 and longitude -116.68913

Under FEMA FIRM panel number 06073C2050F dated June 19, 1997, structure number 1 is defined to be in a Zone D, which is defined as areas in which flood hazards are undetermined. Flooding potential and risk does exist, however to what extent has not been determined by FEMA. The entire area under the noted FIRM panel is defined as within a Zone D but is not printed for reference. Information on the panel is noted on the FIRM index map panel.

Under FEMA FIRM's panel number 06073C2250F dated June 19, 1997, structure number 2 is defined to be in an Unnumbered Zone A with no Base Flood Elevations (BFE) defined. Residential structures in this area are required to elevate the structures lowest floor to or above the BFE if one has been determined to be compliant with FEMA's Code of Federal Regulations Section 60.3 (44 CFR 60.3). Non-residential structures can either be flood proofed or elevated to or above the BFE in order to be compliant with FEMA's Code of Federal Regulations Section 60.3 (44 CFR 60.3). In addition, all utilities are required to be either flood proofed or elevated to or above the BFE as well.

IV, b. Treatment to Mitigate the Emergency

Structures located adjacent to and within the SFHA

Treatment Type, Objectives and Description

As a participant of the National Flood Insurance Program (NFIP), the County of San Diego is required under its duties and responsibilities of the NFIP program to verify any substantial damage that has occurred within its SFHA, to review for compliance prior to the issuance of a permit for any new structure or rehabilitation, reconstruction, or placement of a lateral addition within the SFHAs. Substantial damage is defined within Article IV of the County of San Diego's floodplain management (FPM) ordinance and under the 44CFR 60.3, as damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

The County staff should determine which structures within the SFHA have sustained fire damage and determine if any of the structure is substantially damaged or not. A notice or information letter regarding the regulations and the need for compliance with the NFIP program should be mailed to those property owners. In addition, all findings and evaluations should be documented in the event the community undergoes a Community Assistance Visit so that it can substantiate its determination based on the improvement of the structure versus market value. Not bringing these structures into compliance would be considered a violation of the NFIP program, and the county would be required to remedy all violations. In addition, property owners would be subjected to higher flood insurance premiums because the structure is not built to compliance standards, as required under the county's FPM ordinance and the 44CFR 60.3.

III, c. Emergency Determination

During the field inspection of State and County highways and local roadways, it is noted that a number of culverts and sediment catch basins within the burn area were damaged by fire or have the potential to be obstructed by fallen debris and/or sediment material at both openings of the water crossings. The potential risk for property is the obstruction of culverts due to an increase runoff of an initial storm from increased flows, debris, and flooding that would create blockage of downstream conveyance and cause overtopping of culverts, flooding of roads, and scouring and erosion of banks.

IV, c. Treatment to Mitigate the Emergency

Culverts and sediment debris basins

Treatment type, Objectives and Description

Perform maintenance of drainage channels. Insure that the current drainage channels are clear of obstructions prior to a storm event and after the first initial rainfall. All responsible agencies should inspect all drainage facilities such as channels, canals, culverts, and all water crossings for any obstructions or debris that should be removed. Any repairs scheduled for completion should be performed prior to an initial rain storm. All culverts damaged by fire should be replaced prior to an initial rain to alleviate any potential flooding problems. Trash racks should be installed where applicable to prevent culverts from being obstructed.

V. Appendix

California Geological Survey Burn Site Evaluation Summary

Burned Area Emergency Response Specialist Report

Resource: Hydrology

Incident: Harris Fire CA-MVU-010427

Month/Year: November 2007

Authors: Robert Fastenau (DWR-SD)
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General Resource Setting

The Harris Fire burned from October 21 through November 3, 2007. It burned at a low-to-moderate intensity with large islands of unburned areas and scattered high-to-very-high intensity spots dependent on local slope aspect, fuel load, and wind conditions. The fire resulted in an increased risk to public health and safety, property, and resources because of loss of vegetation, burned soils, and the potential for increased runoff, sedimentation, erosion, and decreased control of water. Accordingly, State Burned Area Emergency Response (BAER) Team #11 were assigned to the Harris Fire on November 13, 2007 to identify potential risks to public health and safety, property, and resources; and to propose general treatments to mitigate the risks identified. Staff was organized by specialty into sub-teams, with separate teams for Geology/Hydrology/Soils, Engineering, Wildlife/Botany and Cultural Resources. Additionally, a sub-group composed of Geology/Hydrology/Fire specialists flew over the burned area on November 17, 2007 and extensively photographed issues previously identified. All the significant portions of the burn area were observed for potential impacts to soil and water resources, as well as

values-at-risk. Areas inspected included the Sweetwater and Lower Otay Reservoirs and their surrounding watersheds, Cottonwood Creek watershed downstream of Barrett Dam, Highway 94 between Dulzura and Potrero, the Potrero Creek drainage, the south-facing slopes along the US/Mexican border near Tecate, San Miguel Mountain, and Lyons Peak. These windshield surveys were a quick assessment of values-at-risk and should not be considered complete.

This specialist report discusses and models the hydrologic and erosion response of the watershed(s), identifies values-at-risk, discusses fire impacts to the values-at-risk, and recommends general treatments for the risks identified. It addresses issues pertaining to the non-Federal property. Lands under Federal jurisdiction were evaluated by the Federal BAER Assessment team. Federal lands include land in the Cleveland National Forest around Barrett Lake, Bureau of Land Management property west of Dulzura and Engineer Springs, and US Fish and Wildlife property in the region around San Miquel Mountain.

I. Overview

A. Climate

San Diego County has hot, dry summers and cool, wet winters. Temperatures range from a mean high of 68.1° F to a mean low of 45.0° F. Precipitation ranges from 14 to 35 inches annually. The rainy season is commonly cited as October through April although more than 85% of the region's rainfall occurs in the period between November through March. Rain is infrequent in summer, along with the occurrence of thunderstorms and tropical storms. Occasional amounts of hail occur and snowfall is rare. Hot, dry winds named after the Santa Ana Canyon commonly occur between October and February. The Santa Ana winds are due to the pressure gradient between high pressure in the plateaus of the Great Basin and lower pressure over the Pacific Ocean (NOAA, 2007b).

B. Watershed Characteristics

The burn area is characterized by high relief and steep slopes with narrow canyon bottoms and outwash alluvial fans. It is in the Peninsular Range geomorphic region with its western edge along the Peninsular Range and Coastal Plain geomorphic boundary. San Miguel Mountain and the Jamul Mountains border the western edge of the Harris Fire with canyons cross-cutting the landscape to the east. The elevations of the Harris Fire range from 245 feet above MSL to 3,883 feet. The Harris fire extended over three separate watersheds (Sweetwater, Otay, and Tijuana) with the vast majority being in the Otay, and the Tijuana watersheds. These three drainages contain ten sub-watersheds:

4. Sweetwater Watershed (Sweetwater River)
    - Sweetwater Marsh sub-watershed
    - Sweetwater Reservoir

5. Otay Watershed (Otay River)
    - Otay Reservoir
    - Jamul Creek

- Otay River sub-watersheds

6. Tijuana Watershed (Cottonwood Creek)
    - Lower Pine Valley
    - Cottonwood Creek/Lake Morena
    - Cottonwood Creek/McAlmond Canyon
    - Cottonwood Creek/Potero Creek
    - Campo Creek

C. Geology and Soils

The Harris Fire burn area is underlain by primarily granitic plutonic rocks with some metamorphic rocks in the southwest portion (see Geology Resource Report for more detail). Soil types are composed primarily of four soil groups (NRCS, 1973):

1. Cieneba-Fallbrook Association, Very Rocky

   Excessively drained to well-drained coarse sandy loams and sandy loams that have a sandy clay loam subsoil over decomposed granodiorite: with 9 to 75% slopes. This association occurs in the Foothills and is made up of soils that developed in material weathered in place from decomposed tonalite or granodiorite. Erosion hazard is high to very high.

2. Exchequer-San Miguel Association, Rocky

   Well-drained silt loams over metavolcanic rock; 30 to 75% slopes. This association is occurs in the Foothills and is made up of soils that developed in hard metavolcanic rock. Erosion hazard is moderate to high.

3. Rock Land Association

   Dominantly exposed bedrock and very large boulders. This association occurs in the Mountains and Foothills, and is 50 to 90% exposed bedrock and very large boulders.

4. Friant-Escondido association, eroded

   Well-drained fine sandy loam and very fine sandy loam over metasedimentary rock; 30-70% slopes. Erosion hazard is high to very high.

5. Las Posas association, stony

   Well-drained stony fine sandy loams that have a clay subsoil over decomposed gabbro; 9 to 65 % slopes.

The high percentage of the Rock Land Association soil group is likely a contributing factor to the overall low to moderate burn intensity of the Harris Fire.

The soil burn severity generally correlates with fire burn intensity although exceptions may occur because “duration plays a critical role in fire effects to soil. A high intensity fire exhibiting extreme fire behavior…might result in low or moderate burn severity. Conversely, a low intensity (smoldering) fire can produce intense heat and long duration, resulting in high soil burn severity.” (Parsons 2003). High soil burn severity may produce hydrophobic conditions particularly where coarse-

textured soils are found. Usually only a thin layer of soil at or below the mineral soil surface becomes hydrophobic after intense heating. The hydrophobic layer is produced when a waxy substance derived from plant material burned during a hot fire penetrates into the soil as a gas and forms a waxy coating around soil particles (NRCS 2000). Hydrophobic soils repel water, reducing the amount of infiltration that can occur into the soil profile, resulting in increased winter peak storm flows and significant soil erosion. Depending on the intensity of the fire, hydrophobic layers can persist for a number of years, especially if they are relatively thick (thicker layers will persist for more than a year). The hydrophobic layer is generally ½ inch to 3 inches beneath the soil surface and is commonly as much as 1 inch thick. On a site specific basis with relatively level or gentle slopes, it is possible to rake or hoe the upper few inches of the soil to break up the water-repellant layer and allow water to penetrate the soil**. Note that for some areas the soils may have been hydrophobic prior to the fire and caution should be used in correlating high hydrophobicity as a result of the fire.**

D. Watershed Erosion Potential

The erosion potential of the affected watersheds and subwatersheds was estimated by modeling changes in peak discharge rates and surface soil erosion between pre-fire and first year post-fire flows.

The Harris Fire burned over 90 thousand acres in ten adjacent HUC6 (Hydrologic Unit Classification definition 6) watersheds in southwestern San Diego County in late October 2007. The purpose of this section is to estimate potential increases in watercourse peak flows and sediment transport within the burned area watersheds. A simple evaluation of expected peak flow by watershed and an example for modeled sediment load are provided to plan and prepare any future mitigation measures and to bound site specific hazard evaluations.

Peak flows may increase following wildfire as a result of reduced surface cover and the formation of water repellent soils. The most intense peaks occur during intense, short duration rainfall events on watersheds with steep slopes (Neary et al. 2005). Estimated changes in post-fire peak flows were patterned after efforts that have been conducted for past federal BAER work in southern California using data provided in Rowe et al. 1949.[1] Pre-fire peak flow estimates were produced using the South Coast USGS regional regression equations for 2, 10, and 100 year recurrence interval discharges (Waananen and Crippen 1977) for the Cottonwood Creek, Otay, Sweetwater, Campo, Jamul, and Lower Pine Valley Creek sub-watersheds using the Hydrologic Unit Classification HUC6 basin definitions despite the fact that the equations were developed for basins less than 25 square miles.

Use of the USGS PEAKFQ software program for a flood frequency analysis revealed that estimates for 2, 5, 10, 25, 50, and 100 year discharges were relatively similar to those produced by the USGS south coast regression equations, particularly for 2, 5,

[1] Examples of past use of data provided in Rowe et al. (1949) include the Las Pilitas, Highway 41, and Highway 58 Fires in San Luis Obispo County; Bridge Fire in Los Angeles County; and the Old and Grand Prix Fires in San Bernardino County.

and 10 year flows in the Sweetwater River near Descanso (USGS station No. 11015000).

These results were also comparable to actual peak flow data recorded from 1937 through 2006 for a USGS stream gage on Cottonwood Creek above Tecate near Dulzura (310 mi^2 drainage area USGS Station No. 11012000) although Cottonwood Creek is regulated by Barrett Dam Spillway and some flow is directed to Lower Otay Reservoir through the Dulzura conduit.

