

Modoc Lightning Complex

Incident Action Plan

July 29, 2010 0600 - 2100

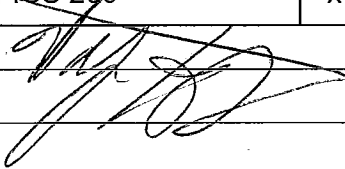
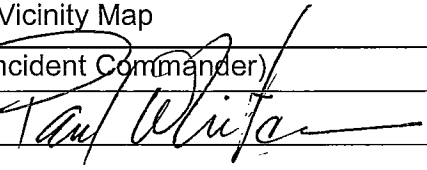
Day Shift

- Numerous unguarded Railroad Crossings throughout the Fire Area. Drive Defensively.
- Ensure LCES is in place before engaging in any suppression activities.
- Demob/Reassignment, follow operators duty limitations, switch operators if possible. Take breaks as needed.
- Clear the cobwebs, review crew protocols and SOP's, be even more ready for the next one.

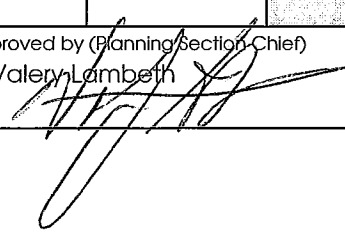
CA-MDF-000343

Modoc National Forest

Northern California Team 1

INCIDENT OBJECTIVES		1. Incident Name	2. Date Prepared	3. Time Prepared
ICS 202		Modoc Lightning Complex	07/28/2010	1800
4. Operational Period				
07/29/2010 Day Shift 0600 - 2100				
5. General Control Objectives for the Incident (include alternatives)				
<ol style="list-style-type: none"> 1. Provide for public and firefighter safety through application of the Risk Management Process. 2. Minimize incident costs and potential resource damage by suppressing all fires in the assigned area. 3. Avoid actions which could result in adverse effects to cultural and natural resources. 				
6. Weather Forecast for Period				
See attached spot weather forecast				
7. General Safety Message				
8. Attachments				
x	Organization List-ICS 203	x	Air Ops Plan ICS-220	x Fire Weather Forecast
x	Division Assignment List-ICS 204	x	Incident Map	x Fire Behavior Forecast
x	Communications Plan-ICS 205		Traffic Plan	x Unit Log ICS-214
x	Medical Plan-ICS 206	x	Safety Message	Vicinity Map
9. Prepared by			10. Approved by (Incident Commander)	
Valery Lambeth 			Kent Swartzlander 	

ORGANIZATION ASSIGNMENT LIST		9. Operations Section	
1. Incident Name Modoc Lightning Complex		Operations	
2. Date July 28, 2010		Planning OPS	
3. Time 1930		a. Branch 1 - Division/Groups	
4. Operational Period Day 07/29/10, Day 0600 - 2100		Branch Director	
Position	Name	Division/Group ALL	Josh Wright
5. Incident Commander and Staff		Division/Group	
Incident Commander	Chris Orr	Division/Group	
Deputy		b. Branch 2 - Division/Groups	
Safety Officer		Branch Director	
Information Officer		Deputy	
Liaison Officer		Division/Group	
6. Agency Representative		Division/Group	
Agency Admin	Robert Trujillo	Division/Group	
Agency Admin Rep	Ray Torres	Division/Group	
Resource Advisor	Mary Flores	Division/Group	
		c. Branch III - Division/Groups	
		Branch Director	
		Deputy	
7. Planning Section		Division/Group	
Chief		Division/Group	
Deputy		Division/Group	
Resources Unit		Division/Group	
Situation Unit		Division/Group	
Documentation Unit		d. Air Operations Branch	
Demobilization Unit		Air Operations Branch Director	
Technical Specialists		Air Attack Supervisor	
Human Resources		Air Support Supervisor	
Training		Helicopter Coordinator	
CTSP		Air Tanker Coordinator	
GIS		10. Finance Section	
FBAN		Chief	
IMET		Deputy	
8. Logistics Section		Time Unit	
Chief		Procurement Unit	
Deputy		Compensation/Claims Unit	
Supply Unit / Ordering		Cost Unit	
Facilities Unit		Prepared by (Resource Unit Leader)	
Ground Support Unit		Gary R. Deboi	
Communications Unit			
Medical Unit			
Receiving & Distribution			
Security Unit			
Food Unit			

