

ORANGE COUNTY FIRE AUTHORITY
CANYON 2 FIRE
October 9, 2017



A Report to the
Orange County Fire Authority
Board of Directors



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FOREWORD

On the morning of October 9, 2017, as strong Santa Ana winds whipped up in Orange County, our communities were hit by a fast-moving wildland fire. When finished, the Canyon 2 Fire was the largest Orange County wildland fire in nearly a decade, consuming 9,217 acres. The Canyon 2 Fire started in the City of Anaheim and the fire front spread rapidly into multiple jurisdictions, including those protected by the OCFA. Despite the severe conditions and rapid progress of the fire, no lives were lost and no major injuries were reported. Sadly however, 14 homes were destroyed, another 44 homes damaged, 1 commercial building damaged, and 21 other outbuildings damaged or destroyed.

We are extremely proud of the heroic firefighting efforts of the more than 1,600 firefighters who responded to this incident, as well as the incredible support of the law enforcement community in managing traffic and safely evacuating the thousands of residents who were in harm's way. Our first responders were stretched to the limit, and they rose to the demanding challenges with which they faced. Although homes were lost and damaged, thousands more were saved by the unwavering efforts of our firefighters.

The Canyon 2 Fire struck an area that has a history of being prone to wildfires. Many of the homes that survived this wind driven blaze were spared because of fire prevention measures that were in place, including non-combustible roofs and defensible space.

The coordinated effort of the fire agencies, cities, county and other organizations contributed significantly to our ability to manage an emergency of this scale. A County-Wide Incident Management Team, central resource ordering point, support from the County and city EOC's, and collaboration from a multitude of agencies were instrumental in dealing with the complexities of this multi-jurisdictional response.

Whenever there is a disaster, there are lessons to be learned that help us to be more prepared for the future. Through our dedication to the communities we serve, the Orange County Fire Authority is committed to seeking ways to help our communities be better protected against wildland fires, to taking advantage of opportunities to enhance our response capabilities, and to collectively partnering to better prepare our citizens.



EXECUTIVE SUMMARY

In what has become a year-round occurrence for California firefighters, the 2017 fire season was the most destructive in the state's history—9,133 fires scorched roughly 1.3 million acres. Five of the 20 most destructive fires in the State's history occurred in 2017. The winter of 2016 brought record rainfall to the entire state providing the necessary water to aid the drought-stricken state, but it also produced an annual grass crop that had not been seen in many years. It would be these annual grasses that would turn many small fires into destructive wildfires. In October of 2017, Northern California experienced 250 wildfires causing \$9.4 billion in insured property loss, becoming the costliest group of wildfires on record. The wildland fires threatened Southern California as well when the Santa Ana winds battered the region.

As the winds raised the temperature and lowered the humidity, the first of several significant wildland-urban interface fires began on September 1, 2017: the La Tuna Fire. Occurring in the Verdugo Mountain area of Los Angeles County, this fire consumed 7,194 acres, destroying 9 homes. Then on September 2, the Palmer Fire began in the Beaumont area of Riverside County. By the time it was contained, almost 3,900 acres had been scorched and fortunately no structures were damaged or destroyed.

The fire siege continued in Southern California in September as the Santa Ana winds returned. A moderate wind event had been forecasted for the week of September 25, 2017 in the Southern California region. On September 25 in the City of Anaheim; a road flare from a California Department of Transportation (Caltrans) road project on the 91 freeway was accidentally introduced into the fuel bed adjacent to the freeway sparking a blaze that was driven by 20 mph winds from the west and low relative humidity into the City of Corona. Known as the Canyon Fire, it consumed nearly 2,600 acres and damaged 6 homes, as well as evacuating nearly 1,800 residents.

On October 8, Northern California again experiencing high winds and dry conditions was attacked by wildfire. In the month of October alone approximately 228,000 acres were scorched in Northern California. Napa and Sonoma Counties experienced devastation beyond comprehension losing over 8,000 homes and nearly 50 lives. The following day Southern California experienced similar conditions as the north, and was hit with extreme Santa Ana winds of more than 20 mile per hour gusting up to 50 miles per hour.

The Canyon 2 Fire began in the City of Anaheim on the morning of Monday October 9, 2017. The incident was in Unified Command between Anaheim Fire and Rescue Department (ANA), CAL FIRE Riverside Unit (RRU)/Riverside County Fire Department (RVC), Orange County Fire Authority (OCFA), and Orange Fire Department (ORG).

Anaheim Fire and Rescue (ANA) established the Incident Command Post (ICP) at Yorba Regional Park and a staging area at Featherly RV Park in Anaheim. Orange County Type 3 All Hazards Incident Management Team (OCAHIMT) personnel arrived the afternoon of October 9, 2017 and embedded with the extended attack forces working overnight. The OCAHIMT facilitated the 7:00 a.m. Operational Briefing the morning of October 10.

The Riverside Unit Chief provided the OCAHIMT with clear expectations. These included priorities for emergency personnel and public safety, accurate and timely release of public information, foster and maintain relationships with cooperators and stakeholders, fiscal accountability, and the rapid and safe repopulation of displaced residents.

The fact that the fire burned four separate jurisdictions (four Unified Incident Commanders) did not impact the IMT's ability to order resources and manage the incident. This was primarily due to the exceptional pre-established relationships the involved agencies have with each other, their cooperators and allied agencies.



The majority of the fire growth occurred during the afternoon, evening and through the night of the first operational period. The aggressive attack of the initial and extended attack resources laid a strong foundation in which to build on. Improved weather conditions moderated fire behavior assisting firefighting resources in establishing containment lines.

Thankfully, no deaths or serious injuries to residents or firefighters were attributed to the fire; however, there were 4 minor injuries. At its height, the Canyon 2 Fire evacuated thousands of residences across the four impacted communities: City of Orange, County of Orange, City of Anaheim, and City of Tustin.

A unified command and strong coordination between fire and law enforcement was the key to evacuating large numbers of residents and animals in the path of this rapidly burning fire. The efforts of firefighters and citizens and the existing fire prevention measures—those requiring defensible space, non-combustible roofs, fuel modification zones, and ignition resistant construction—were the major factors in saving hundreds of homes.

While the Canyon 2 Fire presented the Unified Command with several difficult challenges, other factors contributed to its complexity. These included several years of drought that increased available dead fuels and lowered live fuel moistures resulting in intense fire behavior and burning conditions. The topography and the east-west alignment of the Santa Ana Canyon—together with the extreme offshore winds—resulted in extremely rapid-fire spread, long-range spotting due to flying embers, large-scale evacuations, and the difficult task of deploying resources to protect lives and property over a broad and unpredictable area.

This After Action Report is a culmination of information from multiple references, including: OCFA policies and procedures, Computer Aided Dispatch reports, Resource Ordering Status System reports, the Independent Review Panel report, department-wide surveys, incident documentation, and incident audio files. Many of the conclusions in this report point to things that went well, such as OCFA's advance planning and additional staffing for the extreme weather conditions throughout the region. Additionally, OCFA's ongoing fire prevention efforts contributed directly to saving thousands of homes, by providing firefighters with defensible space to protect threatened structures. Other conclusions illustrate areas that can be improved or should be reviewed for follow-up action with the appropriate agency or policy group.

In addition to this After Action Report, two other independent reports were conducted; Orange County Board of Supervisors Review and the Independent Review Panel (IRP). The recommendations from all three reports will be evaluated and considered for future implementation.

The recommendations contained in this report are intended to help the OCFA better prepare for this type of disastrous wildland fire in the future and improve local capability and surge capacity where possible. Some of these recommendations will require further study, review, and cost analysis to determine the feasibility of implementation. Others are no cost items to implement, or require follow-up action with the appropriate agency or group.

Note: Times in this report were acquired from a variety of resources: OCFA Computer Aided Dispatch Incident Detail Reports, Resource Ordering and Status System (ROSS) reports, Unit Logs (ICS 214), and other sources of incident documentation.



HISTORICAL INFORMATION

Orange County's wildfire history has repeated itself for years. Factors influencing the severity of the county's wildland fires include its topography, fuels, weather, and Wildland-Urban Interface (WUI) encroachment. Narrow canyons, mountainside slopes, and ridgelines with curving saddles, are all typical to wildland regions of Orange County, and all sustain and intensify fires. Common Orange County vegetation, such as chaparral thickets, chemise, and coastal sage scrub, create vast heaps of highly flammable vegetation and dry woods during its normal life cycle.

Many of these native plants have waxy leaves that form flammable tinder as they dry out. Typically, 40-60% of plants that are over 20 years old are dead, highly volatile fuels. Many areas of Orange County, including areas burned during the Canyon 2 Fire, have fuels ranging from 50 to 100 years old. Less preheating is required as fire moves through these older, dead fuels, dramatically increasing the rate and intensity of fire spread.

Narrow canyons, mountainside slopes, and ridgelines with curving saddles, are all typical to wildland regions of Orange County, and all sustain and intensify fires.

However, weather is the most critical factor in fire behavior, as well as the most unpredictable. Long periods of low rainfall and drought conditions increase the amount of dead vegetation. Low humidity saps the moisture from plants, reducing both live and dead fuels to tinder. Wind remains the single most influential weather factor. High pressure systems over Utah and Nevada push dry air toward California. As the air passes over the Mohave Desert, it gains heat; then funneled and compressed through the mountain passes, the heated winds accelerate. The results are Santa Ana winds, which exacerbate low humidity and result in conditions where virtually any spark can ignite a fire.

The geography increases the wind's speed and magnifies the effects of fire on the available fuel bed, contributing to the rapid rate of fire spread. Additionally, the encroachment of civilization into the wildland-urban interface enhances the severity of wildland fires during Santa Ana wind conditions. The frequency of fire in this area has allowed non-native vegetation of volatile grass, weeds, and shrubs to become the dominant fuel type.

Traditionally, the fire season in Southern California has been from May through September. Over the past two decades, a trend has emerged where Orange County—and Southern California—has experienced some of its most devastating wildfires from October through April. Orange County has had several fires outside of the determined fire season such as: in February 2006 Sierra Fire, March 2007 Windy Ridge Fire, October 2007 Santiago Fire, November 2008 Freeway Fire, and the 2017 Canyon Fire. These fires shared several common denominators, including (1) Santa Ana winds; (2) competition for resources due to multiple, simultaneous fires throughout Southern California; and (3) wildland fire occurrence late or outside the traditional fire season.

Over the past 70 years, Orange County has experienced a number of major wildland fire disasters. Figure 1: Seventy-Year Major Fire History—Orange County, lists selected Orange County wildland fires that covered large geographic areas, burned out of control for an extended period of time, and/or resulted in extraordinary property loss of homes, businesses, and valuable watershed.



INCIDENT YEAR	INCIDENT NAME	ACRES CLAIMED	COUNTY(IES) INVOLVED
1948	Green River	53,079	Orange
1958	Steward	69,444	Orange/San Diego
1967	Paseo Grande	51,075	Orange/Riverside
1980	Indian	28,408	Orange/Riverside
1980	Owl	18,332	Orange/Riverside
1982	Gypsum	19,986	Orange
1993	Laguna	16,682	Orange
1993	Ortega	21,010	Orange
2007	Santiago	28,517	Orange
2008	Freeway	30,305	Orange/Riverside/San Bernardino/Los Angeles
2017	Canyon 2	9,217	Orange

Figure 1: Seventy-Year Major Fire History List—Orange County

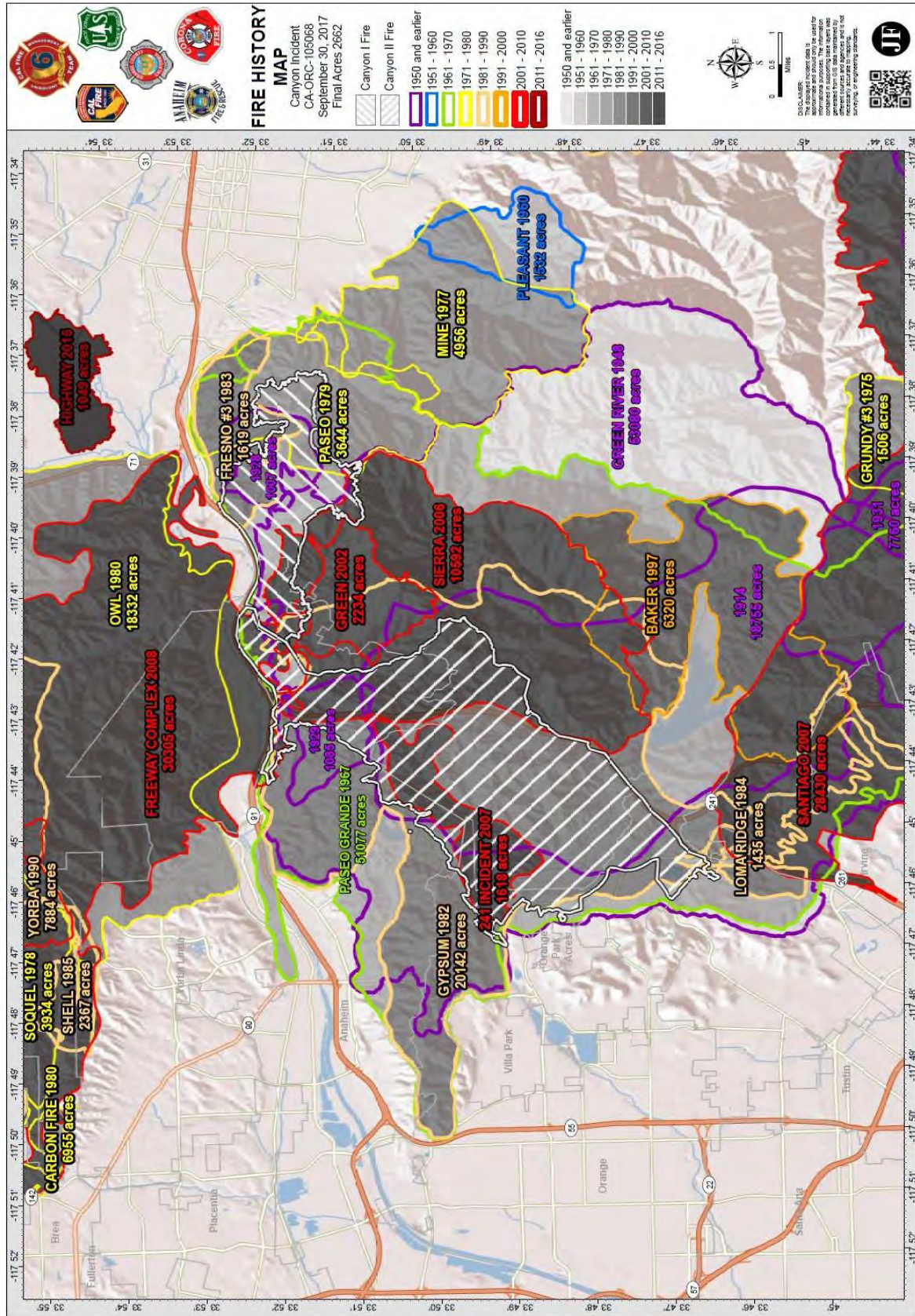


Figure 2: Seventy-Year Major Fire History Map—Orange County



FIRE PREVENTION AND COMMUNITY EDUCATION

The OCFA Wildland Pre-Fire Management Section provides a pro-active approach to wildfire prevention. The Section includes several programs, whose primary function is to ensure community safety and operational success. These programs include: Community Wildfire Mitigation, Wildland Resource Planning, the Santiago Hand Crew, and Heavy Fire Equipment.

The overall success of the Wildland Pre-Fire Management Section is the commitment to collaboration with our stakeholders in wildfire prevention. At the center of this collaboration is the County of Orange Safety Task Force (COAST) and our on-going partnership with the communities we serve.

Successful Examples of Our Partnership

- Transportation Corridor Agency (TCA): Ensuring adequate access gates in key areas along the 241 Toll Road, installation of camera traps in strategic locations, "Red Flag" messaging on electronic signage.
- Irvine Ranch Conservancy: Partnership in the OC Fire Watch Program, constantly seeking new methodologies of wildfire prevention in open space areas.
- Southern California Edison: Access Road Maintenance/Shaded Fuel Break on-going partnership to install and maintain emergency access to open space areas on SCE easements.
- OC Parks: On-going efforts to reduce fuels and ensure emergency access in high hazard areas. The primary focus has been fuels reduction surrounding communities in the Wildland Urban Interface.
- Development of three distinct weather zones in Orange County, each with a Remote Automated Weather Station (RAWS), thanks to the partnership of San Diego Gas and Electric in purchase of the Aliso-Laguna RAWS.

Instrumental to the initial attack of the Canyon 2 Fire was the development and implementation of the CAL FIRE mandated and approved Orange County Fire Danger Operating Plan (FDOP). The related "alarm based" dispatch criteria that includes fixed wing aircraft at the time of dispatch was also instrumental. As a result of these enhancements, OCFA was able to pro-actively determine the fire danger and corresponding dispatch level prior to the start of the fire.

The unincorporated Cowan/Lemon Heights community is an excellent example of the results of the proactive approach utilized by OCFA Wildland Pre-Fire Management. At the foundation was a Federal Emergency Management Agency (FEMA) fuels reduction grant that was completed in 2013, followed by an on-going partnership between OCFA and the residents as outlined below. This FEMA Grant area included fuels reduction and revegetation in the Bent Tree County Park area and continued to the South into the Peters Canyon Wash where it connected to a second Public Works/OCFA combined fuels reduction and restoration project. This project and recent efforts in maintaining mitigation efforts proved critical to the fire containment

Instrumental to the initial attack of the Canyon 2 Fire was the development and implementation of the CAL FIRE mandated and approved Orange County Fire Danger Operating Plan (FDOP).



OCFA /OC Public Works 22.65-Acres Peters Canyon Wash Mitigation Area

The Peters Canyon Wash Mitigation Area is located within Peters Canyon Regional Park in unincorporated Orange County, just downstream of the Peters Canyon Reservoir Dam, and extends south to a flood-control structure located adjacent to Lower Lake Road near the boundary of the City of Tustin. The control of non-natives vegetation within the 22.65 acres provide a reduced fuel load that helped slow the fire down for suppression crews to stop the fire before it moved into the community.

Cowan/Lemon Heights community has had many fire prevention efforts in the past 10 years. The most current outreach occurred one day after the Canyon 2 Fire. Fire prevention staff went door to door educating homeowners on the Ready Set Go message. Staff had great conversations regarding Vegetation Management and Home Hardening techniques. The Cowan/Lemon Heights community has created a Fire Safe Council to help educate the residence on The Ready Set Go message. OCFA staff attends every meeting and community events to support the councils mission.





In December 2014 and February 2015 OCFA supported the North Tustin Fire Safe Council with equipment and crews for two “chipper day” events. These events provided residents of Cowan and Lemon Heights an opportunity to reduce the fuel load on privately owned property. Residents cut and hauled vegetation to their curb. OCFA crews came and chipped the cuttings and hauled away the chipped material. Throughout 2016-2017 Pre-Fire Management continued organizing defensive space/weed abatement assessments of properties in collaboration with OC Public Works and continued monthly involvement with the Fire Safe Council meetings. In conclusion, the collaborative efforts of OCFA Wildland Pre-Fire Management, County of Orange Area Safety Taskforce, and the residents provided for increased wildfire awareness thereby decreasing the fire losses in OCFA protected areas.





ADVANCE PLANNING / DEPARTMENT OPERATIONS CENTER

Planning for the Red Flag weather event of October 9, 2017 began on Friday, October 6 after the National Weather Service issued a Red Flag watch for the Southern California Region, including Orange County.

The OCFA Duty Chief contacted the CAL FIRE Southern Region Duty Chief on October 6 to request authorization for augmented staffing as referenced in the CAL FIRE/Orange County Fire Authority Annual Operating Plan (AOP); Appendix J.

Options Available in Appendix J

- 4-0 Staffing on identified Gray Book engines
- Staff second Type II helicopter w/pilot and Crew Chief
- Staff Second Dozer Module
- Staff Santiago Crew
- Staff up to five Type 3 Engines in “high risk” SRA’s with 4-0 staffing
- Staff up to two additional dispatchers for ECC support for the State Mission
- Pre-Position up to two CAL FIRE Golf Strike Teams in Orange County for the State Mission
- Pre-Position up to two CAL FIRE Charlie Strike Teams in Orange County for the State Mission
- Staff two ORC Water Tenders
- Staff one WUI Task Force to stage in identified “high risk” SRA’s

The OCFA Duty Chief was advised that no California Southern Region (CSR) staffing pattern would be implemented for the Orange County Operational Area. This decision was based on a number of factors, including: the forecasted Red Flag weather pattern was expected to be a mild event for Orange County, and other CAL FIRE assets were available in the region.

Due to ongoing staffing issues the OCFA Duty Chief was forced to use his last option to maintain staffing levels by modifying the existing OCFA Firefighter’s Memorandum of Understanding, forcing firefighters into a 96-hour work schedule. This measure was taken after rescinding firefighter’s ability to refuse forced overtime.

Based on National Weather Service weather predictions for increased fire danger and the OCFA’s Fire Danger Operating Plan (FDOP) the OCFA Duty Chief contacted the OCFA Operations Chief to discuss an OCFA supported staffing plan for the Red Flag weather pattern.

The following staffing plan was put into place for the morning of October 9, 2017:

- Air Operations
 - Staff second Type II helicopter w/pilot and Crew Chief - Monday, October 9, 2017, 8:00 a.m. – 8:00 p.m.
- Crews & Equipment
 - Staff Second Dozer Module - Monday, October 9, 8:00 a.m. – 8:00 p.m.
 - Staff Santiago Crew - 24hr hardcover beginning Sunday, October 8, 2017 at 8:00 a.m.
- Emergency Command Center
 - Staff two additional dispatchers for ECC support for the State Mission- Monday, October 9, 2017, 8:00 a.m. – 8:00 p.m.
- Operations Personnel
 - Maintain situational awareness and ensure personnel were prepared for critical fire weather



Early in the morning at 3:50 a.m. on October 9, 2017 the OCFA Duty Chief received a call from the OCFA Emergency Command Center (ECC) requesting authorization to send two Type 3 strike teams to Santa Rosa County. Initially, the OCFA Duty Chief denied the request due to the anticipated weather in OCFA's jurisdiction. After obtaining additional intelligence on the scope of the calamity unfolding in Sonoma County, the Duty Chief approved one Type 3 strike team for the Tubbs Fire. At 5:40 a.m. OCFA's pre-designated "Blue" Type 3 strike team (1400C) was dispatched to the Tubbs Fire. Strike Team 1400C consisted of: E307 (San Juan Capistrano), E315 (Santiago Canyon), E345 (Rancho Santa Margarita), E347 (Shady Canyon), and E353 (Yorba Linda). The Duty Chief contacted the Duty Manpower coordinator at Station 22 and advised to begin staffing behind the five engines dispatched out of the county. The process to cover Fire Station 53 took approximately four hours. In response to this coverage delay, the Move-up and Cover procedure has been updated in SOP OP.06.27 reflecting a key change that all stations with cross-staffed Type 3 engines will now require 'Primary' (1 hour) coverage during High Watershed and Red Flag periods.

As a cooperating member of the California Fire and Rescue Emergency Mutual Aid Plan, the OCFA participates in Mutual Aid and assists other agencies when disaster strikes. The mutual aid system is founded on the principle of neighbor helping neighbor. When an emergency overwhelms an agency's ability to manage it on its own, other fire departments voluntarily provide resources, if possible. The system allows for an orderly escalation and distribution of resources.

Department Operations Center (DOC)

The mission of the OCFA DOC is to provide support for major incidents regarding resource requests, tracking of situation status, and handling incident communications without impacting normal emergency dispatch center operations. This task is essential to ensure uninterrupted emergency services are being provided for all 9-1-1 calls, while explicitly devoting resources to the major incident. A major responsibility of the DOC was serving as the central ordering point for the incident, which required the coordination of all requests and orders for fire resources, personnel, and logistical support. This entailed a high level of coordination with local, state, and federal partners to ensure requests were filled as timely as possible. The DOC also facilitated the backfill and staffing of relief apparatus for OCFA stations and personnel relief needs for the incident.

The mission of the OCFA DOC is to provide support for major incidents regarding resource requests, tracking of situation status, and handling incident communications without impacting normal emergency dispatch center operations.

