

# **Southern California**

## **SOUTHERN CALIFORNIA**

### **I. INTRODUCTION**

During this course we will examine some of the fuels, topography and weather factors which you, as a member of a Type I team, maybe challenged with in Southern and Central California. In order for you to identify the appropriate strategy (over-all plan), and tactics (deployment of resources to accomplish the plan) you must be able to recognize local fuels, weather, topography, and other special considerations specific to Southern and Central California.

### **II. SOUTHERN CALIFORNIA**

Southern California has had a long history of large and damaging fires. Some of the more notable include LAGUNA, 1970-182,000 acres, MARBLE CONE 1977-170,000 acres, the PANORAMA 1980-300 homes, the numerous fires in the fall of 1993 which burned over 200,000 acres. Deaths to firefighters include: INAJA, 1956-11 deaths, DECKER, 1959-7 deaths, LOOP 1961-12 deaths, SPANISH RANCH, 1979-4 deaths, GLEN ALLEN, 1993-2 deaths. Weather conditions, such as the Santa Ana winds, cause adverse fire behavior and rates of spread under severe conditions that may reach 6,000 acres per hour. These fires are further complicated by highly flammable fuel and steep topography.

The Type I team must be constantly aware of structures within the wildland. Virtually any escaped wildfire in which a Type I team is assigned will involve a structural threat. During the fall of 1993, over 1000 homes were destroyed between October 26, and November 4, through a series of fires in Southern California. Even a relatively small fire such as the SYCAMORE fire, (1979-less than 1000 acres-245 homes) and the PAINT fire, (1990-900 acres-641 homes) can present substantial protection problems. Whenever structures are threatened, numerous other agencies will most likely be involved and must be included in incident management operations. Specific suppression problems associated with structures in wildland fires is covered in a separate class.

For purpose of the lesson, Southern California will include San Diego, Riverside, San Bernardino, Orange, Los Angeles, Ventura, Kern, Santa Barbara, San Luis Obispo, and Monterey counties. This area involves the Santa Monica Mountains National Recreation Area, Cleveland, San Bernardino, Angeles, Los Padres and Sequoia National Forests.

### **III. CENTRAL CALIFORNIA**

Central California also has a history of large, damaging fires. For purposes of this class, Central California will include the Sequoia, Inyo, Sierra, Stanislaus, Eldorado, Tahoe and Lassen National Forests Yosemite and Sequoia Kings National Parks (Central Nevada Range). Low frequency, high intensity large fires and the historic pattern. This pattern can often be associated with drought conditions and lightning storms; however, human caused ignitions

have resulted in large damaging fires. Structural threats can be a protection problem, but somewhat different than Southern California. Southern California structures are often found densely packed at the base of foothills. Central California has some areas like this however, much of the problem consists of small communities tucked in the woods. Numerous houses and cabins can also be found isolated throughout the area. Commercial timber, spotted owl habitat, archeological sites, wilderness area and other natural resources are often the protection priorities. Central California wildfires are often characterized by heavy fuels, burning intensely in remote areas. Logistical support problems can be a difficult challenge.

#### IV. SOUTHERN CALIFORNIA FUELS

##### A. Chaparral.

Southern California fuel is dominated by brush but includes large areas of oak woodland and some small stands of timber. The term chaparral is often used to describe these fuels. Chaparral communities are generally bounded by timber stands over and grasslands below. Elevations where chaparral is found vary from about 500 to 5000 feet. Chaparral is well adapted to fire and a fire every 20 to 30 years is necessary to keep it healthy. Chaparral's relatively large amount of loosely arranged small material, much of it becoming dead as the plants mature, and its highly volatile oil content make it extremely flammable. Burnable chaparral fuel will average 15 to 20 tons per acre but can range from 2 to 40 tons per acre. After a fire, the chaparral is relatively fire-resistant for about 15 years. At about 20 years of age the proportion of dead fuels becomes great enough to support big fires under adverse conditions. As a consequence, the recurrence intervals of fires more than 5000 acres is 20 to 40 years. Most fires in chaparral which exceed 30,000 acres occur in age classes greater than 30 years. Chaparral is fire behavior fuel Model 4.

##### 1. Chamise and Manzanita - The Primary Components.

Chamise is the most abundant and widespread of all chaparral shrubs in Southern California. It usually occupies the drier, south facing slopes. Manzanita is the second most important group of shrubs and it usually occupies the more moist, north facing exposures. Chamise decreases in abundance with elevation and gives way to manzanita at higher altitudes.

##### 2. Other Chaparral Fuel Components.

Other specific fuels included in Southern California chaparral are buckwheat, sage (several types), scrub oak, and oak woodland sumac. There are many additional fuels; however, they don't match these in consequence.