DIVISION ASSIGNMENT LIST			1. Branch	2. Division/Group All Divisions			
3. Incident Name MODOC LIGHTNING COMPLEX			4. Operational Period Date: 07/29/10 Thursday Time: Day Shift 0600 - 2100				
5. Operations Personnel							
Operations Chief				Division/Group Supervisor	Josh Wright		
Planning Ops				Air Attack Supervisor No.			
6. Resources Assigned this Period							
Strike Team/Task Force/ Resource Designator	Leader		Number Persons	Trans. Needed	Drop Off PT./Time		Pick Up PT./Time
ST Engine 3675C	Josh Wright		28	N	Per DIVS		Per DIVS
7. Control Operations Mop-up and patrol existing fires.							
Special Instructions: Backhaul all trash and excess equipment. Use screens on all draft lines.							
Function	Frequency		Channel	Function	Frequency		Channel
Command Repeat (Tones 5 & 7)	RX 168.1500 N	TX 171.3875 N	4	Air to Ground	RX 168.6375 N	TX 168.6375N	13
Tactical Div/Group 1	See Comm Plan	See Comm Plan					
Prepared by (Resource Unit Leader) Gary R. Deboi			Approved by (Planning Section Chief) Valery Lambeth 			Date 07/28/10	Time 1930

FIRE WEATHER FORECAST NO. 2

NAME OF FIRE: Modoc Cmplx	UNIT: CA-MDF-000343	PREDICTION FOR: Day Shift
FORECAST ISSUED: 1600 PDT 7/28/2010	SIGNED: Mark Burger Incident Meteorologist	SHIFT DATE: Thu. 7/29/2010

FIRE WEATHER WATCH beginning Friday afternoon and continuing through Saturday evening for low humidities and strong southwest winds

WEATHER DISCUSSION: Dry weather will prevail today, but afternoon southwest to west winds will be slightly stronger than in previous days. Relative humidity will also be a couple percent lower today. Further decreases in humidity and increases in wind speed are expected for Friday and Saturday. However...even though our fire is not technically in red flag criteria today...IT IS CLOSE AND FIRE ACTIVITY DOESN'T DISCRIMINATE ON A COUPLE OF MPH!!

WEATHER FORECAST FOR TODAY:

SKY/WEATHER: Sunny.

MAXIMUM TEMPERATURES: 83-88.

MINIMUM HUMIDITY: 11-16%

EYE LEVEL WINDS:

LOWER SLOPES/DRAINAGES: Variable/upslope 3 to 6 mph becoming southwest to west 6 to 12 mph after 1200 PDT. A few gusts to 17 mph in the afternoon.

UPPER SLOPES/RIDGETOPS: Variable 3 to 6 mph becoming southwest 8 to 14 mph with a few gusts to 20 mph after 1200 PDT.

SMOKE/STABILITY INFORMATION: Haines index 5 (moderate). Good for aviation ops. Minimal inversions.

WEATHER FORECAST FOR TONIGHT:

SKY/WEATHER: Clear.

MINIMUM TEMPERATURES: 42-47 most areas...50-55 ridges.

MAXIMUM HUMIDITY: 55-60% most areas...40-45% ridges.

EYE LEVEL WINDS:

LOWER SLOPES/DRAINAGES: Southwest to west 5 to 10 mph in the evening becoming downslope/downvalley 1 to 3 mph.

UPPER SLOPES/RIDGETOPS: Southwest to west 8 to 14 mph becoming variable around 5 mph after midnight.

EXTENDED OUTLOOK (Friday through Sunday): Dry with Red Flag conditions probable due to low humidity and higher winds. Highs 86-91. Lows 45-50 most areas...except 55-60 ridges. Minimum relative humidity 7-12%. Maximum overnight humidity recoveries 50-55% most areas...except 35-40% ridges. Southwest afternoon eye level winds 8 to 15 mph with gusts to 30 mph.