Location	mi^2	Area (ac)	Area (sq miles)	Area Burned (ac)	Area Burned (%)	Low/no (ac)	Low (ac)	Mod (ac)	Low/no (%)	Low (%)	Mod (%)
Watersheds											
HUC 6 watersheds											
Cottonwood Creek/McAlmond Canyon	12.6	8,086	12.6	6,426	79%	1,228	5,108	90	15.19	63.16	1.11
Otay Reservoir	81.4	52,085	81.4	38,882	75%	22,066	16,431	385	42.36	31.55	0.74
Cottonwood Creek/Potrero Creek	71.2	45,560	71.2	26,758	59%	18,409	8,243	107	40.41	18.09	0.23
Jamul Creek	17.4	11,146	17.4	4,088	37%	1,865	2,220	3	16.74	19.92	0.02
Lower Pine Valley Creek	29.8	19,059	29.8	2,755	14%	293	1,887	574	1.54	9.90	3.01
Sweetwater Reservoir	50.9	32,570	50.9	3,839	12%	610	3,178	52	1.87	9.76	0.16
Campo Creek	71.6	45,854	71.6	4,816	11%	4,006	805	5	8.74	1.76	0.01
Sweetwater Marsh	49.9	31,962	49.9	1,152	4%	569	563	20	1.78	1.76	0.06
Cottonwood Creek/Lake Morena	46.7	29,881	46.7	946	3%	102	786	59	0.34	2.63	0.20
Otay River	46.3	29,659	46.3	750	3%	579	171	0	1.95	0.57	0.00
Total Watershed Area		305,864	477.91	90413							

Table 1. Burned areas within HUC 6 Watersheds by severity class

For 2, 10, and 100 year return interval peak flow events, expected peak discharges for different soil burn severity classes within the watersheds were estimated to increase as shown in Table 2 as multiples of the pre-fire peak flows. These estimates were not modified for intensity, control structure operations, or developed areas within the watersheds.

Location	Normal Flow--Pre-Fire Conditions			Post Fire Flows-1st yr			2 yr Peak Increase x normal	10 yr Peak Increase x normal	100 yr Peak Increase x normal
	2yr	10yr	100yr	2yr	10yr	100yr			
Watersheds	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)			
Cottonwood Creek/McAlmond Canyon	78	598	2,858	199	1,308	5,783	2.56	2.19	2.02
Otay Reservoir	297	2,605	13,412	648	5,193	25,631	2.18	1.99	1.91
Cottonwood Creek/Potrero Creek	269	2,344	12,002	500	4,100	20,433	1.86	1.75	1.70
Jamul Creek	98	771	3,730	158	1,158	5,419	1.62	1.50	1.45
Lower Pine Valley Creek	144	1,177	5,822	190	1,460	7,011	1.32	1.24	1.20
Sweetwater Reservoir	212	1,798	9,083	261	2,117	10,468	1.24	1.18	1.15
Campo Creek	271	2,356	12,066	308	2,656	13,548	1.14	1.13	1.12
Sweetwater Marsh	209	1,771	8,942	221	1,859	9,341	1.06	1.05	1.04
Cottonwood Creek/Lake Morena	199	1,680	8,456	212	1,763	8,813	1.07	1.05	1.04
Otay River	198	1,670	8,404	205	1,722	8,655	1.03	1.03	1.03

Table 2. Peak Flows for different return period events for pre and post fire conditions

No bulking factor was used in the analysis, but bulking by sediment can be extremely important during the first post-winter period. For example for the Cedar Fire in San Diego County, the federal DOI BAER team estimated that in addition to projected increases in peak flows, flood flow volumes can increase an additional 2.1 times due to bulking (J. Frazier, USFS Stanislaus National Forest, personal communication). This is considered to be a very conservative estimate and it is more likely that bulking could increase flood flows another 30 to 50 percent during very infrequent, severe winter storm events.

Sedimentation volumes may be expected to increase after a fire due to erosion of exposed slopes with precipitation runoff. Background sediment data was estimated with a relatively new computer program denoted as ERMiT (Erosion Risk Management Tool) developed by the USFS Rocky Mountain Research Station (Robichaud et al. 2006, 2007). Predicted sediment yields are calculated from the estimated probabilities for different storms, burn severity patterns, and soil characteristics (Larson et al. 2007). ERMiT is considered to be an improved version of the Disturbed WEPP (Water Erosion Prediction Project) erosion model that has been in use for several years, since it uses probabilities rather than providing one a single, deterministic value. In other words, unlike past erosion models, the model's stochastic component allows users to work on a risk basis. Limited validation work has shown that ERMiT provides reasonable estimates of post-fire sediment yields in California (T. Ellsworth, USFS Inyo National Forest, personal communication).[2] Larson et al. (2007) have recently reported that ERMiT produces realistic estimates of sediment reduction for post-fire hillslopes treated with straw mulch. The output of the ERMiT model was used with the percent burned areas by burn severity to estimate pre and post fire sedimentation loads for each HUC6 watershed (Table 3).

[2] ERMiT was used to model sediment reduction with production following for the Angora Fire in the Lake Tahoe Basin by the USFS BAER team in 2007. ERMiT was found to under predict sediment yields for untreated sites in the Colorado Front Range (Dr. Lee MacDonald, Colorado State University, electronic communication).

Location	Pre-Fire Sediment (tons)	Pre-Fire Sediment (t/ac)	Post-Fire Sediment (tons)	Post-Fire Sediment (t/ac)	Sediment Increase X Normal
Cottonwood Creek/McAlmond Canyon	12,130	1.5	117,196	14.5	**9.7**
Otay Reservoir	78,128	1.5	698,777	13.4	**8.9**
Cottonwood Creek/Potrero Creek	68,341	1.5	491,761	10.8	**7.2**
Jamul Creek	16,720	1.5	82,322	7.4	**4.9**
Lower Pine Valley Creek	28,589	1.5	75,467	4.0	**2.6**
Sweetwater Reservoir	48,856	1.5	111,751	3.4	**2.3**
Campo Creek	68,781	1.5	144,262	3.1	**2.1**
Sweetwater Marsh	47,943	1.5	66,441	2.1	**1.4**
Cottonwood Creek/Lake Morena	44,821	1.5	60,512	2.0	**1.4**
Otay River	44,488	1.5	56,278	1.9	**1.3**

Table 3. Sediment loading estimates for pre and post fire conditions

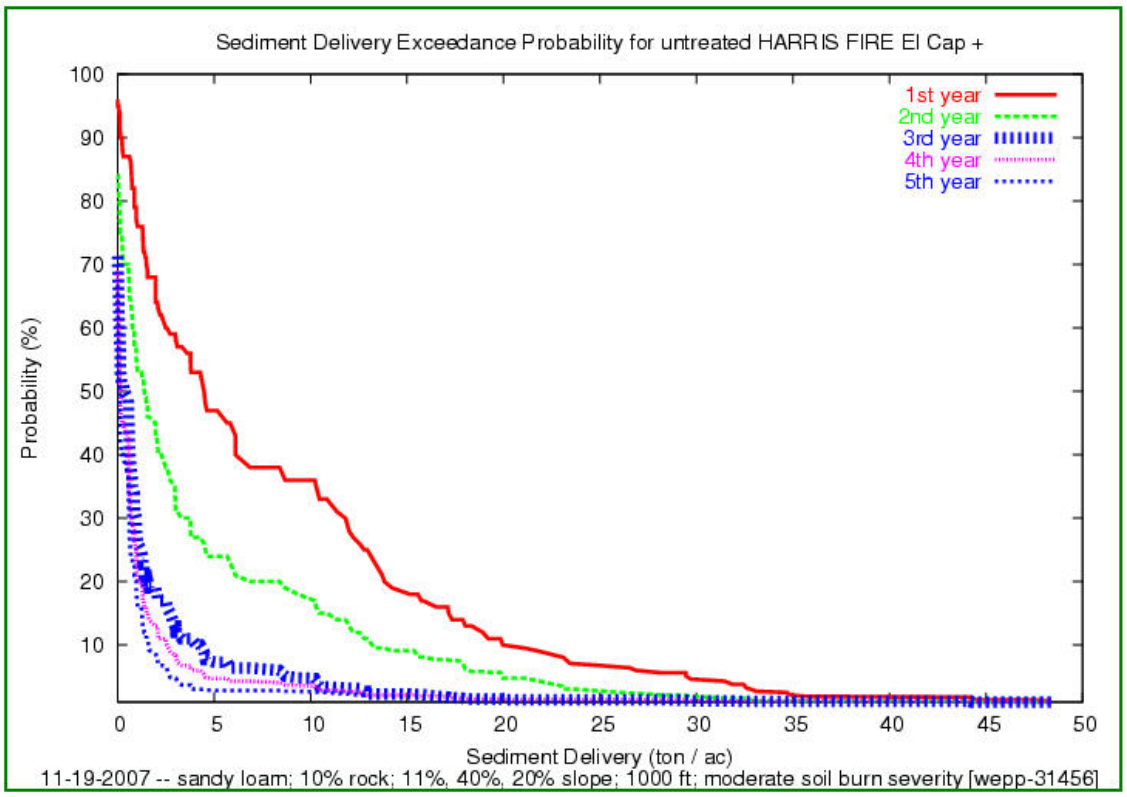
To estimate sediment loading due to erosion, a burned hillslope in the Wilson Creek drainage upstream of Pats Canyon and Barrett Lake below Barber Mountain road was modeled with ERMiT. The soil series was determined to be a Cieneba-Fallbrook association very rocky coarse sandy loam on 9-75% slopes (NRCS 1973), formed from decomposed grandodiorite.[3] The Barber Mountain soils above are a stony Las Posas association with stony fine sandy loams at 9-65% slopes. Rock content was assumed to be 10% based on discussions with the soil scientist on BAER Team 11 for the Harris Fire. Climate data was assumed to be similar to the default values provided for the Harris Fire area near El Capitan Reservoir already in the web based ERMiT model. The top of slope was modeled at 11%, the middle slope was modeled at 40%, with the toe slope at 20%. Slope length was assumed to be 1000 feet and low, moderate, and high burn severity were modeled. Pre-fire hillslope vegetation was assumed be 80% chaparral and 20% bare ground. ERMiT estimated that the pre-fire erosion rate was 1.5 tons/acre. Low, moderate, and high severity first year post-fire sediment yields were predicted to be approximately 17, 18, and 21 tons/acre, with only a 10% probability that these sediment yields will be exceeded (Figures 1, 2, and 3).