##### B. Fuel Characteristics.

Grass in Southern California usually begins to burn in May. Normally, chaparral will start to burn and sustain fire in late June or early July. The fire season ends around the first of December. However, major fires have occurred in January, February, and March. Chaparral fuels are relatively drought resistant; live fuel moistures may drop to 60% during critical periods. Dead fuel ratios will range from 15 to 50%, depending on the age of the fuel.

#### C. Chaparral Communities in Other Regions.

Chaparral exists in numerous mediterranean areas throughout the world (South Africa, France, Australia, Spain, Mexico and Chile). Chaparral is also found abundantly in Arizona. Arizona Chaparral and California Chaparral have common origins on the North American Continent. Arizona chaparral differs from California chaparral as follow:

1. Arizona chaparral has a higher portion of sprouting shrubs.
2. Most of Arizona Chaparral is on rough broken terrain at elevations that range from 3000 to 6000 foot elevations.
3. The upper elevations border ponderosa pine or pinyon juniper and the lower elevations border desert grassland or southern desert shrubs.
4. Arizona chaparral grows primarily during the summer whereas California; chaparral grows primarily in the winter.
5. The fire frequently in Arizona chaparral is somewhat less than California chaparral. Although, we have identified some differences in California and Arizona chaparral, they are both dependent upon fire to remain healthy and behave very similar under extreme fire conditions.

### V. CENTRAL CALIFORNIA FUELS

The Central Sierra Range consists primarily of grass and oak at the lower elevations, mixed brush at the intermediate levels and coniferous stands at the higher elevations. The eastern side of the Sierras is dryer and consists of sage transitioning into ponderosa and Jeffery Pine at higher elevations. Mixed conifer fuels present the primarily fire problem in the Central Sierra Range.

#### A. Oak woodland.

Oak and grass lands will be found at the lower elevations up to 2500 feet. These fuels occur primarily on the west side of the Central Sierras. Oak grass lands are fire behavior fuel model 1; it is less than one ton per acre. Wildfire is carried through the fine grass fuels. Fire spreads rapidly and responds well to direct control efforts.

#### B. Mixed brush.

Mixed brush (chaparral, deer brush ceanothus and manzanita) can be found at the intermediate elevations on the west side of the Central Sierras. Mixed brush in the Central Sierras can often be accompanied by a timber overstory. Mixed brush exists between 2500 and 4000 feet. It is combination of fire behavior fuel models 2 and 4; it ranges from 10 to 20 tons per acre. Wildfire can spread moderately through these fuels and be very difficult to control.

#### C. Sage.

Sage can be found at the lower to intermediate elevations on the east side of the Central Sierras. Sage is fire behavior fuel model 2; it is less than one ton per acre. Sage can burn at a moderate rate of spread, but usually requires a moderate wind to spread. Sage has little continuity on the east side of the Sierra range.

#### D. Mixed Conifer.

Mixed can be found from approximately 4000 to 9000 feet elevation. Mixed conifer is fire behavior fuel model 10; it can range from 10 to 50 tons per acre. Duff layers (compressed pine needles and organic matter) can range from 2" to 6" in depth. Mixed conifer in the Central Sierra Range consists of Jeffery Pine, White Fir, Douglas Fir, Incease Cedar, Red Fir, White Pine and Ponderosa Pine. Mixed conifer fuels present the most difficult fire problem in the Central Sierra Nevada range. The worst or most hazardous mixed conifer fuels is:

1. A combination of young to moderate reproduction and mature conifer. This provides ladder fuels to the crown of the mature conifer.
2. A combination of mixed conifer fuels combined with a mixed brush understory. Once again this provides a combination of ground and crown fuels.
3. Mixed conifer fuels when the 1000 hour fuel moistures dip down into the low teens. Fuels become explosive at this moisture content.

## VI. SOUTHERN CALIFORNIA FIRE TOPOGRAPHY

The topography in Southern California is unique. It consists of coastal and inland valleys which lead to mountain ranges with elevations from sea level to 11,000 feet. The change in elevation from the base of the mountain slopes is very rapid, slopes in excess of 40% are common. The rapid change in elevation can result in fuel type changes over a relatively short distance. Most fires occur in the 1,000 to 5,000 foot elevations. East and north of the mountain ranges are primarily desert plateaus.

#### A. Topographical Features.

The topography consists of broken canyons with many steep side drainages. Such topography causes uneven surface heating, radical changes with fuel conditions, opposing wind directions and resulting erratic fire behavior. Other unique features include:

1. Chimney and chute canyons - Chimneys and chutes are common and vary in depth from a few feet up to 1000 feet. Many firefighters have been killed in or above these topographical features, such as during the Loop Fire on the Angeles in 1966, when 12 firefighters died.
2. Steep rock areas - Steep rocky areas can make firefighter access difficult and provide additional safety hazards to personnel.

B. Access.

A good road system of major freeways, county roads and forest roads provide rapid access to many areas and also provides natural fuel barriers. Major road are quite often used as control lines and anchor points. This is why engines are a primary suppression resource.