Fire Behavior Forecast #2

Name of Incident: Modoc Lightning Complex	Administrative Unit: R5 Modoc National Forest
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Date & Time Issued: 07/28/2010@2000	Operational Period: 7/29/2010
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SITL: Chris Wikeen	Signed:
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Assumptions:
Several lightning fires occurred out of the last series of storms. Some were detected and suppressed, and some went out. There is a high probability of holdovers for the next several days, as the weather will be becoming warmer, drier, and windier throughout the period.

Weather Summary

See attached Extended Weather Forecast.

Fire Behavior Summary

General

Fuels within the complex range from grass, bitter brush, Manzanita, Pinion-Juniper, to sage with a ponderosa overstory. Live fuel moisture. Heavy Precipitation in the late spring has contributed to relatively high live fuel moisture values between 90%-160% in the herbaceous for this time of year depending on location. The grass has cured on southerly aspects below 6000', but remains uncured at higher elevations on most aspects. 10 hour fuel moisture has been running between 5-7%. Heavier fuels are consuming up to 90%.

Specific Assignments:

As the weather becomes warmer, drier, and windier today, the chance of a holdover becoming active is highly probable. Slopes aligned with southwest to west will exhibit the highest potential for active fire behavior.

Any new starts that move into cured grass on exposed southwest to west aspects could exhibit the highest rate of spread. Behavior runs indicate that the ROS could vary between 0-20 ch/hr, 1-4' flame lengths on 0-30% slope at the heat of the day. On slopes not aligned with the southwest to west winds ROS could be around 1-10 ch/hr, with 1-2' flame lengths.

Any new starts that move into sagebrush on exposed southwest to west aspects could have a ROS of 1-8 ch/hr, 1-3' flame lengths, maximum spotting distance 0-.1 mile. On slopes not aligned with the southwest to west winds ROS could be around 1-4 ch/hr, with 1-2' flame lengths.

Any new starts that move into Sage Brush with Ponderosa overstory in southwest to west aspects expect ROS of 1-6 ch/hr, 1-3' flame lengths with a maximum spotting distance of 0-.1 mile at the heat of the day on 0-30% slopes. On slopes not aligned with the southwest to west winds ROS could be around 2-3 ch/hr, with 1-2' flame lengths. Probability of ignition could be in the high 90's for all three scenarios.

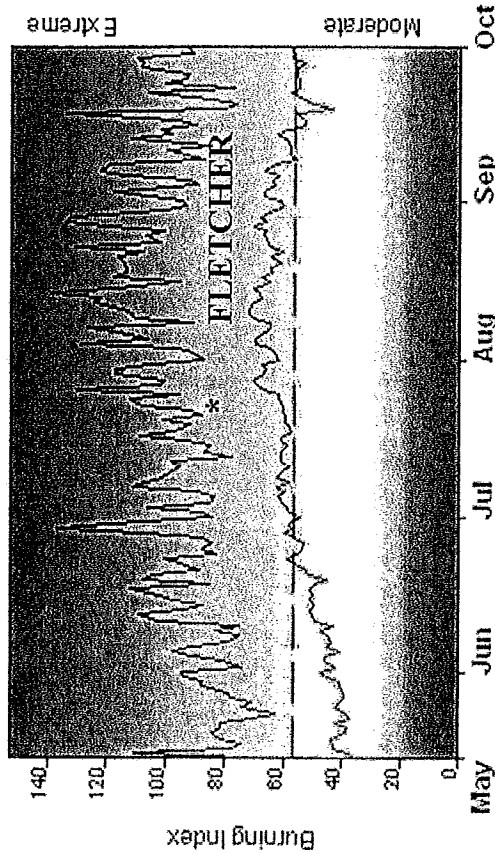
Air Operations: Gusty afternoon winds could hamper aircraft operations.