As the Canyon 2 Fire was dispatched, the Division Chiefs (DC) coordinated responsibilities to minimize duplication of effort. It was agreed that a DC would respond to the incident and enter into Unified Command. Another DC would respond to the DOC and assume the position of DOC Director. A third DC would then assume the Duty Chief responsibilities. The Assistant Chief of Operations also responded to the DOC.

Initial actions in the DOC were to assess needs, assign personnel to DOC positions and brief staff. As the demands of the incident were expanding, the incident was in the "assault phase" and the DOC staff was directed to:

- Staff expanded dispatch in the DOC
- Utilize all means to call back all off-duty OCFA firefighters, chief officers and support staff including: IT staff, Service Center staff, finance staff, and fleet services staff
- Staff the DOC manpower manager position with an on-duty manpower coordinator from Station 22
- Hard cover all reserve apparatus
- Determine drawdown levels, incident commitment, and outstanding incident needs



The drawdown level was determined to be at the major level per the Rapid Attack and Mobilization Plan (RAMP) with numerous stations throughout the OCFA jurisdiction being uncovered. As staff reported to the DOC the following positions were filled:

- DOC Director
- Expanded Dispatch Supervisor
- DOC Captain
- Apparatus Manager
- Manpower Manager
- Staffing/Resource Officer
- Situation/Intel Officer
- EMS Supply & Equipment Technician

As the DOC was staffed and the incident needs began to diminish, the reinforcement phase began. DOC staff was tasked with accounting for all available 100 series and 900 series Type 1 engines, unstaffed front-line Type 1 engines, and available Type 3 engines. As available relief engines were placed into service, it became necessary to utilize 800 series Type 1 engines. This effort took significant coordination between the apparatus manager, EMS Supply & Equipment Technician, and the Staffing/Resource Officer to ensure adequate EMS and communication equipment were properly located and placed in service on each engine. As the list of available resources was compiled, recalled personnel were assigned to units and placed in-service at designated stations. DOC staff utilized the RAMP Guidebook and were directed by the DOC Director to cover stations utilizing the RAMP "Moderate" level 2 drawdown level coverage plan.

As the incident progressed the DOC staff was able to successfully apply for the Fire Management Assistance Grant (FMAG). Under this program, FEMA provides financial assistance in the form of grants, to assist in reimbursement for equipment, supplies, and personnel to any state, Indian Tribal government, or local government for the mitigation, management, and control of any declared fire on public or private forest land or grassland that threatens such destruction as would constitute a major disaster. The FMAG program provides a 75 percent Federal cost share and the state pays the remaining 25 percent for actual costs. Declaration criteria is as follows:

1. Threat to lives and improved property, including threats to critical facilities/infrastructure, and critical watershed areas
2. Availability of state and local firefighting resources
3. High fire danger conditions, as indicated by nationally accepted indices such as the National Fire Danger rating system
4. Potential major economic impact



LEVEL 2 Moderate Draw Down	B1 Stations	B2 Stations	B3 Stations	B4 Stations	B5 Stations	B6 Stations	B7 Stations	B8 Stations	B9 Stations
Career Engines (36) Reserve Engines (36)	48, 64, 65, 66	32, 34	15,21 (RFS-14, 16)	5, 19, 22, 54, 57, (RFS-11)	4, 6, 20, 26, 28, 36, 51	30, 50, 60	9, 24, 31, 58	17, 61, 62	71, 72, 73, 75, 77, 79
Medic Vans (4)				39		7	45	46	
Trucks (7)		10	43	22		7	45	46	74
BCs (6)		10		22	36	7		46	74

Figure 3: Station Coverage Levels

At 9:45 p.m. on October 9, 2017, DOC staff reported all stations in OCFA jurisdiction were staffed according to RAMP staffing level 2 coverage plan (Figure 3). As additional relief apparatus was placed into service and off-duty personnel returned to duty, additional units were placed into the system and utilized to cover additional stations. DOC staff was directed to cover OCFA stations according to the 12+ Hour Brown Out template found in the RAMP (Figure 4). A brown out means that a fire station will be uncovered, but it will be staffed within 12 hours of a significant incident. Generally, this is based upon normal call volume and regional coverage. This procedure has already been updated in the new Move-up and Cover SOP OP.06.27. A key change to this procedure is that all stations with cross-staffed Type 3 engines now require 'Primary' (1 hour) coverage during High Watershed and Red Flag periods.

Battalion	12 + Hour Brown Out Stations (1- per battalion)
1	Engine 25 (Consider covering with Engine 64)
2	Station 53 (Consider covering by Patrol 32 if possible)
3	Station 8 (Consider covering by Patrol 26 if possible)
4	Engine 39 (Consider covering with Truck 22)
5	Engine 47 (Consider covering with Engine 6)
6	Engine 7 (Consider covering by Patrol 7 if possible)
7	Engine 45 (Covered with Truck 45)
8	Engine 63 (Consider covering with Engine 17)
9	Engine 78 (Consider covering with Engine 71)

Figure 4: 12+Hour Station Coverage



INCIDENT NARRATIVE

The following is a chronological perspective of the firefighting efforts that took place in the cities of Anaheim, Orange, Tustin and the unincorporated areas of Orange County on October 9 through 17, 2017. The Canyon 2 After Action Report is as accurate and complete as possible. Since the specifics of this incident are complex and it occurred so rapidly, the actions of every fire company, the events that took place in every community, or the circumstances that surrounded every loss cannot be described in detail. Several documents and Computer Aided Dispatch (CAD) reports were reviewed in order to develop this narrative.

Though it started as a wildland urban interface fire, the Canyon 2 Fire quickly became an urban conflagration. The fire destroyed 14 homes and damaged 44 others. In total 9,217 acres of watershed were consumed across 3 cities and county unincorporated areas, including Irvine Regional Park and Peters Canyon Regional Park. Suppression costs exceeded \$13 million and property loss has been estimated at nearly \$39 million.

The Canyon 2 Fire occurred in the City of Anaheim the morning of October 9, 2017 under Red Flag weather conditions. The OCFA had sent a type 3 strike team to the Tubbs Fire in Santa Rosa, CA the morning of October 9, 2017 at 5:40 a.m. The Santa Rosa area had experienced high winds and low humidity for several days prior.

The Canyon 2 Fire destroyed 14 homes and damaged 44 others.

DAY 1- October 9, 2017

At 8:32 a.m. the OCFA Emergency Command Center (ECC) received a transferred call from California Highway Patrol (CHP) with the caller indicating fire and flames in the 91/241 area. Numerous phone communications with OCFA Fire Station 53 personnel occurred, however, the normal procedure of dispatching a wildland response was not followed, nor was a smoke check response initiated.

At 9:31 a.m. the OCFA received a report from a driver headed west bound on the 91 Freeway stating that they saw smoke and fire in the area between Gypsum and Coal Canyon. OCFA Battalion 2 began driving towards that area from the Placentia area. According to crew members at OCFA Fire Station 53, they could see a spot fire burning within the containment lines of the Canyon Fire and asked for a full response. Around this same time OCFA Battalion 2 could now see some smoke in the burn area and confirmed the request for a full response. OCFA dispatch requested a mutual aid response from Metronet and Anaheim Fire and Rescue (ANA). Resources initially sent were:

Agency	Unit	Agency	Unit		
Anaheim	Engine E10 (E310)	OCFA	Battalion 2 (B2)	Water Tender 32 (WT32)	Investigator 55 (I55)
	Battalion 1 (B1)		Helicopter 2 (HC2)	Dozer 2 (K2)	Safety Officer 2 (SAFE2)
	Deputy 1		Helicopter 1 (HC1)	Dozer 1 (K1)	Safety Officer 3 (SAFE3)
	Engine 9 (E9)		Engine 32 (E32)	Patrol 32 (P32)	Helitender 241 (HT241)
	Engine 308 (E308)		Engine 53 (E53)	Santiago Crew	
Orange	Battalion 1(B1)		Engine 10 (E10)	Investigator 6 (I6)	

At 9:39 a.m., Dozer Tender 2, staffed with a Heavy Equipment Operator and Dozer Swamper, responded to the reported area to investigate the report of fire. Upon arrival, they found a small fire burning in a cactus patch. Shortly after, OCFA Engine 32 arrived on scene.

At 9:53 a.m. OCFA Battalion 2 arrived on scene and set up at the end of Coal Canyon and established the Canyon 2 Fire Incident Command. OCFA HC2 lifted from Fullerton Airport and were advised to arrive on station with a load of water. A park ranger advised that the fire was located between the truck trail and the freeway;



moving towards the 91 freeway. Anaheim Battalion 2 advised all incoming Anaheim Fire and Rescue units to stage at Gypsum Canyon.

At 9:56 a.m. CAL FIRE was advised of the fire and location being in the contract area of the City of Anaheim. At 9:56 a.m. ANA B1 stated that the fire had blown over the hill and the Incident Command Post (ICP) would be relocated at Gypsum Canyon. ANA Deputy 2 advised Metronet that Anaheim would be in a level 2 activation for their Emergency Operations Center (EOC) and overhead. ANA B1 made the request for 2 additional type 3 strike teams, 5 of closest fire engines, and 2 handcrews.

At 10:03 a.m. ANA B1 assumed the Canyon 2 Incident Command.

At 10:13 a.m. OCFA HC1 advised that the Canyon 2 Fire was a wind driven fire. The winds were sustained at 25mph and the fire was headed towards the 241 Toll Road; the Incident Commander made the request for 5 Type 1 strike teams for structure defense in the Anaheim Hills area. Additional units were enroute from the CAL FIRE Riverside and the United States Forest Service Cleveland National Forest (CNF). Due to all of the incoming units a staging area was established at Featherly Park, in the City of Anaheim.

OCFA fire investigators arrived onscene and determined the area of origin was within the City of Anaheim. The OCFA investigators requested ANA investigators to respond to the incident. The final investigative efforts were a collaboration between Anaheim Fire and Rescue, OCFA, and CAL FIRE.

Anaheim Deputy 1 requested additional chief officers to the incident command post with the addition of new divisions and branches. Anaheim structure branch was established and a request for 2 additional fixed wing aircraft along with 2 additional type 1 helicopters. The fire was moving quickly towards the 241 Toll Road and the request was placed through the California Highway Patrol for a hard closure in both directions of the 241 Toll Road.

At 12:07 p.m. OCFA Division 7 assumed the OCFA Incident Command position from OCFA Battalion 2. All fixed wing aircraft were put on a no divert due to the continued structure threat in the cities of Anaheim and Orange as well a life threat. The unified command requested 10 additional Type 1 strike teams for the cities of Anaheim and Orange structure defense. The fire was impacting the area of the 261 and the 241 toll roads and the intersection of Jamboree and Santiago Canyon were closed to the north.

The fire was reported to have expanded to approximately 2,000 acres at 1:12 p.m. with structures lost and still threatened in the cities of Anaheim and Orange. The fire was headed in towards the communities of Lemon Heights and Cowan Heights in the City of Tustin. An Orange County Sheriff's (OCSD) helicopter was requested to function as the Helicopter Coordinator (HLCO). The incident commanders were notified by the Irvine Ranch Water District about 5,000 gallons of sodium hypochlorite was located in the Irvine Park area.

At 1:56 p.m. Branch III was established in the Cowan Heights area. All branches were advised that the tactic of "fire front following" would be utilized in conjunction with "tactical patrols". It was broadcast that the tactic of "anchor and hold" would not be used. Unified Commanders were notified that OCSD Duke 1 were not enroute due to OCSD fuel tender not being available. The fire began to make a significant run towards some critical infrastructure belonging to Cox Communications in the Irvine/Tustin area.

Loma Ridge, the hub for public safety communications for Orange County was now being threatened by the fire's progress at 3:04 p.m. The incident commanders requested two immediate need strike teams to set up for structure defense at Loma Ridge. Additional reports from the Serrano Water District advising the large quantities of diesel fuel and liquid oxygen at their given location.

The fire had progressed into Irvine Park and the horse stables began to catch fire at 3:51 p.m. Branch I was being managed by Anaheim Deputy 2, Branch III was being managed by Orange Battalion 3, and Branch V was being managed by CAL FIRE Division 3107. Operations of the fire was being managed by OCFA Battalion 35.



Santiago Canyon College was being impacted by the fire's front with structures threatened at 4:23 p.m.

At 4:54 p.m. there was a request for two immediate need strike teams to report to the Salvation Army facility in the City of Tustin. Additionally, there were numerous reports throughout the entire fire area that began to report visible smoke or small fires. At 5:15 p.m. OCFA strike team 1400C reported that they were back in the county from the Tubbs Fire and available for an assignment. They were assigned near Santiago Canyon College.

Air Attack 310 returned to Hemet Air Base at 6:10 p.m. and Air Attack 51 took over control of all air resources. Air resources remained on a no divert for the remainder of the evening per OCFA Battalion 2. According to Air Attack 51 all aircraft were off the fire at 7:13 p.m. with the Irvine Helibase closed for the evening and Corona Helibase taking over for the night flying helicopters. Los Angeles County Fire Helicopter 11 and USFS Helicopter 531 were assigned for night operations after a FIRESCOPE Night Operations - NVG Helicopter Go/No-Go Checklist was completed. At 9:54 p.m. there was a request for a helicopter response in the Windy Ridge area of the 241 for a flare up. Helicopter 531 had a transmission issue and returned to Corona Helibase with Helicopter 11 following at 10:22 p.m. Helicopter 531 arrived safely at the Corona Helibase and Helicopter 11 returned to the fire at 10:29 p.m.

At 10:34 p.m. the incident base was established at Irvine Great Park, on Pusan Way and Irvine Boulevard. Reports that the fire had established itself on the south side of the 241 Toll Road and was making a run towards Irvine Lake at 10:44 p.m. Helicopter 531 reported that they were back in service and enroute to Branch V at 11:32 p.m.

Observed Weather

Gusty easterly Santa Ana Winds and Relative Humidity (RH) levels in the teens and single digits were prominent in the initial attack area for the fire. Maximum temperatures were high 80's low 90's.

DAY 2- Tuesday, October 10, 2017

At 12:29 a.m. Operations made notifications to the Cleveland National Forest that there was potential for the Canyon 2 Fire to impact the forest at sunrise. It was reported that there were 10 acres on the south side of the 241 Toll Road under the power lines that could potentially impact the Cleveland National Forest. The fire continued to impact many homes well into the second day of operations. Multiple reports of new and smoldering fires continued to be received by the OCFA dispatch center. Air Attack reported at 1:47 a.m. to operations that there was limited fire activity with most of the activity being in Branch V and Division Y. This would be the focus for the air tankers in the morning per air attack. The objective was to keep the fire out of the CNF.

Helicopters 11 and 531 completed their assignments and returned to Corona Helibase at 2:54 a.m. Operations requested 2 additional dozer strike teams at 2:56 a.m. for Branch V. Air attack 12 would arrived at scene around 8:00 a.m. to recon the fire at first light. Fire activity had been minimized and by noon all air tankers had been released to the Air Operations base.

Most of the day was spent actively seeking out areas that still had hot spots or active fire. An incident safety officer was established along with a medical group. There were 3 firefighter injuries reported and 1 private contractor was transported to the hospital for an evaluation. At 6:18 p.m. all aircraft were off the Canyon 2 Fire and the Irvine Helibase was closed for the remainder of the evening with exception to Air Attack 51 (AA51).

At 7:52 p.m. residents were allowed back into their homes and many areas were being repopulated, this was announced over the radio to advise the assigned resources. AA51 was flying a night time mapping mission for the plans section and was off the fire by 10:07 p.m. The temporary flight restriction was in place and would stay in place until further notice per Air Operations.



Weather Forecast

Gusty easterly Santa Ana Winds will diminish through the morning before turning west-southwest by late morning or early this afternoon. Poor RH recovery will result in one more day of very dry and warm conditions before better RH recovery and cooler temperatures arrive on Wednesday. The marine layer will return to coastal portions of OC late Tuesday and may penetrate the lower elevations of the fire by early Wednesday. Maximum temperature 84-88 degrees with minimum RH of 8-12%

Day 3- Wednesday, October 11, 2017

Several strike teams were released or disbanded as the third operational day began. The wind and weather had become favorable for containment, but there was still a tremendous amount of work to do to ensure containment of the Canyon 2 Fire. Numerous reports of visible smoke and/or fire throughout the day were called into OCFA dispatch center. Many of these flare ups and smokes were along the 91 Freeway, in the City of Anaheim and the City of Orange. The Irvine Helibase was active all day until closing at 6:55 p.m. Figure 5 represents the total number of resources and personnel assigned at the peak of the Canyon 2 Fire.

	Total Resources	Total Personnel
Handcrews	34	569
Helicopters	13	62
Engines	255	910
Dozers	5	13
Water Tenders	2	3
Overhead	-----	103
Total	309	1660

Figure 5: Approximate Resources and Personnel at Peak of Canyon 2 Fire

Weather Forecast

A trough of low pressure will approach the Pacific Northwest and bring additional cooling and stronger onshore flow through Thursday. An increasing marine influence will result in areas of low clouds and fog over portions of the fire early Wednesday along with better RH recovery. Maximum temperatures of 74-78 degrees with minimum RH of 40-45%.

Day 4- Thursday, October 12, 2017

The fourth day of operations began with a report of smoke seen throughout the fires perimeter. Crews were busy responding to these reports ensuring that everything was being addressed to mitigate the public's concern. At 5:47 p.m. Metronet received a report of fire behind a residence and dispatched five fire engines to address the report. Upon arrival Anaheim Battalion 1 found a small spot fire outside the containment line. The fire was quickly extinguished and the cause was being investigated. The Irvine Helibase was closed for evening at 6:42 p.m. At 9:37 p.m. a report of a small fire on the hill near the 91 Freeway and Yorba Linda Boulevard. Crews found a small fire that was quickly extinguished.

Weather Forecast

An area of low pressure over the west will maintain a strong marine influence and bring some additional cooling, light winds and higher relative humidity over the fire today. High pressure will begin to build over the region on Friday and bring a warming trend along with the potential for gusty offshore winds through the weekend. Maximum temperatures of 74-78 degrees with a minimum RH of 45-50%.



Day 5- Friday, October 13, 2017

The morning of October 13, California Department of Transportation (Cal Trans) advised that the southbound lanes of the 241 from the Westbound 91 were now open to through traffic. Night operations confirmed that all divisions were given this information. There were continued reports of smoke and small fires throughout the burn area throughout the day. At 9:06 a.m. Strike Team 1404A was disbanded and released from the incident. At 5:45 p.m. Division C reported a drone flying over the middle of Peter's Canyon and nearly missed an OCSD helicopter. A hand crew strike team requested the OCSD to respond their location because they had located the operator of the drone. Orange Police Department handled the request. Air operations released the temporary flight restriction over the fire area between the hours of 7:00 p.m. - 7:00 a.m.

Weather Forecast

Low pressure to the north will move east today and be replaced by building high pressure into the weekend. This will result in a slight warm-up with on-shore winds along with good overnight RH recoveries through Friday. Winds will transition to offshore on Saturday along with warming and drying through the weekend. Maximum temperatures of 76-80 degrees with minimum RH of 35-45%.

Day 6- Saturday, October 14, 2017

Flare ups and reports of smoke were received by the OCFA dispatch center. At 4:12 a.m. a report of flames seen on the Southbound 241 near Santiago with the CHP enroute. Upon arrival the small spot fire was two feet in diameter and quickly extinguished. The largest spot fire reported occurred at 1:51 p.m. on the south side of the 91 Freeway near the 241. Helicopter 534 arrived onscene reporting black smoke coming from an island of green vegetation well within the fire's perimeter. The OCFA helicopter assisted with extinguishment of the reported spot fire. At 4:02 p.m. a report of a firefighter being stung by a bee in need of medical attention was received and handled.

Weather Forecast

Red Flag Warning 10am Saturday thru noon Sunday. High pressure will be building over the west resulting in a warming and drying trend and offshore winds through the weekend before weakening early next week. Gusty Santa Ana winds will begin Saturday mid-morning and increase overnight into Sunday morning before diminishing Sunday afternoon. Temperatures will warm into the upper 80's and low 90's with relative humidity in the teens and single digits Sunday and Monday. Maximum Temperatures of 86-90 degrees with a minimum RH of 13-15%.

Day 7- Sunday, October 15, 2017

Reports of flare ups continued throughout the night into the daytime hours. Many of these reports continued along the 91 Freeway and the 241 Toll Road. At 12:21 p.m. a report of a Drone was made in the Peter's Canyon area. Law enforcement was not available to respond to the drone report, Orange County Parks responded to the drone operator's location along with an OCFA Battalion Chief. Official notifications were made through CAL FIRE to South OPS aircraft coordinator advising the FAA about a drone being visible for the last two days in the Peter's Canyon area. A new report of smoke near the 91 Freeway and Gypsum Canyon was reported at 1:06 p.m.

Climatology

The area has a Mediterranean climate. Locally, the average yearly temperature is 67 degrees with the average high of 78 degrees and low of 55 degrees. It receives on average 14 inches of rain per year. The common winds come from the Southwest, which can push the marine layer inland towards the incident location.

The State received above average precipitation for the 2016-17 rain year. This aided in alleviating the extreme drought conditions that persisted over the previous 5 years. The precipitation also allowed for an abundance of plant growth, increasing the amount and density of fuels in the area. Additionally, the fire area experienced below average temperatures for the same period of record. This also aided plant growth.



Even as the area began to exit from the extreme drought conditions, local vegetation still possessed large amounts of residual dead and down material. This vulnerable fuel component allowed for rapid rates of fire spread to occur, even though the region had an abundance of precipitation the prior year.

Fuels

Vegetation contains annual grasses and mixed chaparral; including chamise, manzanita, ceanothus, scrub oak, and laurel sumac. Softer plants such as buckwheat, sage, and yuccas can also be found within the final fire perimeter. Additionally, the fire directly impacted various zones of “engineered” vegetation; established as a fire-resistant buffer at the wildland urban interface.

Chemise is a prevalent plant species on Southern California’s slopes and chaparral areas below 5000 ft., and is abundant in the Orange County foothills. Unfortunately, its high resin content makes it burn intensely, and in turn, fuels the spread of wildfire. Consequently, OCFA monitors the Live Fuel Moisture content on a monthly basis for both the drier “Old Growth Chemise”, and the not-quite-as-dry “New Growth Chemise” in two Orange County locations- Black Star Canyon in North Orange County, and in Rancho Mission Viejo in Southern Orange County. When the Chemise Live Fuel Moisture content falls to 60% or below, its ignitability, and corresponding impact on fire behavior, significantly increases. As the following chart illustrates, typically Old Chemise becomes more problematic in summer, and especially during the fall months. Even after significant rainfall during the 2016-2017 rainy season, October 2017 was no exception to this phenomena.

Plant species and composition varies with incremental vegetation changes occurring in relation to aspect and elevation. Furthermore, several large wildland fires over the previous 15 years had directly modified available fuel loadings within the final fire footprint specifically, the *Sierra Fire (2006)* and the *241 Fire (2007)*. Remotely sensed fuel types and proportions were acquired and evaluated to accurately validate field observations.

Fuel conditions when the fire started can be described as very dry; even for this time of the year. Energy Release Component (ERC) values generated from the Freemont Canyon RAWS at the time of ignition were approaching the 97 percentile and setting new records (see Figure 7). Additionally, fine dead fuel moisture was calculated between 3 and 6%, corresponding to a probability of ignition value of 90%. The overall impression of the fuel bed can best be characterized as receptive to fire initiation and vulnerable to spread.

Short and long term regional drought have dramatically increased stress on the native fuels regimen. During the period of the Canyon 2 Fire, locally measured live fuels were well below recognized critical percentages. These values become important due to their historical correlation to large fire growth and their known link to energy release potential. This circumstance is especially amplified when live fuel moistures fall to critical levels on consecutive years (see Figure 6).