## **VII. CENTRAL CALIFORNIA TOPOGRAPHY**

The topography in the Central Sierra Ranges from 2000 to 13000 feet elevation. The east side of the range is primarily desert, the west side is primarily grassy valleys and farmlands.

A. Topographical features.

The topography consists of steep slopes, valleys and canyons. In most of the central sierras lakes, streams and ponds are plentiful. The mountain range runs north and south with numerous canyons and valleys facing east and west.

B. Access.

Access consists primarily of some paved roads, logging roads and hiking trails. Major east/west roads are limited in many areas. Helicopter transportation and walking can be primarily transportation modes. Fire with limited access present substantial logistical problems.

## **VIII. SOUTHERN CALIFORNIA FIRE WEATHER**

Annual rainfall in Southern California varies depending on elevation, from 10 to 40 inches a year. From May until December little or no rainfalls. Fuels at the lower elevations such as grass, light brush and desert fuels will burn early in the season. As the heavier brush dries out, depending on rainfall and weather it will start to burn in June. A dry winter will cause an early season in heavy fuels but will reduce starts, spotting, and rates of spread due to less flashy fuel. The worst type of fire season for Southern California is a wet spring, a hot dry summer, and Santa Ana winds. Such was the case during the bad fire years of 1967, 1970, and 1980. In 1993, Southern California experienced a wet spring, a dry summer and Santa Ana Winds - over 200,000 acres were burned during the Santa Ana Wind events.

#### A. Temperatures.

As on shore weather pattern is standard through much of the early and mid-fire season. Temperatures vary but as a general rule will follow this daytime pattern: 70 to 80 degrees in the immediate coastal areas (1-5 miles inland), 80-90 in the coastal plains and valley areas, (5-20 miles inland), 80+ in the mountain areas (20-50) miles inland and 100+ in the desert areas (about 50+ miles inland). Night temperatures depend on the time of season but generally cool rapidly in the coastal and mountain areas, but remain warm in the desert during the summer months.

#### B. Humidities.

Humidities will range from 20-40 percent, depending on distance from the ocean. In coastal and inland areas humidity recovery is fast and can cause major problems with back fire and burn-out operations. Coastal fog will keep morning and mid-afternoon humidities up and temperatures down. Coastal fog keep morning and mid-afternoon humidities up and temperatures down. Coastal fog usually occurs in May and June. Conditions at higher elevations maybe much hotter and drier than in coastal valleys. Coastal fog may require the movement of aircraft from one location to another on the fire, and from one air base to another.

#### C. Wind.

Because of the relationship of the desert plateaus and the Pacific Ocean, the normal wind pattern is west or southwest. Winds will vary during the daytime from 5-15 MPH. Due to surface heating in the inland valleys and desert, the on shore flow will increase during the afternoon hours. Downslope winds will start at dusk and be in the 5 to 10 MPH range. The normally stop at dawn. This wind cycle is known as a diurnal variation. The downslope winds are strongest at the base of mountains and in river drainages.

#### D. Special Weather Conditions.

There are special weather conditions which are important to be able to predict and recognize. These conditions are as follows:

##### 1. Santa Ana Conditions.

Santa Ana wind conditions occur when a high pressure system develops over the Great Basin area. Air will move from the high pressure system to the low pressure system over the Pacific Ocean. All aspects of the weather change as follows:

- a. Wind - The normal pattern of on-shore flow reverses dramatically to a high velocity off-shore flow. Santa Anas are a gradient foehn type wind which cause extreme fire conditions. The wind will blow from 30 to 50 MPH, and has been known to gust to 90-100 MPH.

During the 182,000 acre Laguna Fire (1970), wind conditions were reported to be 80-90 MPH and the fire spread at an average rate of 6000 acres an hour (between 450 and 500 chains per hour) for 19 hours straight. The winds often blow strongest at night and during the early morning hours. During light Santa Anas, you may get a light westerly flow in coastal areas. These winds normally last for about three days. The last day of a Santa Ana will change to the regular on shore flow but will return the dry air that was pushed out to sea. This is sometimes called an ebbing Santa Ana. This wind change will cause the fire to change direction and can pose a hazard to firefighters. You should closely monitor the predicted wind changes.

- b. Temperature - Temperature will gain about five degrees per 1000 foot drop in elevation and will be in the 80's in the mountains and 90-100 degrees range in the lower elevations.
  - c. Humidity - Humidity will drop rapidly with the onset of the Santa Ana. It may decrease to between 5 and 10 percent and has been recorded as low as 1 to 2 percent. Fuel moisture will also drop rapidly, especially in the 1 and 10 hour fuels and go down to the 2 to 5 percent range.
2. Sundowner Winds - The Sundowner is also a gradient downslope type wind. This special condition takes place in the Ojai and Santa Barbara front country some 90 miles northwest of Los Angeles. The difference with the Sundowner is the speed in which it develops and diminishes. The area in which Sundowners occur involve the steep slopes which rise immediately adjacent to the Pacific Ocean and the desert plateau immediately behind the mountain range. These two vastly different areas in close proximity cause a micro-climate to rapidly develop when there are temperature differences between the desert and the ocean front. The air in the micro high pressure flows to the micro low pressure area of the ocean front. This air is enhanced by the normal down canyon wind starting around sundown. The air compresses and heats as it flows down the mountain slopes toward the ocean. Sundowners have all of the same characteristics as Santa Anas (temperature increases, humidity drops, etc.) but these events happen much more rapidly. Due to the rapid onset, Sundowner winds have caused fire deaths such as the Romero Fire in 1971, on the Los Padres Forest where four fatalities occurred.

