



The South Canyon Fire

July 6, 1994





*The BLM and
USFS Victims*

- **West Flank Fireline Work Force**
 - † Kathi Beck, Prineville HS
 - † Tami Bickett, Prineville HS, Squad Boss
 - † Scott Blecha, Prineville HS
 - † Levi Brinkley, Prineville HS
 - † Doug Dunbar, Prineville HS

- † Terri Hagen, Prineville HS
- † Bonnie Holtby, Prineville HS
- † Rob Johnson, Prineville HS
- † Jon Kelso, Prineville HS, Squad Boss
- **Helitack**
 - † Robert Browning
 - † Richard Tyler, Helitack Foreman

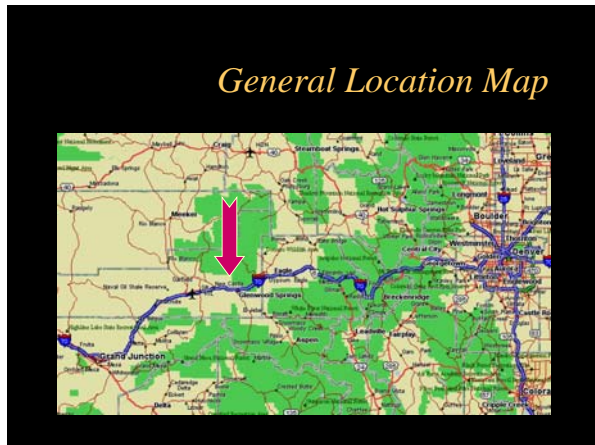
*The BLM and
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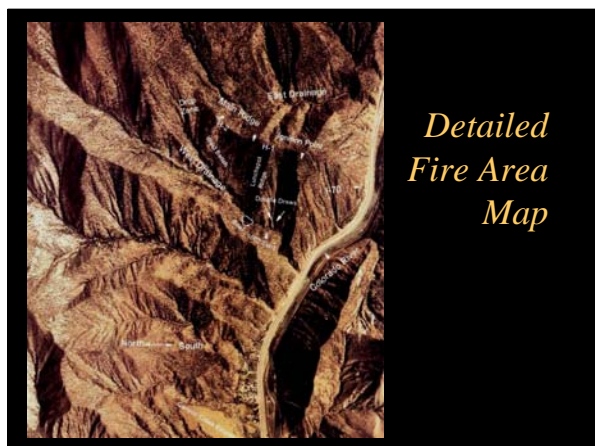
- **West Flank Fireline Work Force**
 - † Don Mackey, Missoula Jumpers, Jumper-In-Charge
 - † Roger Roth, Redmond Jumpers
 - † Jim Thrash, Redmond Jumpers

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Storm King Mtn. Aerial Photo



Fuels

- Extremely dry & susceptible to rapid & explosive spread
- Potential present for extreme fire spread
- Two primary fuel models
 - Fuel Model 2: pinyon-juniper
 - Main carrier of fire was grass
 - Fuel Model 4: Gambel Oak

- Fuel Model 4
 - 6' to 12' high
 - Dense & continuous
 - Little dead material
 - Unknown age
- Gambel Oak*
- No previous recorded fires
 - Unburned live fuel moisture 125%
 - Underburned live fuel moisture 59%
 - Reburn potential



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Weather

- Cold front with high winds (up to 45 MPH) passed over fire, July 6 afternoon
- Several Red Flag Warnings issued before South Canyon Fire started
- Period of drought; 58% of normal precipitation
- Detailed fire weather & behavior info not transmitted to FF's

The Colorado River Wind Chute



Wind Diagram



- Wind was strongly felt on the Main Ridge
- Little wind was felt on lower West Fireline

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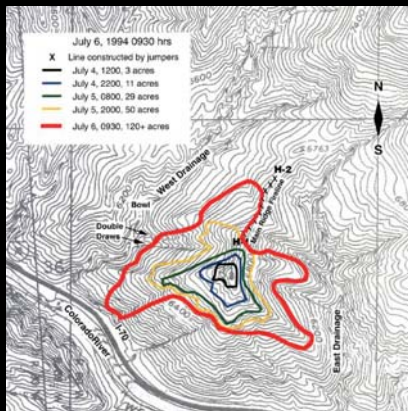
Topography



- Steep topography, 50% to 100% slopes
- Effected fire behavior
- West Flank last pitch was 50 to 55 degrees
- Elev @ H-1 7,000'
- Elev @ H-2 6,700'
- Elev @ I-70, 5,600'