Safety

Insure LCES is in place prior to engagement

FIRE DANGER -- (Fire Danger Area)

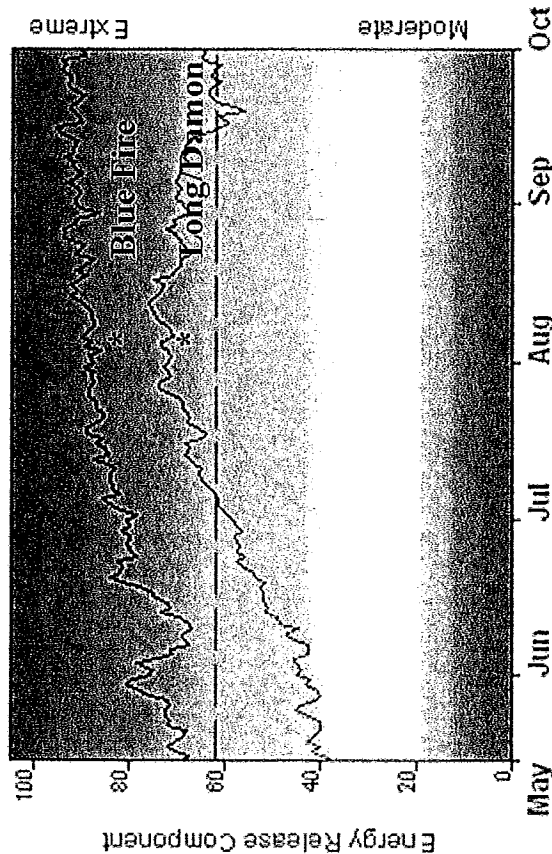
Maximum, Average, and 47th Percentile, based on 38 years data



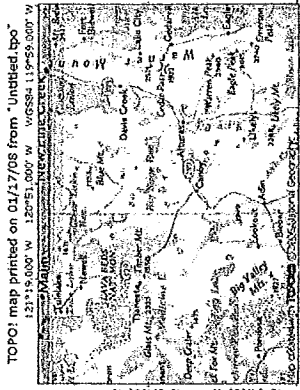
Fuel Model: K—Light Slash

FIRE DANGER -- (Fire Danger Area)

Maximum, Average, and 43rd Percentile, based on 38 years data



Fuel Model: K—Light Slash



- Fire Danger Area:
MODOC 2010 (2009 DATA)
- Northeastern California
 - Modoc National Forest
- Weather Stations:
- 040306—Timber Mtn (NFDRS)
 - 040221—Round Mtn (NFDRS)
 - 040312—Rush Creek (NFDRS)

Fire Danger Chart Interpretation:

- Background colors
- EXTREME Use extreme caution
 - CAUTION Watch for changes
 - MODERATE Lower potential, but always be aware
- Graph Lines
- Maximum—Shows the 38 year average highest component by day (ERC & BI)
 - Average—Shows peak fire season average over 10 years (ERC & BI)

43rd Percentile means 43% of the time the Energy Release Component is below 59
 47th Percentile means 47% of the time the Burning Index is below 51

Local Thresholds:

- Combinations of any of these factors can greatly increase fire behavior:
- 20 ft wind speed over 5 mph
 - Less than 20% relative humidity
 - Temperature over 90
 - Burning Index over 51

Local Knowledge:

- The east side of the Warner Mtn. Range often has lake effect like strong down slope winds beginning in the afternoon
- Flat terrain makes posting lookouts difficult—Utilize lookout stations and aerial observers
- During peak fire season humidity recovery often does not occur until just before daylight

Significant Event:

08/07/1977 CRANKFIRE—Entrapment with 25 shelter deployments due to increased fire behavior caused by the passage of a thunderstorm with strong erratic winds—RH 28% Flat terrain.

Be Alert:

Severe and often unpredictable weather changes caused by thunderstorms or weather fronts can cause erratic winds and downdrafts.

