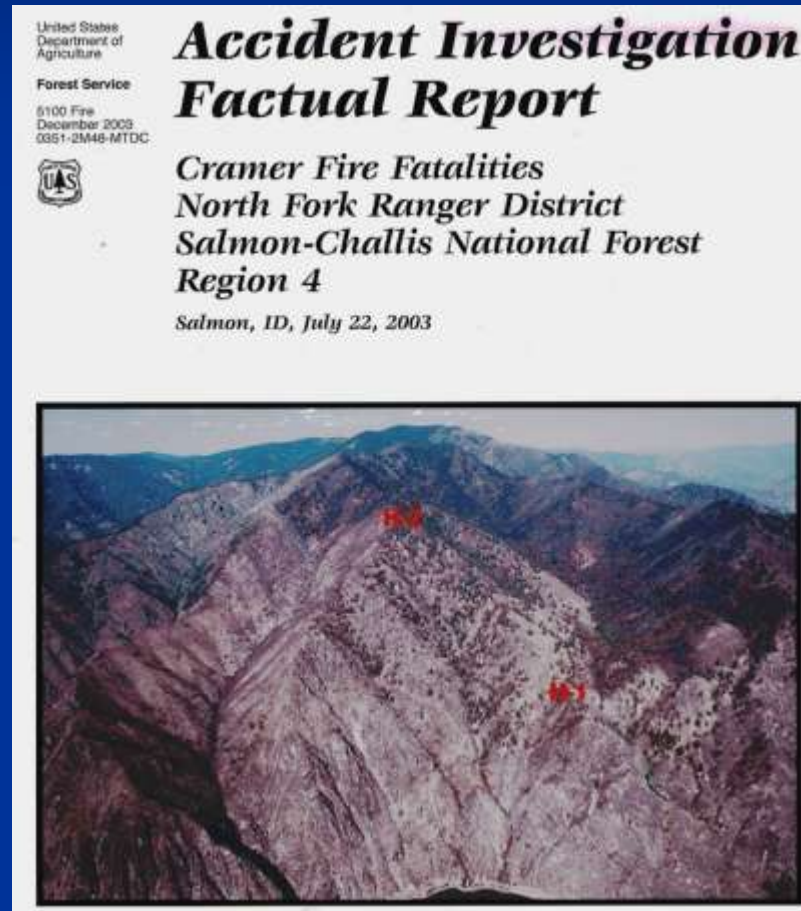
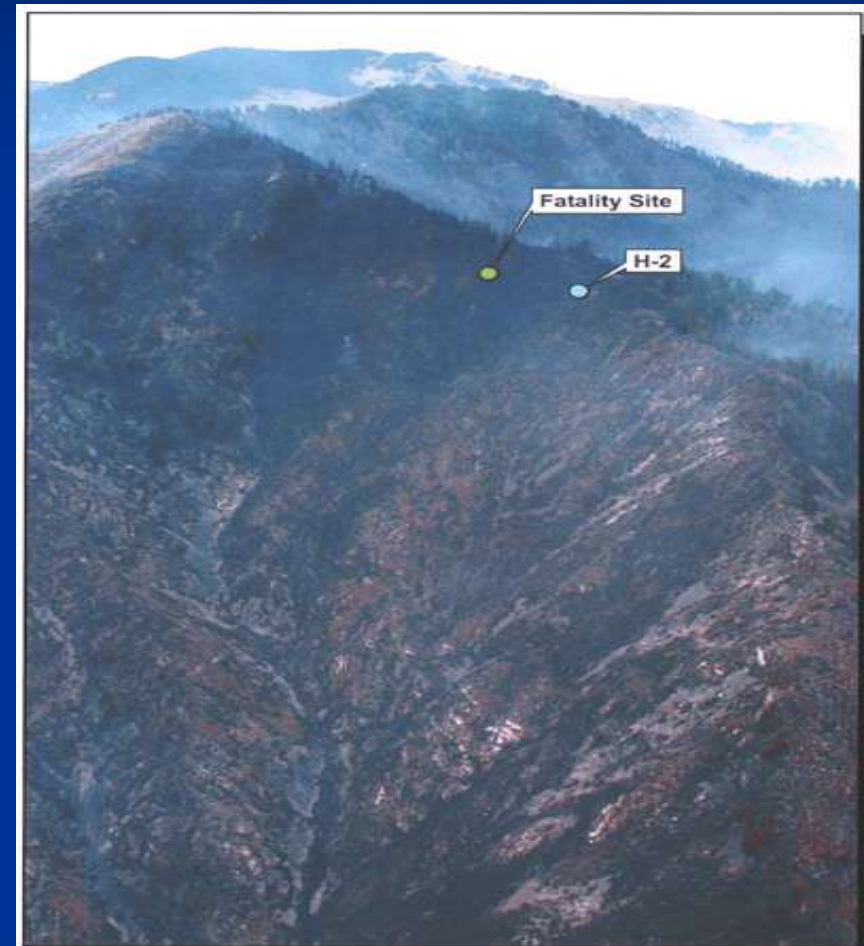