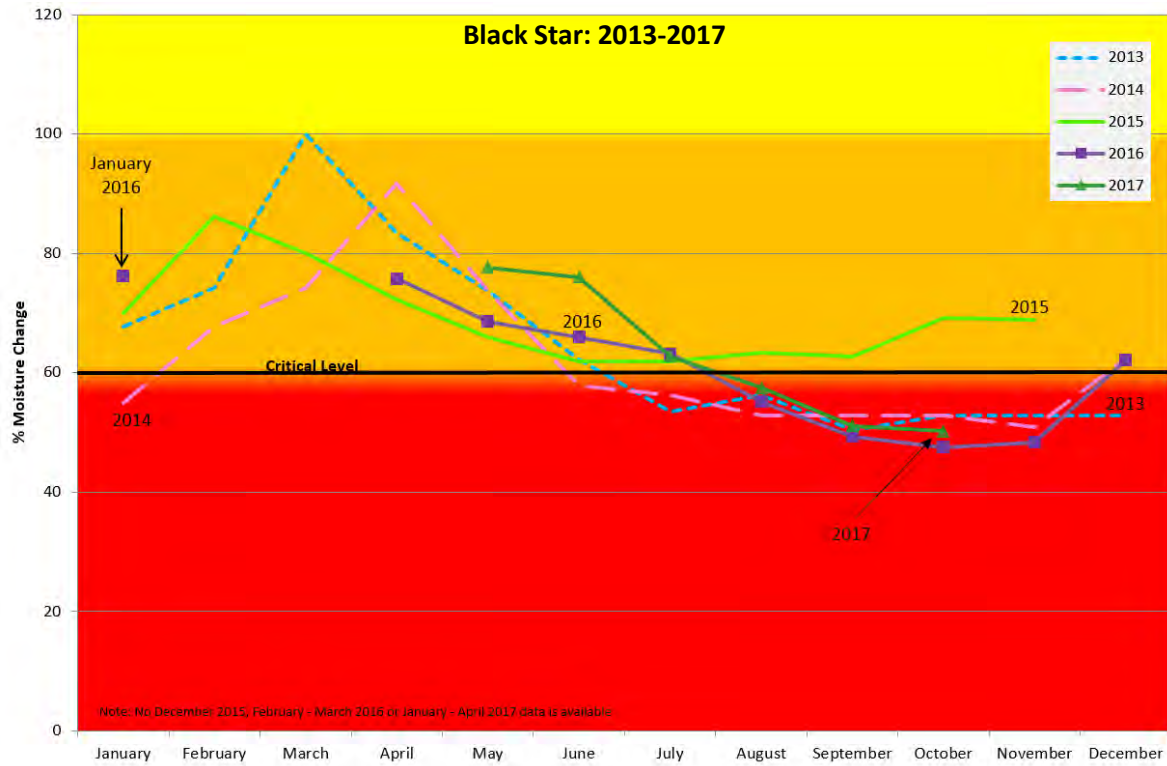


Figure 6: Live Fuel Moisture Year-Over-Year Comparison: "Old" Chamise (Red indicates below critical fuel moisture levels)

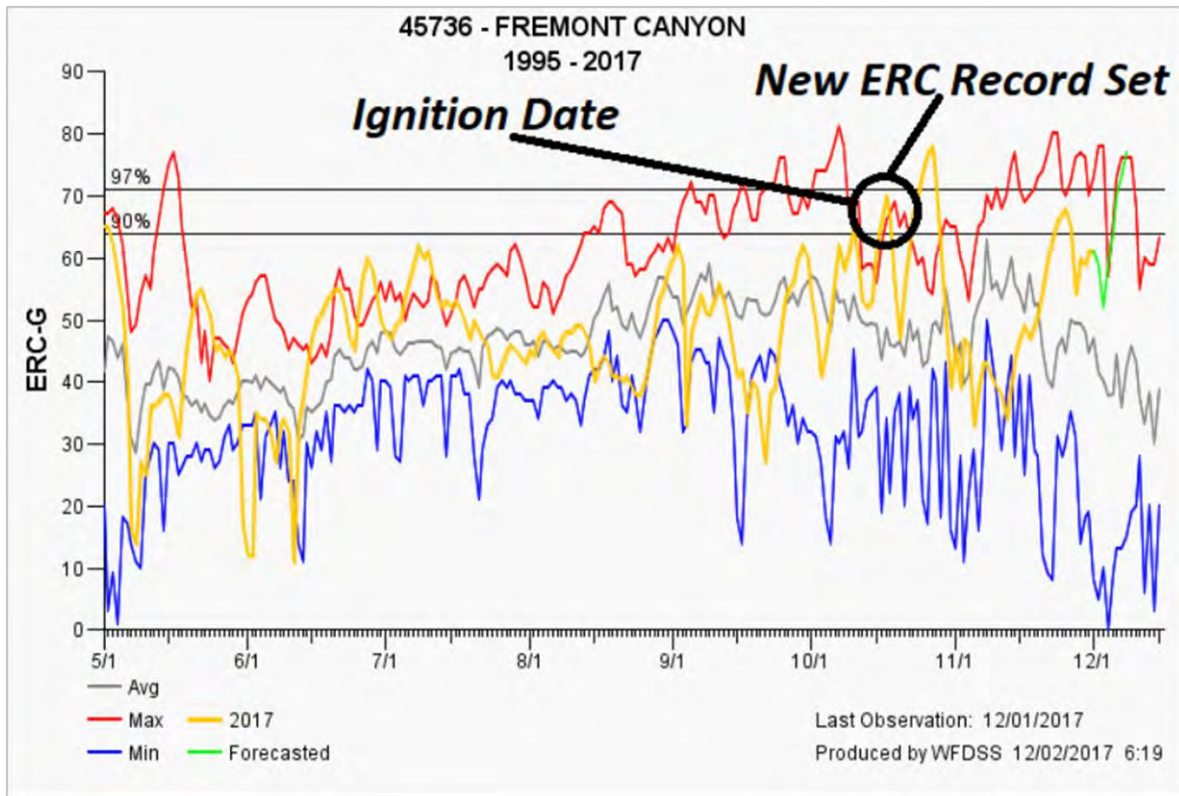


Figure 7: Fremont Canyon Energy Release Component (Record High)



Fire Behavior

Local thresholds for large fire growth include:

- Temperatures greater than 80°
- RH's less than 20%
- 20' winds greater than 10 mph.

With the exception of temperature (70°), all of the aforementioned values were met just prior to the strong wind event during the morning hours of October 9, 2017. Fire spread during the first burn period was largely a function of strong, offshore "Santa Ana" winds in conjunction with very receptive vegetation in all size classes. Small spots up to a 1/2 mile from the main fire front would quickly become established and then be pulled into the main fire. Subsequently, after the first burn period, the fire became primarily fuel and topography driven; generally staying within the established perimeter from October 9, 2017. Abundant annual grasses, as well as a concentrated dead and down understory contributed to a significant portion of the consumed biomass. During times of active fire growth, fire behavior was most commonly classified as high intensity surface fire. However, several runs of active crown fire activity in both natural and engineered canopies were documented; especially where steep slopes were able to allow surface fire to more easily transition into the canopy. As the Canyon 2 Fire wound down, fire spread was predominantly accomplished through rollout of fire impacted, large diameter fuels; further enhanced by steep, complex terrain.



Incident Maps

- Canyon 2 Fire Operations Map, October 14-16, 2017 (Figure 8)
- Canyon 2 Fire Progression Map (Figure 9)
- Canyon 2 Fire Jurisdictional Acreage (Figure 10)

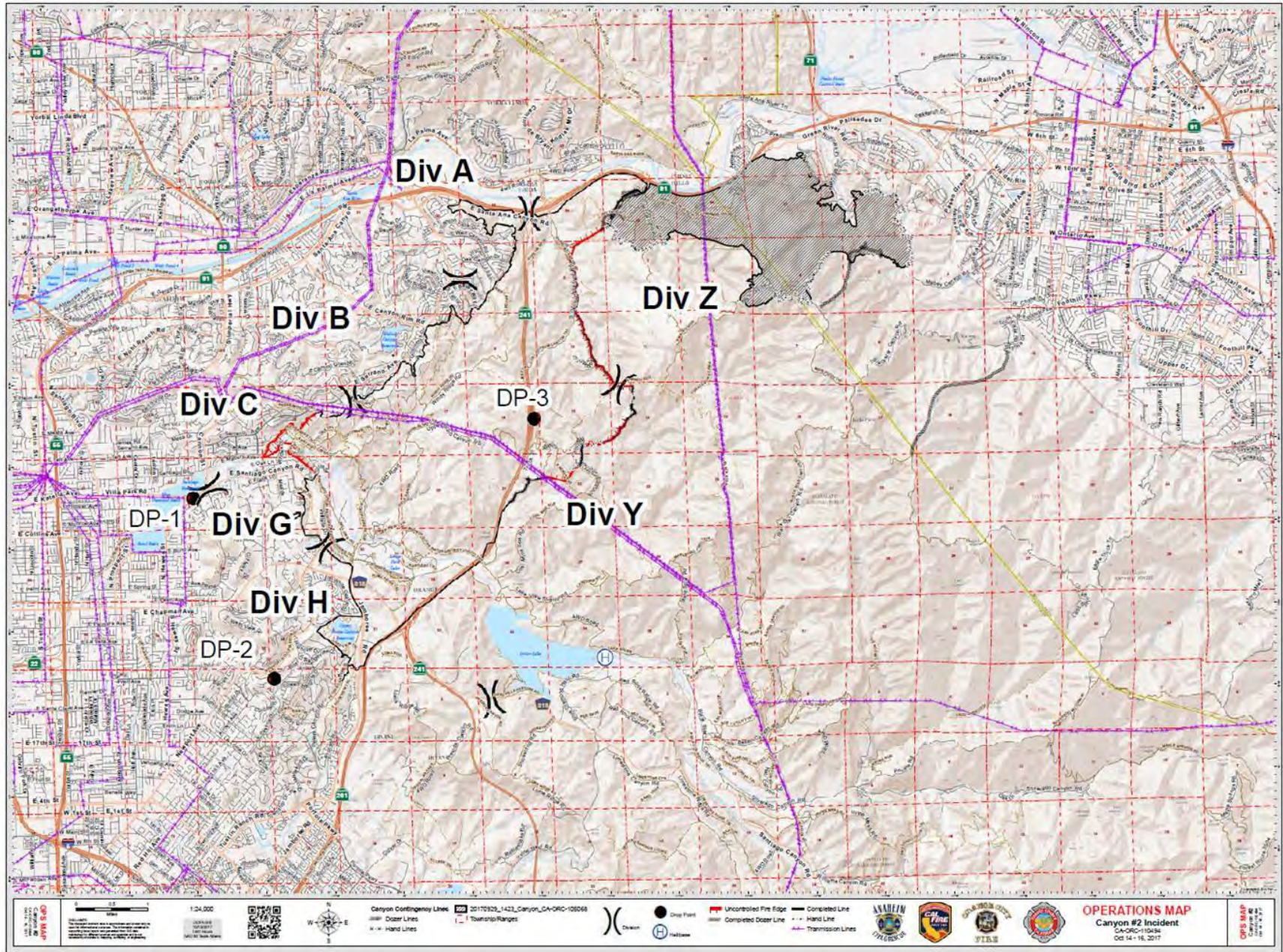


Figure 8: Canyon 2 Fire Operations Map October 14-16, 2017

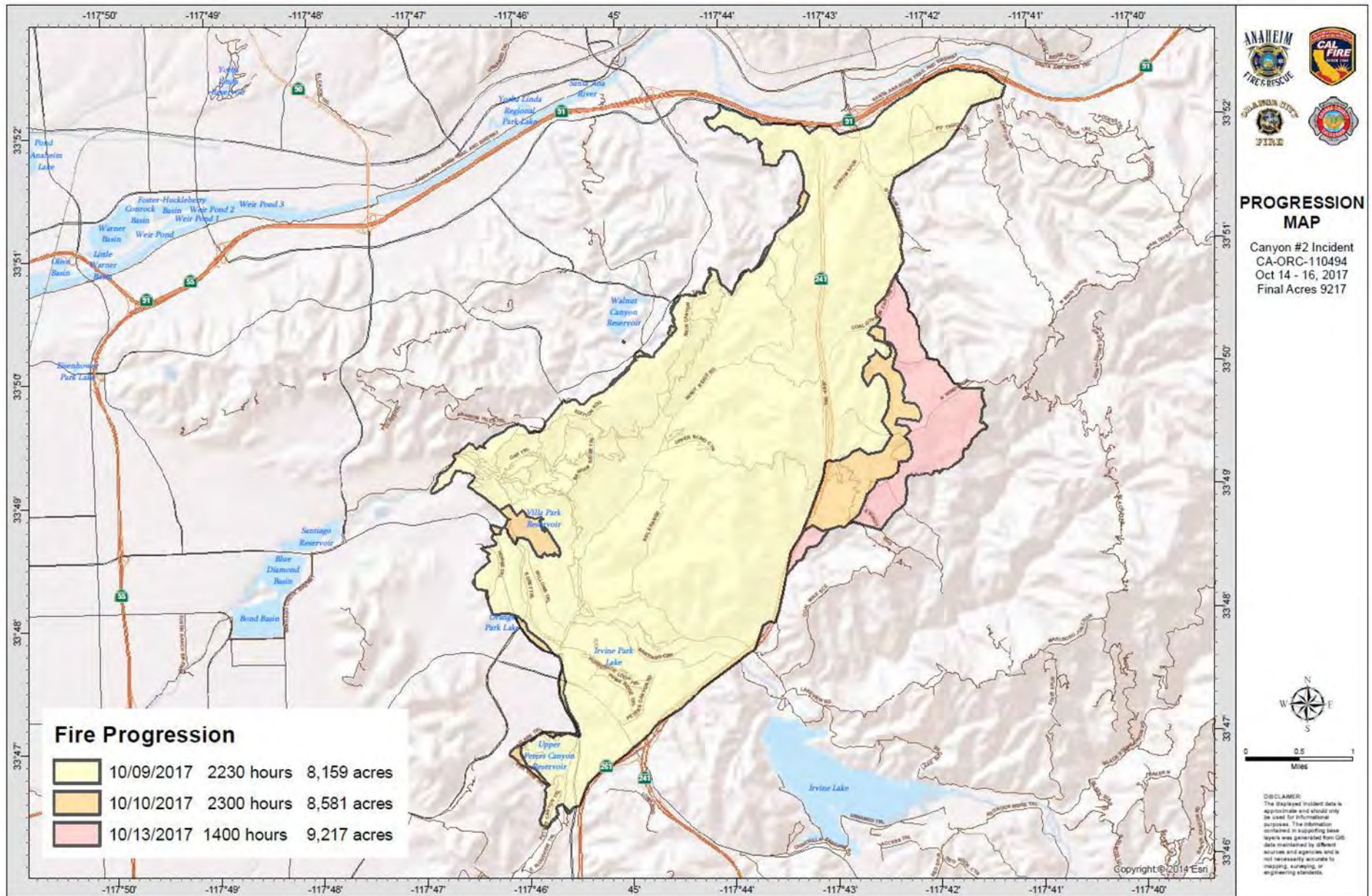


Figure 9: Canyon 2 Fire Progression Map

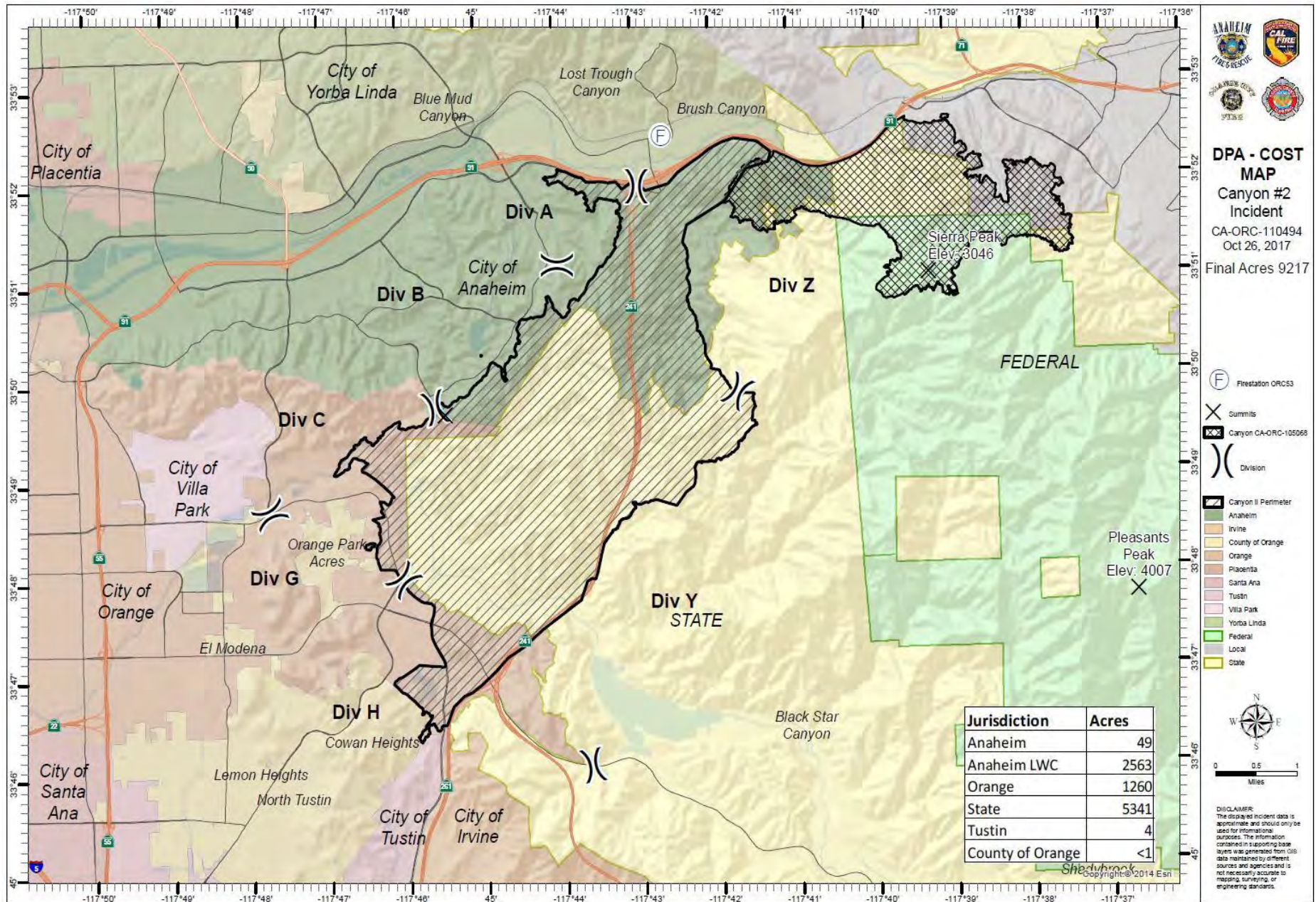


Figure 10: Canyon 2 Fire Jurisdictional Acreage



EVACUATION AND REPOPULATION

Once the fire became established, it was evident it would push to the southwest through the historical fire corridor in Weir Canyon and impact structures in the cities of Anaheim and Orange, as well as OCFA jurisdictions, including Irvine Park, Orange Park Acres, Cowan/Lemon Heights, and the City of Tustin.

Once the fire crossed the 241 Toll Road, the Unified Command implemented evacuations in the City of Anaheim and eventually the City of Orange. Specific to the communities protected by the OCFA, the decision point for evacuations occurred once the fire front reached the mouth of Weir Canyon in the area of Irvine Park. This included the need to evacuate animals at the Irvine Park Zoo, as well as the equine and other large animals in the surrounding residential areas.

Due to the rapid spread of the fire, lack of common evacuation terminology, and heavy civilian traffic along major roads, evacuations occurred slower than optimal but were eventually successful.

Repopulation

Because of waning wind conditions on the second day of the fire, the planning process began to return a sense of normalcy to the residents impacted by the fire. As such, a coordinated approach to the repopulation of the communities began. The process utilized the experience and processes provided by the CAL FIRE Incident Management Team Program and included the "Repopulation Checklist" used throughout California.

Because of the many communities involved, the successful development and implementation of the repopulation plan relied on proper coordination and multijurisdictional support. This included OC Emergency Management, law enforcement from all cities and unincorporated areas, utilities, CHP, environmental health agencies, and building departments. To ensure success, the involvement of the Incident Management Team Public Information Officer (PIO), Liaison Officer (LOFR), Operation Section Chief (OSC), and Law Enforcement Liaison Officer (LELO) was required to develop a plan that the Unified Command could approve. Although many were not familiar with the process, it provided an opportunity for many to learn this pathway for success.

Once the plan was developed and approved for implementation, it was communicated to the County EOC as well as the individual city EOC's by their incident representatives for a coordinated release to the public. Overall, the plan was successful in OCFA jurisdiction.

Because of the many communities involved, the successful development and implementation of the repopulation plan relied on proper coordination and multijurisdictional support.

241 Toll Road Repopulation

The 241 Toll Road was closed in both directions beginning early in the incident. This was initially due to fire activity along the roadway but longer term closures were a result of fire retardant and damage to guardrails in numerous areas. Coordinated by the LOFR, the Toll-Road was able to be re-opened in timeframes accepted by both CHP and the TCA.



MUTUAL AID

The California Fire and Rescue Emergency Mutual Aid Plan is an extension of—and supportive document to—the California Emergency Plan. The plan provides for systematic mobilization, organization, and operation of necessary fire and rescue resources of the state and its political subdivisions in mitigating the effects of disasters, whether natural or man-caused.

No community has the resources sufficient to cope with all emergencies. Thus, fire officials must preplan emergency operations to ensure the efficient use of available resources. Basic to California's emergency planning is a statewide system of fire service mutual aid. Each jurisdiction first relies upon its own resources with mutual aid resources being available from other agencies to augment local response when conditions warrant. The master Mutual Aid Plan outlines and governs what is commonly referred to as the Mutual Aid System for fire service in California.

The Mutual Aid System for the fire service in California has been described by the United States Fire Administration as "unparalleled in the United States." The system is founded on the principle of fire departments providing resources to one another during times of major emergencies when a local agency is overwhelmed and does not have the ability to handle the incident on its own. The system allows resources committed to an incident to escalate from a few engines to hundreds. The State is divided into six mutual aid regions to facilitate coordination of mutual aid. Coordinators are identified at the local and national levels, under the umbrella of the Governor's Office of Emergency Services (OES) Fire and Rescue Branch.

Emergencies may reach such a magnitude as to require mutual aid resources from adjacent local, county, and state levels. Specific requests for mutual aid are processed from the local agency to the County Operational Area Coordinator. OCFA is the coordinator for the Orange County Operational Area. From the County, the request goes to the Regional Coordinator (Los Angeles County Fire Department) and then to the State Coordinator (OES), if necessary. Each ascending level has access to greater numbers of firefighting resources from throughout the State.

The Mutual Aid System for the fire service in California has been described by the United States Fire Administration as "unparalleled in the United States."

When the Canyon 2 Fire began there were no other major fires occurring in Southern California. In Northern California, the Tubbs fire had begun in Sonoma County on the evening of October 8, 2017. OCFA Strike Team 1400C was dispatched to the Tubbs fire at approximately 5:45 a.m. on the morning of October 9, 2017.

At the start of the Canyon 2 Fire, immediate resource requests were placed for Type 1 and Type 3 engine strike teams, fixed wing aircraft, rotor wing aircraft, dozers, and hand crews.

Ordered in First Three Hours	The OCFA and other Orange County Cities Provided	Throughout the <u>Entire Incident</u> Mutual Aid Resources Provided
11 Type 3 Engine Strike Teams	9 Type 1 Strike Teams	42 Strike Teams
35 Type 1 Strike Teams	52 Type 1 and Type 3 Single Increment Engines	11 Type 1 and Type 3 Single Increment Engines
230 Engines Total	97 Engines Total	221 Engines Total



AIR RESOURCES

Air resources (helicopters, fixed wing air tankers, air attack platforms, and lead planes) other than those owned and operated by local government are coordinated by CAL FIRE and the U.S. Forest Service (USFS) through the joint operations center called Southern Region Operations (South Ops) located in Riverside. Both agencies either own or contract for these air resources, and as such they're directly controlled by them.



Orange County Fire HC2 was initially dispatched to a report of smoke. During the response, HC2 received intelligence that there was a fire and requested that HC1 be added to the dispatch. OCFA B2 requested that HC1 bring water with them to the fire and to begin immediate water dropping operations. OCFA HC2 informed HC1 of the plan and directed them to provide a report on conditions then deploy for water dropping operations. The incident was upgraded to a high vegetation fire dispatch which included the following additional air resources: USFS Air Attack 12 (AA12), USFS Air Tanker 10 (AT10), CAL FIRE Air Tanker 73 (AT73), and CAL FIRE Helicopter 305 augmenting the OCFA response of HC1 and HC2. AA12 arrived on scene and established Canyon 2 Air Attack. All subsequent air resource requests were

based on the recommendation of the Canyon 2 Air Attack.