Topographic Map of Locations





Fire Spread Map

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Fire Behavior on July 2 & 3

- **July 2:**
 - Lightning ignited the fire on afternoon of July 2
 - South end of Main Ridge (Hell's Gate Ridge)
- **July 3:**
 - First report, July 3, 1100 hrs, Garfield Co Sheriff to Grand Junction BLM
 - BLM Grand Junction dispatch requested 8 jumpers, air tanker & lead plane
 - BLM Engine 611 arrived, did size-up (saw two trees burning) & assessed low potential. BLM District FMO agreed. Aircraft diverted
 - Red Flag (lightning-high winds), 40 new fires, high to extreme fire danger
 - Continued as backing fire in surface litter of leaves, twigs and grasses
 - Low intensity downslope spread with occasional short duration upslope runs and torching in Gambel Oak
 - FMO requested more firefighting resources & requested divert of others

Fire Behavior on July 4



- 1200 hrs: 3 acres
- Red Flag Warning issued & still many fires
- Higher priority given
- 1450 hrs: concerned resident
- 1830 hrs: BLM engine & FS FF's decide to attack July 5
- 2000 hrs (approx.) air observer "...steep, inaccessible, burning NE, few escape routes, actively burning copters with buckets would be effective
- 2200 hrs: 11 acres

Fire Behavior on July 5

- 0800 hrs: 29 acres
- BLM crew of 7 FF's walked to fire from East Drainage. Cut Helispot 1 (H-1) & began fireline down to West Drainage
- Spread downslope through day with intermittent flare-ups & upslope runs IC ordered another eng, copter & 20-person crew (8 jumpers substituted for crew)
- Air drop near H-1. IC & pilot agreed more drops ineffective
- Another air drop near I-70
- 1730 hrs: IC and crew walked down
- 1745 hrs: 8 jumpers parachute to fire. IC tells them to work H-1 down to drainage. Jumper-in-Charge advises IC fire crossed fireline & requested 2 Type 1 crews
- Many unburned islands
- End of day: 50 acres
- Fire active burning approx. 77 additional acres during night

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Fire Behavior & Activity on July 6, 0000 to 1520 hrs.

- 0030 hrs: Jumpers abandon line east side of fire
- 0430 hrs: 11 BLM FF's walk to fire & clear H-2
- 0530 hrs: Jumper-in-Charge orders copter
- 0600 hrs: 127 acres
- 0730 hrs: NWS fire weather forecast predicts Red Flag Warning for high winds
- Still downslope burning with isolated torching & heating during mid day
- 0845 hrs: IC & JIC discuss plan-Improve Ridge Fireline & start West Fireline
- 0900 hrs: IC & some jumpers hear NOAA wind radio broadcast
- 0930 hrs: Copter 93-R arrives. IC & JIC recon fire.
- 1030 hrs: 8 more jumpers drop to fire
- 1230 hrs: 10 FF's from Prineville HS crew arrives at H-2 & most start down West Fireline
- 1300 hrs: Flare-up on West Flank
- 1400 hrs: Overcast sky & gusty winds
- 1500 hrs: 10 more Prineville HS FF's arrive & widen Main Ridge fireline
- 1510 hrs: Hot spot near Double Draws
- 1520 hrs: dry cold front; winds 30-45 mph in bottom West Drainage

Fire on July 6 at 1300 Hrs.



Fire Behavior & Activity on July 6, 1520 to 2100 hrs.

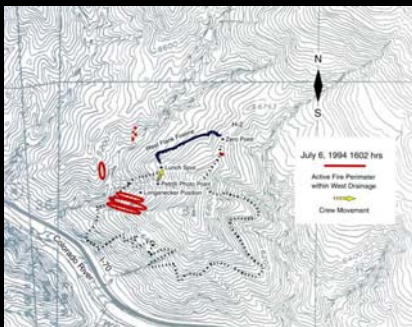
- 1520 hrs: dry cold front; winds 30-45 mph in bottom West Drainage
- 1530 hrs: Erratic winds on West Fireline
- 1545 hrs: Flare-up near Double Draws
- 1553 hrs: Winds approx. 45 mph on Main Ridge
- 1554 hrs: Fire spots across Main Ridge
- 1555 hrs: Several upslope, crown runs near Double Draws, SW side
- 1602 hrs: Smoke coming from bottom of West Drainage, near Double Draws; Fire across drainage
- 1603 hrs: Fire running upcanyon near the Bowl
- 1604 hrs: Spot seen on east side of West Drainage
- 1605 hrs: More spot fires across Main Ridge
- 1609 hrs: Fire running rapidly upcanyon and upslope toward Main Ridge
- 1611 hrs: IC advises Grand Junction dispatch that fire running & needed AT's
- 1615 hrs: Fire crosses Main Ridge
- 2100 hrs (approx): Fire reached 2,115 acres

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The Blowup at 1555 Hrs.