Another Way to Prevent a Reoccurrence



Cramer Fire: A Tactical Failure

- What went wrong with the tactical plan that resulted in 2 deaths?
- Each part of the solution needs to answer the question..
- Would this have resulted in the preferred outcome?



Fire Behavior Tactics

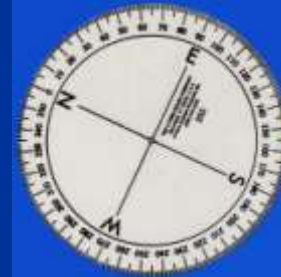
- Tactics based on *expected* fire behavior is a prime requirement before engaging a wildland fire. I would guess that the fire did the unexpected.
- The overhead and firefighters needed the tools to enable them to accurately assess the fire situation and make good tactical decisions.
- They used opportunity tactics rather than fire behavior tactics.

Developing Fire Behavior Tactics

- Do all crew leaders and firefighters know how to obey the fire order to **“base all actions on expected fire behavior?”**
- Is anybody tested to assure they can before given a line assignment?
- Since that is the primary cause of most burnovers, the CPS training has focused on how to accomplish **Fire Behavior Prediction Methods** for all firefighters.

Can You Describe the Potential?

- Conditions: Hot, Dry, NW to W wind 5-mph. Day shift starts at 0600. You are flying the fire developing a plan of attack.
- How would you describe the dangers of this assignment?



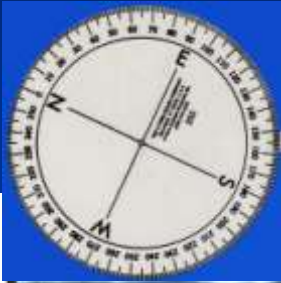
Defining Terminology

- If you decide the helispot, escape route or safety area will not be a safe place to be in the afternoon, **Time Tag** them so your out of there in time.
- If you expect the fire to spread to a location where it can endanger you, establish a **Trigger Point**, a place where you need to change tactics.

Defining Terminology

- To understand when and where the fire behavior will change use **The Alignment Of Forces** concept.
- Know where the wind, slope and solar preheating forces align. That is where and when the fire has greatest behavior potential...**a time and place to disengage.**
- Locations where the forces go out of alignment may allow control.

Force Alignment - Cramer



*Wind, slope
& Preheat
forces are aligned
@ 1500*

Wind

Defining Terminology

- The ***Fire's Signatures*** is a term that identifies the variation of fire behavior in **different Alignments** with the forces,
- There is an **In Alignment Signature**, the head of the fire; and an **Out of Alignment Signature**, the heel of the fire.
- Determine the alignment of forces for a location and use the fire signature of a like alignment to develop an understanding of what the fire behavior will be like in that location.

Prediction Of Fire Behavior Signatures

- Determine the alignment of forces for a location and use the fire signature of a similar alignment on a burning part of the fire to develop an understanding of what the fire behavior will be like in the new location.
- If the fire has not made a run in full alignment in your view, use your experience of what it could become in full alignment.