## **IX. CENTRAL CALIFORNIA FIRE WEATHER**

The annual rainfall averages 10 to 20 inches at the lower elevations and from 30 to 40 inches at the upper elevations. From July to September, rainfall is minimal. Most large fire occur between late July and late October.

### **A. Temperatures.**

Temperatures at the lower elevations range from the mid 70's to the mid 90's. Temperatures can exceed 100 degrees under extreme conditions.

At higher elevations (above 6000 feet) temperatures range from the high 60's to the low 80's. Temperatures can drop below freezing at night at higher elevations.

B. Humidities.

Humidities can range from the mid 20's to the high 30's under normal conditions. Humidities can drop to the low teens during extreme conditions.

C. Winds.

Average winds range from 7 to 10 MPH out of the south, southwest under normal conditions. A frontal wind (in conjunction with the passage of a weather front) can create wind speeds in excess of 30 MPH.

D. Special Weather Conditions.

1. The most common special fire weather conditions are thunderstorms. Thunderstorms are a source of fire ignition and cause erratic winds from unpredictable directions.
2. Another special weather condition is "mono" or east winds. These gravity winds are usually associated with a high pressure system moving Southeast across Washington and Oregon from the Gulf of Alaska. Humidities drop, temperatures rise and winds can blow in excess of 30 MPH. These conditions occur most often in spring and late fall. A wildfire under these conditions, particularly in fall can be very intense and difficult to control.

## **X. SOUTHERN CALIFORNIA FIRE BEHAVIOR**

Many firefighters have been killed in Southern California. Fires run hot and fast. A typical fire from July through August with a normal on-shore flow (10 to 15 MPH) will burn 175 to 200 chains per hour with flame heights of 20 to 25 on moderate slopes. Spotting can be expected.

In September, October and November, fires will burn 250 to 275 chains per hour with flame lengths greater than 30 feet. Moderate intermediate and long range spotting is common.

Wildfires in chaparral will slow and rapidly lose intensity as they reach the 5000 foot elevation range. Normally, evenings will cool and fire intensities will subside substantially. Canyon bottom and mid-slope runs will still occur, however sustained runs with high intensities are the exception under normal conditions at night.

Unless the area is under extreme drought conditions, fires under normal on-shore wind conditions will not continue to run or carry through the mixed conifer stands at higher elevations.

Under Santa Ana conditions, fires will burn with extreme intensity. These can occur at anytime of the year, but are most dangerous in the fall when fuel moistures are at their lowest. Rates of spread can exceed 1000 acres per hour and flame lengths of 75 feet or greater are not unusual. Santa Ana conditions cause extreme burning at all hours of the night and day. Long range spotting up to a half mile or greater can occur.

Santa Ana fires are influenced by the wind with virtually no influence from topography. One the Santa Ana Winds start to subside, there will be various wind changes from opposite directions as the on-shore flow tries to overcome the high pressure air movement from the east. Fire behavior during this transition can be confusing and dangerous.

## **XI. CENTRAL CALIFORNIA FIRE BEHAVIOR**

Wildfires in mixed conifer fuels burn hot at moderate rates of spread. Average chains per hour range from 10 to 15. This can increase dramatically when spotting beings to occur. A typical wildfire in mixed conifer fuels will burn hot and be influenced by slope during peak burning periods. At night the fire will lay relatively dormant until mid-morning and repeat the pattern. This pattern is often complicated by thick smoke inversions in canyons and draws. During drought conditions, extremely intense burning can occur in mixed conifer fuels. Convection columns can rise is excess of 35,000 feet. After an intense fire run, the convection column will flatten out or break up. Then this occurs it can result in numerous spot fires sometimes miles in front of the fire. This will often result in a number of fires which leaves difficult control and mop-up problems.

Spotting is always a problem in mixed conifer fuels. Currently, as a result of many years of drought dead, fuels are abundant. There are pockets, 30 to 50 acres of standing dead material. Fire, as it spreads into these areas burns intensely and sends bark platelets high into the convection column. This results in unusually violent fire behavior and long distance spotting. Due to heavy duff layers, mop-up will be difficult and require significant time.

Mixed conifer fuels with young reproduction or with mixed brush always present a potential for re-burns. A wildfire may burn through the brush or smaller fuels and later, run through the overstory. This is always a dangerous possibility for firefighters.