The Blowup at 1602 Hrs.



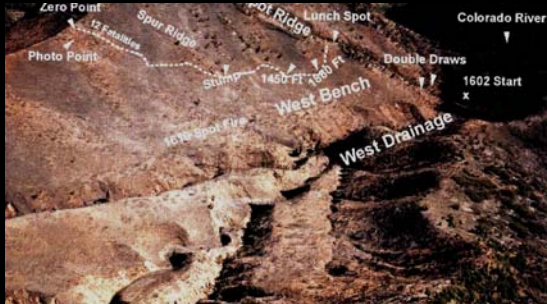
Bottom of West Drainage, 1999



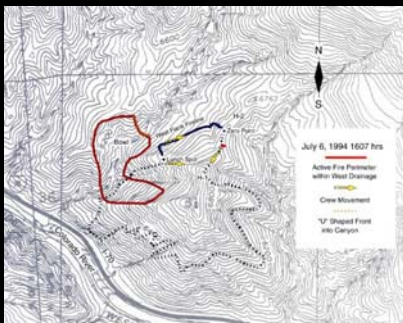
The South Canyon Fire

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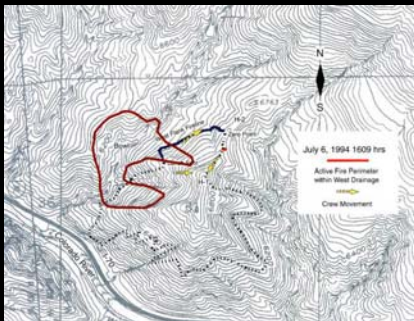
*The Spots,
First Seen at 1602 Hrs.*



The Blowup at 1607 Hrs.

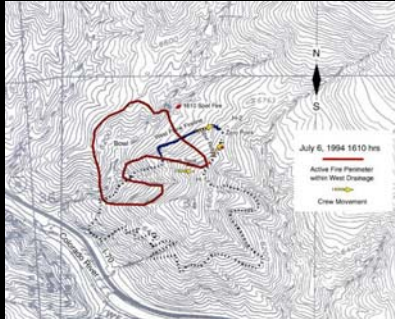


The Blowup at 1609 Hrs.



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The Blowup at 1610 Hrs.



- Walked 1108' for about 5 mins.
- Ran 317' with tools

Times of Fire Spread & Positions



General Work Areas

- Main Ridge (Hell's Gate Ridge)
- Lunch Spot Ridge
- West Flank Fireline
- Helispot 2 & ICP

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The Main Ridge Workforce

- **Prineville Hotshots**
 - Bill Baker
 - Kip Gray
 - Tony Johnson
 - Brian Lee
 - Louie Navarro
 - Tom Rambo
 - Alex Robertson
 - **Bryan Scholz (Foreman)**
 - **Tom Shepard (Superintendent)**
 - Mike Simmons
 - Kim Valentine
- **BLM/USFS**
 - Todd Abbott
 - **Butch Blanco (IC)**
 - Jim Byers
 - Eric Christianson
 - Mike Hayes
 - Loren Paulson
 - Brian Rush
 - Michelle Ryerson
 - Neal Shrunk

Main Ridge Looking South from H-2



Main Ridge at 1600 hrs.



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The West Fireline Workforce

- **Prineville Hotshots**
 - Kathi Beck, Prineville HS
 - Tami Bickett, Prineville HS, Squad Boss
 - Scott Blecha, Prineville HS
 - Levi Brinkley, Prineville HS
 - Doug Dunbar, Prineville HS
 - Terri Hagen, Prineville HS
 - Bonnie Holtby, Prineville HS
 - Rob Johnson, Prineville HS
 - Jon Kelso, Prineville HS, Squad Boss
- **BLM**
 - Derek Brixey
 - Brad Haugh
- **USFS**
 - Sonny Archuleta
 - Sarah Doehring
 - Kevin Erickson
 - Eric Hipke
 - **Don Mackey, JIC**
 - Roger Roth
 - Jim Thrash

View of West Flank from the West



West Fireline at 1605 Hrs.