Lessons Learned

- Develop a complete understanding of **when and where the fire will change alignments** as it continues to burn.
- Use this understanding to develop the **L.C.E.S.**
- Identify the **tracks** a fire will take and avoid them.
- Do not plan an escape route that is in alignment.
- Leave before the fire makes its dangerous move and do not get run out by the fire.
- Learn to relate your situation to past fires.
- Position yourself so that fire has to come at you **out of alignment**.

Using Terms To Evaluate Assignments

- The use of a **Time Tag** of 1200 hours to get the firefighters off the hill would have avoided the accident.
- **Trigger Points** to change tactics due to fire position on the terrain would have alerted them to disengage.
- Recognizing the **Alignment Of Forces** that result in various **Fire Signatures** on the fire-ground would have enabled a prediction of the fatal fire behavior.
- This terminology enables the firefighters to discuss the fire behavior tactics with the overhead personnel.

Discuss this scene
 Develop the proper fire behavior tactical plan using the terminology.



Figure 20—Movement of the fire into the Cache Bar drainage late in the day on July 21.

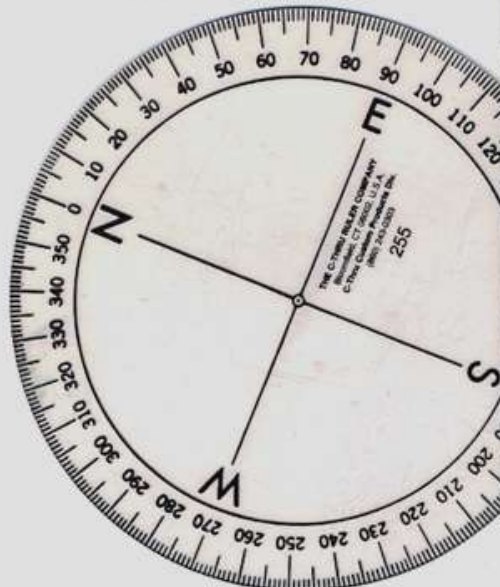
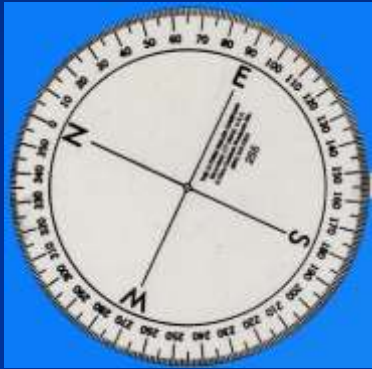
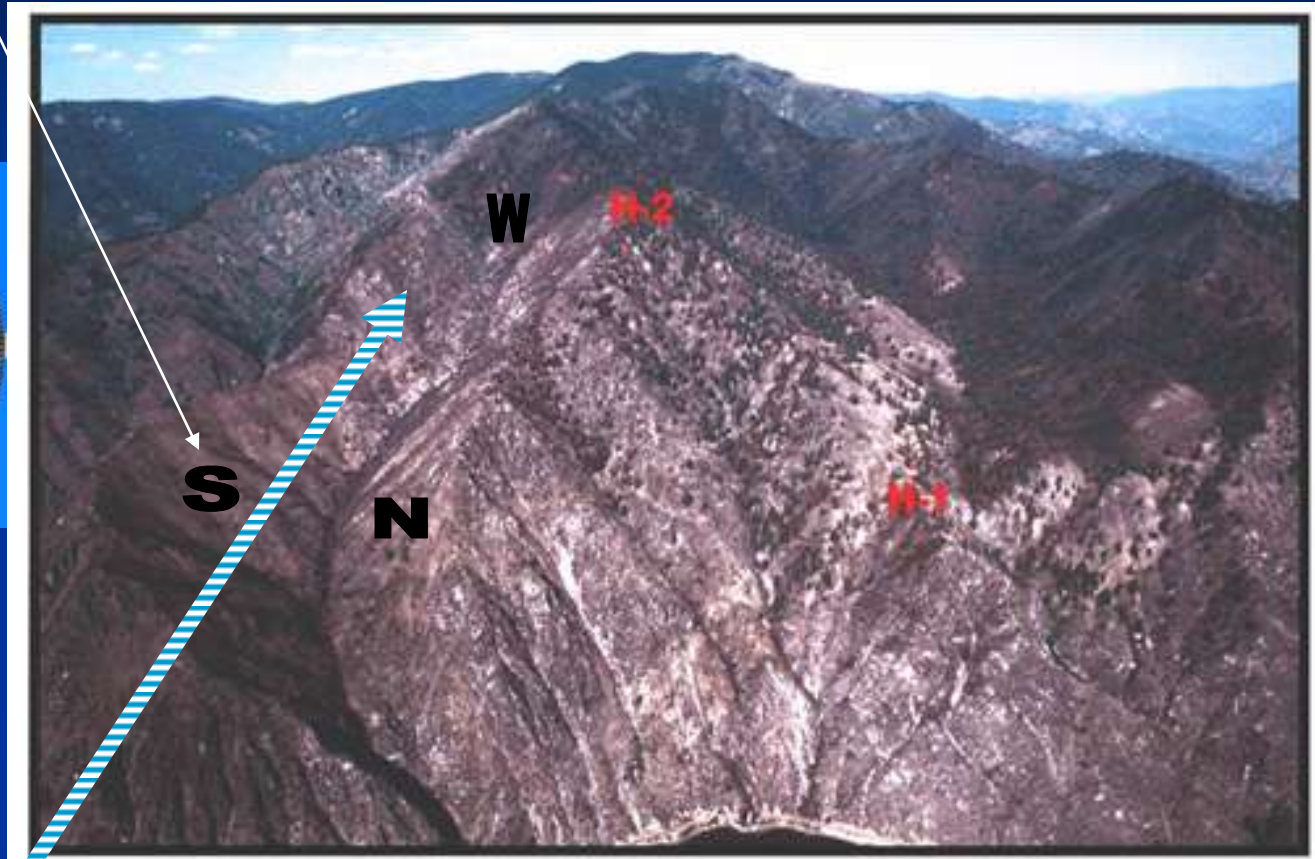