INCIDENT RADIO COMMUNICATIONS PLAN		Incident Name Modoc Lightning CA-MDF-000343		Date/Time Prepared 7/28/2010 1800	Operational Period Date/Time 7/29/10 Thursday 0600 - 2100
GROUP 15		Only frequencies listed on this 205 are authorized for use on this incident.			

Ch #	Function	Channel Name/Trunked Radio System Talkgroup	Assignment	RX Freq N or W	RX Tone	TX Freq N or W	TX Tone	Mode	Remarks
1	MDF-DISPATCH	MDF-Direct 1	Emergency ECC Contact	168.7500 N		168.7500 N		A	
2	MDF-DISPATCH	MDF-RPT	Emergency ECC Contact	168.7500 N		170.1750 N		A	Tone 5 Grouse Mtn, Tone 7 Red Shale Mtn
3	COMPLEX COMMAND	MDF-Admin Direct	All Divisions	168.1500 N		168.1500 N		A	
4	COMPLEX COMMAND	MDF-Admin Rpt	All Divisions	168.1500 N		171.3875 N		A	Tone 5 Grouse Mtn, Tone 7 Red Shale Mtn
5	MDF CAMP NET	MDF-SERVICE NET	Not assigned	164.1000 N		164.8000 N		A	
6	TACTICAL	FS TAC-1	Division A	168.0500 N		168.0500 N		A	
7	TACTICAL	FS TAC-2	MDF-JA Tactical	168.2000 N		168.2000 N		A	If dispatched outside Complex
8	TACTICAL	FS TAC-3	Division B	168.6000 N		168.6000 N		A	
9	TACTICAL	R5 TAC-4	Division C	166.5500 N		166.5500 N		A	
10	TACTICAL	R5 TAC-5	IA Group	167.1125 N		167.1125 N		A	Within Complex
11	TACTICAL	R5 TAC-6	Unassigned	168.2375 N		168.2375 N		A	If assigned by Ops notify Comm Unit
12	COMMAND	R5 FS A/G	ALL DIVISIONS	170.0000 N		170.0000 N		A	A/G IA outside of complex
13	AIR/GROUND	Incident Specific	ALL DIVISIONS	168.6375 N		168.6375 N		A	A/G inside of complex
14	EMERGENCY	AIR GUARD	ALL DIVISIONS	168.6250 N		168.6250 N	110.9	A	110.9 TONE 1, USE FOR EMERGENCY TO CONTACT AIRCRAFT
15	CAL-CORD		ALL DIVISIONS	156.0750 W		156.0750 W		A	EMERGENCY AMBULANCE CONTACT
16	EMERGENCY	AIR GUARD	ALL DIVISIONS	168.6250 N		168.6250 N	110.9	A	110.9 TONE 1 USE ONLY IN EMERGENCY TO CONTACT

5. Prepared by
Rick Cartoscelli Nor Cal Team 1, COM1

Incident Location
County Modoc State: CA Fire Latitude N Longitude W

The convention calls for frequency lists to show four digits after the decimal place, followed by either an "N" or a "W" depending on whether the frequency is narrow or wide band
ICS 205 - 2007H