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West Fireline at 1605 hrs.



Photo Point, 1999

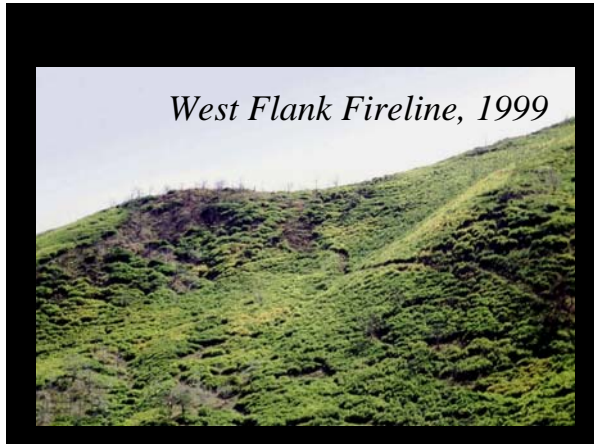


West Fireline Escape Route

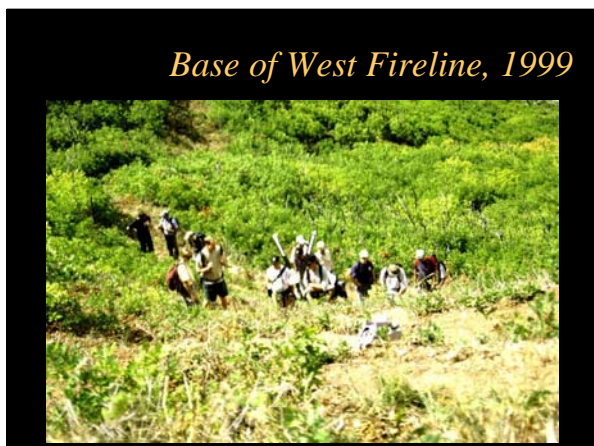


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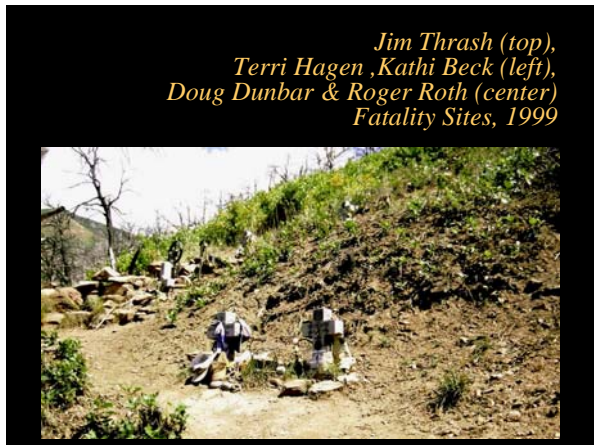




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Hipke at Blecha Site, 1999



Hipke Above Tree, 1999



*John Maclean & Eric Hipke,
1999*



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West Fireline Fatality Locations

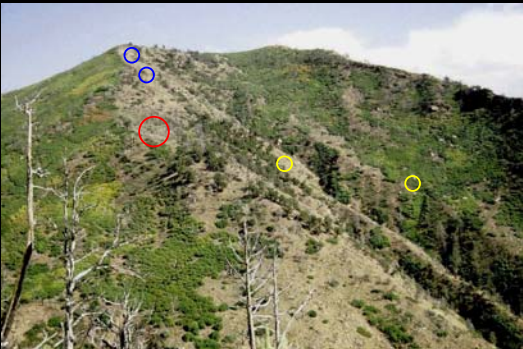


- **Location 1**
 - † Scott Blecha
- **Location 2**
 - † James Thrash/deployed
 - † Kathi Beck
 - † Terri Hagen
 - † Doug Dunbar
 - † Roger Roth/deployed
- **Location 3**
 - † Tami Bickett
 - † Levi Brinkley
 - † Jon Kelso
 - † Rob Johnson
 - † Don Mackey
 - † Bonnie Holtby

The Lunch Spot Ridge Workforce

- **USFS**
 - Michael Cooper
 - Mike Feliciano
 - Dale Longanecker
 - Tony Petrilli
 - Quentin Rhoades
 - Eric Shelton
 - Sonny Soto
 - Bill Thomas
 - Keith Woods

Lunch Spot Ridge, 1999



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The Double Draws & Fire Crowning



The Helispot 2 Workforce



Helitack Fatality Site



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Helitack Fatality Spot, 1999



Escape Route, 1999



*East Drainage
Escape Route*



- FF's began leaving Main Ridge at about 1605 hrs
- Last FF out about 1730 hrs.