Figure 21—Cramer Fire perimeter and spread on July 21, 2003, and early morning on July 22.

Aspects S,N,W @ 1500 S & W aspects are Hot Slopes



A Time Tag is needed for H-2
Out by 1200



West Wind @ 1500

The Cash Bar drainage is in full alignment with wind, slope and solar preheating.

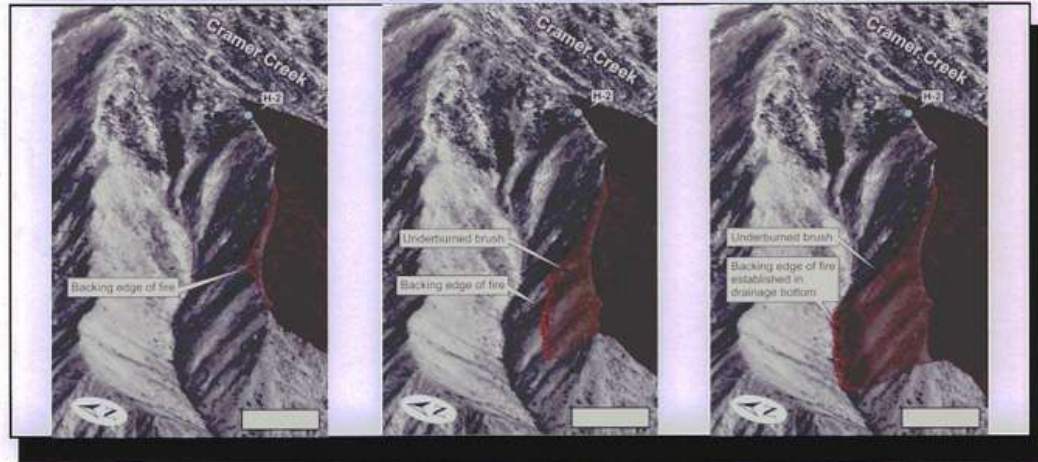
If the fire is moving out of alignment with slope, wind and on a N aspect, when it reaches the bottom it will run the Cache Bar drainage hard, in full alignment.