With mulching and moderate burn severity, first year post-fire estimated sediment yield is modeled to be 3.5 ton/acre (assuming mulching at a rate of 0.5 t/ac). This is approximately an 80% reduction is sediment yield. Seeding is modeled as ineffective for the first winter, with sediment yield equaling 20 tons/acre (essentially unchanged). This is consistent with results from past monitoring work that has shown that grass seeding rarely reduces surface erosion the first post-fire winter

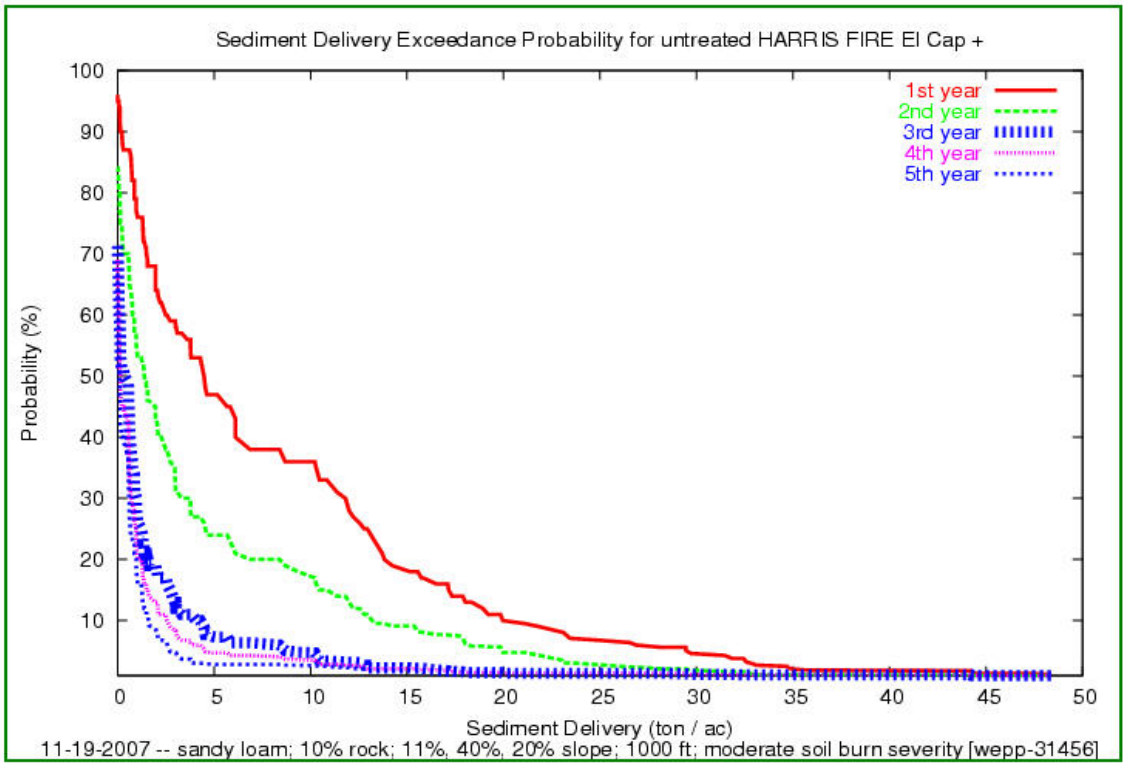
[3] Significant gullies were evident across the basin where concentrated flow had occurred in the past without adequate energy dissipators.

period (Booker and Dietrich 1998, Beyers et al.1998, Wohlgemeuth et al.1998, Robichaud et al. 2000).

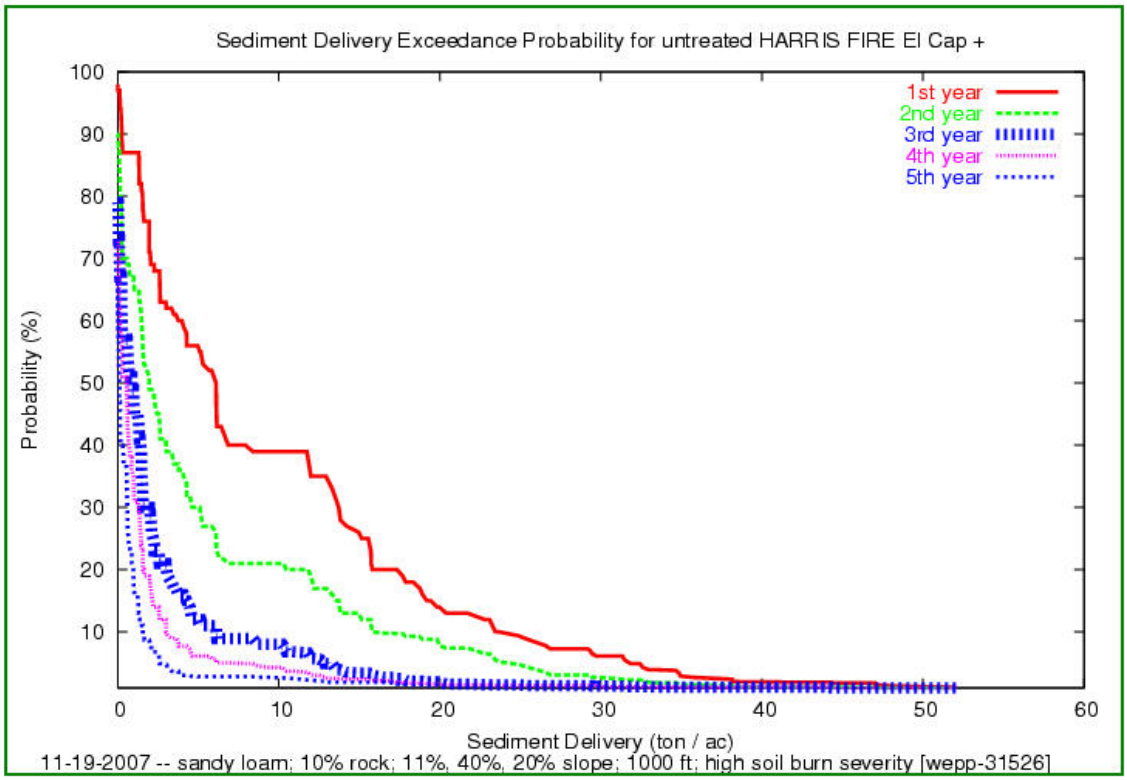
Numerous post-fire monitoring studies have documented that a significant percentage of sediment can be expected to occur immediately following the fire (MacDonald et al. 2004). Rice (1975) stated that approximately 70 percent of long-term sedimentation can be expected to occur during the first year after the fire. ERMiT predicts that nearly half of the additional sediment will occur during the first overwintering period (Figures 1, 2, and 3).



Modeled sediment yield using the ERMiT program (Low Intensity).
Figure 1.



Modeled sediment yield using the ERMiT program (Moderate Intensity). Figure 2.



Modeled sediment yield using the ERMiT program (High Intensity). Figure 3.

The danger to specific areas within and around the burned area due to precipitation runoff, erosion, sedimentation, and landslides is dependent on site specific conditions and intensity/duration of storm events within sub-watersheds. More specific evaluations of localized hazards should be used to detail the use of the model output for planning and mitigation activity. The methods applied are commonly used and do not incorporate a great deal of detail for specific areas within the watersheds being based primarily on percentages of burned area within the HUC6 watersheds. Limited trips to the Harris Fire area were not comprehensive, but did reveal relatively limited hazard due to sparse vegetation, sparse and rural human habitation, and rocky terrains.

USGS and NOAA produced a report in 2005 (USGS circ 1283) that relates localized precipitation intensity to flooding and debris flow hazards. It suggests that for the San Diego County area two to three day forecast products for precipitation events exceeding 0.25 in/hr be developed to produce 24 hour notice to local Public Works and Roads Divisions, Sheriff's Communication offices, EOC, and Flood Control officials (i.e the ALERT system). Potentially affected communities could then be warned about moderate to severe flooding and associated debris flow events.

E. Values-at-Risk

The BAER team identified potential risks to life, property and resources prior to performing field surveys. These values are generally categorized as:

1. Reservoirs
2. Water Transmission Facilities
3. Buildings located on erodible slopes
4. Buildings located in drainages below steep, burned slopes
5. Structures adjacent to river and creek channels
6. State Highways
7. County and local Roadways
8. Water quality impacts
9. Soil resources

II. BAER Team Field Survey Results

A. Soil Conditions

Several hydrophobic soil tests were conducted in the Cottonwood Creek, Potrero Creek, and Campo Creek watersheds. The test procedure was to scrape the upper layer of ash away with a trowel and test with water at the bare mineral soil surface. Several additional tests were then conducted at a depth of one to two inches into the soil profile (NRCS 2000). Water drops remaining on the soil surface for more than 40 seconds rates the soil as highly hydrophobic, 10 to 40 seconds as moderately hydrophobic, and less than 10 seconds as having low hydrophobicity (Frazier 2002). Test results were variable dependent on local fire and soil conditions although there may be a correlation between slope aspect and hydrophobicity. For example in the Campo Creek watershed near the ignition source hydrophobic tests were generally low on the eastern slope of a ridge and dramatically higher on the crest and western

slope. This may be because the fire was driven by high winds that rapidly spread the fire up the eastern slope whereas the fire burned more slowly on the crest and lee side of the ridge, allowing volatilized resins a longer time to penetrate into the soil.

B. Fire Impacts to Values-at-Risk

1. Reservoirs

The Harris Fire perimeter contains three reservoirs that provide water supply to urban populations, help to alleviate flood risk, and provide recreational opportunities for local communities. The reservoirs are listed as impaired water bodies with the State Water Resources Control Board on the 303(d) list. These reservoirs may be at increased risk for erosion on embankment slopes, sedimentation, debris and ash accumulation, water quality, and slope stability issues.

The state Burned Area Emergency Response (BAER) team assigned to the Harris Fire inspected the burned area November 12, 2007 through November 17, 2007, both as an entire team the first day and as specialist groups over the next five days. All the significant portions of the burn area were observed for potential impacts to structures, roads, soil and water resources, as well as identified values-at-risk. Areas inspected included Barrett Lake, Lower Otay and Sweetwater Reservoirs, and their surrounding watersheds. The sites visited all had drainage facilities in place to handle storm runoff under normal conditions. Watershed response to precipitation events is expected to increase in the regions inspected during the recovery period. Additionally, ash and sediment could be entrained and mobilized with initial precipitation events compounding flooding due to blockage of hydraulic structures such as drains and culverts.
(For additional details reference the Engineering specialty report)

2. Water Conveyance Facilities

The Dulzura Conduit (Barrett to Lower Otay). The Dulzura Conduit was constructed in 1922 and is owned by the City of San Diego. It consists of an 11-mile reach of covered and uncovered concrete flumes, tunnels and siphons that extend along the northern slope of Dulzura Creek from Barrett Lake to Lower Otay Reservoir. It may be at additional risk of damage by an increase in rockfall and debris flows because of increased runoff and the loss of vegetation support to the slope.

3. Buildings Located on Erodible Slopes

Houses located on erodible slopes and/or adjacent to gullies may be impacted by erosion from increased post-fire runoff (for additional details reference the Engineering specialty report).

Example:
Single family residence: Lat. N 32.70528˚/Long. W 116.40254˚
Engineered fill that supports a residence on a steep hill slope adjacent to intermittent stream could be compromised from increased flow.

4. Buildings Located at the Toe of Slopes

Several residences located within drainages below steep burned slopes may be affected by excess runoff carrying sediment. Falling and rolling rocks may become a hazard as soil becomes saturated and erodible during significant storm events (for additional details reference the Engineering specialty report).

Examples include:

a. Single family residence Lat. 32.70871/Long. 116.83642
Runoff from the surrounding upland funnels down a drainage within 40 feet of the house. Owner has installed culverts and other measures to address the runoff issue. However, increased erosion rates may overwhelm the existing structure and may pose a high risk to the house.

b. Single family residence Lat. N 32.66441˚/Long. W 116.78773˚
Runoff from the surrounding upland is intercepted by a newly cut in -sloped access road and is funneled down to the driveway to the north. This along with the water that is already directed to the driveway from properties to the north could cause increased erosion down the driveway.

c. Multiple Mobile Homes Lat. N 32.xxxxx˚/Long. W 116.xxxxx˚
A group of mobile homes are located at the toe of a steep west-facing slope scattered with loose granitic boulders that have weathered out of bedrock near the ridge top and rolled downslope. These large boulders will pose a high risk to the homes if mobilized by a significant storm event. Additional runoff and slope erosion may also impact the residences.

5. Structures within the Special Flood Hazard Area

A number of structures within the burn area lie adjacent to or within the Federal Emergency Management Agency (FEMA) SFHAs or what is known as FEMA's floodplains or floodways. Structures existing in these low lying drainage areas are subject to flood risk based on the FEMA Flood Insurance Rate Maps (FIRM) developed for the County of San Diego. If the watersheds areas were damaged by the Harris Fire, the watercourses and the structures constructed within them, are now subject to higher flood risk because of the lack of vegetation, potential increase of sediment, ash, and debris within the channels that could cause increase flood heights and overtopping of levees, berms and channels. For potential risk, impacts, and treatment of structures within the SFHA a detailed write-up is included within the Engineering Section of this report.

Flooding may occur not only because of the overwhelming of drainage facilities by increased runoff, but also because of the increase in sediments, ash and debris that will impact riverine systems, roadway culverts and low-lying structures. The flooding also could affect water quality at specific sites and downstream along the draining waterway creating significant secondary concerns. The BAER team engineering specialist determined that the areas with highest potential risk to values were the Barrett Lake, Lower Otay and Sweetwater Reservoirs, structures adjacent or within a SFHA, and culvert sediment basins located on major State, County or local roads.