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The Blowup at 1630 hrs.



*Jumpers Watching & Waiting at
Canyon Creek Staging*



*Escaped
Firefighters
at
Canyon
Creek
Estates*



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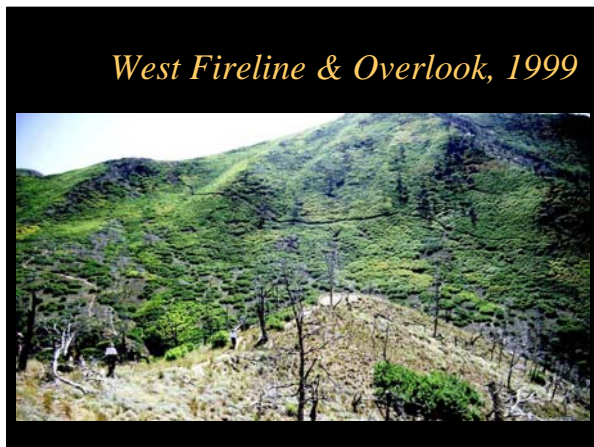
Trail Head, 1999



Trail Leading from I-70, 1999



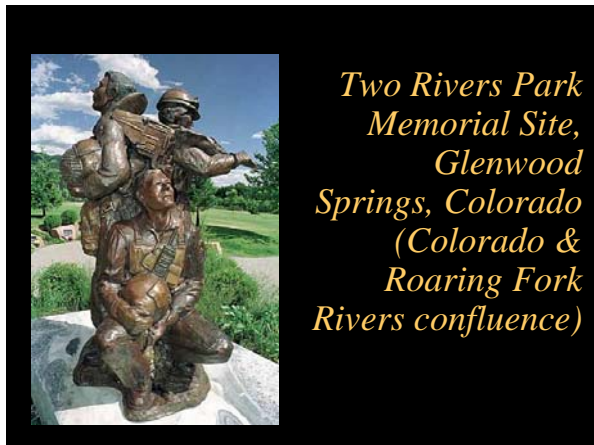
West Fireline & Overlook, 1999



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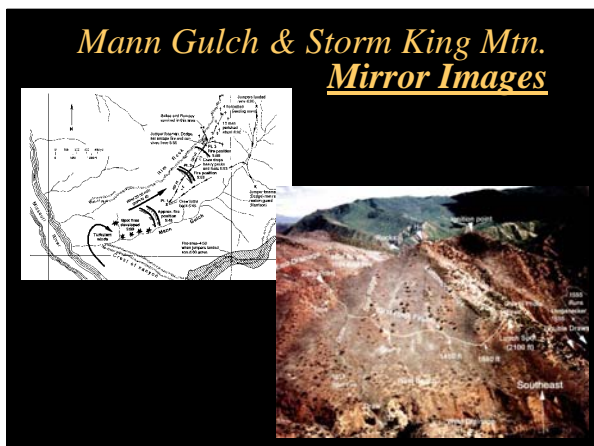
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*Mackey
Memorial,
Glenwood
Springs,
1999*



*John Maclean & Eric Hipke at
Memorial Park, 1999*



*Mann Gulch & Storm King Mtn.
Mirror Images*

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Investigation Report Findings

Three Factors that Changed Fire Behavior

- Steep, complex topography
- Strong, turbulent & variable winds
- Involvement of live fuels

Predicted Fire Behavior

- July 6 fire behavior could have been predicted on basis of fuels, weather & topography
- Fire behavior info not requested nor provided
- Critical info not available for developing strategy & tactics

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Fire Support Structure

- Above normal fire activity overtaxed relatively small local firefighting organization
- Local dispatch did not provide clear understanding of what resources would be provided
- Unclear priority setting between local dispatch center & local firefighting organization resulted in confusion about priorities, operating procedures & resource availability
- Lack of management oversight, technical guidance & direction to local firefighters

Strategy & Tactics

- Escape routes & safety zones were inadequate for burning conditions
- Most of West Flank effort was hazardous
- Most of Downhill Fireline Construction Guidelines were not followed
- Did not compensate for changes in observed or potential extreme fire behavior
- There was a question of whom was the incident commander
- There was no organizational division of labor, i.e. divisions, etc.