Requests for air resources are often prioritized based on factors such as imminent threat to life and property. As new fires start, these "new starts" receive the highest priority. This is because there is an all-out effort to limit the spread of controllable fires during the initial attack phase, thus limiting the overall regional fire commitment. Aircraft assigned to active fires can be diverted to new fire starts unless there is a "no divert" order placed on them. This order is in place if there are lives threatened/structures burning or imminently threatened. A "no divert" order was placed by the Incident Commander on the Canyon 2 Fire due to life safety, structures and critical infrastructure burning or imminently threatened.

Aircraft requests are placed based on the number and type of aircraft needed to fulfill the incident objectives. Recommendations for aircraft are submitted to the incident commander based on dialogue between Operations, Air Operations, and Air Attack. Air Attack makes all aerial firefighting resource recommendations based on his need to support the air campaign. The incident commander, or his designee, places the order through the central ordering point. The orders are placed for type and quantity, not specific aircraft, vendor, or agency. The central ordering point fills the requests through a well-established automated process known as the Resources Ordering and Status System (ROSS). This system is utilized to ensure air resource orders are not duplicated and incidents receive resources according to prioritization. At the start of the Canyon 2 Fire, there were multiple major incidents burning throughout the state including the disastrous Napa/Sonoma region fires. The aviation ordering point (South Ops) managed filling aerial firefighting resource request for all the ongoing incidents based on their prioritization policy.

An OCSD Type 3 helicopter was used during the initial phases of the incident to assist in evacuations around Anaheim Hills. That helicopter left the scene after being relieved by an Anaheim Police Department helicopter. Other OCSD aircraft were not utilized for water dropping operations due to a combination of factors. The OCSD Type 2 aircraft was not within the ROSS System as an "Agency" aircraft and not carded for belly tank operations at the time of the Canyon 2 Fire. The Canyon 2 Fire Air Attack stated he did not order any Type 3 helicopters for water dropping because the weather and fire conditions were too severe for it to be effective. The OCSD's Type 3 aircraft was requested several hours into the fire to fill the role of Helicopter Coordination (HLCO) platform. However, the aircraft was not made available to respond by OCSD due to a potential logistic support issue. Fuel tender support is required as part of the "Call When Needed" (CWN) contracting requirement. Specifically in the case of the Canyon 2 Fire, fuel tender support was necessary due to the scope and complexity of the dynamic incident and the inability for the OCFA, or incident, to provide that level of logistical support as the incident was rapidly expanding. This fuel requirement is true for any fire incident across the state so that the incident is not burdened by the resource. All 14 CWN aircraft assigned to the incident brought



their own fuel or made arrangements at local airfields with helicopter fuel. OCSD has fuel trucks but chose to not separate them from their Type 2 helicopter.



All aircraft orders for the Canyon 2 Fire were filled, by the central ordering point, with one exception. On the first day of the incident they were unable to fill a request for a Type 3 helicopter. Initially, they had a fill for the Type 3, however, for reasons unknown, the filling agency refused the request. The Type 3 request was filled during the second day of operations and utilized as a Helicopter Coordinator (HLCO) platform.

The Inter-Agency Helicopter Operations Guide (IHOG) lists the standards for helicopter operations on wildfires. These standards are universally recognized as common practice in the fire aviation arena. Helicopters may fly during daylight hours only, unless they meet the FIRESCOPE Night Flying Guidelines.

Orange County Fire Authority (OCFA) has a Night Vision Goggle (NVG) Program that meets or exceeds the FIRESCOPE Night Flying Guidelines. OCFA can fulfill night water dropping, recon, and ALS hoist / rescue missions. In order to allow OCFA helicopters to provide standby night rescue, initial attack readiness, and next day availability OCFA helicopters did not drop water at night. This allowed OCFA pilot's to maintain their flight hour limitations. Los Angeles County Fire Department Helicopter 14/11 (Copter 14 and Copter 11) and the United States Forest Service Helicopter 531 (Copter 531) had night water dropping capabilities. The FIRESCOPE Night Operations NVG Helicopter Go/No-Go Checklist was used by the unified incident commanders to stand up a night operations plan. Night water points were established at Corona Airport and Fullerton Airport to meet the potential needs of the incident. Ground fill operations are preferred at night over snorkeling for safety reasons.



The Inter-agency Helicopter Operations Guide (IHOG) lists the standards for helicopter operations on wildfires.

Canyon 2 Fire Air Operations utilized:

- 14 Air Tankers
- 6 Type 1 Helicopters
- 10 Type 2 Helicopters
- 1 Type 3 Helicopter

A Type 1 Helibase was located at Irvine Lake for all of the helicopters. The air attacks flew out of San Bernardino and Hemet-Ryan air attack bases which were also the primary bases for air tankers. Irvine Lake, Walnut Canyon Reservoir, Peter's Canyon Reservoir, and Santiago Creek catch basin were used as dip sites for water dropping. A temporary flight restriction (TFR) was placed over the fire. This TFR was modified as to not affect air traffic into and departing from John Wayne Airport.



Three SAFECOM reports were filed on the incident. One for a pilot carding issue and two for an unmanned airborne vehicle (UAV or drone) over the fire. There were 14-air tankers that made 94 drops for a total of 247,232 gallons of retardant with a total fixed wing cost of \$1,193,415 (\$4.82/gal). Helicopters flew 137.7 hours dropping 522,427 gallons of water for a total cost of \$637,563 (\$1.22/gal).



LOGISTICS SUPPORT

The Incident Command System (ICS) has proven itself valuable in managing emergency incidents worldwide; and a critical component of ICS is the logistical support function. This effort can be compared to establishing and maintaining a small, temporary city designed for the sole purpose of supporting all the needs of an incident. In the case of the Canyon 2 Fire, it was apparent upon arrival of the first units that the logistical needs for this incident were going to be significant and challenging.

The incident base was established at the Orange County Great Park in the City of Irvine, CA. Early into the incident, it was decided that the previous incident base used during the Canyon Fire, Irvine Regional Park, was in the direct path of the fire and an alternative location would need to be established. Contact was made with the responsible parties at the former Tustin and El Toro Military Bases. After site visits at each location, the determination was made to setup the ICP at the Orange County Great Park, formerly known as the Marine Corps Air Station El Toro. The location accommodated over 1700 personnel at its height. The location is easily accessible and is in close proximity to highways, Toll Roads, and surface streets. The location was a large open concrete lot which provided for ample room for a Type 1 incident base with room to expand.

The OCFA was well prepared for setting up support infrastructure in preparation for a large incident. Over the past three years, the Logistics Section has been working closely with the OCFA Finance and Purchasing Divisions. The OCFA Purchasing Division has been working to pre-establish contracts with Emergency and Support Vendors to add to our Emergency Vendor List. The pre-established list allowed our Purchasing Division within hours of the team activation, to order food, hydration, and support services without delay in an effective and efficient manner. The OCFA Finance Division has established yearly budgets for supporting the Orange County All Hazard Incident Management Team (OCAHIMT). These monies have been used to purchase additional equipment and supplies to enhance the capabilities of our three Fire Command Trailers, Information Technology, and incident base support needs. Equipment and manpower from the OCAHIMT, OCFA Service Center, and Logistics personnel from the local Urban Search and Rescue Task Force, California Task Force Five, allowed for immediate support of the fire while simultaneously building a base to support the incident.

The OCFA was well prepared for setting up support infrastructure in preparation for a large incident.

As in most major incidents, there were several challenges that taxed the efforts of the Logistics Section. The most notable was the scarcity of resources and personnel. The Canyon 2 Fire met all the criteria of a Type 1 Incident, but there were not any Type 1 IMTs available due to the statewide fire activity. When the Canyon 2 Fire started, there were several other large fires burning in Northern California. Four of the six California State Type 1 Incident Management Teams were already assigned to managing the other fires. To support the size and magnitude of the incident, the logistics section filled out all unit leader and manager positions. However, expanded dispatch was unable to fill several of the requested overhead support personnel in base camp. The OCFA was able to provide support to the incident with eight firefighters from the OCFA to assist in both the Plans and Logistics sections. These firefighters were requested as Technical Specialists (THSP) through ROSS.

Building on the lessons learned from the Canyon Fire, a CAL FIRE ECC Support Team was ordered immediately and imbedded into the OCFA DOC to support the incident. This provided a central ordering point, gave access to the Hired Equipment Management System (HEMS), and streamlined the ordering process. It is worth noting that the success of the Logistics Section on the Canyon 2 Fire was largely the result of the support, cooperation, and hard work of individuals representing the City of Irvine, Irvine Police Department, representatives of the Orange County Great Park, numerous vendors and businesses throughout the area, and the exemplary training and professionalism of the firefighting personnel. The following information has



been included to provide a more detailed overview of each of the six units that combine to make up the Logistics Section for a major incident such as the Canyon 2 Fire.

With multiple Incident Management Teams deployed throughout the State, personnel and resource drawdown levels, multiple fires competing for resources, and the need to find an alternate ICP location due to the fire impacting Irvine Regional Park, the logistics section was challenged from the beginning of the Canyon 2 Fire. However, despite these overwhelming challenges, the logistics section was able to overcome and perform due to the overwhelming support and collaboration of the logistics personnel, OCFA RFOTC support staff, cooperative agencies and our local vendors.

Facilities

The Facilities Unit is managed by the Facilities Unit Leader (FACL). The FACL creates and maintains the physical layout of the incident base camp. Consideration must be given to all aspects of supporting the incident. Included are the staging; maintaining and repair of apparatus, and feeding and sleeping of assigned personnel (including the special needs of inmate crews). The FACL also provides suitable working space for the administrative and support positions. They also provide showers, laundry, and other support for personnel assigned for extended periods of time.

The Facilities Unit on the Canyon 2 Fire benefited from several factors. The site location allowed for planning and efficient layout and traffic pattern. The site was a large, wide-open space of concrete which worked well for supporting the incident. This layout provided ample space for setup and servicing the incident without any limitations for heavy equipment. One limitation of the site location is the lack of grass and shade to be used for designated sleeping areas. Overall, the close proximity to OCFA's Regional Fire Operations Training Center (RFOTC), accessibility to major roadways, lodging, and the incident made this an ideal location for the ICP and should be considered for future incidents.

Supply

The Supply Unit is managed by the Supply Unit Leader (SPUL). The SPUL is primarily responsible for ordering personnel, equipment and supplies; receiving, storing and distributing all supplies for the incident; maintaining an inventory of supplies; and servicing non-expendable supplies and equipment. With the numerous large fires burning throughout the state and resource drawdown, delays in availability of resources and personnel provided additional strain on incident personnel. The site location provided for a large footprint that provided ample room for receiving and distribution of incident supplies. The Ordering Manager overcame the normally difficult task of transitioning from a local initial attack to the OCAHIMT and reconciling resource orders. Establishing an expanded dispatch early in the incident, assisted with shortening the reflex time it took to get orders filled and enroute to the incident.

Ground Support

The Ground Support Unit is managed by the Ground Support Unit Leader (GSUL). The GSUL tasks range from the coordination of vehicles to ferrying crews; from maintenance of equipment to planning routes on the incident and furnishing the fuel needs for all equipment. Ground Support was set up late Monday evening October 9, 2017. Fuel was originally furnished by the OCFA fuel tender until the contract vender arrived. Ground support organized traffic flow for fuel, and demobilization (DEMOB) inspections. On Wednesday, October 11, 2017, the incident identified 46 excess strike teams to be released from the incident to be made available for reassignment. The Ground Support Unit Leader requested two additional mechanics to be assigned to the incident to assist with the DEMOB of the forty-six strike teams in two days. The mechanics were released from the incident once the DEMOB of units was complete.

Communications

The Communications Unit is managed by the Communications Unit Leader (COML). The COML is responsible for developing plans for the effective use of incident communications equipment and facilities; installing and testing communications equipment; distributing communications equipment to incident personnel and maintaining and repairing communications equipment.



Communications on the Canyon 2 Fire was established using the multi-county mutual threat zone guide (San Bernardino, Orange, Los Angeles, and Riverside; SOLAR) response communications plan. Early into the incident, contact was made with OCFA ECC by the OCAHIMT COML to determine the current plan and begin establishing a communication plan moving forward. The determination was made that OCFA ECC would maintain control of the dispatch responsibilities out of the OCFA DOC with the support of a CAL FIRE ECC Support Team. The COML, OCFA ECC, and South OPS worked together to establish the communications plan moving forward. South OPS received an approved communications frequency package, which included one command, and seven tactical and air frequencies. The decision was made to stay on "FIREOC" as the command frequency based on the fact that it has the best coverage in the fire's operational area. Field personnel reported no coverage problems on the incident with the use of FIRE OC.

Medical

The Medical Unit is managed by the Medical Unit Leader (MEDL). The MEDL is primarily responsible for the development of the Medical Emergency Plan, obtaining medical aid and transportation for injured and ill incident personnel and for preparation of reports and records. The Medical Unit may also assist Operations in supplying medical care and assistance to civilian casualties at the incident.

The MEDL office was co-located with the Safety Officer. Early into the incident, two ambulances were ordered and dedicated to the incident. The Medical Unit was staffed with 13 personnel and a medical supply trailer. The medical supply trailer supported fire personnel with basic medical needs like cold, allergy, and poison oak treatment. A Medical Plan was published in the Incident Action Plan (IAP) and was followed successfully. A total of 14 contacts were made by line personnel with four reportable injuries.

Food

The Food Unit is managed by the Food Unit Leader (FDUL). The FDUL is responsible for determining feeding requirements at all incident facilities and for menu planning, determining cooking facilities required, food preparation, service, providing potable water and general maintenance of the food service areas.

The Logistics Chief tasked the OCFA Purchasing Division early in the initial attack phase to provide a hot meal on the first night of the incident as well as ordering a hydration trailer and line lunches to support initial attack crews. With approximately 1,800 firefighters onscene and enroute to the fire, a Mobile Kitchen Unit (MKU) was ordered and provided by CAL FIRE Prado Camp. The MKU was onscene and setup to take over feeding of incident personnel by the following morning. The MKU provided more than 9,400 meals with a high of 2,019 personnel being fed on Wednesday morning breakfast on October 11, 2017. The Prado MKU was able to meet the needs of the incident. The projected meal cost for the MKU for the duration of the incident, including hydration and line lunches was \$12.63 per meal.



INCIDENT COMMUNICATIONS

In the days leading up to the Canyon 2 Fire, the determination was made by the Assistant Chief of Operations and the Duty Chief to add additional staffing to various components of the OCFA in anticipation of the winds and fire weather predictions. As a part of this discussion the Emergency Command Center (ECC) agreed to provide two additional Fire Communication Dispatchers (FCD) on October 9, 2017. Due to the holiday on this date there were no additional administrative staff working in the ECC.

During this time frame, the ECC would normally be staffed with eight FCD's and one Fire Communication Supervisor (FCS). The morning of October 9, 2017 the ECC was staffed with ten FCD's and one FCS. In addition to this extra staff, the ECC also had three trainees on duty who had reached a point in their training where they could answer telephone lines if necessary.

The benefit of having additional staff in the ECC greatly assisted with the increased call volume. The table below provides a comparison of a normal daily call volume in the ECC as compared to the call volume the ECC experienced on October 9, 2017. The comparison date of October 9, 2016, was chosen simply as the same time of year and a non-major fire day.

The benefit of having additional staff in the ECC greatly assisted with the increased call volume.

As indicated in Figure 11, the ECC answered over 3 times more telephone calls than normal on October 9, 2017. Although the ECC experienced an extremely high call volume, the additional staffing allowed the ECC to meet national standards for answering 9-1-1 calls received. The National Standard as set forth in NFPA 1221 requires Public Safety Answering Points (PSAP) to answer 95% of all 9-1-1 calls within 15 seconds and 99% of all 9-1-1 calls to be answered within 40 seconds. On this date, the OCFA ECC exceeded national standards by answering 98.56% of all 9-1-1 calls within 15 seconds and 100% of all 9-1-1 calls within 40 seconds.

October 9, 2016		October 9, 2017	
9-1-1 Lines	283	9-1-1 Lines	415
10 Digit Emergency	188	10 Digit Emergency	916
Administrative	128	Administrative	706
Total	599	Total	2037

Figure 11: Total Number of 9-1-1, Emergency, and Administrative Phone Calls Answered

Although the ECC had extra dispatch staff available at the start of the Canyon 2 Fire, there was a need for additional FCS support as the incident started to progress. A message was sent out for FCS that were available to return to the center and three additional FCS returned to assist ECC Operations. The extra staffing on duty this date, as well as the additional FCS staff that returned to work, allowed the ECC to move the Canyon 2 Fire into expanded dispatch. This move allowed the ECC staff to focus on the increased call volume and normal day to day operations, while the expanded dispatch team could focus their efforts on the Canyon 2 Fire.

During a retrospective review of procedures, audio recordings, and incident documentation, it has been determined that the first call for service relative to a potential incident in the 91/241 area occurred at approximately 8:32 a.m. Background and recommendations relative to this issue are further identified in the Challenges and Recommendations summary.



EMERGENCY OPERATIONS CENTER

The purpose of the Emergency Operations Center is to focus on centralized emergency management where priorities are established, policy decisions are made, long-term planning is carried out, and coordination of Operational Area information flow and non-fire related resource requests.

The Director of Emergency Services/Operational Area Coordinator serves as the key decision-maker in the Operational Area/County Emergency Operations Center providing the direction and control necessary to accomplish the purposes specified in the Operational Area Agreement. In this role, the Orange County Fire Authority, with assistance from the OCSD Emergency Management staff, provided collaborative and coordinated policy direction.

The Policy Group, (also referred to as Management), is responsible for the overall emergency policy and coordination through the joint efforts of government agencies. They set priorities, establish any necessary constraints and limitations, keep the members of the Board of Supervisors informed of the progress of the response effort, provide emergency information to the public, and coordinate with the cities, state, and federal governments. The Policy Group faced several decisions during the Emergency Operations Center activations, including health issues related to air quality, coordination with several affected school districts, evacuation of residents, closure of major roadways, and identifying shelter needs.

Support staff included public information staff who ensured information was provided upon request, that press releases and press briefings were consistent, accurate, and timely; and that appropriate information was being provided to all required agencies. The Public Information Hotline provided a vital conduit for receiving and disseminating information to the public, while also gauging rumors. Other support positions included a LOFR, whose role was to coordinate with representatives from outside agencies.

On Sunday, October 8, 2017, the National Weather Service issued a Red Flag Warning for the Santa Ana Mountains/Foothills and inland Orange County, effective Monday, October 9, 2017, from 6:00 a.m. through Tuesday, October 10, 2017, at 10:00 a.m. A Red Flag Warning indicates critical fire weather conditions are either currently occurring or will be experienced shortly. A combination of strong winds, low relative humidity and heat contribute to this extreme fire behavior. An e-mail to the Orange County Operational Area was sent at 1:52 p.m. by the OCSD Emergency Management Division advising of the weather warning.

A Red Flag Warning indicates critical fire weather conditions are either currently occurring or will be experienced shortly.

On Monday morning, October 9, 2017, the Operational Area Emergency Operations Center (the County/OA EOC) activated to a Level 2 (mid-level), activation at 11:37 p.m. This activation was in support of Anaheim and Orange, and also in anticipation of Orange County Unincorporated land being affected in a short period. By the end of the first day, the cities of Tustin and Irvine had also activated their EOC's.

As the decision was made to activate the Emergency Operations Center, Emergency Management Division staff were immediately notified and reported to the Emergency Operations Center. After Emergency Management staff arrived, additional call-outs were initiated to the County Departments for staffing needs. The Emergency Operations Center was organized in accordance with the Standardized Emergency Management System and the National Incident Management System. This system is comprised of functional responsibilities and is structured by sections: Policy/Management Group, Operations Section, Planning and Intelligence Section, Logistics Section, and Finance Section.



EOC Assignments

At 11:20 a.m., the first of OCFA staff, a Division Chief, arrived at the County/OA EOC and immediately assumed the role of Director of Emergency Services (DES), as specified in the Operational Area Emergency Plan. Along with this position, he acted as the Operations Section Chief and the Fire/Rescue Branch Manager. It should be mentioned that the OCFA staff dedicated to the County/OA EOC, (Battalion Chief of Emergency Planning and Coordination, an Assistant Chief and a Division Chief), are in staff positions, and this incident started on a holiday. Despite the holiday, OCFA off-duty staff responded to the County/OA EOC due to the extreme fire conditions and the likelihood that the fire would become a "campaign" Type of fire. It was noted early in the incident that additional OCFA staff was needed at the County/OA EOC; by 1:00 p.m. an Assistant Chief had arrived to assume the DES position.

After the arrival of OCFA's representative at the County/OA EOC, communications between the County/OA EOC and OCFA's Department Operations Center (DOC) were established and efficiently functioned throughout the incident. The ability to obtain current and accurate situational awareness and status was challenging in the County/OA EOC due to the rapid spread of the fire. Most of the intelligence was gathered by monitoring fire department radio traffic, local television coverage, and occasional phone calls to the ICP. Situation status was made more challenging because the Situation Awareness & Collaboration Tool (SCOUT) program was not initiated early in the incident for County/OA EOC personnel to monitor. Whenever available, it is beneficial for overall situational status to have someone at the ICP initiate and update the incident in SCOUT. For reference, during a couple of fires earlier in the season, an incident in SCOUT had been initiated, and they were extremely beneficial to the personnel assigned to the County/OA EOC. Emergency Management staff immediately began notifications to County Agencies, the Emergency Management Council, and the Operational Area Executive Board. Based on the rapid spread of the fire and the extreme wind conditions, the Emergency Operations Center Manager requested County Counsel to draft an Emergency Proclamation in accordance with County of Orange Emergency Ordinance, and the Operational Area Emergency Plan. The local proclamation was signed on October 9, 2017, and ratified by the Orange County Board of Supervisors on October 12, 2017.

The State of California was informed of the signed Emergency Proclamation and that Orange County was requesting a State Gubernatorial Proclamation and Federal Declaration of Emergency. The Governor issued a State Proclamation on October 9, 2017. A Federal Major Disaster Declaration was issued on Thursday, October 12, 2017, for the State of California, but did not include Orange County. The Federal Major Disaster Declaration was amended on October 13, 2017, to include Orange County.

Two areas of note that County/OA EOC staff initiated early in the incident and thereby led to successful outcomes were the opening of a local assistance center (LAC) and the need to develop a Post-Fire Debris Flow Plan and assessment of the damage in the burn area.

In an effort to support the community in its recovery, the OA began planning a Local Assistance Center (LAC) on October 11, 2017. Daily conference calls were held over the next several days to coordinate amongst agencies that would be present. The East Anaheim Gymnasium was identified as the LAC location, as it is geographically located near the most affected communities from the Canyon 2 Fire. In the past, the site was used as a LAC following the 2008 Freeway Complex Fire, which made planning easier.

Staffing at the LAC consisted of representatives from the following agencies: Allstate Insurance, American Red Cross, CA Dept. of Contractors License Board, CA Dept. of Insurance, CA Dept. of Motor Vehicles, CA Dept. Tax & Fee Administration, CA Franchise Tax Board, Anaheim Community Services Department, City of Anaheim Planning/Building, City of Anaheim Utilities, the Anaheim Community Foundation, City of Orange, OC Assessor, OC Clerk Recorder, OC Health Care Agency- Behavioral Health, OC Social Services Agency, California Office of Emergency Services, 211 Orange County, and HOPE Animal-Assisted Crisis Response.

The LAC was opened on October 13, 2017, and closed on October 16, 2017; during the three days it was open, 50 residents affected by the Canyon 2 Fire received services.



On October 12, 2017, conversations were initiated to coordinate a Post-Fire Debris Flow Plan and assessment of the damage to the burn area. Unlike previous large wildfires in Orange County's past, the Canyon 2 Fire burned largely on Local Responsibility Area (LRA), and there would be no response from a federally led Burned Area Emergency Response Team (BAER), or state-led Watershed Emergency Response Team (WERT), to handle post-fire debris flow assessment and planning. Instead, a local task force was created by stakeholders and public agencies to formalize a local Post-Fire Debris Flow Plan.