## **XII. IMT CONSIDERATIONS**

### **A. Incident Commander**

Incident management teams who are assigned to an incident should be prepared to enter into a unified command mode. There are a number of fire agencies/departments with major wildland responsibilities. There are literally hundreds of other agencies/departments that have limited wildland capability and responsibilities. Some of the primary agencies includes:

1. Forest Service (USFS)
2. Bureau of Land Management (BLM)
3. Bureau of Indian Affairs (BIA)
4. National Park Service (NPS)
5. Military
6. California Department of Forestry and Fire Protection (CDF)
7. Los Angeles City Fire Department
8. Los Angeles County Fire Department\*
9. Ventura County Fire Department\*
10. Santa Barbara County Fire Department\*
11. Orange County Fire Department\*
12. Kern County Fire Department\*
13. Marin County Fire Department\*

\* Counties which contract with CDF for initial/extended attack wildland fire protection.

Type I teams taking over a fire in California must be sensitive to how they will be viewed by the other agencies. A team may be working in the “fish bowl” of the fire world. How a team is judged will not only be based on how well they manage the incident, but also how they interact with locals - Be Professional!

There are three agreements that an IC will need to be aware of while managing an incident. The first are local agreements. These are agreements that a local Forest, Park, Reservation or other units will have with its neighbors or cooperators. These can cover items such as response plans, local interagency incident management teams or any other needs. The next agreement is the Four Party agreement. This agreement is between USFS, BLM, NPS and CDF. The agreement outlines how the agencies will share resources, how items such as billing will be handled and other key elements. the last one is the Five Party agreement. This agreement allows the Federal agencies to use local government resources. The Governors Office of Emergency Services Fire Rescue Branch (OES) acts as the broker for these resources. OES is not a full time fire agency although they have over 100 engines through out the state. The engines are staffed and maintained by a local fire department/district. The OES Assistant Chiefs who are assigned to an incident are in the role of agency rep, not only for OES but local government fire resources.

Most fires in southern and central California will have structures in the fire area. The IC should determine who the key agencies are to deal with for structure protection issues and responsibilities.

Even smaller fires can have great structural losses. Some of the biggest challenges the IC will have to deal with could be the loss of many homes and how the new Federal Fire Policy was put into use.

California has more Congressmen than any other state. There are numerous small towns, big cities, and other communities with elected officials and fire departments. It is important for the team to work with these local officials. It is particularly important to include local fire personnel when planning structure protection. Treating locals with respect will be important. The team will be remembered for their courtesy as well as how they managed the fire.

A union representative may be assigned to the incident. This person will work with/represent members of the union if and when issues arise. Each incident will have one or more Human Resource Specialist assigned. They will most often work for the IC and will be responsible for comprehensive report on issues that arise. California has a general policy of not closing Bases or Camps. A closure can be implemented if there are special circumstances but this must be negotiated with the Agency Administrator. A minimum of 20 trainees will be assigned to every Type I incident. Staffing the Training Specialist position will be important to manage the paperwork and administrative requirements of this job.

Fires will impact local tourist and vacation income of some of the smaller remote communities. Many of the high use areas are booked months or even years in advance. The industries of the area may suffer. These could be the logging trade, the rafting companies, the lake recreational business or the rental properties. The IC may have to work with the local office to lessen the impact.

## B. Safety Officer

California has poisonous rattlesnakes, scorpions, ticks and bees. People who are allergic to insect bites should carry medication for anaphylactic reactions. The Pajahuello tick can cause severe damage to the surface skin and underlying tissues; Lyme disease can be a serious long term health hazard. Proper clothing and sleeping arrangements will help prevent bites. Stay away from rodents and rodent burrows, hanta virus is beginning to be a serious problem. The Africanized honey bees have moved through southern California and are heading north. Poison oak can be found in or near shaded areas where fuels are more moist. Poison oak can be found in large areas of the Sierra Nevada Mountains.

Heat exhaustion and dehydration can be a major problem for firefighters. Firefighters need to carry, be supplied with and drink lots of water. A rule of thumb would be a minimum of two gallons per operational period.

Firefighters should be encouraged to drink large amounts of fluids during their off time as well. It is also important that incident personnel get quality rest. This could mean tents with coolers for day sleepers. On the reverse side fire at higher elevations may get rain from thunderstorms and the personnel will need protection from the moisture.

Traffic both on the ground and in the air can be real safety concerns. There are many well traveled roads that will provide routes to and from the base to the incident. These routes could include major freeways with lots of traffic. Air operations can be very complicated. Smog, fog and/or smoke inversions will often cause poor visibility. There are numerous private, commercial and military aircraft in the area, along with some densely populated areas with all of the associated hazards (power lines, antennas, etc.). Temporary flight restrictions will need to be declared over and around the fire area. Because of the numerous low level military training routes it is important to double check with the military to assure they are aware of the restricted air space.