For potential risk, impacts, and treatment of structures within the SFHA reference the Engineering specialty report.

6. State Highways

Caltrans Highway 94 embankments may erode and existing drainages may become overwhelmed as excess inflows resulting from the fire damaged areas carry sediment and/or debris from outside as well as within the Caltrans right-of-way easements. A similar situation may occur on Highway 188, although to a lesser extent due to the gentler slopes.

7. County and Local Roadways

County-owned roadways such as Skyline Truck Trail, Lyons Valley Road, Honey Springs Road, Otay Lakes Road, and Barrett Lake Road may be subject to inundation in some areas due to existing drainage structures becoming overwhelmed by increased streamflows carrying sediment and/or debris. The roads, particularly Barrett Lake Road, could also be impacted by rock falls and earth slides originating from slopes immediately above the roads. County and private roads in the communities of Dulzura, Engineer Springs, Barrett Junction, Potrero and Tecate may also be subject to minor to moderate sedimentation due to increased erosion in the adjoining areas. Access for border patrol and fire response roads along the Mexican border may be interrupted due to washouts or overwhelmed drainage structures.

8. Water Quality Impacts

Water quality will be affected by polluted water runoff containing ash and soil, as well as hazardous waste runoff from burned homes, vehicles, and public facilities. The proximity of the fire on the slopes of San Miguel and San Ysidro Mountains to water supply reservoirs serving large numbers of people may require monitoring and mitigation to prevent costly reductions in water quality.

a) Burned Mobile Homes Lat. N 32.62238˚/Long. W 116.68899˚
A group of about 40 mobile homes burned during the fire. Runoff from the site could pose a high risk to both ground and surface water quality.

9. Soil Resources

A minimal percent of the fire burn is used for agriculture. Increased erosion potential caused by excess runoff from hydrophobic soil conditions and reduced vegetative cover will deplete soil resources

III. TREATMENTS FOR VALUES AT RISK:

A. Reservoirs

1. Sweetwater Reservoir

Type: Silt fencing, straw bale dikes, sand bagging, and K-rails. Trash rack protection at pipe/culvert intakes. Monitor and maintain drainage structures and channels free of debris before, during, and after rainstorm events.

Objective: Protect drainage facilities from sediment/debris obstruction and prevent runoff flows from entering the reservoir.
Description: Place silt fencing, straw bale dikes, filled sandbags, and K-rails to direct sediment/debris flows away from drainage structures and deflect excess runoff from entering the reservoir. Installation direction is provided in NRCS publications that are attached to this report (www.ca.nrcs.usda.gov). Trash rack protection upstream of drainage pipes and culverts should deny entry of debris large enough to lodge within the pipe or culvert. Crews should be dedicated to monitoring and maintaining the drainages free of obstruction.
Cost: Cost will vary depending on method used. Judgment is needed to provide effective choice and placement of mitigation measures and needs may vary over the site. Monitoring and maintaining the drainage facilities free of obstruction are to be provided by the Fallbrook PUD (owner) forces.

2. Upper and Lower Otay Water District Reservoirs

Type: Jute netting, fiber rolls, hydromulching.
Objective: Prevent erosion of dam embankment slopes.
Description: Place jute netting, fiber rolls, hydromulching on burned slopes to prevent erosion. Installation direction is provided in NRCS publications that are attached to this report (www.ca.nrcs.usda.gov).
Cost: Cost will vary depending on method used and area covered.

B. Water Transmission Facilities
Some portions of the Dulzura Conduit are at risk, see the Geology specialty report for details.

Type: Fiber rolls, hydroseeding/hydromulching. Native sand/gravel bag emplacement along ravines for sediment retention. Monitor and maintain drainage and debris catchment structures before and after storm events to keep them clear of sediment and debris

Objective: Prevent soil loss and erosion and/or slope instability that may lead to undermining the structure foundation.
Description: Place sand bags, straw bale dikes, v-ditching, diversion ditching, and deflector walls to control excess runoff. Place straw bale dikes, fiber rolls, jute netting, coconut fiber mats, riprap, mulching hydromulching to prevent progressive erosion on slopes. Installation direction is provided in NRCS publications that are attached to this report (www.ca.nrcs.usda.gov).
Cost: Cost will vary depending on site and slope conditions, area covered, and pre-existing conditions.

C. Houses Located on Erodible Slopes
Some locations are at high risk, see the Geology specialty report for details.

Type: Sand bags, straw bale dikes, v-ditching, diversion ditching, fiber rolls, jute netting, coconut fiber mats, retaining walls, deflector walls, riprap, mulching,

hydromulching. Use of San Diego County Flood Control District system ALERT rain gages for early warning from severe storm events.[4]

Objective: Prevent soil loss and erosion and/or slope instability that may lead to undermining the structure foundation.
Description: Place sand bags, straw bale dikes, "V"-ditching, diversion ditching, and deflector walls to control excess runoff. Place straw bale dikes, fiber rolls, jute netting, coconut fiber mats, riprap, mulching hydromulching to prevent progressive erosion on slopes. Installation direction is provided in NRCS publications that are attached to this report (www.ca.nrcs.usda.gov).
Cost: Cost will vary depending on site and slope conditions, area covered, and pre-existing conditions.

D. Buildings Located at the Toe of Slopes
Some locations are at high risk, see the Geology specialty report for details

Type: Obtain professional assessment of landslide risk. Awareness of the hazard and evacuation plan. Retaining walls, deflection walls, sand bags, straw bale dikes, v-ditching, diversion ditching, fiber rolls, jute netting, coconut fiber mats, debris fences, mulching, hydromulching. Removal/modification of hazardous obstructions in drainages.
Objective: Prevent soil loss and runoff, erosion, and/or slope instability that may affect the structure. Protect the structure from runoff, debris slide, mudflow, or landslide.
Description: Be prepared, place erosion and landslide deflection devices as prescribed by a hired state-licensed engineering geologist, and/or the NRCS or California Geological Survey (CGS) publications (see attached CGS Note 33). Evaluate man-made obstructions in drainages.
Cost: Cost will vary depending on existing conditions and professional assessment.

E. Buildings Adjacent to Creek Channels
(Some locations may be at risk, see the Engineering specialty report for details)

Type: Early warning devices such as San Diego County operated ALERT rain gauges. Trash rack protection of drainage culverts/pipes. Monitor and maintain drainage and debris catchment structures before and after storm events to keep them clear of sediment and debris. Evacuation plan and recognition of potential hazards. Other measures developed by the appropriate public emergency services (see Engineering Resource Report).
Objective: To the extent possible, prevent loss of life and property in flood channels.

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[4] San Diego County Flood Control District operates ALERT rain gages in the area. ALERT systems are used to provide real-time flood warning to local communities at risk from flooding threat. Changes in rainfall levels throughout San Diego County are transmitted by radio to mountaintop repeaters, which in turn relay the transmission to the District Flood Warning office in Kearny Mesa. The radio signals are intercepted and also relayed by independent radio repeaters to the National Weather Service in San Diego.

Description: Utilize existing early warning devices (ALERT rain gauges) in the Harris Fire area during the rainy season per professional assessment and have an evacuation plan. Design and install trash racks and sediment/debris catchment basins per professional assessment. Develop evacuation plans and educate the public regarding potential flood hazards. Involvement of appropriate public emergency services is recommended.
Cost: Unknown, but potentially significant.

F. Caltrans Highway 94

(Some reaches of the highway and associated culverts are at risk, erosion and sedimentation issues are currently being addressed by Caltrans, Note the survey teams did not observe any CalTrans rockfall mitigation measures)

Type: Fiber rolls, hydroseeding/hydromulching. Native sand/gravel bag emplacement along ravines for sediment retention. Monitor and maintain drainage and debris catchment structures before and after storm events to keep them clear of sediment and debris. Recognition of potential hazards to the public and a highway closure plan. Other measures developed by the appropriate public emergency services organizations.
Objective: Prevent erosion and debris slides affecting the highway and easements, and minimize sediment/debris runoff (bulking) impacts to the highway drainage systems. Prevent potential hazards to the public in case of debris slides and drainage system failure.
Description: Install erosion control measures, and sediment/debris control structures per professional assessment. If not already in place, develop highway closure plan if potential hazards are identified.
Cost: Variable depending on the area size and number of affected drainage structures. Cost will be significant due to the large area affected.

G. Roadways

1. County and Local Roadways
(possible emergency - addressed by San Diego County Public Works?)

Type: Fiber rolls, hydroseeding/hydromulching, K-rails, sandbagging. Trash rack protection of drainage culverts/pipes. Monitor and maintain drainage and debris catchment structures before and after storm events to keep them clear of sediment and debris. Recognition of potential hazards to the public and a road closure plan. Other measures developed by the appropriate public emergency services organizations. Public education to reduce sediment/debris impacts from outside the roadway easements.
Objective: Prevent erosion and debris slides affecting the roads and easements, and minimize sediment/debris runoff (bulking) and overflow impacts to the road drainage systems. Prevent potential hazards to the public in case of debris slides and drainage system failure.
Description: Install erosion control measures, and sediment/debris control structures per professional assessment. If not already in place, develop road closure plans if potential hazards are identified.
Cost: Variable depending on the area size and number of affected drainage structures. Cost will be significant due to the large area affected.

2. Border Access Roads for Border Patrol and Fire Response
(possible emergency and national security)

Type: Increased road maintenance including debris and sediment clearing/removal from road drainage structures. Installation of additional drainage structure(s).
Objective: Mitigate anticipated increased sediment accumulation along road drainage and reduce risk of road washouts.
Description: Increase regular road maintenance schedule and install additional road drainage structures (i.e., culverts) as necessary..
Cost: Cost will be minor to moderate depending upon amount of increased erosion and sedimentation.

3. Graded Utility Access Roads
(increased runoff and sedimentation could impact adjacent highways, roads and structures)

Type: Increased road maintenance including debris and sediment clearing/removal from road drainage structures. Installation of additional drainage structure(s).
Objective: Mitigate anticipated increased sediment accumulation along road drainage and reduce risk of road washouts.
Description: Increase regular road maintenance schedule and install additional road drainage structures (i.e., culverts) as necessary..
Cost: Cost will be minor to moderate depending upon amount of increased erosion and sedimentation.

H. Water Quality Impacts
(high risk of point source pollution of groundwater and regional impact to stream water quality)

Type: Public education regarding removal of burned hazardous waste, erosion protection, water control, public services support for removal hazardous waste (note all subdrainages are 303d?)(San Diego County is a resource for this). Other measures developed by the appropriate public services.
Objective: Protect water quality to the extent possible from polluted water runoff containing ash and earth, as well as hazardous waste runoff from burned homes, vehicles, and public facilities, particularly in the 303(d) listed Rainbow Creek drainage.[5]
Description: To the extent possible reduce water quality impacts by providing education and support to the public in this regard.
Cost: Unknown.

I. Soil Resources

[5] The California Regional Water Quality Control Board, San Diego Region (Regional Board) has adopted Total Maximum Daily Loads (TMDLs) for Total Nitrogen and Total Phosphorus to address water quality impairments in Rainbow Creek. A TMDL allocates pollution control responsibilities among pollution sources in a watershed, and is the basis for taking the actions needed to restore a water body.

(high risk but minimal agricultural use)

Type: Public education regarding erosion protection, water control, removal of burned hazardous waste, and public services support for removal of hazardous waste (San Diego County is a resource for this). Other measures developed by the appropriate public services. NRCS will be a valuable resource for protection of soil resources.
Objective: Protect soil resources to the extent possible from excess runoff, pollution, and erosion.
Description: To the extent possible reduce impacts to soil resources by providing education and support to the public.
Cost: Unknown.

IV. Summary and Recommendations

The Harris Fire burned primarily at low-to-moderate intensity through rural Southern San Diego County adjacent to the Mexico border. Some of these areas were recognized by the BAER survey teams as having burned at a higher intensity than initially indicated by the BARC mapping.

Quick modeling of the burned watersheds indicate post-fire peak flows may be expected to increase by a factor of up to 2.5 and that sedimentation loading may be increased by a factor of 1.3 to 9.7. Sediment yields for the first winter are projected to be significantly increased and close monitoring may be helpful to avoid damage to downstream communities and property. New stream gages and an early warning system to identify risk of erosion hazard with incoming precipitation should be considered.