The fire was declared fully contained (when a control line has been completed around the fire which can reasonably be expected to stop the fire's spread) on October 17, 2017, nine days after the fire began. Overall, the Canyon 2 Fire burned 9,217 acres. The Canyon 2 Fire threatened over 3,500 structures. The Canyon 2 Fire started in the City of Anaheim and the fire front spread rapidly into multiple jurisdictions, including those protected by the OCFA. Despite the severe conditions and rapid progress of the fire, no lives were lost and no major injuries were reported. Sadly however, 14 homes were destroyed, another 44 homes damaged, 1 commercial building damaged, and 21 other outbuildings damaged or destroyed. The cost of all structures impacted was estimated at \$39,256,673.

The following is a summary of activities coordinated through the County/OA EOC. It is not meant to be an exhaustive all-inclusive list, but merely a highlight of events.

Monday, October 9, 2017

- Due to the activation of four Orange County City Emergency Operations Centers: Anaheim, Orange, Tustin, Irvine; the Operational Area Emergency Operations Center was activated and operational at 11:37 a.m.
- Emergency management staff that was off-duty was recalled. Emergency management staff began to call back EOC support staff. The Public Information Hotline was immediately activated with support staff.
- The fire quickly jumped the 241 Toll Road and began heading into the area of Anaheim Hills.
- Evacuation orders were issued for parts of Anaheim Hills, Orange, and North Tustin, along with Santiago Oaks Park, Peters Canyon Park, and Irvine Park, including the OC Zoo.
- Numerous road closures were immediately initiated, including the closure of the 241 Toll Road from Santiago Canyon road to the 91 Freeway.
- A local emergency was proclaimed by the City of Anaheim and the County. The County/OA EOC requested a State Gubernatorial Proclamation of Emergency.
- Governor Brown proclaimed a State of Emergency at 4:20 p.m. for Butte, Lake, Mendocino, Nevada and Orange Counties due to the fires, and requested a Presidential Major Disaster Declaration.
- Two shelters opened with the help of the American Red Cross. Shelter locations were El Modena High School and Katella High School.
- The County/OA EOC staff was advised to begin staffing for anticipated two-day staffing pattern on 12-hour shifts.
- Two care and reception centers opened by the City of Anaheim. Their locations were the East Anaheim Gymnasium and Downtown Anaheim Youth Center.
- Three shelters opened for animal care needs: the OC Animal Shelter on The City Drive was open for small animals; the Orange County Fair Grounds and the Los Alamitos Race Track opened for large animal shelter.

**Tuesday, October 10, 2017**

- Orange Unified School District closed nine schools impacted by the fire, and Tustin Unified School District closed all schools.
- Forward progress of the fire was stopped, and no further threat to structures existed.
- At 4:00 p.m., all evacuation orders and road closures were lifted with the exception of Windes Drive in the City of Orange, and the 241 Toll Road from Santiago Canyon to State Route 91 Freeway. Irvine Park, Peters Canyon Park, and Santiago Park remained closed due to extensive damage.
- The shelter at Katella High School, and the Care & Reception Center at East Anaheim Gym in the City of Anaheim closed.
- Initiated discussions with the City of Anaheim regarding opening a local assistance center (LAC) in the City of Anaheim.
- By 10:00 p.m. all EOC's deactivated to Duty Officer status.
- Discussion with the ICP for repopulation coordination began to take place and continued, together with a conference call, to coordinate all jurisdictions where possible.

Wednesday, October 11, 2017

- The County/OA EOC reactivated to a Level II for daily daytime operations and began recovery efforts.
- The shelter at El Modena High School closed.
- Coordination to establish a Local Assistance Center continued with all affected jurisdictions.

Thursday, October 12, 2017

- All schools in Tustin & Orange Unified School Districts were re-opened.
- Coordinated a meeting with stakeholders to discuss initiating a Post-Fire Debris Flow Plan and assessment of the damage to the burn area.
- County/ OA EOC deactivated and returned to duty officer status.

Friday, October 13, 2017

- Local Assistance Center opened at the East Anaheim Gymnasium in the City of Anaheim and operated daily for three days.

Monday, October 16, 2017

- Local Assistance Center closed.

Tuesday, October 17, 2017

- The fire was declared fully contained nine days after it began.



MEDIA AND PUBLIC COMMUNICATIONS

The Communications and Public Affairs section is overseen by the Communications and Public Affairs (CAPA) Battalion Chief, this section is comprised of an Office Services Specialist, the Operations Public Information Officer (PIO), a Community Relations and Education Supervisor, and four Community Education Specialists.

This section is responsible for providing timely and accurate information to the public, media outlets, elected officials, and OCFA Board Directors. CAPA provides support to the Fire Chief and Executive Management on special projects as well as internal and external communications. The PIO ensures accurate and timely information is released to the public. Utilizing press releases, board advisories and our social media platforms, the PIO acts as the spokesperson for OCFA during major incidents as well as daily requests from the media.

The Community Relations and Education Supervisor oversees four Community Educations Specialists. This group is responsible for large-scale educational campaigns and community outreach events. The group also promotes public awareness for safety campaigns, including drowning prevention, wildfire awareness, disaster preparedness and smoke alarms. Through community events, such as station tours, safety fairs, and school programs, the CAPA section works towards meeting the mission statement of the OCFA, *"To enhance public safety and meet the evolving needs of our communities through education, prevention, and emergency response."*

The Public Information Officers were responsible for disseminating information and handling public relations during the Canyon 2 Fire. This includes conducting the Public Information Officer (PIO) functions for the incident command, updating of information online, and handling inquiries from citizens and elected officials. With the extreme fire behavior, rapid spread, and threat to homes, the public information officers realized there would be great media interest in the event.

The OCFA Public Information Officer was dispatched to the incident as part of the initial attack response. This is typical for any vegetation fire response. The Anaheim Fire and Rescue and Rescue/Police Department PIO, also responded as part of Anaheim Fire and Rescue's vegetation fire response. Once it was determined that the fire's origin was in the City of Anaheim's area of responsibility, it was agreed that Anaheim would act as the lead PIO, until an incident management team transitioned into command of the fire. A brief meeting was conducted between the two PIOs to ensure that all information would be accurately disseminated by both PIOs.

As the incident progressed, it became clear that the fire would make a significant push towards homes in the cities of Anaheim, Orange, Cowan/Lemon Heights and Tustin. Incident commanders decided to activate the OCAHIMT, and begin the process of setting up an incident base at Irvine Great Park.

The OCFA website (www.ocfa.org) received almost 2.2 million inquiries during the first day of the incident.

Once the OCAHIMT took command of the fire, the designated PIOs for OCAHIMT, transitioned to the lead PIOs for the incident. The PIO section operated with existing personnel with no augmentation, due to the lack of available PIO personnel. It was the consensus that the PIO's on scene, combined with additional communications and public affairs personnel from the respective agencies, would be enough to manage the initial and short-term communication needs for the incident.



A total of 14 press releases, media advisories, and notifications with information on evacuations and road closures were issued in a coordinated fashion. The OCFA website (www.ocfa.org) received almost 2.2 million inquiries during the first day of the incident. Over 6 million inquiries were made from October 9 through October 11, 2017. Prior to that time frame, the average number of inquiries to the ocfa.org website was 25,171 per day. It is unknown about the inquiries to neighboring agency servers.

As with most major incidents, incongruent information occasionally ended up being disseminated to the media, mostly through the social media environment. Individuals would post information about the fire's extent, travel, and homes threatened based on rumor and hearsay. These reports were often picked up by local media and reported to the public. This created additional effort and required research to respond and correct misinformation. A regular media update schedule was set up, so the news outlets were aware of when new updates were being released as to the size of the fire, road closures, and other information.



FIRE CAUSE AND ORIGIN INVESTIGATION

The investigation of the Canyon 2 Fire was a collaboration between Anaheim Fire and Rescue, OCFA and CAL FIRE investigators. The fire originated in the City of Anaheim's jurisdiction near the 91 Freeway and the Coal Canyon Truck Trail. The area of origin is the jurisdiction of the Anaheim Fire and Rescue Department; therefore, Anaheim Fire and Rescue Department investigators assumed the responsibility for the fire investigation.

There were reports that a fire near Sierra Peak on October 8, 2017 was a contributing factor to the start of the Canyon 2 Fire. This theory was thoroughly investigated and determined to be untrue. The fire discovered on October 8, 2017 by the Anaheim Police Department's helicopter (Angel) was approximately 2.4 miles away from the determined area of origin.

In a systematic approach, the perimeter of the general area of origin was walked, first clockwise, then counter-clockwise, looking for burn indicators and/or evidence along the perimeter of this section of fire. This was done in a back and forth manner through the general area of origin from the upper slope back toward the dozer line below. The origin of the Canyon 2 Fire was determined to be located approximately 50' west of the finished containment line completed by a dozer during the first Canyon Fire. The fire cause was determined to be accidental. The probable cause was burning embers from a smoldering group of oak trees located approximately 20 feet east of the control line.

The fire cause was determined to be accidental. The probable cause was burning embers from a smoldering group of oak trees located approximately 20 feet east of the control line.



Investigators examine the area of origin

The first Canyon Fire, On September 25, 2017, was investigated by Anaheim Fire and Rescue along with investigators from the OCFA, and was determined to be an accidental fire. The most probable cause of the first Canyon Fire was a lit road flare or the hot slag/debris from a lit road flare that left the road way. This was most likely caused by a passing vehicle contacting the road flare and sending it into the brush along the south side of the 91 Freeway.



DAMAGE INSPECTION OVERVIEW

The damage inspection process is intended to be “All-Hazards” to meet incident reporting needs for any type of incident. Damage inspection personnel conduct a systematic survey of an incident, collecting and recording damage to property, infrastructure, environmental resources, and other items as needed. Damage inspection provides a clear understanding of the impact a disaster has had and provides information for loss analysis. The OCFA relies on timely and accurate damage inspection information from which to make appropriate response and recovery decisions.

The intent of damage inspection is to provide an evaluation of fire damage to structures within the fire perimeter. This section attempts to include all habitable structures and outbuildings with a footprint greater than 10' X 12' throughout the fire area. The section may evaluate or identify fire damage to infrastructure, mobile equipment, or other miscellaneous parcel improvements.

The damage inspection data is approximate and for informational purposes only. The information and data contained in this section was collected using a systematic inspection process. Data collection concluded on October 14, 2017 at 1:00 p.m.

Additionally, identification of structure types, such as single family - single story residences vs. single family - multi story residences, was extremely difficult in some areas due to complete combustion of all identifying features. Damage Inspection (DINS) Teams used their best judgment when assigning structure type classifications based on available features.

Damage inspection is based on the Firefighting Resources of California Organized for Potential Emergencies (FIRESCOPE) Damage Inspection Specialist training curriculum. Damage inspection is not designed or intended to assess the value of individual damaged structures or determine the value of the total damage caused by the fire.

CAL FIRE's Office of the State Fire Marshal (OSFM) Damage Inspection Criteria, which follows FIRESCOPE standards for post fire inspections, was used for this incident. Data collection for each structure began with the visual confirmation by inspection teams. This visual confirmation provided the percent of the total structure that was damaged. The following chart provides the damage classification levels used in the evaluations:

1-9%	Superficial Damage
10-25%	Minor Damage
26-50%	Moderate Damage
51-75%	Major Damage
>75%	Destroyed

Figure 12: Damage Classification Levels

CAL FIRE's Office of the State Fire Marshal (OSFM) Damage Inspection Criteria, which follows FIRESCOPE standards for post fire inspections, was used for this incident.



DINS teams classified the damaged or destroyed structure into one of the following structure classifications:

Category	Structure Type
Commercial	Commercial Building - Single Story
Commercial	Commercial Building - Multi Story
Commercial	School
Commercial	Hospital
Commercial	Church
Other	Environment
Other	Miscellaneous
Other	Agriculture
Other	Infrastructure
Outbuilding	Outbuilding Greater Than 10'X12'
Outbuilding	Non-Habitable - Shop
Outbuilding	Non-Habitable - Barn
Outbuilding	Non-Habitable - Detached Garage
Residence	Single Family Residence - Single Story
Residence	Single Family Residence - Multi Story
Residence	Multi Family Residence - Single Story
Residence	Multi Family Residence - Multi Story
Residence	Mobile Home - Single Wide
Residence	Mobile Home - Double Wide
Residence	Mobile Home - Triple Wide
Residence	Mobile Home - Motor Home (if used as residence)

Figure 13: Structure Classifications

A structure is considered to be a habitable space when it appears to have permanent features that could be identified as a Dwelling Unit.

A Dwelling Unit, as defined in the 2016 CBC, in Chapter 2, Section 202, is a single unit providing complete, independent living features for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation. Teams generally considered a structure permanent if the foundation was comprised of concrete or cinder block and was attached to that foundation. Temporary habitable structures, such as mobile homes, are included in this section and are classified separately from permanent habitable structures.

Structures greater than 120 square feet (10' X 12') are included in this section. This threshold is a common size at which a structure becomes taxable by County Assessor rules. Only outbuildings that appear to be permanent structures are included in this section.



Findings

In total, 80 structures were identified by the DINS team as damaged or destroyed by the Canyon 2 Fire in Orange County (Figure 14). The construction components of damaged areas are captured in Figure 15.

	Commercial	Other	Outbuilding	Residence	Grand Total
10-25%	1	1	2	20	24
1-9%		3	1	15	19
26-50%		3		5	8
51-75%				4	4
Destroyed		5	6	14	25
GRAND TOTAL	1	12	9	58	80

Figure 14: Structures Damaged or Destroyed

Construction Method	Roof Construction	Window Panes	Eaves	Eave Vent Screen	Exterior Siding	Deck or Porch
Combustible	5				10	
Fire Resistant	67				41	
Composite						4
Masonry						4
Wood						28
Multi Pane		47				
Single Pane		13				
Enclosed			22			
Un-Enclosed			36			
Yes				33		
No				8		
Unknown	8	20	22	39	29	33
Not Applicable						11
GRAND TOTAL	80	80	80	80	80	80

Figure 15: Construction Methods and Damaged Areas

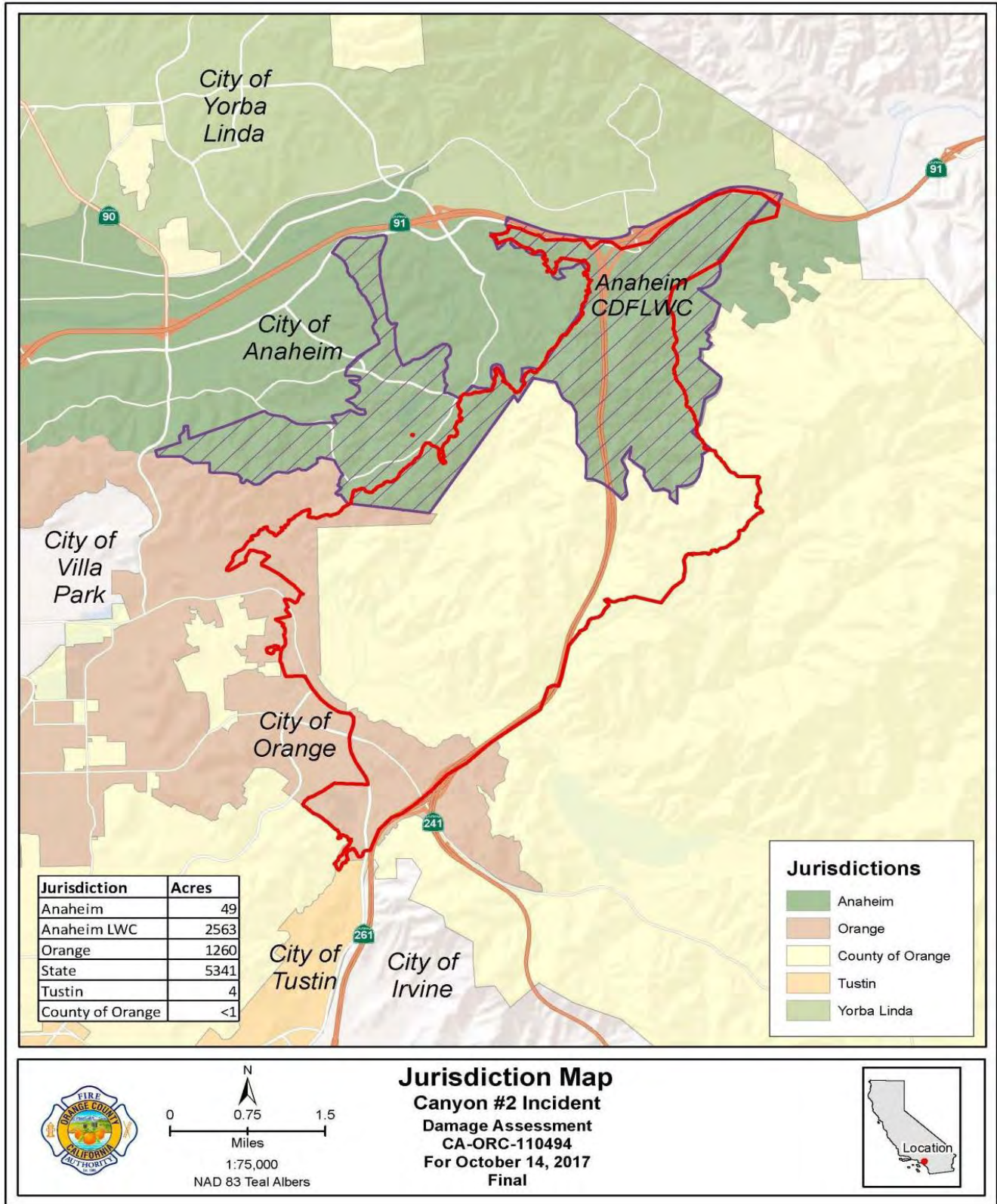


Figure 16: Jurisdiction Map

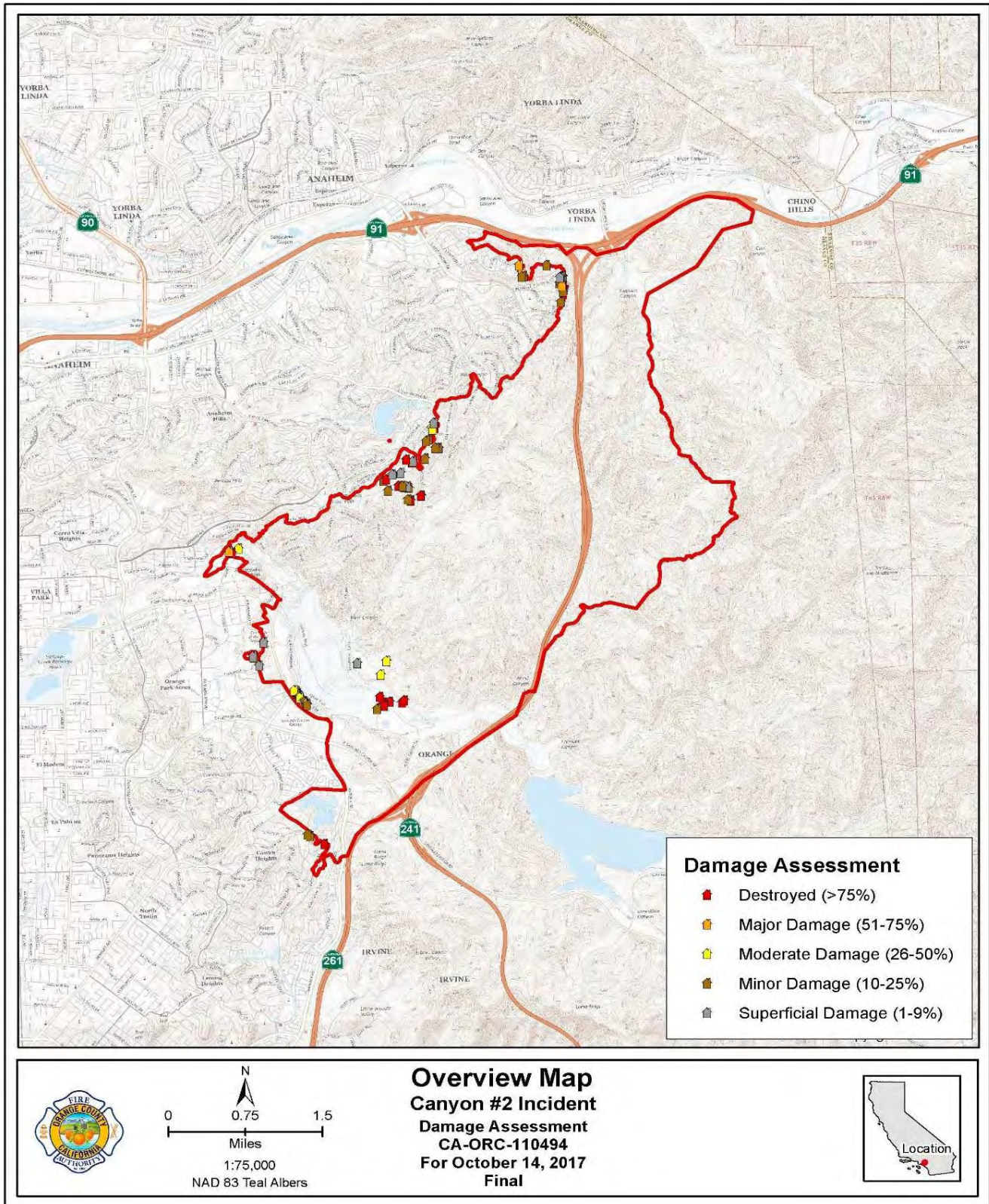


Figure 17: Overview Map

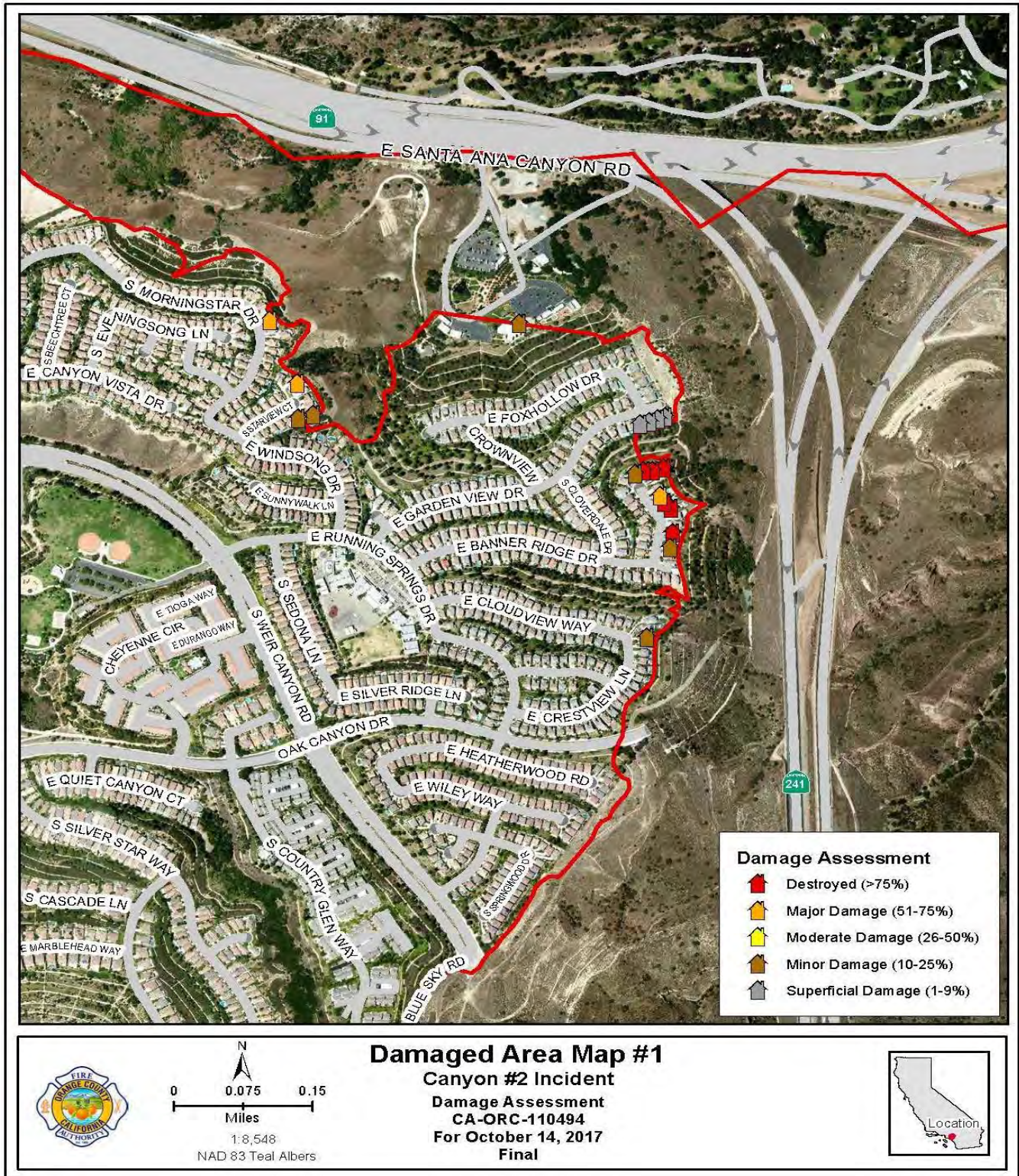


Figure 18: Damaged Area Map #1



Figure 19: Damaged Area Map #2



Figure 20: Damaged Area Map #3



Figure 21: Damaged Area Map #4



Figure 22: Damaged Area Map #5



VOLUNTEER GROUPS AND RESOURCES

Many volunteer groups assisted during the Canyon 2 Fire in various capacities. Major volunteer groups included:

- American Red Cross
- OC Fire Watch
- Anaheim Community Emergency Response Team (CERT)
- Large Animal Rescue Team (LART)
- City of Orange Amateur Radio Operators (COAR)
- Hope Animal-Assisted Crisis Response (Hope AACR)

These volunteer groups provided invaluable assistance to a wide variety of non-suppression and incident support activities. The positive attitude, helping nature, and initiative of these groups were recognized and appreciated by OCFA staff, the Incident Command staff, and those who were responsible for supervising and managing various support functions.