Safety Briefing & Major Concerns

- With fire's potential, escape route along West Flank was too long & steep
- 8 of 10 of Standard Firefighting Orders were compromised
- 12 of 18 Watch Out Situations were compromised
- Downhill Firefighting Guidelines were compromised
- Prineville HS were not briefed on local conditions, fuels or fire weather forecasts
- Air support was inadequate
- Any suppression was delayed until Day #2 with major suppression only started late on Day #4
- IC & Jumper-In-Charge never had chance to communicate prior to morning of July 6

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Equipment

- Two FF's never had fire shelters
- Don't take fuses or packs into shelters
- Wind and fire intensity & spread prevented effective fire shelter deployment
- Carrying tools & packs slowed fire escape efforts

Storm King Mountain 2000

Let's Safely Do It Again!

Size-Up Components

- Get the **FACTS**
- Generate the **PROBABILITIES**
- Inventory the **RESOURCES**
- Make a **DECISION** (Strategy = IAP = Objectives = "What")
- Implement the **PLAN OF OPERATIONS** (Tactics = "How")

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Developing Facts & Probabilities

- Map fire & locate fire in relation to hazards & risks
- Determine advantage control points/locations
- Evaluate probabilities in relation to risk to FF's, civilians, property & the environment
- Evaluate current & expected resource availability
- Evaluate direct vs. indirect attack

Safety Considerations

- Determine **LOOKOUT LOCATIONS**
 - Establish **COMMUNICATIONS**
 - Determine & establish **ESCAPE ROUTES**
 - Determine and establish **SAFETY ZONES**
-
- Know and keep FF accountability information

Develop Strategy-Incident Objectives

- **DIRECT:**

- **INITIAL ACTION ESCAPE:**

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Develop & Implement Tactics

- Use integrated ground & air attack
- Hit hard with air attack (air tankers & copters) before committing ground FF's to Main Ridge
- Watch tactics driven by transportation needs

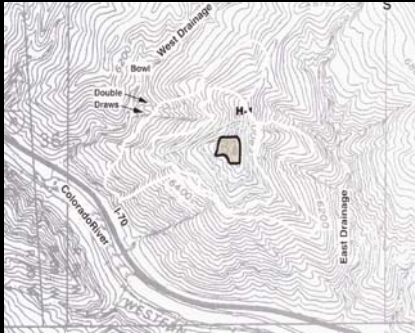
Overall Major Considerations

- Always consider risk vs. gain
- Think risk management
- Supervisors redeem role as supervisor
- Be aware of group think mentality

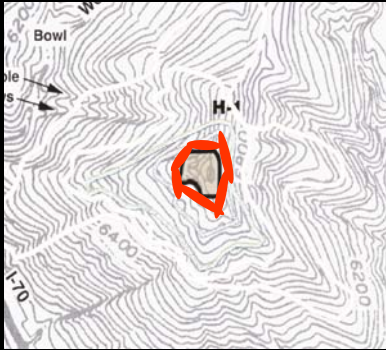


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Third Day, July 4, 1200 hrs, 3 ac.



Third Day, July 4, 1200 hrs, 3 ac.



- Direct attack
- Air resources:
one air tac,
one to two
AT's, one
copter w/
bucket & crew
- Ground
resources: IC,
one 20 person
fire crew
- Contained:
7/4, 2200 hrs
- Controlled:
7/6, 1900 hrs.

Day #3, July 4, 2200 hrs, 11 ac.



The South Canyon Fire July 6, 1994

Third Day, July 4, 2200 hrs, 11 ac.



Third Day, July 4, 2200 hrs, 11 ac.



- Must aggressively attack on July 5
- Direct attack
- Air resources: One air tac, two air tankers, one copter w/ crew & bucket
- Ground resources: IC, Two 20 person crews
- Contain: July 5, 1800 hrs.
- Control: July 7, 1900 hrs.