Pre-survey issues identified by the BAER hydrology sub-team included an increased rockfall hazard to Hwy 94 between Potrero and Barrett Junction, higher burn intensities than shown on the BARC map, potential closure of Border Patrol and fire response roads adjacent to the Mexico border, and imminent threat to unburned structures. Actual windshield and aerial surveys confirmed that the risk of rockfall to Highway 94 will not be significantly greater than the pre-fire risk, confirmed higher burn intensities, alleviated concerns that sections of the Border Patrol and fire response roads could be closed, confirmed that several unburned structures will be at risk from slope erosion and debris flows during the next significant storm event.

The team recognizes that some treatments may not be implemented timely enough to reduce the risk to property and resources. It also recognizes that the County and Caltrans are actively identifying, assessing and mitigating additional risks resulting from the Harris Fire.

Finally, note that the hydrology sub-team collected a great quantity of additional field notes, maps, ground and aerial photographs that have been archived. Contact the authors if these additional resources are needed.

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Burned Area Emergency Response Specialist Report

Resource: Safety

Incident: Harris Fire CA-MVU-010427

Month/Year: November 2007

Author: Richard G. Eliot, Division Chief/Reforestation
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I. Situation

Watershed Assessment on the 90,440 Acre Harris Fire, San Diego, CA. Personnel were assigned to the Incident Command Post (ICP) located at the San Diego Unit Headquarters, El Cajon, California. Team 11 Leader, Herb Dallas.

The Incident Command Post is located at 2249 Jamacha Road, El Cajon, CA, 92019. The incident was located southeast of the ICP with State Highways 94 and 188 (Tecate Road) used for main access. The southern edge of the incident bordered Mexico.

II. Objective

To provide Safety and Security for the incident personnel while assessing the increase threats to life, property and resources at risk as a result of the after-effects of the fire. Specifically increased runoff, mudflows, landslides or rock falls as well as increased sediment impacts to wildlife and aquatic habitat, water quality, plants, agricultural and/or archaeological resources may also be impacted by mitigations proposed.

III. Emergency Determinations and Treatments to Mitigate the Emergency

A. Driving Hazards

Hwy 94 and 188 are commuter routes that have tourist and motorcycle traffic traveling at high speeds on narrow, windy mountain roads with poor line of sight visibility during the weekends and holidays.
Actions: Maintain flow of traffic; avoid stopping and looking unless well off the roadway and use reflective safety vests while waking along highways.

B. Terrain Hazards

Steep uneven terrain with loose rocky soils and the potential for deep ash layers and burnt out stump holes.
Actions: Wear lug soled, high top boots, watch footing and avoid stepping into ash pockets.

C. Residential Hazards

Burned homes or buildings with the potential for puncture wounds, tripping, falling, unstable debris, falling objects and toxic substances.
Actions: Wear boots, long sleeve shirts, gloves and hard hats where necessary. Avoid walking on debris that may be unstable or contain items that may cause puncture wounds or contamination from toxic materials.

D. Animal or Plant Hazards

Rattlesnakes and poison oak were initially identified as hazard, but none were found. Pets found at homes could also be a concern.
Actions: Wear high top boots & long sleeve shirts and maintain close attention when walking in rocky or brushy areas. Make initial size up of homes approach to determine if problem dogs or other pets may be on property prior to entry. Contact owners if necessary.

E. Weather Hazards

Hot, dry and windy conditions are predicted.
Actions: Wear appropriate clothing to protect against sunburn, use sunscreen, stay hydrated, and carry & use dust masks in windy, dusty conditions due to significant ash layer from the fire becoming airborne.

F. Overhead Hazards

Watch for falling objects.
Actions: Wear hard hats as needed and pay close attention when working in and around trees that may have been compromised by fire.

G. International Traveler Hazards

Be aware of international travelers crossing the border.
Actions: Avoid contact unless necessary to preserve their safety. Note location and provide the information to the border patrol if possible. In case of finding deceased humans in the fire area, call local police and report the location. Stand by for a report.

H. Illegal Drug Activity Hazards

In several areas of the incident, drug dealing and or production has been noted.
Actions: Pay close attention to inspections around homes and in remote areas. Stay clear of dumped containers that could contain toxic chemicals. Do not open or attempt to detect odors. If found, report to local authorities.

I. Home Inspection Hazards

Inspecting homes in area and meeting with home owners.
Actions: First attempt to contact homeowners before doing any inspections. Show identification, explain the reason for your visit, note if they may be armed and leave immediately if requested. Note any property of concern where entry was denied and note a description or name of the individual contacted with, the time of contact, and the location of the property.

J. Helicopter flight Hazards

Actions: Ensure proper personal protective equipment (PPE) is obtained prior to the flight and follow the directions of the flight crew.

IV. Communications

Agency	Contact Information	Miscellaneous
Monte Vista ECC	(619) 401-7787	HT Channel Tac 5
San Diego County Sheriff	(858) 565-5200	
California Highway Patrol	(619) 401-2000	
Border Patrol - El Cajon	(619) 258-4500	
Team Leader - Herb Dallas	(858) 722-4406	
Grossmont Hospital	(619) 740-6000	5555 Grossmont Dr. La Mesa, CA, 91942 North of the junction of Highways 125 and 8.
Emergency	911	

Burned Area Emergency Response Specialist Report

Resource: Wildlife

Incident: Harris Fire CA-MVU-010427

Month/Year: November 2007

Author: Erinn Wilson, Wildlife Biologist,
California Department of Fish and Game
4665 Lampson Avenue,
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Office: (562) 342-7155

General Resource Setting

The 90,440-acre Harris Fire burn area consists of the mountains and rolling hills and valleys east of San Diego and Chula Vista. The fire burned across several state, federal, and private conservation lands. State lands include Rancho Jamul Ecological Reserve and Hollenbeck Canyon Wildlife Area and portions of Otay Mountain Ecological Reserve. Federal lands include Cleveland National Forest, Otay Wilderness Area, South San Diego Wildlife Refuge, and Mount Miguel Wildlife Refuge. Significant local and private conservation lands include Sweetwater Reservoir, and the City of San Diego's Marron Valley. The western portion of the fire, roughly west from Barrett Junction, is included in the approved South San Diego County Multiple Species Conservation Plan (SCMSCP] South County MSHCP, March 1998). The eastern portion is located in the East County MSCP, which is not completed at this time.

I. Potential Values at Risk

This report assesses the effects of the Harris Fire and the proposed effects of the Burned Area Emergency Response (BAER) treatments to several state and federally listed endangered or threatened species, State Species of Concern, and "Covered Species" (California Department of Fish and Game website) of the SCMSCP (see table 1 below). Several additional sensitive species are known to occur within the burn area (see attached California Natural Diversity Database Map); however, risks to these species were not analyzed in this report due to the low probability of a significant risk from the fire.

II. Resource Condition Assessment

A. Resource Setting

The Harris Fire is located in the southeast portion of San Diego County, along the United States/Mexico border. Due to the topography, elevation, and marine influence the habitats within the Harris Fire vary dramatically from west to east. The western half of the fire, roughly delineated by the SCMSCP boundary, is dominated by low growing sage scrub, with grasslands and chaparral (in the higher elevations). Vernal pool habitat occurs in Marron Valley and southwest of Otay Lakes. The riparian areas of the western half of the fire consist of two different habitat types:

Willow (*Salix* sp.) and mulefat (*Baccharis salicifolia*) dominated riparian around Otay Lakes and Sweetwater Reservoir, and the more interior riparian habitats that are dominated by Coast live oaks (*Quercus agrifolia*) and California Sycamore (*Platanus racemosa*).

Desert chaparral and oak woodlands dominate the eastern half of the Harris Fire. The riparian habitat within the drainages of the east half of the fire are predominantly vegetated with oak and sycamore with small patches of willow riparian in several locations. Wildlife species affected by the fire include sage scrub species, desert chaparral species, and riparian species.

Table 1 – Values at Risk

Common Name	**Scientific Name**	**Status**
Arroyo toad	*Bufo californicus*	Federal Endangered, State Species of Concern, SCMSCP Covered Species
Coastal cactus wren	*Campylorhynchus brunneicapillus*	State Species of Concern SCMSCP Covered Species
Coastal California gnatcatcher	*Polioptila californica californica*	Federal Endangered SCMSCP Target Species
Hermes Copper	*Lycaena hermes*	Federal Species of Concern, SCMSCP Covered Species
Least Bell's vireo	*Vireo Bellii pusillus*	State and Federal Endangered SCMSCP Target Species
Quino checkerspot butterfly	*Euphydryas editha quino*	Federal Endangered, SCMSCP Target Species
Thorne's hairstreak	*Callophrys thornei*	SCMSCP Target Species

<u>Sage scrub/chaparral species of special interest include:</u>
Coastal cactus wren (cactus dominated sage scrub)
Coastal California gnatcatcher
Quino checkerspot butterfly
Thorne's hairstreak

<u>Riparian Species include:</u>
Arroyo toad
Least Bell's vireo

B. Findings of the On-the-Ground Survey

2. <u>Resource condition resulting from the fire</u>

<u>Upland Habitats</u>

Within the western half of the fire, upland habitats (i.e., grasslands and sage scrub) generally burned at a low severity. Several locations including Otay Lakes, Marron Valley burned in a mosaic pattern leaving a majority of the areas of brush unburned.

Areas north of Sweetwater Reservoir and River, on Sweetwater Authority and U.S. Fish and Wildlife Refuge (Mount Miguel), including a significant portion of the willow riparian habitat, burned at a moderate severity. The recent burn of these areas in 2003 can account for the low severity of the burn from the Harris Fire.

Within the eastern half of the fire, desert chaparral and oak woodland habitats generally burned at a moderate severity; however, there were significant areas of low severity burn, primarily throughout the southeastern half of the fire. The canyons on the northern portion of the fire including; Lake Barrett, Rattlesnake Canyon, Echo and McAlmond Mountains, and the slopes north of Tecate Peak burned at a moderate severity, while Potrero and Tecate burned with a lower severity.

Riparian Habitats

Riparian habitats within the western half of the fire generally burned at a low severity; however, riparian areas at Sweetwater Reservoir and lower reaches of Dulzura Creek, dominated by willow species and mulefat, burned at a moderate severity. On the eastern half of the fire, the burn severity within riparian was mixed. Larger riparian corridors of Cottonwood Creek, Dulzura Creek, and Grapevine Creek generally burned at a low severity with only patches of moderate severity, while smaller riparian systems dominated by smaller oaks (*Quercus berberidifolia*) burned at a moderate severity.

2. Potential Consequences of the fire on values at risk

Upland Species

Sage scrub-dependent bird species, including coastal California gnatcatcher, recover quickly from fire as the sage scrub recovers within one to five years after the fire. Areas which have recently burned may be slower to recover and have the potential to convert to non-native grasslands. Based on the low severity and patchy nature of the burn throughout the sage scrub habitat, most upland bird species, including gnatcatcher, are at a low risk of extirpation from the fire. Coastal cactus wren, a cactus/sage scrub-dependent species, however, recovers much slower. Cactus scrub must be taller then three feet to support wrens. Data from the Laguna Fire of 1993 demonstrated a 58 percent decline in the wren populations, 13 years following the Laguna Fires (Mitrovich and Hamilton, 2006). Because of the long recovery period for Coastal cactus wren, and the amount of habitat lost throughout southern California in the 2007 fires, the Coastal cactus wren is at high risk of extirpation from the fire.

Two sensitive butterfly species are known to occur within the fire area. The Quino checkerspot butterfly occurs in open sage brush/chaparral habitats within the hills north and south of Otay Lakes Road and east near Barrett Junction. The exact effects of the fire on Quino checkerspot butterfly larvae are unknown, due to insufficient data; however, in areas of low to patchy burn, it is expected that some larvae survived the fire. In areas of moderate burn, the potential for survival of the larvae remain questionable. Post fire recovery in low burn areas could see a spike in population if availability of the herbaceous host plants, Dwarf plantain (*Plantago erecta*) or exserted Indian paintbrush (*Castilleja exserta*), are abundant after the fire. Due to the species' already limited range and the temporary loss of a significant

amount of habitat, the Quino checkerspot butterfly is at high risk from extirpation from the fire.