American Red Cross

The American Red Cross is the lead agency responsible for establishing and staffing evacuation centers during disasters and other major emergencies requiring evacuation of large number of residents. During the Canyon 2 Fire, 2 evacuation shelters were established at El Modena High School in the City of Orange and Katella High School in the City of Anaheim. The 93 volunteers and staff served at both evacuation centers as well as the Red Cross EOC. 129 meals and 184 snacks were served to 31 shelter registrants and many others.



OC Fire Watch

OCFA Wildland Pre-Fire Management works in collaboration with the OC Fire Watch Program. The program is coordinated by Irvine Ranch Conservancy (IRC) that provides training and coordination of a robust network of volunteers. OC Parks contracts with IRC to provide fire watch volunteers in their open space facilities throughout the County with a primary focus on visibility and education, deterring potential arsonists as well as reporting any potential fires while they are small.

OC Fire Watch deployed as a result of the Red Flag event in the mountain and intermediate weather zones of Orange County on Monday, October 9, 2017. The operations center was activated and staffed at 8:30 a.m. 25 volunteers were at 19 Watch locations beginning at 9:00 a.m. for the first Fire Watch shift. After hearing the OCFA dispatch for a vegetation fire, the operations center contacted a Fire Watch participant at the Irvine Ranch Open Space #1 Gypsum Canyon gate location at 9:52 a.m. to get a report from the area. The participant reported that visibility conditions were poor with a lot of ash being blown around. He reported a moderate smell of smoke but could not determine if it was the ash from the previous burn or something new. He stayed on location to provide additional information. While monitoring the scanner radio traffic, at approximately 10:00 a.m., the OC Fire Watch operations center made the determination from size up information from responding units to evacuate volunteers from multiple locations.

OC Fire Watch deployed as a result of the Red Flag event in the mountain and intermediate weather zones of Orange County on Monday, October 9, 2017.



Other volunteers were released if they had information that their own residences were being notified to evacuate while others were relocated to other OC Fire Watch locations. OC Fire Watch volunteers were on shift throughout the day with operations concluding at 5:00 p.m.

Anaheim Community Emergency Response Team

The CERT Program educates people about disaster preparedness for hazards impacting their community. CERT trains people in basic disaster response skills such as fire safety, light disaster and rescue, team organization, and disaster medical operations. Anaheim CERT assisted with 25 volunteers filling in at the city's EOC, the Call Center and with Fire Watch patrols following the fire event.



Large Animal Rescue Team

The San Juan Capistrano LART was activated on October 9, 2017 at 12:45 p.m. The first Master Mutual Aid request came in to the City of San Juan Capistrano from Orange PD and immediately following was a request from the County EOC.

Irvine Regional Park and Orange Park Acres were in need of personnel and horse trailers to move 100-150 horses from their stables to a safe location. The Alert OC emergency notification system was utilized by the City of San Juan Capistrano to alert members of the LART. A dozen or more LART were mobilized based on their level of training. Trailer Team Leaders were identified and sent with other LART members to assist in the response. Due to the amount of horses needing to be evacuated and the urgency of the fire, horses were initially taken to some area stables in a safe zone allowing for more trips to quickly get horses out of harm's way. Horses were then directed to evacuation centers at the Orange County Fairgrounds and the Los Alamitos Race Track. Other LART members met at those evacuation sites to assist in the care and reception of the animals.

The LART volunteers respond with their own vehicles and were diverted in many instances when the need of evacuation of horses was identified. This occurred in Orange Park Acres and the vicinity of the Albertsons store at Jamboree and Santiago Canyon where horses were being led on to the streets.





City of Orange Police Volunteers and City of Orange Ham Radio Operators

Orange Police Department Volunteers were used for support roles in the city's EOC. Additionally, the COAR group were assisting during the fire.

HOPE Animal-Assisted Crisis Response

Cal OES requested HOPE teams to deploy to the Local Assistance Center (LAC) at the Anaheim Community Gymnasium that was to open on Friday, October 13, 2017. HOPE sent teams consisting of a Handler and Canine Friday, Saturday, and Monday. While at the LAC, the teams helped to comfort and relieve the stress of 75 workers and those coming in to get help and information. HOPE had an information table, but mostly circulated throughout the day giving comfort and lending an ear when needed.

On request of the OC Department of Education Crisis Response Network, three HOPE teams responded to Rancho Santiago College (RSC) on Monday, October 16, 2017 and Tuesday, October 17, 2017. The teams were at RSC on October 9, 2017 for a separate matter when the fire broke out and came perilously close to the college. The teams helped to evacuate the students in an orderly manner and to avoid panic. Over the two days the team helped to comfort and relieve the stress of approximately 250 students and faculty.



Having trained, qualified, and eager volunteers who can assist in non-suppression activities can free up firefighting personnel. This enables them to focus on life-safety and fire suppression efforts. Additionally, volunteers assist in providing human services, aid, and comfort to evacuated residents and those whose homes were damaged or destroyed. The contributions and assistance of all volunteer groups and the individual volunteers was invaluable.



FISCAL IMPACTS

Overview of Costing and Reimbursement Procedures for Major Incidents

Each year, the OCFA establishes Cost Reimbursement Rates which are used to bill for personnel and equipment resources that are requested on an assistance-by-hire basis by State, Federal, and other agencies needing OCFA services. The personnel rates are based on budgeted salary and benefit costs along with indirect administrative support costs from Financial Services, Purchasing, and Human Resources. Equipment rates are provided by FEMA and Cal OES. These rates are used to recover OCFA's costs when assisting State, Federal, and other agencies.

Public Assistance Funding

Public Assistance Funding is authorized by the Stafford Act and funded through FEMA. The Stafford Act provides for the following:

- Gives the President the authority to administer Federal disaster assistance
- Defines the scope and eligibility criteria of the major disaster assistance programs
- Authorizes grants and direct assistance to the States
- Defines the minimum Federal cost-sharing levels

Employees' actual hourly rates are used when an OCFA incident is declared a major incident subject to Public Assistance Funding.

Canyon 2 Fire Costs

On October 15, 2017, a Local Government Fiscal Responsibility/Cost Share Agreement was made between CAL FIRE and OCFA concerning reimbursement of resources for the Canyon 2 Fire. Due to the magnitude of the fire, both FEMA and the State's Office of Emergency Services (OES) declared the Canyon 2 Fire a major incident and offered to provide Public Assistance Funding to the participating agencies. A request for Federal Public Assistance (PA) was submitted on December 15, 2017. OCFA anticipates to recover at least 95% of costs associated with the Canyon 2 Fire. The breakdown on the two reimbursements claims are as follows:

Types of Costs	FEMA (PA)	CAL FIRE	Total
Labor	\$490,000	\$1,058,000	\$1,548,000
Supplies	\$40,000	\$131,000	\$171,000
Equipment	\$230,000	\$464,000	\$694,000
Grand Total	\$760,000	\$1,653,000	\$2,413,000

Figure 23: Reimbursement Claim Breakdown



Following are total incident costs for all agencies, whereas the figures on the prior page were for the OCFA only.

Day	Date	Cost per Day	Cost to Date	Acres to Date	Cost per Acre
1	10/9/2017	3,925,857	\$3,925,857	4,500	\$872
2	10/10/2017	3,559,595	\$7,485,452	7,500	\$998
3	10/11/2017	2,358,874	\$9,844,326	9,217	\$1,231
4	10/12/2017	1,684,877	\$11,529,203	9,217	\$1,251
5	10/13/2017	907,115	\$12,436,318	9,217	\$1,349
6	10/14/2017	890,176	\$12,991,123	9,217	\$1,409
7	10/15/2017	335,371	\$13,326,494	9,217	\$1,446
8	10/16/2017	398,506	\$13,725,000	9,217	\$1,489

Figure 24: Estimated Incident Cost by Date

Due to the magnitude of the fire, both FEMA and the State's Office of Emergency Services (OES) declared the Canyon 2 Fire a major incident and offered to provide Public Assistance Funding to the participating agencies.



The Canyon 2 Fire impacted the 261 and 241 toll roads



RECOVERY EFFORTS

As a result of the already established relationships with the land owners and resource managers impacted by the Canyon 2 Fire, recovery plans were in place even before the fire began its march westward into the areas protected by the OCFA. This included the pro-active prevention activities coordinated by the OCFA Wildland Pre-Fire Management Section that included fire access roads in the open space areas as well as coordinated prevention activities in the Cowan/Lemon Heights community and Orange Park Acres.

Prior to the Canyon 2 Fire being controlled, post fire suppression repair began to remediate any environmental damage done during the suppression effort. This effort focused on rehabilitating dozer lines, hand lines, staging areas, stream impediments, degraded roads, removing hazardous trees to ensure public safety, reducing erosion, and protecting the natural resources. Post fire suppression repair was conducted using bull dozers, strike teams, water tenders, an OCFA grader, hand crew, and skid steer, and the associated incident command and resource planner, with input provided by Orange County Parks (OC Parks), the Irvine Ranch Conservancy (IRC), and the Natural Communities Coalition (NCC).

The installation of water bars was conducted on all dozer lines, as well as hand lines that met the requirements for rehab. The water bars were constructed using the following criteria:

	Water Bar Spacing			
Percent of Slope	0-10%	11-25%	26-50%	>50%
Water Bar Spacing for Dozer Lines and Hand Lines	100'	75'	50'	50'
Water Bar Spacing for Road	200'	150'	100'	75'

Figure 25: Water Bar Spacing

All water bars were installed diagonally with a minimum cut of 6" into the existing grade, and a minimum height of 18" from the bottom of the trench to backfill top. Water bars were installed at all approaches to watercourse crossings, and all water bars were constructed at 30 degrees, angled downhill. Water bars were constructed to allow for drainage at the discharge end into non-erodible material and into the green where feasible.

Dozer Lines

During the incident, 6.3 miles of dozer line was installed as either direct fire line or contingency line. Post suppression repair focused on using heavy equipment and hand crews to reduce the long-term impacts of dozer lines by:

- Bringing in and smoothing out berms
- Installing water bars to control erosion and runoff
- Reducing erosion and dispersing water flow by placing cut brush across the lines
- Revegetating dozer lines with cactus (*Opuntia Littoralis*, *Opuntia Proliferai*) that was removed when the dozer cut the line

During the incident, 6.3 miles of dozer line was installed as either direct fire line or contingency line.



Hand Lines

1.1 miles (5,606.5 feet, 1,708.9 meters) of hand line was installed during the Canyon 2 Fire. Hand line was used in areas that are steep, rocky, or otherwise only accessible to hand crews, as well as in sensitive habitats. Hand lines, while causing less resource damage than dozer lines, are rehabbed in a similar fashion to dozer lines:

- Water bars are installed to control erosion
- Where excessive berms formed, the berms were pulled onto the control line and smoothed out
- Organic debris was pulled on to the line and scattered throughout to disperse water flow
- If the hand line presented a potential access point for illegal trespass on OC Park land, it was closed off with cut debris at least 100' into the line

Roads

Due to substantial use by heavy equipment (bull dozers, fire engines, trucks, etc.) during the suppression effort, miles of road were in disrepair post fire. The consistent use of these roads (Windy Ridge Road, Coal Canyon Road, Mountain Park Rd) during the suppression effort caused significant damage to roads in the form of siltation, drain sedimentation, and compromising the structural integrity of drains after being struck by equipment. Using an OCFA HFE0 and contract water tenders, the following procedures were undertaken to repair the roads:

- Grading roads to the original road prism where necessary
- Cleaning culverts and drains plugged with soil or debris
- Breaching/removing berms to facilitate drainage
- Improving and cleaning up pullouts



A hand line at Peters Canyon (OC Parks) that does not need repair due to lack of slope, minimal mineral soil disturbance, and no berms

Slash Piles

Any debris or slash piles within 150' of roadways or trails were lopped and/or scattered.

Staging Areas/Safety Zones

Throughout the firescape, staging areas or safety zones were created near pullouts, in the black, or in areas adjacent to roads to allow for units to rest, recover, group up, monitor fire or weather conditions, and await instructions. These staging areas were negatively impacted with berms, trash, tire ruts, and other ground disturbance. Post fire suppression repair addressed these areas in the following ways:

- New construction: pull in berms, resurface, cross drain, remove debris resulting from use and scatter on site, remove trash, and abandon (if applicable)
- Existing: repair to original condition, cross drain, remove debris resulting from use and scatter on site, remove trash, and abandon (if applicable)



A staging area off Windy Ridge Rd. used for parking bull dozers and crew vehicles



Watercourses

During the post suppression repair effort, OCFA worked with OC Parks and made every effort to restore watercourses to allow for natural, effective drainage. This included using an excavator to remove sediment and debris deposited by dozer line construction operations.

After the excavator had cleared debris from the watercourse, a strike team was used to install erosion control barriers to the watercourse. Cut debris was packed onto the slope and used to filter rainfall and capture sediment from entering the waterway.

In addition to using cut debris and heavy equipment, OCFA worked with OC Parks at Santiago Oaks Park to install hay bales to control erosion into a waterway at the park. During suppression efforts, a helicopter made a water drop on a steep slope that caused runoff material onto a trail adjacent to a waterway. OCFA used a skid steer to clear the debris off the trail, and the OCFA hand crew installed over hay bales at the base of the affected slope to control erosion until something more permanent can be installed by OC Parks.



Before and after pictures of the slope erosion control adjacent to a watercourse where crews used cut debris to help regulate and capture sediment

Archaeological Sites

By working with OC Parks and a CAL FIRE archaeologist during the suppression repair, it was determined that an archaeological site was situated adjacent to a dozer line. In cooperation with OC Parks, the CAL FIRE archaeologist entered the area and found remnants of lithic scatter in the vicinity of the dozer line. After the area was flagged, it was determined the dozer line did not affect the archaeological site and that it was safe to continue with suppression repair efforts.

Hazard Tree Removal

The fire damaged a number of trees adjacent to public use trails within the OC Park system. At the request of, and working with OC Parks, the OCFA hand crew removed over 120 hazardous trees at Irvine Regional Park. This effort was conducted to maintain public safety for trail users, reduce hazardous dead standing material, and assist the Park in opening the trails to public use post fire.



OCFA Hand Crew installed hay bales at the bottom of the slope to control erosion



CHALLENGES AND RECOMMENDATIONS

COMMUNICATIONS

The following statements are in no particular order of importance.

Statement 1	There was a delay in sending a full response to the Canyon 2 Fire.
Background	<p>OCFA Resource Response Guidelines dictate the dispatching of an engine or truck for Smoke Check calls. The Guidelines dictate the dispatching of a multi-resource response (i.e. chief officers, dozer, engines, helicopters, hand crews, etc.) for Vegetation Fire calls in Watershed Medium and Watershed High conditions. Chief Officers and the ECC can modify the amount and type of dispatched resources when special circumstances or conditions warrant.</p> <p>In the days leading up to Canyon 2, ECC staff were receiving numerous reports of smoke in the burn areas of the Canyon Fire. There were also numerous communications with agencies such as Cleveland National Forest who were patrolling burn areas in the days prior.</p> <p>Post Canyon 2 Fire, Metro Net and OCFA have a new directive to dispatch personnel to facilitate quicker dispatch of emergency resources. The OCFA has clarified the vegetation response requirements in an October 25, 2017 memo:</p> <ul style="list-style-type: none"> • Fires reported within the burn scar areas (or “black”) of a previous fire will result in the immediate dispatch of the closest unit or units. The coordination with outside agencies, who may or may not be in the area, will occur after the dispatch of resources. • Reports of “fire” or “flames” will always be treated as fire until proven otherwise. It is not appropriate to send a ‘smoke check’ response. • When obtaining details from calling parties about a potential fire, it is necessary to obtain what is burning, where it is burning, color of smoke, and threat to structures or infrastructure. • The details obtained by calling parties need to be carefully documented in CAD and communicated to partner agencies and responding resources; the calling party’s words and descriptions are recommended when possible. • Personnel are to remain alert and avoid fatigue when working on extended incidents. For example: if you receive several fire and smoke calls in a short period of time, treat the first call with the same care as the last one. Each call has the unique possibility of resulting in a large incident. • If/when Metro Net transfers a report of smoke or fire, clearly determine if they are asking the OCFA to initiate a full vegetation fire response in the mutual threat zone. • Do not let assumptions or speculation cloud judgment. • Maintain awareness of current, predicted, and changing weather conditions. • When there is doubt on a response level err on the side of caution and send an appropriate response.
Recommendations In Progress	<ol style="list-style-type: none"> 1. Maintain accountability in the ECC that re-enforces the initiation of a response to a report of smoke and/or fire, regardless of the number of reports. 2. Review and update SOP OP.06.43 annually and clarify circumstances and conditions on which this guideline can be modified. 3. Develop additional policies for daily briefings and situational updates (i.e. significant weather events). 4. Provide additional tools and mechanisms to maintain situational awareness.



<i>Statement 2</i>	By not establishing a Joint Information Center (JIC), information was not shared among all involved agencies and was not initially distributed in a timely manner.
Background	The incident started in a single jurisdictional area and expanded to a multi-jurisdictional response and command structure. During this event information was not shared consistently across all PIOs including the Incident Management Team.
Recommendation	Establish a Joint Information Center (JIC) when a unified command is established, to ensure that all information is distributed timely and specifically to those cities that are impacted.

<i>Statement 3</i>	Expanded dispatch was assisted by a CAL FIRE ECC support team, but due to the limited work space in the DOC the team utilized the strategic conference room.
Background	The Department Operation Center is currently in the middle of the Request for Proposal process to redesign the current space to accommodate additional personnel.
Recommendation In Progress	Complete the re-design of the DOC, consider future technologies, and implement as available during re-design and construction to provide for additional space and functionality.

<i>Statement 4</i>	No public information phone bank system was used during the Canyon 2 Fire. No phone bank was available for recalled OCFA employees to answer the phone from our communities to assist in disseminating information.
Background	The phone bank system was used in prior incidents to assist with the delivery of accurate and timely information. Due to the movement of the PIO's office this capability is no longer available. Several years ago, the phone bank was shut down in the previous PIO office, a facility designed and built expressly for use during major incidents.
Recommendation	Re-establish the OCFA phone bank system, which includes televisions to monitor current news outlets to assist with dissemination of accurate information to the public. Consider relocating the Communications/Public Information Office.

<i>Statement 5</i>	There was a lack of professional communication on both telephone and radio.
Background	Unprofessional communication when heard by the public can create a sense that staff are not taking a situation or their response to a situation seriously.
Recommendation	Re-enforce the need for professional communications throughout OCFA. This should be incorporated in all levels of training (New FF Academy, Captains Academy, Spark Training, ECC Academy, etc.). Specifically, the ECC needs to develop a policy on telephone etiquette that includes direction on formal communication.



<i>Statement 6</i>	Communication between the PIO and media was difficult due to limited phone capabilities.
Background	Although major incidents are a low frequency event, we need to have a dedicated incident phone available.
Recommendation	Evaluate how to expand phone capabilities for PIOs.
<i>Statement 7</i>	Official notification of the Emergency Management staff was delayed and occurred late in an incident of this significance.
Background	The Emergency Management staff learned of the incident through the media. Timely notification of the status of the incident to the County/OA EOC staff is critical. Since this was a fire, the early notification should come from OCFA personnel.
Recommendation	Reinforce the importance of County/OA EOC notification with OCFA DOC activation.
<i>Statement 8</i>	The lack of operations centric command and control in the ECC is a concern.
Background	The ECC is supervised by an experienced Communications Supervisor and Manager. Additionally, the ECC is supported by an Operations Fire Captain during the traditional fire week.
Recommendation	Evaluate command and control oversight in the ECC to determine areas of improvement and identify needed augmentation to policy, procedure, or personnel.



RESPONSE

<i>Statement 9</i>	Incident responses into mutual threat zones with separate dispatch centers are complex, especially during rapidly developing fires.
Background	The origin of Canyon 2 Fire was within the City of Anaheim local responsibility area (LRA) and Direct Protection Area (DPA). This particular area has a history of significant fire activity, is a mutual threat area, and is also the convergence of two separate regional dispatch centers: OCFA and Metro Net.
Recommendation	Training should be sought specific to the application of the automatic aid agreement between the City of Anaheim and Orange County Fire Authority.

<i>Statement 10</i>	Many vacancies of all ranks exist affecting the ability for the OCFA to staff effectively. This issue is magnified during major incidents.
Background	The OCFA has been experiencing staffing challenges over the last several years due to a culmination of several causal factors (open positions, 48/96 work schedule, workers compensation, etc.).
Recommendations In Progress	<ol style="list-style-type: none"> 1. Strive to fill all open positions in collaboration with the local 3631 through the staffing Joint Labor Management team. 2. Continue to maximize the number fire recruits in each recruit fire academy 3. Continue the frequency of academies as necessary 4. Continue the utilization of the attrition planning process 5. Continue to offer multiple entry portals into the OCFA for the firefighter rank. 6. Continue to balance the timing of all promotions, to minimize overly affecting any one rank. 7. Develop decision points and actions in anticipation of predictable future staffing issues (i.e. SAFD 10-year mark 4/2022): <ol style="list-style-type: none"> a. Go above the master control position list in anticipation of mass retirements 8. Effectively plan for future academies and promotions 9. Evaluate how the 48-hour shift schedule impacts the ability to call back employees during major emergencies.

<i>Statement 11</i>	Night Air Attack was unable to see below the smoke where helicopters were operating.
Background	The after-action report provided by night air attack (AA51) commented to its limitations for seeing structures and hazards below the smoke. It stated that the night time HLCO operating with the other helicopters at low levels and under the smoke exceeded their abilities and recommends its utilization when helicopters are engaged. HLCO was able to identify aviation hazards and locate structures threatened that AA51 was unable to visualize. The use of HLCO during night time operations is further supported by FIRESCOPE recommendations.
Recommendation	Provide a night HLCO with NVG training during night time helicopter firefighting anytime two or more ships are operating in accordance to FIRESCOPE guidelines.



<i>Statement 12</i>	ECC was unable to utilize local resources due to the resources not being in the Resources Ordering and Status System (ROSS)
Background	Air resources beyond initial attack are based on recommendations from Air Attack. These orders are then processed through the Incident Commander to the Central Ordering Point and filled by South OPS. The requests are made following FIRESCOPE based typing in sufficient quantity that matches the mission need; it, the right tool for the job. This process is followed to ensure aircraft coordination (no duplicate orders and incident prioritization) occurs.
Recommendation	Ensure agencies with resources that wish to participate in firefighting operations are in the ROSS system.