Flashy fuels can react to changes quickly and look innocent, then explode. Fatalities have occurred in light flashy fuels on flat ground as well as steeper terrain. Older stands of brush where the dead to live ratio is great can be explosive and react like flashy fuels designed and arranged to burn.

Snags have caused many injuries and fatalities. Snags are one of the most important fire line safety considerations in mixed conifer fuels. Night operations can cause increased hazards. Due to droughts and bug kill there are numerous acres of dead/dying trees throughout the region. Fire damage or winds developed by the fire can cause an increase in the snag problem.

Steep terrain can cause a number of safety issues. Difficult walking up down or side hill can lead to falls and the associated injuries. Rolling material must always be considered in steep terrain.

### C. Information Officer

The demands for information is high as information is BIG business. There are numerous network and local television stations and many of them have their own helicopters. The live coverage of breaking stories or stories of interest will be shown almost all day (remember the O.J. chase). There are hundreds of radio stations and newspapers that will also want information. There are many of these news agencies that are Spanish only. The Information STAFF (a single IOFR will not be able to handle all of the demands) will need a coordination plan to shepherd the "newsees" around. The mobile remote van is the weapon of choice for the live coverage on the ground and there could be 10 or more on the incident in different locations. They like to park in the same places Operations likes to stage resources and this can cause some issues.

Depending on the agency the team is working for, the Agency Administrator may want control over information. They may want to staff information centers. It is important to find out how they want to handle

this. Information personnel should provide information to local communities. The team may be asked to give briefings at local shopping centers, business groups, social groups, the governing bodies and schools. Information centers should be staffed during business hours and in some cases into the evening hours. This is a great opportunity to educate the public.

There is a great chance that there will be a number of cooperating agencies working the incident. The team may be working under a unified command. If this is the case the Information Officer should think about a unified staff. That local agency will have contacts in the community and the media. It is very important that credit is given to all the major players on the incident. This will also include the non-fire organizations.

#### D. Plans

Rapidly changing conditions combined with media feed updates will require the Sit-stat staff to work very hard to keep their information current. In some cases intelligence may be difficult to obtain. Smoke inversions or fog may make fire perimeter locations difficult. Infrared or other aerial heat detection mapping systems may be critical.

The tracking of resources may be an issue early on in an incident. With a number of different fire agencies responding it will be critical to get an accurate tracking. Some of the local fire departments will change people on an engine and leave the same engine on the fire for all the operational periods. This information needs to get to other team members so they can plan accordingly.

Long range planning will be the key to success on many incidents. Intelligence gathering and contingency planning up to 72 hours in advance will be needed if something goes wrong. The Fire Behavior Analyst will be the key to much of this planning. In many areas where structures are involved or will be involved, structure protection plans will need to be written. evacuations plans may be needed.

There will be a number of environmental considerations that may require specialist. There are many archeological sites, sensitive habitats, wilderness areas and T&E both plant and animal that will need special consideration. Other special considerations will include air and water quality concerns. Rehab will need special consideration in many areas. There are a number of BAER teams available in the state.

#### E. Logistics

Base locations are not usual a problem to locate. The issues may arise when the base is located close to towns/cities or commercial facilities. Security is important to safeguard equipment and keeping those who

don't belong out of the base. Expect that in more urban areas people and corporations will want to donate a whole variety of materials, products,

services and food. Close coordination and constant vigilance will be required to handle the situation and its potential ramifications. Some fires will be in remote areas where supplying a base can cause some challenges. Buying units should not have any problems supplying items that are not in the caches. Recycle facilities should be set up and many organizations will take the items. Hospitals and burn centers are usually close by. Many have heliports so air transport is not a problem.

Contract equipment such as dozers and water tenders are in good supply depending on the number of incidents in the state. Many of these type of resources are already signed up on contracts prior to fire season. Moving large dozers on weekends will cause problems on timing of their release. They can not transport from Friday night until Monday morning without a special permit which may take a few days to process. Ground Support should get accurate counts on water tenders, dozers and other contract equipment as soon as possible. The tracking has become more harder as some of these resources are called or dispatched on initial attack. Demob inspections will need to be well planned due to the amount of rolling stock. In an incident where there is a large structure threat Logistics could inspect 30 or more strike teams of engines all wanting to leave at the same time.

Communications can be a challenge in some areas in southern California. Bleed over from Mexico or other illegal radio transmissions can interfere with radio traffic. If there are a number of incidents going on in an area close coordination will be needed.

#### F. Finance

Cost share agreements will be of big concern when dealing with a multi jurisdictional incident. These agreements can be very simple to complex. The main point is to have all the agencies sign the agreement that have responsibility for the other lands involved. Most cost share agreements will be with CDF. Cost apportionment then becomes an important task for the incident. There are many ways to do the apportionment, 'you order you pay', burned areas and resource assignments are some of the methods. There are cost apportionment technical specialist available to do the day to day work on the apportionment. They can be ordered through the system. There may be local fire departments who know little or nothing about cost apportionment that will have to be educated. Cost information may be hard to gather from some local fire agencies. They may not have developed daily cost for equipment or personnel. OES has some basic cost rates for reimbursement that can be used until more specifics can be obtained.