Thorne's hairstreak is only known to occur within the Tecate cypress forests of Otay Mountain. Because the Tecate cypress is the host plant for the Thorne's hairstreak, the loss of Tecate cypress could result in a direct loss in habitat for Thorne's hairstreak (Center for Biological Diversity Website). Although a major portion of the extant Otay Mountain Tecate cypress population was not burned in the 2007 fire, several smaller stands of mature trees along the southeastern slopes of Otay Mountain were burned. Thorne's hairstreak is at a high risk of extirpation because of its dependence on Tecate cypress as a host plant. This risk is further compounded by the risk to Tecate cypress from extirpation due to increased fire frequency, including extensive damage to Tecate cypress from the 2003 Otay Fire (see section on Tecate cypress in the Botany Technical Report).

Reptile species including Red diamond rattlesnake and Orange-throated whiptail, and small mammal species such as the San Diego woodrat, likely sustained some mortality as a direct result of the fire; however, based on the low severity of the burn in suitable habitat, these species are at low risk from the fire.

Mountain lions, deer, and mesopredators including bobcat, coyote, and grey fox will typically survive the initial fire event, only to starve in the following year, as food resources are scarce. Based on the low to moderate severity of the burn, and observed evidence of wildlife, and wildlife movement throughout the burn area after the fire, large mortalities of mountain lion, deer, and mesopredators after the fire are not anticipated.

Riparian Species

The state and federally listed endangered Least Bell's vireo is a spring breeding migrant to several willow riparian vegetated drainages throughout the burn area. Sweetwater Reservoir is the largest population of nesting Vireo within the burn area. Willow riparian habitat in these areas burned at a moderate severity. Because Least Bell's vireo is a spring migrant, no direct impacts to the species occurred during the fire. Indirect impacts will occur when Least Bell's vireo return in spring 2008 and find minimal to no suitable nesting habitat to produce offspring. Because the Sweetwater Reservoir is known to support a significant San Diego population of the species, the species is at high risk from the fire.

Arroyo toad, known to occur in Potrero Creek and Upper Cottonwood Creek (near Lake Barrett) and lower Cottonwood Creek (west of Marron Valley), likely survived the initial fire, but could be impacted by extensive sedimentation after the fire. Forage and breeding habitat in burn areas is likely to be significantly reduced in quality until debris/sediment flows are normalized. Shallow breeding pools may be inundated with sediment / silt. Heavy post-fire sedimentation within these creeks or post-fire remediation within these creeks could pose a high risk for indirect impacts to the Arroyo toad.

III. Emergency Determination

The fire burned a significant portion of the conserved land in southeastern San Diego County. Some areas that burned in the 2003 Otay Fire are at a risk from

habitat conversion, which may reduce the possibility of full recovery to pre-fire habitat condition. Several species may be at risk from long-term displacement or extirpation from the burn areas.

IV. Treatment to Mitigate the Emergency

A. Treatment Type

Methods of treatment for burn areas include:

- Implement appropriate BMPs upstream of sensitive riparian habitats to minimize sediment load.
- Conduct revegetation efforts where appropriate to promote rapid recovery of native habitats.
- Conduct post fire population surveys for wildlife species.
- Conduct long-term monitoring of key species to document long-term population trends as a result of the fire.
- Coordinate local agency activities during maintenance activities to avoid, minimize, and mitigate additional impacts to species.
- Repair fencing along major roads to reduce further damage to recovering habitats from expected OHV and foot trespass.

B. Treatment Objective

The treatment objectives are to monitor wildlife populations and encourage adaptive management of sensitive wildlife species both within the SCMSCP, pending East County MSCP Area, and on private land.

C. Treatment Description

Erosion Control

- Oak slash should be left in place if possible/feasible.
- Stabilize slopes between 20 and 50 percent, where feasible, with biodegradable matting or geotextiles to limit slope erosion while also limiting impacts to recovering native vegetation and wildlife habitat.
- Avoid use of hydroseed and hydromulch. Hydromulch and hydroseed are ineffective as there is a lack of soil moisture for them to be efficient, they inhibit natural recruitment from the native seed bank, and they introduce exotic weed species into the native habitat.
- Prior to any work within Potrero and Cottonwood Creek, surveys should occur for Arroyo toad. Potrero and Cottonwood Creeks are designated as Critical Habitat by U.S. Fish and Wildlife Service and Toads are known to occur within both creeks throughout their reaches.
- Vegetation important to sensitive species (e.g., Quino checkerspot butterfly and California gnatcatcher), especially unburned habitat in known nesting or foraging territories, should be avoided to the greatest extent feasible.
- Use appropriately sized culverts when replacing or improving drainage structures. Vegetation clearing required within culverts and drainages should be restricted to amounts necessary as to not impede flow.

- Vegetation clearing should be limited to the smallest area feasible to accomplish activities safely. Vegetation important to sensitive species (e.g., Quino checkerspot butterfly, California gnatcatcher, and Least Bell's vireo), especially unburned habitat in known nesting or foraging territories, should be avoided to the greatest extent possible.

- Invasive exotic plant species should not be planted, seeded or otherwise introduced. Exotic plant species not to be used include those species listed on Lists A & B of the California Invasive Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California as of October 1999." This list includes such species as: pepper trees, pampas grass, fountain grass, ice plant, myoporum, black locust, capeweed, tree of heaven, periwinkle, sweet alyssum, English ivy, French broom, Scotch broom, and Spanish broom. A copy of the complete list can be obtained by contacting the California Invasive Plant Council at 1442-A Walnut St. #462, Berkeley, CA 94709, or by accessing their web site at http://www.cal-ipc.org

Revegetation of Native Habitat

- Revegetate riparian habitats in burn areas to encourage habitat regrowth for Least Bell's vireo. Riparian vegetation will promote soil stabilization as well as provide refugia for wildlife species.

- Hand broadcast Quino checkerspot butterfly host plant in suitable habitat. The larvae may use either Dwarf plantain or exserted Indian paintbrush, both of which may be common in meadows and upland sage scrub/chaparral habitat (The Butterfly Conservation Initiative, 2006). Additional sage scrub seeds may also be broadcast in more disturbed areas to promote regrowth of suitable habitat.

Population surveys and long term monitoring

- Conduct long-term bird monitoring for coastal California gnatcatcher and Cactus wren throughout the burn area to evaluate the likelihood of direct mortality, the extent of duration of displacement, and the rate and extent of recovery of lost habitat.

- Conduct spring Vireo surveys within all willow riparian systems in the burn area to determine extent of loss of occupied habitat. Monitor this long term to assess recovery of occupied habitat within the burn area.

- Conduct long-term small mammal monitoring throughout the burn area to evaluate mortality rates from the fire.

- The Department of Fish and Game should be consulted regarding the protocols and season of wildlife surveys.

- Document unburned habitat and monitor for use by sensitive species.

Local agency Coordination

- Local agencies and jurisdictions should coordinate activities with Wildlife Agencies to avoid, minimize, and mitigate impacts to sensitive species during post-fire recovery efforts.

- Coordinate local jurisdiction and private landowner activities within riparian areas and in listed and "covered species" habitat to address wetland permitting (including, but not limited to Department of Fish and Game, Regional Water Quality Control Board, and U.S. Army Corps of Engineers) and California and Federal Endangered Species issues.
- Resource Agencies including Department of Fish and Game and U.S. Fish and Wildlife Service should be consulted regarding the suite of species, appropriate vegetation protocols, and season for re-vegetation efforts.
- Recommend the above-mentioned government and non-government groups mutually staff and participate on a Harris Fire recovery and remediation Team, commencing with the ending of the BAER Team. This will facilitate coordination, timeliness and environmental sensitivity of the projects that have been / will be proposed for the burned area's watershed.

V. References

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The Butterfly Conservation Initiative, 2006, http://www.butterflyrecovery.org/species_profiles/quino_checkerspot/

VI. Appendices

Appendix 1: General BMP Recommendations

Appendix 1

General BMP Recommendations

Post Fire Recommendations,

Measures and Best Management Practices

General Categories

- **I.** General
- **II.** Wildlife
- **III.** Birds
- **IV.** Herptiles
- **V.** Invertebrates
- **VI.** General Erosion Control
- **VII.** Equipment Use, Maintenance, Pollution, Litter and Education
- **VIII.** Wetlands – CDFG Jurisdictional General
- **IX.** Streams and Associated Habitats

(Note: Some measures are repeated in multiple categories)

I. General – Applicable to all projects

A. A qualified biologist (wildlife) should be present on site for the duration of the project to monitor activities and ensure all practicable measures be employed to minimize impacts when working in areas with listed animals.

B. Resource monitoring is recommended in all areas with listed and/or sensitive species to examine the natural rehabilitation.

C. Construction activities should avoid impacts to any existing stands of unburned native resources in a burned area (e.g. shrubs). Such habitat should be adequately marked.

D. Removal of native vegetation should be avoided and minimized. Temporary impacts should be returned to pre-existing contours and re-vegetated as appropriate.

E. The construction footprint should be minimized to the maximum extent feasible. Access to sites should be via pre-existing access routes to the greatest extent possible.

F. Oak slash should be left in place if possible/feasible.

G. Some burned standing trees should remain, when safe, to provide habitat for cavity nesting for bird species.

H. Conservation of the seedbank is critical to the survival of many special status plant species.

I. If any wildlife is encountered during the course of construction, the wildlife shall be allowed to leave the construction/project area unharmed and should

be flushed, hazed, or herded in a safe direction away from the project sites or roadways.

J. If night work is necessary, night lighting shall be of the lowest illumination necessary for human safety, selectively placed, and shielded and directed away from natural habitats.

II. Wildlife

A. If any wildlife is encountered during the course of construction, the wildlife shall be allowed to leave the construction/project area unharmed and should be flushed, hazed, or herded in a safe direction away from the project sites or roadways.

B. Exotic species that prey upon or displace listed or species of concern should be permanently removed from sites.

C. Where appropriate, based on site-specific survey results, wildlife undercrossings shall be designed and implemented for new roads or road improvement projects that could disrupt wildlife movements or result in increased roadkill. Such undercrossings, along with any necessary wildlife fencing or other facilities, shall be designed based on best available information to maximize use of the undercrossing by species of concern. Undercrossing design shall strive to maximize the openness index ([width x height]/length), minimize traffic noise within the crossing, use appropriate fencing to funnel wildlife into the crossing rather than across the road surface, and screen the undercrossing openings with natural vegetation.

D. To minimize impacts on **bats,** work at a bridge site should be surveyed for bats by a qualified biologist. If bats are found to be present, avoid working on the bridge from March 1 through October 15. Ensure that roosting areas remain intact for future use and nearby water sources remain available. If the bridge needs to be replaced, it should be removed prior to March 1. The new bridge should be designed to include roosting habitat within the structure.

III. Birds

A. General

1. Migratory, non-game, native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918(50 C.F.R. Section10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests, including raptors and other migratory, non-game birds (as listed under the Federal MBTA).

2. To minimize impacts on nesting birds on site or in the vicinity during construction, construction (including disturbances to native and non-native vegetation, structures and substrates) should occur outside of the bird breeding season (March 1 - August 31). Construction proposed during the breeding season should have a qualified biologist conduct a pre construction survey of the project site and surrounding habitat to determine whether there are active nests within the area. If an active nest is observed, we recommend that a buffer be established (with flagging and stakes) between the

construction activities and the nest so that nesting activities are not interrupted. The buffer should be a minimum width of 300 feet and should be in effect as long as construction is occurring and until the nest is no longer active.

3. To minimize impacts on nesting raptors (birds of prey) on site or in the vicinity during construction, construction (including disturbances to native and non-native vegetation, structures and substrates) should occur outside of the bird breeding season (February 1 - August 30 or July 31 for *Buteo* spp.) A qualified biologist should conduct a pre-construction survey of the project site and surrounding habitat during breeding season to determine whether there are active raptor nests within the area. If an active nest is observed, it is recommended that a buffer be established between the construction activities and the nest so that nesting activities are not interrupted. The buffer should be a minimum width of 300 feet and should be in effect as long as construction is occurring and until the nest is no longer active.