<i>Statement 13</i>	As compared to Type 1 helicopters, OCFA Type 2 helicopters have a lower payload capability.
Background	Historically, Orange County experiences fast moving wild fires, driven by Santa Ana winds, which rapidly impact the urban interface and become destructive. With today's fire season greatly extended and wildfires showing increased resistance to control, approaches that were once successful in the urban interface are now proving to be less reliable. Governor Gerry Brown recently stated after touring the destruction that California faces a "new reality" where lives and property are continually threatened by wildfire at a cost of billions of dollars. Multiple fire agencies in California (CAL Fire, LA County, LA City, San Diego City, & Ventura County) have adapted to these changes in fire behavior and upgraded to larger and faster Type 1 helicopters. These next generation aircraft are capable of dropping 300% more water per drop than the traditional Type 2 "Hueys" during initial attack. Their faster speed and larger water dropping capability provides an initial attack punch of up to 1000 gallons per drop that can prevent urban interface fires from growing into large devastating fires. As a result of their fleet analysis, CAL Fire has placed an order for twelve S-70i FIREHAWKS to completely replace their Type 2 "Super Huey" fleet. Utilizing Type 1 helicopters for direct structure protection was very successful.
Recommendation	OCFA should research the feasibility to secure Type 1 helicopters with improved payloads and firefighting capabilities.

<i>Statement 14</i>	OCFA Air Operations has limited capabilities to support incident fuel needs for other agency aircraft.
Background	It is standard practice for rotary wing aircraft to provide their own fuel when assigned to an incident. Per contracting requirements, air resources are to not rely on an incident for fuel, staffing, and logistical support. If an agency has fuel needs and unable to fulfill themselves, there are multiple airports within 10-minute flight times with Fixed Base Operators that can provide fuel support.
Recommendation	Ensure assisting agencies are aware of the obligation to comply with all contracting fuel provision requirements for accepting ROSS call when needed orders.



Statement 15	OCFA could not provide Forward Looking Infrared Radar (FLIR) capability.
Background	A FLIR camera is used on helicopters to sense infrared radiation helping pilots to fly at night, in fog, or to detect warm objects against a cooler background. During wildland fires FLIR allows the flight crew to locate a fireline through the smoke or vegetation canopy and identify spot fires inside or outside the control lines that ground crews can extinguish. Also, FLIR allows for more accurate delivery of water directly on the fire. FLIR has many uses and is not limited to firefighting. This capability enhancement will assist in SAR during fires, medical aids, and offshore marine rescues. It can additionally be utilized during structure fires for providing overhead imaging to incident commanders including where ember cast may be threatening other structures. USFS Air Attack 51 (AA51) and Anaheim PD provided valuable FLIR assistance during the Canyon 2 Fire. This included directing water drops under canopy in steep canyons and mapping hot spots with GPS coordinates for ground personnel to extinguish.
Recommendation In Progress	OCFA should evaluate securing FLIR capability for its helicopters and consider a Unmanned Aerial Systems (UAS) program with similar capability.

Statement 16	Patrols were underutilized.
Background	In some cases, patrols with Compressed Air Foam Systems (CAFS) were available within their areas providing station coverage, but potentially could have been utilized in a tactical patrol function to releasing fire apparatus to assist with fire front following and perimeter control.
Recommendation	Re-evaluate and establish decision points when patrols are deployed to cover a battalion during major incidents versus incident response.

Statement 17	Conversion of pre-identified paramedic engines into paramedic assessment engines and paramedic vans/squads was underutilized.
Background	During major incidents the RAMP Guidebook indicates converting pre-identified paramedic engines into paramedic assessment engines and paramedic vans. This historically has taken place after a major incident has begun. It is during the initial attack phase of a major incident the reflex capabilities are at full capacity and often focus on operational incident needs only.
Recommendations	<ol style="list-style-type: none"> 1. Evaluate decision points to reconfigure these identified units within each battalion. 2. Consider converting pre-identified units (RAMP) before a major incident occurs, based on established decision points. 3. Consider clarifying those positions other than the Duty Chief that have the authority to execute these types of decisions

Statement 18	The incident was unable to staff a Type 3 helicopter for HCLCO during the first operational period.
Background	A request was made through South OPS for two Type 3 helicopters to perform as HCLCO platforms. These orders were not filled. HCLCO is an important command position during incidents requiring multiple helicopters. The role includes providing areal supervision and tactical recommendations to Incident Commanders.
Recommendation	OCFA should consider additional procedural options regarding HCLCO capabilities as well as the development of standardized practices to use local public safety aircraft as HCLCO capable platforms during Red Flag conditions.



<i>Statement 19</i>	As a result of deployment model changes there were not enough radios/equipment available at RFOTC to outfit surge apparatus.
Background	Historically, radio caches, EMS equipment, and other necessary equipment have been kept at the RFOTC for use with the surge apparatus. Over the last several years deployment model changes have affected the availability of these caches.
Recommendations	<ol style="list-style-type: none"> 1. Evaluate the replenishment of all equipment caches at the RFOTC. (i.e. communications kit, EMS, iPads and other) 2. Consider alternative equipment deployment strategies: such as individually issued radios and/or decision points for all front-line paramedic units to remove second set of EMS equipment. 3. Ensure IT personnel are added to the DOC activation process to allow access to iPads and radios.

<i>Statement 20</i>	Insufficient pool of qualified dozer operators to meet incident and department needs.
Background	We have limited qualified personnel to meet the demands of the agency and potential surge capacity.
Recommendation	Evaluate the current dozer operator program for depth, succession planning, and surge capacity relative to the needs in declared fire season.

<i>Statement 21</i>	Some units were moved out of an area that was later impacted by fire.
Background	Units adjacent to wildland interface areas were uncovered for various reasons. OCFA Engine 53 (Yorba Linda) was uncovered due to a strike team assignment. OCFA Engine 8 was moved up to cover Yorba Linda. Soon after, Station 8's first due area was impacted by fire.
Recommendation In Progress	Consider development of policy/procedure for the movement of units during major incidents. Incorporate utilization of the leapfrog methodology to avoid having open areas that are impacted by the incident.

<i>Statement 22</i>	Identifying available/excess personnel at fire stations during a major incident is problematic.
Background	Some personnel were reportedly available at fire stations during the Canyon 2 Fire. The process to gather that information currently occurs manually and requires multiple phone calls causing a delay.
Recommendation	Consider the utilization of an electronic process to quickly capture all available personnel/ranks available; in order to improve the station coverage process.

<i>Statement 23</i>	Some personnel performed in positions they had previous experience with but lacked technical qualification in.
Background	ICS/FIRESCOPE allows personnel to function outside of their qualifications during initial attack until such time qualified personnel can be brought in or after the first operational period.
Recommendation	Follow-up with the internal CICC's committee to augment the number of personnel qualified/trainee for incident command positions such as Division Supervisor, Operations Branch Director, Operations Section Chief (Type 3), and Incident Commander (Type 3).



<i>Statement 24</i>	Wildfire Pre- Plans were not accessible on engine and truck company's iPads.
Background	Currently, the only access is through the Battalion Chief's configured iPads or at the fire station. This issue is due to an internal server capability limitation.
Recommendation	Consider upgrading server capability to provide for access on all department issued iPads.

<i>Statement 25</i>	The base camp at Irvine Regional Park was unavailable due to fire impact.
Background	Historically the OCFA has used Irvine Regional Park as a central location to establish an Incident Command Post location.
Recommendation	Consider evaluating the entire county and re-establishing several locations throughout Orange County that can function as a base camp. Pre-plans with agreements should be sought out to ensure this process is efficient and effective.



MITIGATION AND PREPARATION

<i>Statement 26</i>	After fire containment, mop-up and patrol areas of responsibility need to be clearly identified for each agency.
Background	The most probable cause of this fire was burning embers from a smoldering group of oak trees located approximately 20 feet east of the dozed control line that was cut into the hillside after the Canyon Fire. The origins of both Canyon and Canyon 2 fires were within the City of Anaheim local responsibility area (LRA). Following the transition from Unified Command back to the local agencies; the local agencies are responsible for mop up and patrol for their local areas.
Recommendations	<p>When unified command is disbanded, jurisdictional authority and responsibility must be clearly understood by all involved agencies.</p> <ol style="list-style-type: none"> 1. When dealing with multi-jurisdictional areas of responsibility ensure mop up is coordinated with the agencies having jurisdiction, communicated with all levels of line leadership, areas of responsibility are understood, and are acknowledged via agency representative's signature. 2. Ensure incident action plans identify mop up parameters and are followed throughout the potential for re-ignition; especially during expected high wind events. 3. Upon the completion of the incident action plan timeframes, the ongoing mitigation of the incident including mop up and patrol remains with the agency having jurisdiction. 4. Mop-up and patrol plans need to consider upcoming weather conditions.

<i>Statement 27</i>	The OCFA did not provide sufficient representatives to staff the city EOCs.
Background	Historically fire prevention personnel have been trained in order to fill the roles and responsibilities of this valuable position. However, with attrition and competing job priorities this function has become inactive.
Recommendation	Re-institute a liaison program for city EOC positions and provide a process for continual training and succession planning.

<i>Statement 28</i>	Multimedia was delayed in being notified of this major incident.
Background	Multimedia was not previously included in the notification process for a major incident.
Recommendation	Explore automated processes to support personnel notification.

<i>Statement 29</i>	The Weather Preparedness Plan has not been updated to take into consideration technology and additional decision support tools.
Background	Parameters for national weather service predicted events can be variable and not based on local factors.
Recommendation	Re-evaluate the current policy and process to assist with consistent up-staffing decision points and outcomes during the pre-designated weather events (i.e. inclusion of the Santa Ana Wind Threat Index (SAWTI)).



<i>Statement 30</i>	RAMP Guidebook is under-utilized and some sections are outdated.
Background	Due to recent departmental deployment changes, staffing, and apparatus fleet changes the RAMP Guidebook has sections that are outdated.
Recommendations	<ol style="list-style-type: none"> 1. Consider recurrent RAMP Guidebook training for the AC, DC, BC, and FC Administrative Staff. 2. Consider re-designed some sections to provide decision support through a phase specific checklist. 3. Develop an internal process to allow for more rapid updates to be concurrent with departmental changes.

<i>Statement 31</i>	Covering the County/OA EOC with on-duty suppression chief officers is problematic.
Background	Suppression staff were used as coverage for staff personnel with regard to EOC duties. Generally, suppression staff are needed for incident response.
Recommendation	Develop policy to identify staff chief officers' roles and responsibilities for the County/OA EOC needs. Continue to utilize an Assistant Chief, a Division Chief and a staff Battalion Chief for operations at the County/OA EOC.

<i>Statement 32</i>	Not all Chief Officers have experience operating within the County/OA EOC.
Background	The OCFA has experienced continuous movement of personnel throughout the organization. The frequency of movement necessitates the OCFA provide additional training opportunities for staff chief officers to maintain skill sets specific to County /OA EOC operations.
Recommendation	Conduct ongoing County/OA EOC training for each of the OCFA specific positions in the County/OA EOC; specifically, the Director of Emergency Services.

<i>Statement 33</i>	No OCFA planning personnel were available early in the incident to initiate the use of SCOUT. This hampered the situational awareness of the personnel in the County/OA EOC; it has been used very effectively during other fires.
Background	In several fires earlier in the season, OCFA personnel were able to initiate the use of SCOUT and it is a great tool for keeping the County/OA EOC informed on the status of the fire.
Recommendation	Develop a deeper pool of personnel who can use SCOUT and initiate an incident in the program. Train all Administrative Captains on the use of SCOUT.



SUCSESSES

COMMUNICATIONS

The following statements are in no particular order of importance.

<i>Statement 1</i>	Public notifications via all mediums were coordinated with the ICP during the incident. The notification of the public regarding the evacuations was initiated via AlertOC and the Wireless Emergency Alert System without an issue.
Background	Upon confirmation from the IC the OA EOC initiated evacuation notifications.
Successful Actions to be Sustained	Continue to coordinate any and all evacuation and other public notifications with the incident commander at the ICP.

<i>Statement 2</i>	PIO's assigned to the incident were experienced at communicating to the media.
Background	The initial attack PIO's (OCFA, Anaheim FD/PD) were extremely well versed and adept at dealing with the initial "blitz attack" by media outlets, reporters and social media platforms.
Successful Actions to be Sustained	Maintain the high level of education and preparedness of the PIOs through classes and training.

<i>Statement 3</i>	Once the OCAHIMT was assigned to the incident, PIOs were able to process information and release it in a timely manner.
Background	The PIO's created a regulated information release schedule, and communicated those intervals to the media.
Successful Actions to be Sustained	Use the Canyon & Canyon 2 fires as a template for media information release schedules.

<i>Statement 4</i>	Information disseminated through social media was consistent.
Background	All PIOs operating on the fire had identical information to provide, through a central information sheet that was distributed each day, while updates occurred through group messaging platforms. The PIO trailer had a whiteboard that posted the latest verified and releasable information on the fire, which was updated regularly.
Successful Actions to be Sustained	Maintain this "best practices" method of updating PIOs with the latest information using these mediums.

<i>Statement 5</i>	When the OCAHIMT arrived, we had more PIOs to assist during the initial attack phase of the fire.
Background	Usually, there is a shortage of PIOs to work with the media outlets during the initial attack phase of an incident. Having two PIOs assigned with the responding IMT provided relief to the I.A. PIOs, and enabled them to begin working in the field, where the media was broadcasting.
Successful Actions to be Sustained	Maintain at least two PIOs on each IMT. Also, have a backup of qualified PIOs to augment the initial attack resources quickly.



<i>Statement 6</i>	Incident notifications were sent to the OCFA JPA Board using out new incident notification format that was well received.
Background	The OCFA Board Notification System was developed in a collaboration between OCFA's I.T. and Communications divisions. It enabled fast informational updates to be uploaded to either the JPA board, or to an active call banner located on the ocfa.org website. The system was not supposed to enter active operation for several more months, but the fires forced it into early service. Fortunately, it surpassed our expectations for reliability and robustness. The OCFA received several compliments about the system.
Successful Actions to be Sustained	Continue utilizing the notification system when needed, and continue development of the program.



RESPONSE

Statement 7	The early implementation of a command structure to support the expanding incident was noted as a significant success for the incident and the OCAHIMT.
Background	The IMT has had numerous successful activations during the 2017 Fire Season. The IMT brings together qualified personnel that gain experience from out-of-county overhead assignments to benefit the Operational area by having qualified personnel available locally. Many of the personnel assigned to our local Type 3 Team are Type 1 or 2 qualified and have honed their skills sets on large incidents throughout the State of California. The ability of the IMT to rapidly establish an Incident Command Post and support the needs of an expanding incident were a testament to the value of including the Team early within the incident.
Successful Actions to be Sustained	<ol style="list-style-type: none"> 1. Continue/formalize the decision points to include and IMT response early within the incident. 2. Continue/consider increasing support of the Incident Management Team Program in the way of additional training, funding, and succession planning. 3. While balancing in-county staffing needs continue to assign personnel to Type 1/2 IMT's as well as send overhead personnel to incidents to bring valuable experience back to the Orange County Operational Area.

Statement 8	The use of the Mutual Aid System was noted as a tremendous success.
Background	<p>The California Fire Service and Rescue Emergency Mutual Aid Plan provides a practical and flexible pattern for the orderly development and operation of mutual aid on a voluntary basis between cities, counties, fire districts, special districts, county fire departments, and applicable state agencies. Normal fire department operating procedures are utilized, including day- to-day mutual aid agreements, and plans which have been developed by local fire and rescue officials”</p> <p>“The California Fire Service and Rescue Emergency Mutual Aid Plan as we know it today, was first prepared and adopted in 1950 as Annex 3-C of the California State Civil Defense and Disaster Relief Plan. This plan has been reviewed, revised, approved, and adopted after careful consideration by the Cal OES Fire and Rescue Service Advisory Committee/FIRESCOPE Board of Directors.</p> <p>PURPOSE OF THE PLAN:</p> <ul style="list-style-type: none"> • To provide for systematic mobilization, organization, and operation of necessary fire and rescue resources of the state and its political subdivisions in mitigating the effects of disasters, whether natural or man-caused. • To provide comprehensive and compatible plans for the expedient mobilization and response of available fire and rescue resources on a local, area, regional, and statewide basis. • To establish guidelines for recruiting and training auxiliary personnel to augment regularly organized fire and rescue personnel during disaster operations. • To provide an annually-updated fire and rescue inventory of all personnel, apparatus, and equipment in California. • To provide a plan and communication facilities for the interchange and dissemination of fire and rescue-related data, directives, and information between fire and rescue officials of local, state, and federal agencies. • To promote annual training and/or exercises between plan participants.



	<p>Throughout the <u>entire incident</u> mutual aid resources provided:</p> <ul style="list-style-type: none"> • 42 Strike Teams • 11 Type 1 and Type 3 Single Increment Engines • 221 Engines in Total
Successful Actions to be Sustained	Continue to support the Statewide Mutual Aid Plan and provide education to our elected officials and the public as to the direct benefit to the Orange County Operational Area.
<i>Statement 9</i>	Coordination of the evacuations with law enforcement partners was effective and undoubtedly saved lives.
Background	One of the primary roles of the County/OA EOC is to bring together all the agencies needed to effectively coordinate support activities during a wildland fire. By having the OCSD representatives in the County/OA EOC, OCFA was able to assist in coordinating evacuations ordered by the IC.
Successful Actions to be Sustained	Continue to foster a positive working relationship with all agencies in the County/OA EOC. Continue to train regularly in the County/OA EOC operations.
<i>Statement 10</i>	Staffing a Type 1 helibase occurred quickly.
Background	Having trained and qualified OCFA personnel in all positions was instrumental in the success of air operations. OCFA air operations provided personnel from Helicopter Crewmember to Air Operations Branch Director and were able to staff a fully functioning Type 1 helibase and Air Operations Branch during the first day of the Canyon 2 Fire. Orders were placed for miscellaneous personnel from outside agencies to augment the helibase staffing but it wasn't until the second day that those orders were filled. The lack of available Type 1 Incident Management Teams due to fire activity levels across the state did not impact air operations because OCFA was able to stand up and meet almost all needs of the Air Operations Branch.
Successful Actions to be Sustained	The OCFA should continue sending members to California Incident Command Certification System (CICCS) training and supporting qualification assignments through single resource overhead requests or participation on Incident Management Teams.
<i>Statement 11</i>	Helicopters engaged in 24-hour firefighting operations.
Background	The Canyon 2 Fire utilized night water dropping helicopter capabilities. This incident benefited from this decision by providing structure protection and fire line suppression at night with water dropping helicopters utilizing night vision goggles. LA County Fire Department and the USFS provided a night air attack platform, Type 1 and Type 2 helicopters to augment OCFA helicopter.
Successful Actions to be Sustained	Continue utilizing night water dropping capabilities following FIRESCOPE Night Operations – NVG Helicopter Go/No-Go Checklist.



Statement 12	Response command and control collaboration with multiple agencies was excellent.
Background	The addition of outside agencies to the Orange County Operational Area Incident Management Team has had an unintended side benefit of fostering greater relationships, coordination, and communication between the numerous agencies with the Orange County Operational Area.
Successful Actions to be Sustained	Continue to re-enforce the importance of meeting, training, and communicating with our outside agency response partners to solidify relationships.

Statement 13	Early resource ordering and allocation allowed for numerous units to be available for Structure Defense Operations, saving thousands of structures.
Background	Currently Incident Commanders can request immediate need or initial attack resources and dispatch supervisors (ECC Duty Officer) are authorized to dispatch up to 35 engines consistent with our RAMP Guidebook prior to requesting Duty Chief approval. This level of authorization and empowerment is necessary for rapidly expanding dynamic incidents and is an improvement over historical incidents.
Successful Actions to be Sustained	Continue the process of putting OCFA personnel and equipment into position early and often to effect positive outcomes for the benefit of the entire Orange County Operational area.

Statement 14	Air Operations resources were effectively ordered based on weather conditions.												
Background	<p>Weather conditions, specifically high winds dictate the type of aircraft that are able to be utilized during an incident. These winds limited the Type of helicopters that could be utilized for suppression operations. The International Helicopter Operations Guide (IHOG) version 2016 Chapter 6 Section VII provides wind restriction guidance for helicopter safety.</p> <p>Exhibit 6.2—Flight Permitted in Winds Less Than/Maximum Gust Spread in Knots, by Helicopter Type.</p> <table border="1"> <thead> <tr> <th>Distance Above Ground Level (AGL)</th> <th>Type 1 (Heavy) Helicopter</th> <th>Type 2 (Medium) Helicopter</th> <th>Type 3 (Light) Helicopter</th> </tr> </thead> <tbody> <tr> <td>More than 500' AGL</td> <td>50/NA</td> <td>50/NA</td> <td>50/NA</td> </tr> <tr> <td>Less than 500' AGL</td> <td>40/15</td> <td>40/15</td> <td>30/15</td> </tr> </tbody> </table> <p>The capability to fly a helicopter in excessive wind conditions varies considerably with the weight class of the helicopter and the degree of turbulence associated with the wind. These limits may be further be restricted at the discretion of the pilot or other air operations personnel. Based on these standards Air Attack 12 ordered the appropriate rotary air resources (Type 1 and Type 2 helicopters). Type 3 helicopters were ordered for the HLCO platform.</p>	Distance Above Ground Level (AGL)	Type 1 (Heavy) Helicopter	Type 2 (Medium) Helicopter	Type 3 (Light) Helicopter	More than 500' AGL	50/NA	50/NA	50/NA	Less than 500' AGL	40/15	40/15	30/15
Distance Above Ground Level (AGL)	Type 1 (Heavy) Helicopter	Type 2 (Medium) Helicopter	Type 3 (Light) Helicopter										
More than 500' AGL	50/NA	50/NA	50/NA										
Less than 500' AGL	40/15	40/15	30/15										
Recommendation	Continue to follow IHOG Exhibit 6.2 for safe aviation operations. Only utilize aircraft for special use mission (below 500' AGL) that can operate safety in accordance but not limited to IHOG recommendations.												



MITIGATION AND PREPARATION

Statement 15	Property and environmental damage resulting from the Canyon 2 Fire was significantly reduced in large part due to the OCFA Wildland Pre-Fire Management efforts
Background	<p>Short and long-term Wildland Pre-Fire Management efforts, including Community Wildfire Mitigation, Wildland Resource Planning, the Santiago Hand Crew and Heavy Fire Equipment programs, in a collaborative effort with the major landowners and cooperators, provided increased access to remote areas, reduced fuels, and increased defensible space, such as:</p> <ul style="list-style-type: none"> • Increased community outreach and efforts through the North Tustin Fire Safe Council • Defensible Space inspections (784) in OCFA jurisdiction in Cowan/Lemon • Community Chipper Days • Community Evacuation Drill • OCFA/Public Works Peters Canyon Wash Mitigation grant • Bent Tree Park fuels mitigation grant • Combined outreach with OC Public Works for fuels reduction/invasive plant removal on County owned parcels. • OC Register article outlining home hardening and defensible space. • Ready, Set, Go based community outreach. • Collaborative MOU with OC Parks for wildland fuels mitigation in open space parks adjacent to structural areas. • On-going maintenance of Southern California Edison, OC Parks, and State Parks roads through open space areas providing increased access for fire apparatus and crews, as well as strategic holding points that reduce fire spread. • Development and implementation of the CAL FIRE funded Countywide Community Wildfire Protection Plan (CWPP). This document was developed through a collaborative approach involving our wildland stakeholders in the identification of wildfire hazards and associated mitigation projects. • Development and implementation of the Orange County Fire Danger Operating Plan (FDOP). This plan included the establishment of three weather zones in the County, each with a weather station to accurately identify the fire danger and appropriate response levels. • Leadership participation in the County of Orange Area Safety Task Force (COAST). The TF includes the major wildland stakeholders in the County, with the sole focus of improving wildfire safety. • Development and coordination of various cooperators workshops with the goal of increased responder awareness of contractual obligations and formulating appropriate decisions on wildland fires.
Successful Actions to be Sustained	<ol style="list-style-type: none"> 1. Continue to reinforce the major components of Fire Protection: Prevention, Education, and Suppression to ensure operational success and protection of life and property. 2. Work with CAL FIRE to update the Fire Hazard Severity mapping to accurately reflect ember intrusion zones and high hazard areas. Utilize these maps to pre-plan fuels mitigation and education efforts. 3. Increase public awareness surrounding the importance of home hardening. 4. Continue to build upon already strong inter- agency/cooperator relationships in wildfire prevention and planning. 5. Expand community interaction beyond the simple Defensible Space inspection



	<p>program. This will likely require an increased use of operational assets, as well as extra-help inspectors to fulfill this mission and best serve the public.</p> <ol style="list-style-type: none"> 6. Continue efforts with OC Parks and OC Public Works to reduce hazardous fuels on public lands. 7. Improve efforts with public and private stakeholders to reduce roadside fuels and ignitions. 8. Continue and expand support for Fire Safe Councils countywide. 9. Continue outreach efforts with County government to expand the Wildfire Detection and Monitoring Camera program into Orange County (Alertwildfire.org). 10. Enhance training for engineering, enforcement, and education in wildfire prevention. 11. Assess OCFA Wildfire Pre-Fire Section, Santiago Crew, and Heavy Fire Equipment for focused, but limited expansion to best meet our fire safety goals.
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<i>Statement 16</i>	Use of the Wildland Urban Interface Pre-fire Plans (WUIPP) was useful for coordination purposes with law enforcement.
Background	The Wildland Urban Interface Pre-fire Plans were completed using UASI grant funds. OCFA was the primary coordinating agency for these plans and they were a tremendous success during the Canyon 2 Fire.
Successful Actions to be Sustained	Update the WUIPP to reflect the newly burned fuels and lessons learned from this fire.