If the incident has or is going to involve structures the claims people assigned to the incident are going to be busy. There may be city or county departments which will need to interface with the claims shop for

information regarding damaged or lost structures. Land use agreements and a lot of people wanting to be hired by the incident may present some issues. Local fire agencies should bring their own worker's comp forms to the incident to cover their people. This may not always be the case. The Comp Unit may have to walk them through the process or make contact with the headquarters to get the proper paperwork. It will not be uncommon to get a strike team of engines made up of one engine from five different fire departments.

Time keeping on a multi-agency incident can present some different challenges. CDF will bring their own time keepers and the OES assistant chief assigned to the incident can help with the local government resources assigned. Most all of the fully paid departments which respond to the incident will be on 'portal-to-portal' pay. The time unit will not need to track the individual times for the personnel. Some of the local departments will trade people on the resources on a daily basis and keep the time at their home office. OES has a form FC 42 that is used to track the overall time of local government resources assigned. They will need the FSC to co-sign with the OES rep on the form at demob. The Finance section will need to gear up and be prepared for demob if a large number of engines will be released at one time. How long will it take to process 100 plus FC 42s?

#### G. Operations

Coordination with multiple agencies will be the key to success in many incidents. Resources will, in most cases, be abundant. The challenge will be the communications and coordination to meet the objectives. Fires move fast and constantly threaten improvements on multiple jurisdictions. It is important to have a person with local fire expertise for input into the planning process. Fire history maps are available in most areas. Many fire tend to repeat themselves and much can be gained from studying the historical data.

The tactical resources and some strategy and tactics have been broken down into southern and central California.

### **XIII. SOUTHERN CALIFORNIA STRATEGY AND TACTICS**

Strategy is the board plan, tactics is what you do to carry out the plan. There is often much confusion concerning what are tactics and what is strategy. Strategy is usually the overall general plan. Tactics are the specific actions and methods to accomplish the plan. In Southern California, Type I teams will most always inherit a fire from an existing Type II team. There will normally already be a wildfire situation analysis and work with the agency administrator if changes are required.

#### A. Strategy.

Initial attack strategies in Southern California include fast aggressive initial attack. Due to land ownership patterns and rapid rates of spread,

fires usually involve several jurisdictions and threaten structures and other improvements.

## B. Tactics.

Tactics are those specific actions taken to accomplish the over-all goal (strategy). Your tactics will be based upon using the right equipment (both in quantity and type) to suppress the fire safely, and meet all of the incident objectives. Your tactics will be developed based on current and expected fire behavior.

### 1. Direct Attack.

In Southern California it is always safest to employ direct attack. Because of the steep terrain, it is not always possible to see the entire fire. Because of the numerous canyons and broken topography, the wind can be erratic. Add to these factors the flashy fast burning fuels and direct attack is obviously the safest tactic. In chaparral fuels it is always best to have "1 foot in the black" whenever possible. During Santa Ana Winds, it is best to flank the fire, as it is virtually impossible to stop the head of the fire during these conditions.

If the fire is too intense for direct attack, parallel tactics can be used. Parallel tactics involves getting far enough away from the fire to avoid the heat and still see it. Line is fired out as it is constructed.

### 2. Indirect Attack.

Indirect attack is usually employed when the fire is already large and other tactics are not safe or appropriate. It is risky and must be well planned with all of the necessary safety precautions including Lookouts, Communications, Escape Routes, and Safety Zones (LCES) strictly adhered to. Burn-out or back fire will normally be used in conjunction with indirect tactics. Burning must be well planned and executed. Burning must always be accomplished with favorable wind conditions, with adequate resources and when the exposure of the fuels is appropriate. Southern California fuels will often be difficult to ignite if they are shaded (cold) and will suddenly take-off with greater intensity than anticipated once exposed to the sun (hot). Most of the firefighters killed in Southern California have died during indirect attack operations. These include the Inaja 1956 - 11 deaths, Decker 1959 - 7 deaths, Loop 1966 - 12 deaths, Libre 1968 - 1 death, Bell Valley 1972 - 1 death, the Spanish Ranch 1979 - 4 deaths, and the Glen Allen 1993 - 2 deaths.

When fire intensity is extreme, such as in Santa Ana conditions, the tactical posture may be primarily defensive rather than offensive, since the conditions make offensive tactics futile and dangerous. Protection of structures, critical watersheds, or other values may be the only tactic that is attainable. As offensive opportunities present

themselves, it will be important to be prepared with resources to take advantages of them. This posture may continue until the conditions change and the fire's intensity reduces.