B. Species specific

1. California gnatcatcher

Habitat

Coastal sage scrub

Recommendations

1. Monitor post burn to assess if Coastal sage scrub is converted to less desirable forms of sage scrub or non-native grasslands, that are not suitable for nesting
2. Complete invasive vegetation removal before February 15 or after August 30 to prevent effects to nesting avian species

2. Least Bell's vireo

Habitat

Riparian Scrub, Woodlands, Forests. Migratory - nesting season March to September. Primary concerns - nesting season spring/summer breeder, site fidelity, nests typically less than a meter off the ground in dense vegetation, habitat reduced (at least temporarily) by the fires and will not be fully re-established by the spring arrivals of the Vireo.

Post Fire concerns

Forage and breeding habitat in burn areas is likely to be removed or significantly reduced in quality until the riparian vegetation returns to a more closed-canopy growth pattern. Marginal quality habitat becomes more important due to habitat loss.

Recommendations

1. Avoid impacts to habitats during nesting season from March through September
2. Avoid nesting areas and habitat with a minimum 300 to 500 foot buffer area

3. Preserve and enhance existing riparian habitat within the vireo historic range
4. Remove exotic vegetation and replace with native riparian vegetation
5. Continue cowbird removal to controlling cowbird parasitism
6. Management on a community level in order to reduce predation levels
7. Monitoring and reporting in burn areas and adjacent habitats

IV. Herptiles

A. General Recommendations

The extent and severity of the fire on coastal streams within San Diego County will likely produce an increase in sediment transport and erosion this coming winter. It is likely that there will be an increase in the amount of sediment and debris from previous years. To minimize the streams effects on herptiles by this years fire, any affected stream should be evaluated when it has been determined that Threatened and endangered herptiles have been recently documented within that given stream. With the support of a qualified biologist familiar with local streams, an assessment will be made in the field to determine a best management plan for that stream. The use of hay bails has the benefit of ease of transport, site placement and perhaps more importantly the filtering ash material. Access and placement need to be taken into account.

B. Species Specific Recommendations

Arroyo Toad

Habitat

Riparian habitats with sandy streambeds with riparian areas for breeding. Adults disperse from breeding habitat up to a kilometer (0.6 mile) to forage and up to 2 kilometer to aestivate in adjacent upland habitats in Coastal Sage Scrub and Chaparral. The Toad is chiefly nocturnal; breeding season - eggs are laid from March to July. Summer stream flow or the persistence of shallow breeding pools until at least July is essential. Tadpoles develop over an extended period of 65-85 days. The lengthy larval period makes them extremely susceptible to mortality during this time. Primary concerns - the natural fluvial processes that create and maintain Toad breeding habitat have been disrupted by altered streamflows and watershed degradation. The remaining breeding habitat in the area has been infested with detrimental exotic species that are difficult to control. Introduced predators include bullfrogs and freshwater gamefish.

Post Fire concerns

Forage and breeding habitat in burn areas is likely to be significantly reduced in quality until debris/sediment flows are normalized. Shallow breeding pools may be inundated with sediment/silt. Marginal quality habitat becomes more important due to habitat loss.

Recommendations

1. Avoid impacts to habitats during breeding season from March through July
2. Avoid habitat with a minimum 300 to 500 foot buffer area
3. Preserve and enhance existing habitats
4. Avoid night driving adjacent to habitats
5. Educate public on nocturnal habits of species
6. Remove exotic species/introduced predators such as bullfrogs and freshwater gamefish from habitats

7. Monitoring and reporting in burn areas and adjacent habitats

V. Invertebrates - Species specific

A. Quino checkerspot butterfly

1. Habitat

Coastal sage scrub, open chaparral, grassland and open canopy

2. Soils

Loamy soils with moderate to high amounts of clay

3. Recommendations

Avoid non-native seed mixture, maintain open-canopy woody communities. Host plants and nectar sources are the preferred mitigation. Monitoring of known population areas in the future by qualified biologist.

VI. Erosion Control - General

(also see Erosion under Streams and associated habitats below)

A. Silt fences should be removed when no longer necessary or, alternatively, need to be made of biodegradable materials. Fencing should be installed in a manner that does not impact habitats to be avoided.

B. Any temporary structure should be removed when it no longer functions.

C. Erosion control fabric or blankets should not be comprised of inorganic materials.

D. Avoid mulching in areas with listed annuals as it may inhibit seed germination. Mulching might be acceptable in areas with listed shrubs or perennials but this depends on the specific species in question (see species specific recommendations).

E. Avoid any ground disturbing activity such as grubbing, contour tilling, scarification, driving heavy equipment, or other activities that would result in soil compaction or soil disturbance in areas mapped with listed plant species.

F. All straw and mulches should be seed free and should not contain species on the California Invasive Plant Council list (see site at http://www.cal-ipc.org).

G. The Department of Fish and Game promotes natural recovery without seeding except in situations where 1) risk to downstream property and life adjacent to impacted land is too great, and 2) probability of reducing erosion is high. Seeding is appropriate only if the following criteria are met: there is clear, scientific evidence that a given seeding mix will more effectively establish ground cover than the remaining, viable seeds in the natural seedbank, and 2), seeding has been demonstrated to be an effective restoration technique in relation to that specific incident's conditions (i.e. slope, soil-type, soil and duff damage, etc.). The Department of Fish and Game believes that seeding may be appropriate in areas where fire suppression activity has removed or destroyed the natural seedbank (i.e. bulldozing). The Department of Fish and Game acknowledges that when

human safety is an issue downstream and seeding would protect human safety by better stabilizing an area, seeding is appropriate.

H. If seeding is carried out a basic seed mix should include the dominant species on-site pre-disturbance. Eight species are recommended in a mix. Annual or perennial ryegrass for erosion control is not recommended.

I. Invasive exotic plant species should not be planted, seeded or otherwise introduced. Exotic plant species not to be used include those species listed on Lists A & B of the California Invasive Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California as of October 1999." This list includes such species as: pepper trees, pampas grass, fountain grass, ice plant, myoporum, black locust, capeweed, tree of heaven, periwinkle, sweet alyssum, English ivy, French broom, Scotch broom, and Spanish broom. A copy of the complete list can be obtained by contacting the California Invasive Plant Council at 1442-A Walnut St. #462, Berkeley, CA 94709, or by accessing their web site at http://www.cal-ipc.org

VII. Equipment Use, Maintenance, Pollution, Litter and Education

(also see Pollution, Sedimentation, Litter under Streams and associated habitats below)

A. A qualified biologist shall conduct a training session for all project personnel prior to proposed activities. At a minimum, the training shall include a description of the target species of concern and its habitats, the general provisions of the Endangered Species Acts, the general measures that are being implemented to conserve the target species of concern as they relate to the project, and the access routes to and project site boundaries within which the project activities must be accomplished.

B. Construction equipment and vehicles should be checked and maintained daily in order to prevent leaks of materials.

C. Spills need to be prevented when fueling vehicles or transferring fluids from one container to another. Use drip pans under spigots, valves and pumps to catch leaks and spills. The clean-up of all spills shall begin immediately upon observation of the spill.

D. Equipment maintenance should not be done within or near any stream channel or other sensitive resource site as petroleum products or other pollutants from the equipment may enter these areas under flow conditions.

E. Work sites should be protected from erosion.

F. Comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the Applicant to ensure compliance. Retrieve any construction debris and litter on a daily basis from the project site. Utilize fully covered trash receptacles with secure lids (wildlife proof) to contain all food, food scrapes, food wrappers, beverage and other miscellaneous trash.

G. Do not permit pets on or adjacent to the construction site.

H. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, construction waste, cement or concrete or washings thereof, asphalt, paint, oil or other petroleum products, or any other substances/materials associated with any project-related activity should be allowed to contaminate the soil and/or enter into or be placed where they may be washed by rainfall or runoff into a stream or lake. Any of these substances/materials, placed within or where they may enter a stream or lake, either by the Applicant or any party working under contract, shall be removed immediately upon observation of their presence.

I. Access to the work site shall be via existing roads and access ramps.

J. The equipment and vehicles shall be clean and free of any weed seeds.

VIII. Wetlands - CDFG Jurisdictional General

A. A water pollution and erosion control plan shall be developed that describes sediment and hazardous materials control, dewatering or diversion structures, fueling and equipment management practices, and other factors deemed necessary by reviewing agencies. Erosion control measures shall be monitored on a regularly scheduled basis, particularly during times of heavy rainfall. Corrective measures will be implemented in the event erosion control strategies are inadequate. Sediment/erosion control measures will be continued at the project site until such time as the revegetation efforts are successful at soil stabilization.

B. The upstream and downstream limits of projects disturbance plus lateral limits of disturbance on either side of the stream shall be clearly defined and marked in the field and reviewed by the biologist prior to initiation of work.

C. Projects should be designed to avoid the placement of equipment and personnel within the stream channel or on sand and gravel bars, banks, and adjacent upland habitats used by target species of concern.

D. When steam flows must be diverted, the diversions shall be conducted using sandbags or other methods requiring minimal instream impacts. Silt fencing or other sediment trapping materials shall be installed at the downstream end of construction activity to minimize the transport of sediments off-site. Settling ponds where sediment is collected shall be cleaned out in a manner that prevents the sediment from re-entering the stream. Care shall be exercised when removing silt fences, as feasible, to prevent debris or sediment from returning to the stream.

E. Equipment storage, fueling, and staging areas shall be located on upland sites with minimal risks of direct drainage into riparian areas or other sensitive habitats. These designated areas shall be located in such a manner as to prevent any runoff from entering sensitive habitat. All necessary precautions shall be taken to prevent the release of cement or other toxic substances into surface waters. All project related spills of hazardous materials shall be reported to appropriate and shall be cleaned up immediately and contaminated soils removed to approved disposal areas.

F. Avoid heli-mulching when in the vicinity of streams or channels.

G. Trash racks above culverts should be maintained.

IX. Streams and Associated Habitats

(The following are standard DFG Code Section 1600 Streambed Alteration Agreement Measures)

A. Vegetation Clearing

1. Work areas shall be limited to the smallest area feasible to accomplish the activity safely.
2. Work activities requiring the removal of intact habitat shall clear vegetation from disturbed areas towards intact habitat to allow wildlife to escape into undisturbed areas.
3. In areas of temporary disturbance, with intact native vegetation having DBHs of 3 inches or less, the vegetation shall be cut to ground level with hand operated power tools rather than by grading.
4. Vegetation removed from the stream shall not be stockpiled in the stream bed or on its bank.
5. Vegetation removed from the stream shall not be stockpiled in the stream bed or on its bank. The sites selected on which to push this material out of the stream should be selected based upon least damaging impacts to resources including sensitive uplands resources. Downed woody debris can be retained on upland slopes to hold soils.
6. No living native vegetation shall be removed from the channel, bed, or banks of the stream, except as otherwise provided for in the notification.
7. If work in a stream/lake is anticipated, the work area shall be flagged to identify its limits within the stream. Vegetation shall not be removed or intentionally damaged beyond these limits.
8. In areas infested with giant reed (*Arundo donax*), salt cedar (*Tamarix spp.*), or other exotic, invasive plant, or non-native plant species, the non-native plants shall be either removed or treated.

B. Species Protection

1. The Operator shall not remove or otherwise disturb vegetation from March 1 to August 15 to avoid impacts to breeding/nesting birds; if disturbance must occur, then consult with the Department of Fish and Game.
2. Be advised, migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918(50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests including raptors and other migratory nongame birds (as listed under the Federal MBTA).
3. Prior to any construction during the raptor-nesting season, February 1 to September 1, a qualified biologist shall conduct a site survey for active nests prior to any scheduled activities. If an active nest is located, then consult with the Department of Fish and Game.
4. In areas of intact habitat and known occurrences, the Operator shall have a

qualified wildlife biologist or botanist survey the area to confirm the presence/absence of threatened, endangered, and/or other species of concern likely to be found in the area during the proposed operations. If evidence exist that listed species are present or likely to be present, consultation with the Department of Fish and Game shall occur prior to disturbance activities. The Operator shall be responsible for reporting all observations of threatened/endangered species or of species of special concern to the Department of Fish and Game's Natural Diversity Data Base within ten (10) days of sighting.