MEDICAL PLAN	1. Incident Name	2. Date Prepared	3. Time Prepared	4. Operational Period							
	Modoc Lightning Complex	07/28/2010	1130 am	07/29/2010 0600- 2100 Hrs							
5. Incident Medical Aid Station											
Medical Aid Stations		Location			Paramedics Yes No						
Frontline Medical		Ambrose Base Camp			X						
6. Transportation											
AIR Ambulance Services											
Name		Address		Phone		Paramedics Yes No					
REACH *NVG		3775 Flight Ave. Redding, CA. 96003		Modoc Interagency Communication Center		RN					
Mercy Air (PHI) *NVG		1524 East St. Redding, CA 96001		MICC		RN					
Mt. Life Flight		650 Ash St., Susanville, CA		MICC		RN					
CHP hoist with 165' line		Benton Airfield, Redding, CA		MICC		X					
Ground Ambulance Services											
Name		Location			Paramedics Yes No						
Mt Shasta Ambulance		Ambrose Base Camp			X						
Modoc Med Center Ambulance		Alturas / Adin, CA			X						
7. Hospitals											
Name		Address		Travel Time Air Ground		Phone		Helipad Yes No		Burn Center Yes No	
Mercy Medical Level 2 Trauma		2175 Rosaline Ave, Redding N 40° 34.29 / W 122° 23.67		60 Min. 3 hr		530- 225-6000 530- 225-7201		X			
UC Davis Level I Trauma/Burn Center.		2315 Stockton Blvd. Sacramento N38 33.17 / W 121 27.05		2 hrs. 6 hrs.		916- 734-3636 916- 734-3790		X		X	
Modoc Medical Center		228 McDowell, Alturas CA N 41 28.48/ W 120 32.42		5 min. 20 min.		530-233-5131		X			
Mayer's Memorial Hospital		Hwy 299, Fall River CA. N 41 01.40 / W 121 25.35				530-336-5511		X			
Canby Family Practice Clinic		Canby, CA		5 min.		530-233-4641				X	
8. Medical Emergency Procedures											
<input type="checkbox"/> Contact Modoc Lightning Complex communications and declare a medical emergency on Command, advising your location and situation <input type="checkbox"/> The closest Division Supervisor will respond to the location to take control and direct necessary actions <input type="checkbox"/> The closest Safety Officer and EMTs will respond to the location to assist with patient care <input type="checkbox"/> Use the attached Injury/Incident Communications Worksheet to coordinate appropriate care and transportation <input type="checkbox"/> Secure the scene area and identify witnesses for later investigation -- Keep a log <input checked="" type="checkbox"/> MICC IS STAFFED 24hr THROUGH THIS INCIDENT Phone # (530) 233-8880											
Prepared by (Medical Unit Leader)						10. Reviewed by (Safety Officer)					
Ken Kumpe MEDL						Dave Kirste SOF2					

Injury or Incident Communications Protocol

Location _____

Situation _____

Any special equipment required _____

Number of injured _____ Type of injuries _____

Immediate transport required: Yes No Best method: Ambulance Helicopter Vehicle

Closest pick up point (DP, Helispot) _____

LOC _____ Resp. _____ Pulse _____ BP _____ Weight _____

Injury _____

Medical History/Allergies _____

Air Transportation Triage

Contact EMS Helicopters on CALCORD

	Air Ambulance	Ground Transport to Med Unit
Mechanism	Stuck by tree Fall of 10' or more Snake bite with pain and swelling Insect bite with shortness of breath Signs of heat stroke (hot, dry, disoriented) Burn Injury greater than 1% body area	Most heat exhaustions Cut or laceration & bleeding controlled Minor bites and Stings Minor burns
Area Injured	Significant Blunt or Penetrating Trauma to Head, Neck, Chest, Abdomen or pelvis Any Arm or Leg fracture	Minor blunt trauma Minor penetrating trauma Extremity sprains and strains
Symptoms	Disoriented Chest Pain or Shortness of Breath Weak or absent radial pulse Pale, cold and sweating	Alert and oriented No shortness of breath Good pulses

Approved Medivac sites:

Incident Base Medivac Site N 41°30.013 X W 120°58.538 Elevation 4959'

IF AIR or GROUND AMB is DELAYED:

Package and transport patient to ICP Med Unit for Advanced Life Support. Med Unit ALS personnel may attempt to rendezvous with patient if travel time is extended. Re-route EMS helicopter to ICP or rendezvous point as appropriate.