All line firefighters can be taught this method of appraisal.



Figure 23—Cramer Fire perimeter and spread on July 22, 2003, by 1430 (estimate).

54



0830-0850: Smokes seen below West Ridge.

1300: Smokes and backing fire seen down to midslope below West Ridge.

1430: Fire estimated to have backed down to lower portion of drainage.

Figure 24—Fire spread estimates from backing and rollouts into the Cache Bar drainage.

This is a full alignment run

Learn to recognize the potential long before you go above a fire. Leave before the fire makes its run.

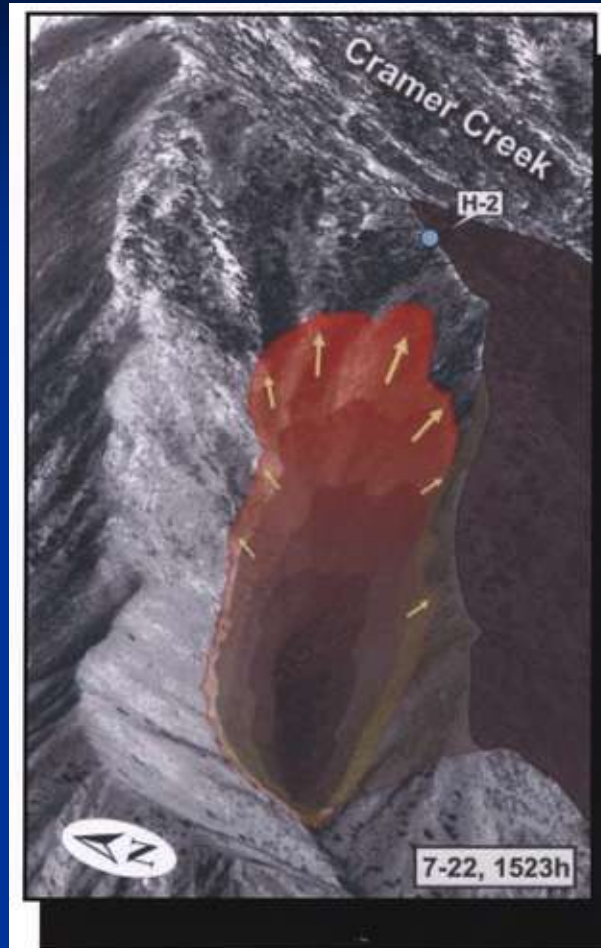


Figure 32—At 1523, the fire front, based on a model projection, reached the base of the stand of trees below H-2.



Figure 33—At 1525, the fire front, based on a model projection, reached H-2.

This run should not surprise any firefighter that knows the *Alignment Of Forces* concept.