### 3. Structure Protection.

Structure protection will quite often take away many of your wildland firefighting resources. You will have to make tough judgements on resource allocation. When possible, allocate structural protection to the local structural protection agency and when applicable involve them in a unified command structure. One of the biggest challenges an Incident Commander will encounter is attaining perimeter control when structures are involved. The best over-all structure protection strategy is to control the wildfire.

Type I and Type II engine strike teams are often ordered for structural protection assignments. This type of equipment is usually readily available. However there may be times when a mixture of Type II, and Type III engines may be more appropriate. When making tactical decisions consider:

- Firefighter Safety. (**ALWAYS OUR FIRST PRIORITY**)
- Rescue-evacuation.
- Available Engines.
- Location of Homes.
- Roof Coverings.
- Rate of Spread.
- Direction of Spread.
- Engine Access
- Water Supplies.
- Defensible Space.

## **XIV. SOUTHERN CALIFORNIA TACTICAL RESOURCES**

### A. Engines:

The primary attack tool in Southern California is the engine. There are literally hundreds available with quick attack times due to a good urban and rural highway system.

Wildland Engines normally carry 500 to 1000 gallons of water, a 250 to 500 gpm pump, and about 2000 feet of hose plus hand tools. Hose lays

and mobile pumping is done on most fires. A number of wildland engines in Southern California are equipped with Class A foam proved to invaluable during the 1983 Santa Ana Fires. Many Fire Department are currently equipping many of their engines with this capability.

#### B. Hand Crews.

- Abundant in Southern California.
- All are fully trained and equipped, they have radios and are mobile.

#### C. Dozers.

Plentiful, several available from fire agencies for initial attack. Many rentals available; however, training may be limited. Size D-6 to D-7 is best for the fuel and terrain. Federal agencies have land management limitations on the use of dozers in almost all areas of Southern California.

#### D. Aircraft.

Five air attack bases serve the area with 15 minutes attack times. A number of these bases are jointly operated and staffed by CDF and the U.S. Forest Service. Aircraft types include C-130's, Orions, DC-6's and CDF S-2's. Terrain favors coordinated attack with aircraft and helitack crews. Approximately 15 initial attack helitack crews are available with both medium and light helicopters.

Normally, tactics will use a combination of all of these resources; engines, dozers, aircraft, and hand crews. At higher remote elevations, operations are usually limited to hand crews and aircraft.

### **XV. CENTRAL CALIFORNIA TACTICS AND STRATEGY**

#### A. Strategy.

Strategy, as previously stated is the over-all plan. Strategies in mixed conifer fuels may be somewhat different than that of chaparral. Fires in mixed conifer fuels usually require thinking bigger and looking for opportunities well out in front of the fire.

#### B. Tactics.

Tactics are those specific actions taken to accomplish the over-all strategy.

##### 1. Direct attack.

The best method for attacking fires in mixed conifer fuels is direct attack. This may not always be possible. If the fire demonstrates any of the characteristics listed below, direct attack may not be possible.

- a. Running in the crown.
- b. Long distance spotting.
- c. Substantial convention column.
- d. Influenced by mono and east winds.
- e. Burning in heavy logging slash or windfall.
- f. Indirect.

If direct attack is not possible, a combination of parallel attack on the flanks and indirect on the head may be necessary. It is critically important to build long range contingencies. Look for topographic opportunities in front of the fire which allows sufficient time to execute. Back firing operations must be well planned and carried out only under ideal weather and burning conditions. If the fire is running and spotting, backfiring operations may make the situation worse. Consideration should be given to burning at night, if practical. In many cases it will require a change in the weather conditions which are causing the extreme burning conditions before you will be successful in halting the spread of the fire. It maybe important to think in terms of 72 hours rather than 12 or 24.

Mop-up will be difficult job. All fireline should be black and mopped up entirely 100 feet inside. If foam can be used, it will make the job easier. (Mop-up in these fuels is very difficult).

## **XVI. CENTRAL CALIFORNIA TACTICAL RESOURCES**

- A. Hand crews - In large fire conditions, hand crews will be one of the primary resources. It is not uncommon for fires to be in remote areas with limited road or heavy equipment access. There are numerous crews available in California.
- B. Dozers - If the topography permits, dozers will be invaluable. They will particularly important in implementing contingency plans where firing from a wide fire break is required.
- C. Aircraft - Aircraft will be vital. Both fixed and rotor wing. Air tankers will assist not only supporting crews, but in knocking down spots. Rotor wind will be necessary for tactical operations as well as logistical operations. Crew transportation will most likely be a accomplished with helicopters. Remote camps and coyote tactics may be necessary. Helicopters will be key to the success of these operations. Aerial ignition for firing operations may also be required. Heavy lift or Type I helicopters are very effective for water and retardant dropping in mixed conifer fuels.
- D. Engines - Fire engines will be useful if the fire is accessible or if structures. Smokejumpers may be helpful in jumping or repelling into isolated spot fires if this can be accomplished safely.