If Declaring an "Incident within the Incident"

The closest DIVS will respond to manage the incident. They are responsible for giving an accurate size up, ensuring scene safety, setting priorities and initiating an appropriate response

The closest Safety Officer and Line EMS will respond to the scene to assist the DIVS. Secure site and begin initial investigation when situation is stabilized

Modoc Lightning Complex Risk Analysis (215a) July 29th

Div.	LCES Analysis of Tactical Applications (Hazardous Actions or Conditions)	LCES Mitigations/Warnings/Remedies
All	Driving Hazards	<ul style="list-style-type: none"> • Reduce speed, be watchful of traffic. • Drive defensively! Expect the unexpected around every curve. • Drive with your headlights on. Use chock blocks. Keep windshields clean. Look before backing and use backers. • Don't drive when fatigued • Maintain driving situational awareness. • Observe speed limits. • The roads in the area are open to the public. • Unguarded Railroad Crossings • Open Range Cattle-Crowder Flat Rd and Hwy 139
All	Fire Behavior	<ul style="list-style-type: none"> • Closely monitor weather conditions. Communicate weather changes to ICP. • Maintain adequate escape routes and safety zones. Advise all personnel if these are compromised or changed. Set trigger points when appropriate. • Adhere to the 10 standard orders, mitigate the 18 watch out situations where appropriate and maintain situational awareness. • Be aware of the light, flashy fuels and the winds that affect them. • Be aware of the predictable diurnal wind patterns associated with this area.
All	Communication	<ul style="list-style-type: none"> • Use human repeaters as appropriate. Follow the communications plan.
All	Initial Attack	<ul style="list-style-type: none"> • Perform Risk Mgt Process before engaging. Refer to pg 1 of IRPG
All	Hydration	<ul style="list-style-type: none"> • Drink water before, during, and after shifts. • Be alert for signs of heat stress in yourself and others. • Be sure to eat throughout the shift to better assimilate energy/hydration needs.
All	Foot Travel	<ul style="list-style-type: none"> • Watch footing, both in camp and on the line. • Minimize fatigue by pacing yourself. • Treat "hot spots" on your feet before they become blisters.
All	Fire Area Hazards	<ul style="list-style-type: none"> • Maintain snag awareness. • Maintain situational awareness with respect to illicit agricultural activities. • Natural Gas Lines and Overhead High Voltage Lines.
All	Sanitation	<ul style="list-style-type: none"> • Monitor yourself and others for signs of illness (flu,colds,etc.) • Wash hands regularly and thoroughly.
All	Wildlife	<ul style="list-style-type: none"> • Snakes, Bees, Ticks
All	Fatigue	<ul style="list-style-type: none"> • Affects judgment, decision making, and performance

Date & Time Prepared: July 28, 2010 @ 1500 Operational Period: July 29, 2010 0600 - 2100
 Prepared By: Dave Kirste, SOF2

CA-MDF-000343

Modoc National Forest

Northern California Incident Management Team 1














Today's discussion is from the First Aid / Health Category.

Six Minutes Home Page

HYDRATION

Studies conducted on wildland firefighters indicate that fire suppression activities generate about 7.5 kilocalories of heat each minute worked, or 450 kilocalories for each hour. Additional heat (about 180 kilocalories per hour) comes from the environment and the fire. The total heat load amounts to 580 kilocalories per hour ($400 + 180 = 580$). Complete evaporation of 1 liter of sweat removes 580 kilocalories of heat. In order to maintain a healthy body temperature, the firefighter needs to evaporate about 1 liter (slightly more than 1 quart) of sweat during each hour of work.

-  Maintaining body fluids is essential for sweating. You must hydrate before, during, and after work.
-  Before work you should take extra fluids to prepare for the heat. Drink 1 or 2 cups of water, juice, or a sport drink before work. Avoid excess caffeine; it hastens fluid loss in the urine.
-  While working drink at least 1 quart of fluid per hour. Drink as much as you can during the lunch break. Water is your greatest need during work in the heat.
-  Providing a portion of fluid replacement with a carbohydrate/electrolyte sport beverage will help you retain fluids and maintain energy and electrolyte levels.
-  After work it is important to continue drinking to replace fluid losses. Thirst always underestimates fluid needs, so you should drink more than you think you need.
-  Rehydration is enhanced when fluids contain sodium and potassium, or when foods with these electrolytes are consumed along with the fluid.
-  Unacclimatized workers lose more salt in the heat so they need to pay particular attention to salt replacement. Don't overdo salt intake; too much salt impairs temperature regulation. Excessive salt can cause stomach distress, fatigue, and other problems.
-  Make potassium-rich foods like bananas and citrus fruits a regular part of your diet, and drink lots of lemonade, orange juice, or tomato juice.
-  Limit the amount of caffeine drinks such as coffee and colas because caffeine increases fluid loss. Avoid alcoholic drinks. They also cause dehydration.
-  You can assess your hydration by observing the volume, color, and concentration of your urine. Low volumes of dark, concentrated urine, or painful urination indicate a serious need for rehydration. Other signs of dehydration include a rapid heart rate, weakness, excessive fatigue, and dizziness.
-  Rapid loss of several pounds of body weight is a certain sign of dehydration. Rehydrate before returning to work; continuing to work in a dehydrated state can lead to serious consequences, including heat stroke, muscle breakdown, and kidney failure.