5. In areas of intact habitat, a qualified biological monitor with all required collection permits shall be on site during operations and shall survey for species prior to activities. If any life stages of any native vertebrate species are found in the path of construction, the monitor shall relocate the species to a safe location. Exclusionary devices shall be erected to prevent the migration into or the return of species into the work site.
6. Place and monitor cowbird traps to minimize cowbird nest parasitism on sensitive bird species.
7. Pump intakes placed in stream/lake water shall be fitted with (1/8) inch or smaller mesh screens for January 1, through March 30, and (1/4) inch or small mesh screens thereafter.
8. If flowing or ponded water is within the proposed work limits, the Operator shall telephone the fishery biologist, Maurice Cardenas at (805) 640-1852, five days prior to commencing activities within the bed, bank, and channel. The Operator shall leave his/her name, date and time called, telephone number, the stream name, county/city, work location, nature of planned activities and proposed schedule.
9. The Operator shall install and use fully covered trash receptacles with secure lids (wildlife proof) to contain all food, food scrapes, food wrappers, beverage and other miscellaneous trash.
10. The Operator shall not permit pets on or adjacent to the construction site.
11. The Operator shall ensure that no guns/or other weapons are on-site during activities, with the exception of the security personnel. No hunting shall be authorized/permitted during activities.

C. Erosion Control

1. Projects shall revegetate and stabilize areas of disturbed soils with slopes toward a stream or lake to reduce erosion potential. Stripped or exposed work areas within the banks, bed, and channel of the stream (including construction areas, temporary spoil pile, access roads, or other adjacent uplands work areas, etc.) with native vegetation local to the area by reseeding, planting, hydro-mulch. Where suitable vegetation cannot reasonably be expected to become established, non-erodible materials, such as coconut fiber matting, shall be used for such stabilization. Any installation of non-erodible materials not described in the original project description shall be coordinated with the Department of Fish and Game.

2. To provide protection from erosion, the Operator may plant willow cuttings (obtained from nearby plants) on 6 ft centers, on the slope and in the streambed of the restored area. Plantings and/or cuttings may require irrigation, when natural moisture is insufficient to sustain growth, for an interval of two years.
3. All planting should be done after the first wetting rains between October 1 and February 1 to take advantage of the winter rainy season, dormancy of foliage, and rooting period to ensure optimum survival of plantings. Should the Operator be required to plant during other times of the year, chances of survival are diminished. The Operator shall provide irrigation when natural moisture conditions are inadequate to ensure survival of plants.
4. Any materials placed in seasonally dry portions of a stream or lake that could be washed downstream or could be deleterious to aquatic life shall be removed from the project site prior to inundation by high flows.
5. Erosion control shall include the revegetation of stripped or exposed work areas with vegetation native to the area.
6. Restoration shall include the revegetation of stripped or exposed habitat or mitigation areas with vegetation native to the area.
7. If work in a stream/lake is anticipated, the work area shall be flagged to identify its limits within the stream. Vegetation shall not be removed or intentionally damaged beyond these limits.

D. Pollution, Sedimentation and Litter

1. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, construction waste, cement or concrete or washings thereof, asphalt, paint, oil or other petroleum products or any other substances which could be hazardous to aquatic life, or other organic or earthen material from any logging, construction, or other associated project related activity shall be allowed to contaminate the soil and/or enter into or placed where it may be washed by rainfall or runoff into, waters of the State. Any of these materials, placed within or where they may enter a stream or lake, by the Operator or any party working under contract, or with the permission of the Operator, shall be removed immediately. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.
2. Cement and concrete shall not be poured within 150 feet of a stream if precipitation is predicted within 24-hours. The Operator shall monitor the 7-day forecast. Cement shall not be poured in or near a flowing stream, to reduce the potential for significant adverse impacts to the stream, water, or biota.
3. The clean-up of all spills shall begin immediately. The Department of Fish and Game shall be notified immediately by the Operator of any spills and shall be consulted regarding clean-up procedures.
4. The Operator shall comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the

responsibility of the operator to insure compliance.

5. Any equipment or vehicles driven and/or operated within or adjacent to the stream/lake shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life.
6. Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to the stream/lake shall be positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill/leak. Clean up equipment such as extra boom, absorbent pads, skimmers, shall be on site prior to the start of activities adjacent to the streambed or lake.
7. No equipment maintenance shall be done within or near any stream channel or lake margin where petroleum products or other pollutants from the equipment may enter these areas under any flow.
8. When work in a flowing stream is unavoidable, the entire stream flow shall be diverted around the work area by a barrier, temporary culvert, new channel, or other means approved by the Department of Fish and Game. Construction of the barrier and/or the new channel shall normally begin in the downstream area and continue in an upstream direction, and the flow shall be diverted only when construction of the diversion is completed. Channel bank or barrier construction shall be adequate to prevent seepage into or from the work area. Diversion berms shall be constructed of onsite alluvium of low silt content, inflatable dams, sand bags, or other approved materials. Channel banks or barriers shall not be made of earth or other substances subject to erosion unless first enclosed by sheet piling, rock rip-rap, or other protective material. The enclosure and the supportive material shall be removed when the work is completed and removal shall normally proceed from downstream in an upstream direction.
9. Flow diversions shall be done in a manner that shall prevent pollution and/or siltation and which shall provide flows to downstream reaches. Flows to downstream reaches shall be provided during all times that the natural flow would have supported aquatic life. Said flows shall be sufficient quality and quantity, and of appropriate temperature to support fish and other aquatic life both above and below the diversion. Normal flows shall be restored to the affected stream immediately upon completion of work at that location.
10. Operator shall take all necessary steps to contain sediment and reduce stream turbidity when the work area(s) are re-watered. Operator shall install an appropriate sediment control device downstream of the work area to filter sediment. Acceptable materials include silt fence, straw bales, or other appropriate devices to prevent sediment runoff during re-watering activities. Silt control shall remain in place only until the water running through the work area is clear of sediment.
11. Silty/turbid water from dewatering or other activities shall not be discharged into the stream. Such water shall be settled, filtered, or otherwise treated prior to discharge.
12. Upon the Department of Fish and Game's determination that turbidity/siltation

levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation, shall be halted until effective Department of Fish and Game approved control devices are installed, or abatement procedures are initiated.

13. If an off-stream siltation pond/s is/are used to control sediment, pond/s shall be constructed in a location, or shall be designed, such that potential spills into the stream/lake during periods of high water levels/flow are precluded.

14. When operations require moving of equipment across a flowing stream, such operations shall be conducted without increasing stream turbidity. For repeated crossings, the operator shall install a bridge, culvert, or rock-fill crossing as specified in comments below, and approved by the Department of Fish and Game prior to placement.

E. Equipment and Access

1. Staging/storage areas for equipment and materials shall be located outside of the stream/lake.
2. Access to the work site shall be via existing roads and access ramps.
3. Access to the work site shall be via existing roads and access ramps. If no ramps are available in the immediate area, the Operator may construct a ramp in the footprint of the project. Any ramp(s) shall be removed upon completion of the project.
4. No equipment shall be operated within the dripline of native trees, which are not proposed for removal. Protective fencing shall be placed around the dripline of native trees to prevent compaction of the root zone.
5. Vehicles shall not be driven or equipment operated in water covered portions of a stream or lake, or where wetland vegetation, riparian vegetation, or aquatic organisms may be impacted.
6. Vehicles shall not be driven or equipment operated in water covered portions of a stream or lake, or where wetland vegetation, riparian vegetation, or aquatic organisms may be impacted, except as otherwise necessary to complete authorized work.
7. One vehicle may be driven in wet portions of the stream/lake to accomplish the work authorized by this notification. This work is only authorized when the vehicle is completely clean of petroleum residue and water levels are below the gear boxes of the equipment in use or lubricants and fuels are sealed such that inundation by water shall not result in leaks.
8. The equipment and vehicles shall be clean and free of any weed seeds.

F. Fill and Spoil

1. Fill length, width, and height dimensions shall not exceed those of the original design/installation or the original naturally occurring topography, contour, and elevation. Fill shall be limited to the minimal amount necessary to accomplish the agreed activities. Except as otherwise specified in this notification, fill construction materials other than on-site alluvium, shall consist of clean silt-free gravel or river rock.

2. All fill materials shall be obtained from upland sources, and must be weed free.
3. Permanent spoil storage sites shall not be located within a stream/lake, where spoil can be washed back into a stream/lake, or where it will cover aquatic/riparian vegetation, intact upland vegetation, and areas documented with sensitive species.
4. Temporary spoil piles may be placed in the streambed during the work day; the quantity of material that is used within one work day period may be placed in the streambed at one time. At the end of the work day all temporary fill material shall be relocated outside of the streambed.
5. Spoil shall not be placed on the stream side slope, or where it could enter the stream. Spoil shall not be placed over vegetation except with prior notice to and authorization by the Department of Fish and Game.

G. Structures

1. Structures and associated materials not designed to withstand high water flows shall be moved to areas above high water before such flows occur.
2. The Operator shall construct an effective water velocity dissipation device at the outlet structure to minimize erosion.
3. Installation of bridges, culverts, or other structures shall be such that water flow (velocity and low flow channel width) is not impaired. Bottoms of temporary culverts shall be placed at or below stream channel grade. Bottoms of permanent culverts shall be placed below stream channel grade.
4. Plans for design of concrete sills and other features that could potentially impede fish migrations shall be approved by the Department of Fish and Game.
5. Storm drains lines/culverts shall be adequately sized to carry peak storm flows for the drainage to one outfall structure. The storm drain lines/culverts and the outfall structure shall be properly aligned within the stream and otherwise engineered, installed and maintained, to assure resistance to washout, and to erosion of the stream bed, stream banks and/or fill. Water velocity shall be dissipated at the outfall, to reduce erosion.
6. The Operator shall place structures on properties so that fire clearance activities will not impact vegetation within the stream bed, banks and channel, mitigation areas or associated buffer areas.

Appendix 2

Burn Severity Evaluation
Burned Area Emergency Response Team 11

Incident: Harris Fire CA-MVU-010427

Month/Year: November 2007

Author: Rich Eliot

I. Condition

On the initial meeting with the Harris Fire Incident Participants Team 11 noted that the burn severity maps of the incident may not be accurate. In addition to the evaluation of the risks to life, property and resources within the fire area, the team was assigned the task of verifying these maps. Two burn severity maps were produced for the fire incident - Soils and Vegetation. Of these, the team decided to concentrate on the vegetation map as the one that could be verified by visual estimates. Four degrees of Severity were used on these maps - Unburned, Low, Moderate and High.

II. Methods for making this visual verification

1. Two aerial, helicopter reconnaissance flights were made of the fire area.
2. Visual estimates near and far were taken by various team members during their inspections of identified areas of concern, which covered approximately 70% of the fire area. The remaining area was covered by the over-flights, which included covering a portion of the ground reconnaissance areas as well.
3. Overlaying past fire history onto the “Harris Fire Final Field Survey Map” provides an indication of the fuel load present after these burns. This estimates the degree of severity the Harris Fire may have reached while burning, due to the fuel load present in the area before the fire.
4. Develop a draft map for review by the team.

III. Results

A revised Vegetation Fire Severity Map is included in the BAER Team 11 Report. Note: this new map is somewhat of a broad brush change of the severity of the overall map and not the individual polygons on it. The original map contains over 18,000 polygons, which were not changed. Their degree of severity was either increased or decreased to reflect the observed large area changes.

IV. Conclusion

The team concluded that vast areas of the fire area were either over or underestimated on the original Fire Severity Map. In turn, there was a significant reduction in the amount of unburned area originally estimated. (See “Harris BAER Team Final Updated Representational Burn Severity Burn Map”)


SAN LUIS OBISPO
KERN
SANTA BARBARA
SAN BERNARDINO
VENTURA
LOS ANGELES
ORANGE
RIVERSIDE
SAN DIEGO
IMPERIAL
Harris Fire
Location Map
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Harris BAER Team
Final Updated Representational Burn Severity Map
November 19, 2007

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N W E S