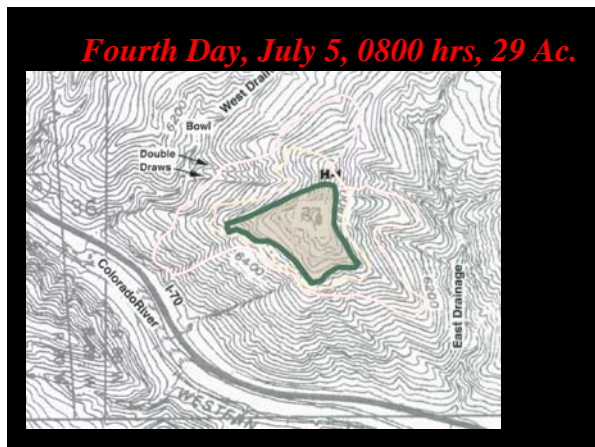
Day #4, July 5th

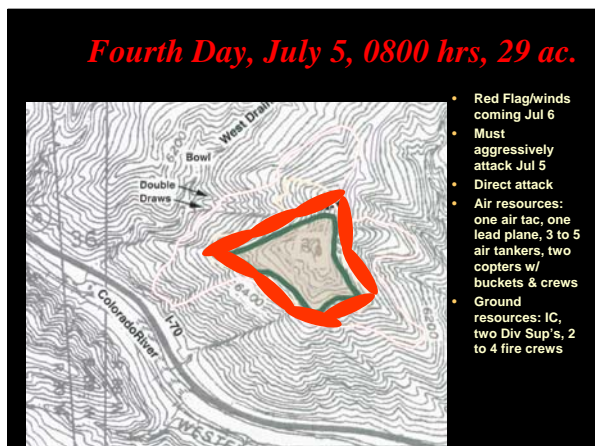


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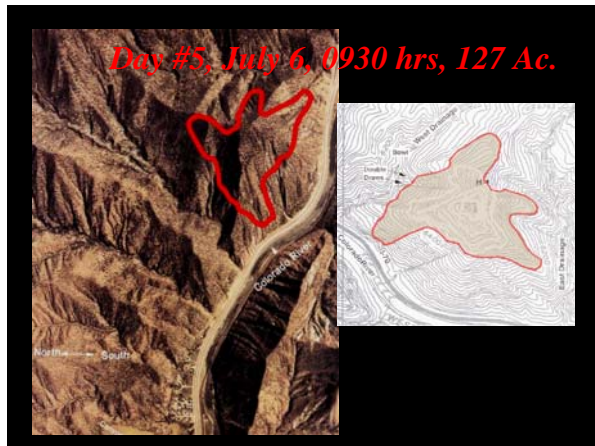
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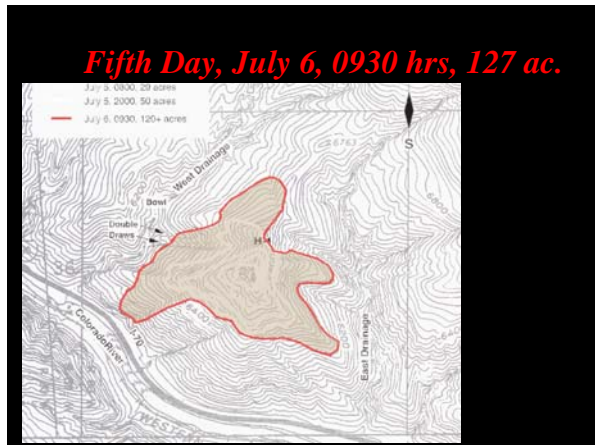


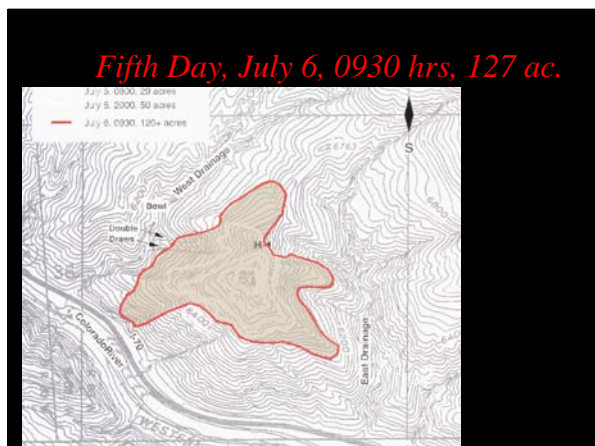




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The South Canyon Fire

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*To Jim Roth and Storm King Fire
Shelter Technologies:*

*Thank you very much.
Firefighters will be much better
off due to your work to improve
fire shelters!*