References:

Standards for Fire and Aviation Operations, BLM, www.fire.blm.gov/Standards/redbook.htm
Fitness and Work Capacity--Second Edition

TRAINING SPECIALIST MESSAGE

All training packages must be completed and turned in to Training by 0900 Today, July 29

Bring the following to the exit interview

- **A completed and signed Performance Evaluation**
- **Your Task Book, filled out by your trainer**

Forms are available at the Training Unit

Dominic Panno

Training Specialist

Appendix A

The 5-D System for Effective Waterbars

When locating and building waterbars, place them the right **distance** apart, at a **diagonal** to the fireline, so that they **divert**, then **discharge**, then **dissipate** the energy of the flowing water. Be sure to make them deep enough so they'll be durable, and that soil does **not block** the water bar outlet.

Recommended spacing for waterbars on firelines.

Fireline slope %		Maximum Distance Apart (feet)
4-6		250
7-9		150
10-14		125
15-20		60
21-40		30
41-60		15

Waterbars should be at least 2 pulaski widths wide and 12-24 inches high

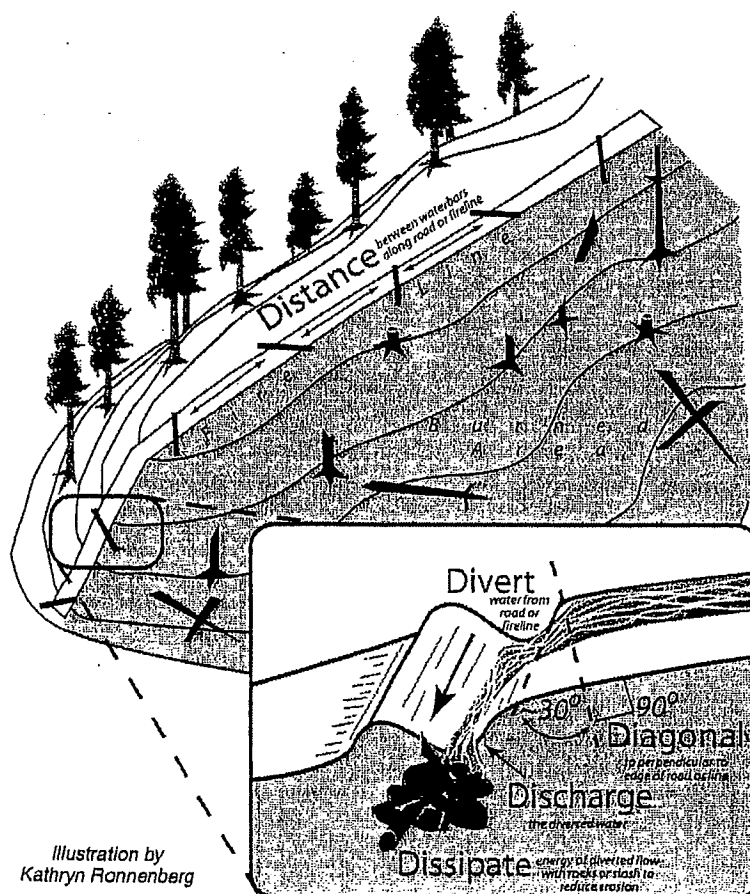


Illustration by
Kathryn Ronnenberg