<i>Statement 17</i>	Up-staffing additional resources and augmenting additional specialty personnel in response to predicted Red Flag weather conditions was beneficial.
Background	Weather preparedness staffing ahead of the predicted red flag event. The duty chief, utilizing the National Weather Service and SAWTI forecasts and predictions, implemented the extreme weather SOP. Wind conditions should not be the sole determining factor. Major fires also occur during extreme heat and low humidity events. Burn Indexes (BI) and Haines Level values are valuable tools to assist in determining threat level and determine decision points. OCFA staffed a second Type 2 helicopter, a second dozer module, 24-hour coverage for the Santiago Crew, and two additional dispatchers were added for ECC support.
Successful Actions to be Sustained	Duty chiefs should continue to up staff when weather conditions indicate.

<i>Statement 18</i>	OCFA staff was able to access the County/OA EOC.
Background	OCFA is issued access badges into the County/OA EOC and they worked effectively and expedited access by OCFA personnel
Successful Actions to be Sustained	Continue to provide access badges to key role players at the County/OA EOC.



GLOSSARY

AGENCY REPRESENTATIVE – Individual assigned to an incident from an assisting or cooperating agency. He/she has been delegated authority to make decisions on matters affecting that agency's participation at the incident. Agency Representatives report to the Incident Liaison Officer.

AIR ATTACK – Airplanes flying over an incident, providing tactical coordination with the incident commander on the ground, and directing air tankers and helicopters to critical areas of a fire for retardant and water drops.

ANCHOR AND HOLD – The goal of the Anchor and Hold tactic is to defend structures directly exposed to other burning structures or vegetation, extinguish structure fires, and reduce ember production in communities or subdivisions where fire spread is primarily structure to structure. Resources establish a control line, generally a street or roadway, and use large water streams in conjunction with fixed water supplies.

ARCING – Luminous discharge of current—formed when a strong current jumps a gap in a circuit or between two electrodes.

ASSISTING AGENCY – Agency supplying direct operational resources

BASE CAMP – Location at which primary logistics functions for an incident are coordinated and administered—only one base camp per incident.

BRANCH – Organizational level having functional or geographic responsibility for major parts of incident operations. The Branch level is organizationally between Section and Division/Group in the Operations Section, and between Section and Units in the Logistics Section. Branches are identified by the use of Roman Numerals or by functional name (e.g., medical, security).

BUMP AND RUN – Bump and run is a defensive tactic used when fire front impact is imminent or the fire is already burning structures and there are not enough resources to effectively take perimeter control action. When using the Bump and Run tactic, resources move at or near the fire front, often in the spotting zone ahead of the fire, to extinguish spot fires and hot spots, and to defend as many structures as possible. Bump and Run may be effective in the early stages of an incident when the resource commitment is light and structure defense is the priority. Resources should apply foam, gel or retardant to structures and surrounding vegetation as appropriate.

BURN AREA RECOVERY TEAM (BART) – Team comprised of multi-agency and multi-disciplined resource specialists assembled to assess fire damage and suppression effects and to prepare mitigation measures. Upon development of a rehabilitation plan, the team makes recommendations on hazard mitigation.

BURN OVER – Wildfire situation where—because of wind-shift, topography, and/or poor planning—a person (firefighter) is caught in an inescapable fire and literally has fire burn over, under, and around him/her; this is the leading cause of firefighter deaths during wildfires.

CALIFORNIA FIRE ASSISTANCE AGREEMENT (CFAA)—Agreement between Cal OES, CAL FIRE, USFS, BLM, NPS, FWS, and the BIA.

CALIFORNIA HIGHWAY PATROL (CHP) – The CHP is the uniform traffic law enforcement agency throughout the state of California.

CALIFORNIA INCIDENT COMMAND CERTIFICATION SYSTEM – The California Incident Command Certification System (CICCS) is a cooperative effort between the State Fire Marshal's Office and the California Governor's Office of Emergency Services, Fire and Rescue Branch. State Fire Training is a SFMO responsibility, while the movement of fire service resources throughout the state during times of emergency is the responsibility of Cal



OES Fire and Rescue through the California Fire and Rescue Service Emergency Mutual Aid Plan.

CALIFORNIA SOUTHERN REGION (CSR) – Also referred to as The Southern California Geographic Area Coordination Center (OSCC) is the focal point for coordinating the mobilization of resources for wildland fire and other incidents throughout the Geographic Area.

CENTRAL ORDERING POINT – Facility or dispatch center where all personnel, supplies, and equipment requests are placed and tracked.

CHECK AND GO – Check and Go is a rapid evaluation to check a structure for occupants who may require removal or rescue. In some instances, it may be necessary for firefighters to assist with evacuations prior to leaving. This tactic is appropriate when fire spread, intensity, lack of time, or inadequate defensible space prohibits resources from taking action to defend the structure. Check and Go should be used when there is no safety zone or temporary refuge area available near the structure. It is a hasty evaluation due to expected fire behavior and fire impact time with the purpose of civilian life safety and a quick evaluation of the structure for follow up action after the fire front passes.

CHIEF OFFICERS – Agency Administrators, Fire Chiefs, Deputy Chiefs, Assistant Chiefs, Division Chiefs, and Battalion Chiefs with executive and/or management-level responsibilities.

COMPLEX – Two or more individual incidents located in the same general area that is assigned to a single Incident Commander or to Unified Command.

COMPRESSED AIR FOAM SYSTEM (CAFS) – Used in firefighting to deliver fire retardant foam for the purpose of extinguishing a fire or protecting unburned areas from becoming involved in flame. CAFS units are effective when used to pre-treat structures and vegetation with foam in advance of the fire to protect it from heat and flames.

CONFLAGRATION – Uncontrolled burning or fire that moves across natural and man-made barriers and threatens human life or property and the environment.

CONNECT THE DOTS – Using the Connect the Dots tactical action, re-resources assigned to structure defense operations effectively stop forward fire spread at a particular structure or property. This area becomes a “dot” in the overall perimeter control effort. Connecting controlled portions of the fire perimeter, connecting one dot to another dot, is the foundation for this strategy. Connecting the controlled section of fire line at one structure, where the fire has been stopped, to a driveway or road where the fire is holding, can be an effective method to contain portions of the fire perimeter.

CONTAINMENT – Fire is contained when it is surrounded on all sides by some form of boundary, line, or clearance but is still burning and has the potential to jump or escape the containment line.

CONTROLLED – Fire is controlled when no further threat of it escaping outside the containment line exists.

COOPERATING AGENCY – Agency supplying assistance including—but not limited to support functions for the incident control effort.

DEFENSIBLE SPACE – Creating a fire safe landscape for at least 30 feet around homes—out to 100 feet or more in some areas—to reduce the chance of a wildfire spreading to structures. – Essentially, an area helping to protect a home and provide a safety zone for the firefighters battling flames.

DEFENSIVE – Firefighting mode primarily focusing on the protection of exposures through the confinement of the fire to a selected area.



DEPARTMENT OPERATIONS CENTER (DOC) – DOC provides agency dispatching capability independent and separate from routine emergency dispatch. The DOC is activated and staffed for large or complex incidents allowing personnel to focus efforts solely on the incident: maintaining situation status, processing orders for resources, and maintaining a direct link with EOCs.

EMERGENCY COMMAND CENTER (ECC) – Dispatch Center, an ECC is the center of an agency's information and communication capability. It is tasked with receiving and processing incoming calls for help. ECC personnel determine the nature of the request and forward it to the appropriate resource.

EMERGENCY OPERATIONS CENTER (EOC)–A central command and control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level during an emergency,

ENGINE TYPES – See Field Operations Guide definitions at the end of the glossary.

ETE–Estimated time enroute

EXTREME FIRE BEHAVIOR – “Extreme” implies a level of fire behavior characteristics ordinarily precluding methods of direct control action. One or more of the following is usually involved high rate of spread, prolific crowning and/or spotting, presence of fire whirls, and/or strong convection column. Predictability is difficult since such fires often exercise some degree of influence on their environment and behave erratically and dangerously.

FIRE DANGER OPERATING PLAN (FDOP) – A plan designed to help guide the application of the National Fire Danger Rating System (NFDRS) at the unit level. It provides a framework for a consistent thought process to apply the Fire Danger Operating Plan in Orange County for OCFA administrators, fire managers, dispatchers, agency coordinators, and firefighters using accurate and effective scientific methods and historical fire and weather data. Management decisions dealing with dispatch levels and staffing levels will be assessed based on vegetation, climate, and topography in conjunction with NFDRS modeling.

FIRE FRONT FOLLOWING –The Fire Front Following defensive tactic allows resources to defend structures while staying behind the fire front or on the flanks of the fire, engaging after the fire front passes and fire intensity subsides. This fast-paced tactic requires engines to continuously move just behind the fire front in order to extinguish fires around structures before those fires can ignite the structure. The main goal of Fire Front Following is to extinguish spot fires and hot spots burning around structures, extinguish partially involved structures when feasible, and to defend as many structures as possible from direct flame impingement and radiant heat. Resources can also conduct primary searches for civilians who did not evacuate and render aid if needed. Fire Front Following is commonly used in conjunction with Check and Go, Prep and Go, and Bump and Run.

FIRE LINE – Area where the vegetation has been removed to deny the fire fuel—or a river, a freeway, or some other barrier expected to stop the fire. Hose lines from fire engines may also contribute to a fire being surrounded and contained.

FIRE MANAGEMENT ASSISTANCE GRANT (FMAG) – Federal assistance program managed by FEMA through the State Office of Emergency Services (OES). Program is designed to help state and/or local jurisdictions impacted by high cost, high damage wildland fires. The Fire Management Assistance Grant program provides a 75 percent Federal cost share and the state pays the remaining 25 percent for actual costs.

FIRE PERIMETER – Entire outer edge or boundary of a fire.

FIRESCOPE – The original acronym FIRESCOPE stood for "Firefighting Resources of Southern California Organized for Potential Emergencies." The system was developed after a bout of massive southern California



wildfires in 1970, which burned for days and involved multiple jurisdictions. The system was designed to create an efficient interagency resource coordination system for fire and other emergencies in the Southern California Region. The system was later expanded to provide service statewide

FIRING OPERATIONS – Setting a controlled fire with the intent to create a fire break so the path of the fire will be impeded.

FIXED WING AIRCRAFT (AIR TANKERS) – Aircraft designed for the purpose of picking up and depositing fire retardant on a fire while in mid-air.

FUEL MODIFICATION – Modification and irrigation of combustible vegetation to reduce fuel energy output. Highly flammable wildland vegetation is replaced with managed areas of light or fire resistive fuels and thereby allowing firefighters the ability to control a fire while relatively small.

FUELS – Combustible material or vegetation.

GREY BOOK – Agreement between CAL FIRE and the six contract counties that addresses direct fire protection of State Responsibility Area (SRA) within each of the contract counties. Orange County, along with the other contract counties, receives funding from the state to provide protection to the SRA

HANDCREW – Team of wildland firefighters primarily assigned to fire line construction activities. Handcrews also mop up hot-spots, burn out vegetation to provide fuel free zones, and assist with hose lays. See Field Operations Guide definitions at the end of the glossary.

HIGH WATERSHED DISPATCH – Level of dispatching ensuring the appropriate Type and number of wildland firefighting resources based on current weather conditions.

INTERAGENCY HELICOPTER OPERATIONS GUIDE (IHOG)-The Interagency Helicopter Operations Guide constitutes operational policy for those federal, state, and local agencies who have formally adopted it as such.

INCIDENT COMMAND SYSTEM (ICS) – Standardized on-scene emergency management concept specifically designed to allow its user(s) to adopt an integrated organizational structure equal to the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries.

INCIDENT COMMAND SYSTEM 214 – An activity log used to document actions, agreements, assignments, accidents, and other miscellaneous documentation.

INCIDENT COMMANDER – ICS position responsible for overall management of the incident. Reports to the Agency Administrator for the agency having incident jurisdiction.

INCIDENT MANAGEMENT TEAM (IMT) – Incident commander and appropriate general and command staff personnel assigned to an incident. Also known as an Incident Command Team.

INITIAL ATTACK (IA) – Aggressive suppression action taken by first arriving resources with the priorities of protecting life, property, and the environment.

INTERFACE ZONE – Area where the wildland comes together with the urban areas. This is often referred to as the I-Zone or the Wildland Urban Interface (WUI).

MASTER MUTUAL AID SYSTEM – personnel, facilities, and equipment can voluntarily assist other jurisdictions when capabilities are overwhelmed.



MUTUAL THREAT ZONE – Area in which two or more jurisdictions have responsibility to protect in case of a fire, flood, or other emergency.

OFFENSIVE ATTACK – Putting water directly on the flames with the intent to extinguish.

PATROL UNIT – OCFA fire apparatus designed for wildland firefighting built on a heavy-duty passenger crew-cab truck chassis. It carries 100 gallons of water in a pressurized tank. OCFA Patrols are assigned to fire stations adjacent to wildland interface areas.

PREP AND DEFEND – Prep and Defend is an appropriate tactic to use when a structure is threatened but, based on forecasted fire behavior, it will be relatively safe to defend the structure when the fire front arrives. Use Prep and Defend when there is adequate time to safely prepare the structure for defense and there is ready access to a safety zone or temporary refuge area. Firefighters must maintain situational awareness and be prepared to move to the temporary refuge area or withdraw along the escape route to the safety zone when necessary.

PREP AND GO – Prep and Go is an appropriate tactic to use when it is not safe for resources to remain when the fire arrives, but there is enough time to safely complete some structure defense preparation before resources leave the area. It is a quick strike maneuver where bare minimum tasks are quickly addressed by resources who may return after the fire front passes. Evaluate the structure for follow-up action when additional resources become available, the fire front passes, or fire behavior intensity has diminished.

RATE OF SPREAD (ROS) – Relative activity of a fire as it extends from the point of origin and the total perimeter of the fire. Usually expressed in acres per hour.

READY, SET, GO (RSG) – RSG is a national program for wildfire preparedness. The main focus is on Vegetation Management (i.e. creating/maintaining defensible space, fuel mods, inspections, etc.), Home Hardening (i.e. fire-resistant construction features, best practices, etc.), and Outreach/Education.

RED FLAG WARNING – Term used by fire weather forecasters to alert users to an ongoing or imminent critical fire weather pattern.

RESOURCE ORDERING AND STATUS SYSTEM (ROSS) – Computer software program, which automates the resource ordering, status, and reporting process during a wildfire; tracks all tactical, logistical, service, and support resources mobilized by the incident dispatch community.

REHABILITATION – Activities necessary to repair damage or disturbance caused by wildfire or the wildfire suppression activity.

REKINDLED – Act of catching on fire once again; usually caused by a fire not fully extinguished.

RIPARIAN AREA – Interface between land and a stream—usually an ecological area with the abundance of both plants and animals.

SAFECOM – The Aviation Safety Communique (SAFECOM) database fulfills the Aviation Mishap Information System (AMIS) requirements for aviation mishap reporting for the Department of Interior agencies and the US Forest Service. Categories of reports include incidents, hazards, maintenance, and airspace. The system uses the SAFECOM Form [OAS-34/FS-5700-14](#) to report any condition, observation, act, maintenance problem, or circumstance with personnel or the aircraft that has the potential to cause an aviation-related mishap.

SANTA ANA WINDS – Type of Foehn wind—a warm, dry, and strong general wind that flowing down into the valleys when stable, high pressure air is forced across and then down the lee side slopes of a mountain range. The descending air is warmed and dried due to adiabatic compression producing critical fire weather conditions. Locally, it is called by various names such as Santa Ana and Sundowner winds.



SAN BERNERDINO, ORANGE, LOS ANGELES, RIVERSIDE – SOLAR is a multi-county mutual threat zone guide.

SOUTH OPS – Formally known as the Southern California Geographic Area Coordination Center (OSCC), it is the focal point for coordinating the mobilization of resources for wildland fire and other incidents throughout the Geographic Area. Located in Riverside, the Center also provides Intelligence and Predictive Services.

SPECIAL STAFFING – Persons put in place on assigned fire apparatus in addition to the normal staffing—usually done in case of an emergency such as a fire, wind event, or flood.

SPOT FIRE OR SPOTTING – Small fire ahead of the main fire—caused by hot embers being carried (generally by winds) to a receptive fuel bed or structure. Spotting indicates extreme fire conditions.

STATE RESPONSIBILITY AREA (SRA) – The California Board of Forestry and Fire Protection classifies areas in which the primary financial responsibility for preventing and suppressing fires is that of the state. CAL FIRE has SRA responsibility for the protection of over 31 million acres of California’s privately-owned wildlands.

STRIKE TEAM – Engine strike team consisting of five fire engines of the same Type and a lead vehicle. Strike team leaders are usually a Captain or a Battalion Chief. Strike teams can also be made up of bulldozers and handcrews. A strike team comprised of structure engines is designated with the letter “A”; i.e., 1400A. A strike team comprised of wildland engines is designated with the letter “C”; e.g., 9329C. See Field Operations Guide definitions at the end of the glossary.

TACTICAL PATROL – Numerous structures in the WUI are destroyed after the main fire front passes and unseen smoldering or creeping fire ignites the structure. Initiate Tactical Patrol after the main fire front has passed and flames have subsided but when the threat to structures from smoldering or creeping fires remains. Use this tactic to extinguish hot spots or secondary structure ignitions, and address safety issues such as downed power lines, weakened trees, and other hazards. The key element of Tactical Patrol is to remain mobile and continuously monitor the tactical area while taking appropriate actions to defend structures and secure perimeter lines. Firefighters must remain vigilant to prevent structure re-ignition.

UNIFIED COMMAND – Unified team effort allowing all agencies with jurisdictional responsibility for the incident, either geographical or functional, to manage an incident by establishing a common set of incident objectives and strategies.

WATER BAR – A water bar is a construction feature that is used to prevent erosion on sloping roads, cleared paths through woodland, or other access ways by reducing flow length.

WATER TENDER – Specialized firefighting apparatus capable of transporting a minimum of 1,000 gallons of water from a water source directly to the fire scene.

WILDLAND ENGINE (Type 3) – Fire engines designed for the wildland firefighting environment. Constructed on heavy-duty commercial truck chassis with high ground clearance and often equipped with four-wheel drive. Type 3 engines carry 500 gallons of water and have a minimum pump capacity of 120 gpm at 250 psi.

WILDLAND-URBAN INTERFACE (WUI) – Line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.



PRIMARY MOBILE SUPPRESSION RESOURCES (Minimum ICS Standards)								
RESOURCE	RADIO CALL	COMPONENTS	TYPES					
			1	2	3	4	5	6
Engine Company	Engine Telesquirt*	Pump minimum flow GPM Tank minimum capacity Gallons at rated pressure (psi) Hose 2.5" Feet Hose 1.5" Feet Hose 1" Feet Ladder per NFPA 1901 Master Stream 500 minimum GPM Pump and Roll Maximum GVWR (lbs) Personnel minimum	1,000 300 150 1,200 500 Yes Yes - - 4	500 300 150 1,000 500 Yes - - 3	150 500 250 - 1,000 500 - - 3	50 750 100 - 300 300 - - 2	50 400 100 - 300 300 - - 26,000 2	10 50 100 - 300 300 - - 19,500 2 14,000 2

*Engine with elevated stream capability, specify when requested.

PRIMARY MOBILE SUPPRESSION RESOURCES (continued)

RESOURCE	RADIO CALL	COMPONENTS	TYPES	
			1	2
Hand Crew	Crew #	*Personnel, Equipment, and Transportation	TYPE 1	TYPE 2
			<ul style="list-style-type: none"> Highest training level No use restriction Fully mobilized Highest experience level Fully equipped Permanently assigned supervision 	<ul style="list-style-type: none"> Minimum training or Some use restriction or Not fully mobilized or Moderate experience or Minimum equipment or No assigned supervision
		State CAL FIRE (13) Federal Hotshot (18) Regular (18) Local Government Inmate (12) Paid (10)	Fly Crew (8) Fly Crew (10) Fly Crew (8) Hotshot (18)	Federal (Blue Card) (18) State (12)

*Indicates minimum number of crew personnel including supervision.



STRIKE TEAM TYPES AND MINIMUM STANDARDS

K i n d	Strike Team Types	Number/Type	Minimum Equipment Standards										Minimum Personnel				
			Pump Capacity GPM	Tank Capacity Gallons	PSI	2.5" Hose Feet	1.5" Hose Feet	1" Hose Feet	Ladder NFA 1901	Master Stream 500 GPM	Max. GVWR Lbs.	Pump and Roll	Strike Team Leader	Per Single Resource	Total Personnel		
E N G I N E S	A	5 - Type 1	1,000	300	150	1,200	500	-	Yes	Yes	-	-	-	-	1	4	21
	B	5 - Type 2	500	300	150	1,000	500	-	Yes	-	-	-	-	-	1	3	16
	C	5 - Type 3	150	500	250	-	1,000	500	-	-	-	-	-	-	1	3	16
	D	5 - Type 4	50	750	100	-	300	300	-	-	-	-	-	-	1	2	11
	E	5 - Type 5	50	400	100	-	300	300	-	-	-	-	26,000	-	1	2	11
	F	5 - Type 6	50	150	100	-	300	300	-	-	-	-	19,500	-	1	2	11
	FF	5 - Type 7	10	50	100	-	-	200	-	-	-	-	14,000	-	1	2	11
C R E W S	G	Handcrew combinations consisting of a minimum of 26 persons (Do not mix Type 1 and Type 2 crews)	Type 1 Handcrews have no restrictions on use										1	-	27		
	H		Type 2 Handcrews may have use restrictions										1	-	27		
D O Z E R S	K	2 - Type 1 1 - Dozer Tender	Heavy Dozer Minimum 200 HP (D-7, D-8 or equivalent)										1	1	4		
	L	2 - Type 2 1 - Dozer Tender	Medium Dozer Minimum 100 HP (D-5, D-6 or equivalent)										1	1	4		
	M	2 - Type 3 1 - Dozer Tender	Light Dozer Minimum 50 HP (D-4 or equivalent)										1	1	4		



ACKNOWLEDGEMENTS

The development and writing of this After Action Report has been a collaboration, which has drawn on the time and talents of many personnel from every department within the OCFA. It would not be possible to name every individual who played a role in the development of this document. A work of this magnitude cannot be successful without the help and support of many people.

We are grateful for the time and contributions of those who completed after action surveys and documented their actions and observations. The team leaders who coordinated the gathering of information and compilation of data. The OCFA members who went into the impacted communities and spoke with the residents and evaluated the damage to ensure accurate data was documented. Those who listened to hours upon hours of radio traffic and phone calls to capture fire ground activity. The writers and editors of the various report sections. Technical specialists who created maps, charts, pictures, and graphics to capture the core message.

A special thank you is extended to all those who responded to or supported the fire fighting and recovery actions that took place between October 9-24, 2017.

We'd also like to express our appreciation to the readers of this report, who by taking time to study the actions and outcomes of the Canyon 2 Fire will be better prepared to respond to, support, and manage future emergency incidents.