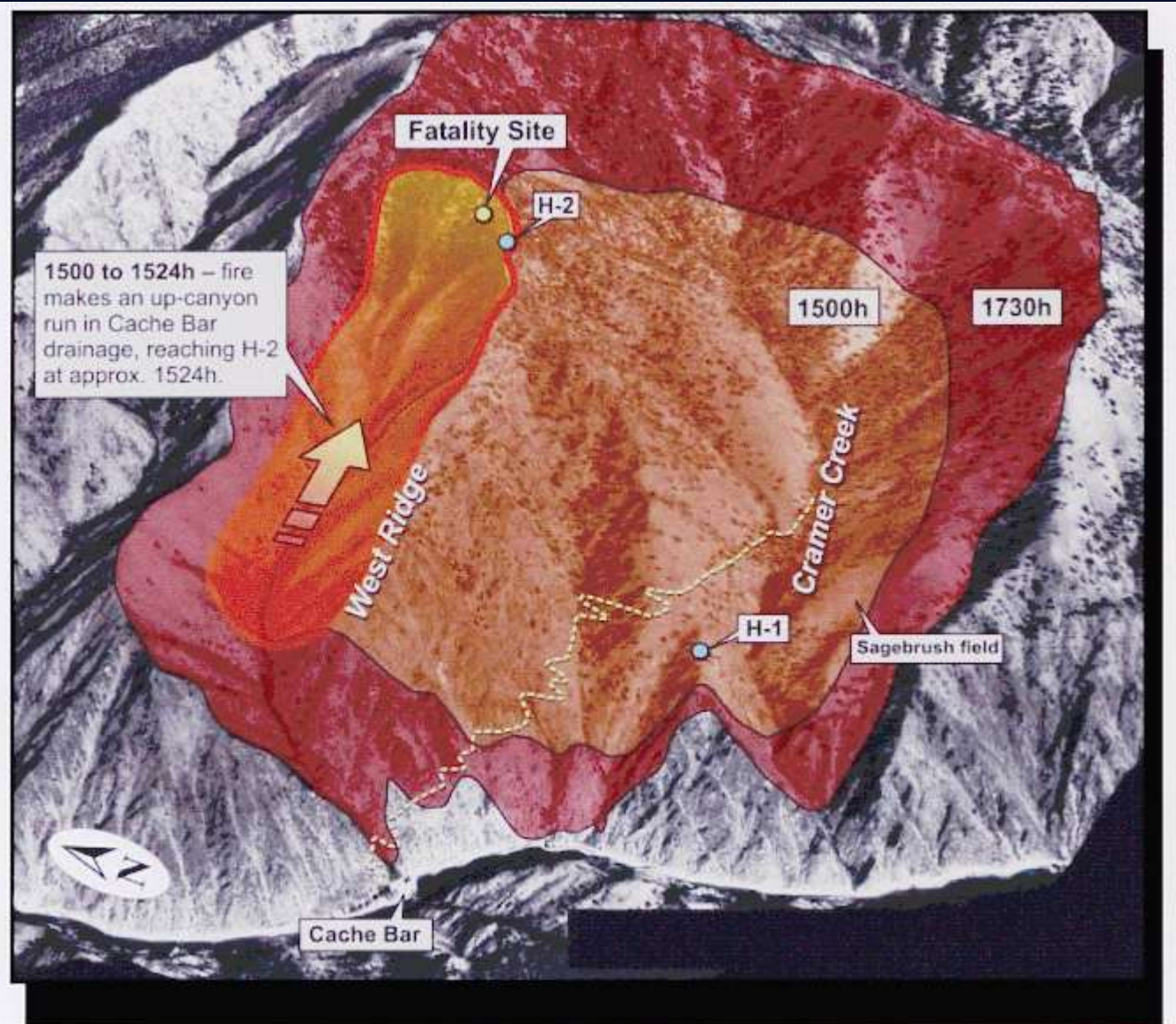


Figure 40—Cramer Fire perimeter and spread on July 22, 2003, from 1500 to 1730 (estimate).

No safety area that would be viable at 1500 in sight.

Why are firefighters still there?

No one set a *time tag* or established *trigger points*.



Figure 25—Between 1430 and 1440, smokes in the bottom of the Cache Bar drainage turn into a flaming front.



Figure 27—Between 1513 and 1520, the fire front intensifies and continues to move up-slope below the West Ridge.



Figure 31—View of the ravine at the base of the slope below H-2 in the Cache Bar drainage, from below the stand of trees under H-2.

Learning from the Past Or Repeating it?

- The South Canyon fire fatalities and many others have the identical commonalities.
- **Condition:** Wind, Slope and at the peak heating period of the day.
- **Situation:** The firefighters were in the **fire's track**.
- The firefighters did not set a **time tag**.
- They did not know the **Alignment of Forces** method of prediction.
- Did not reevaluate tactics before the fire reached **Trigger Points** of fire **behavior Signature** changes.

South Canyon Spread Map prior to the fatal run

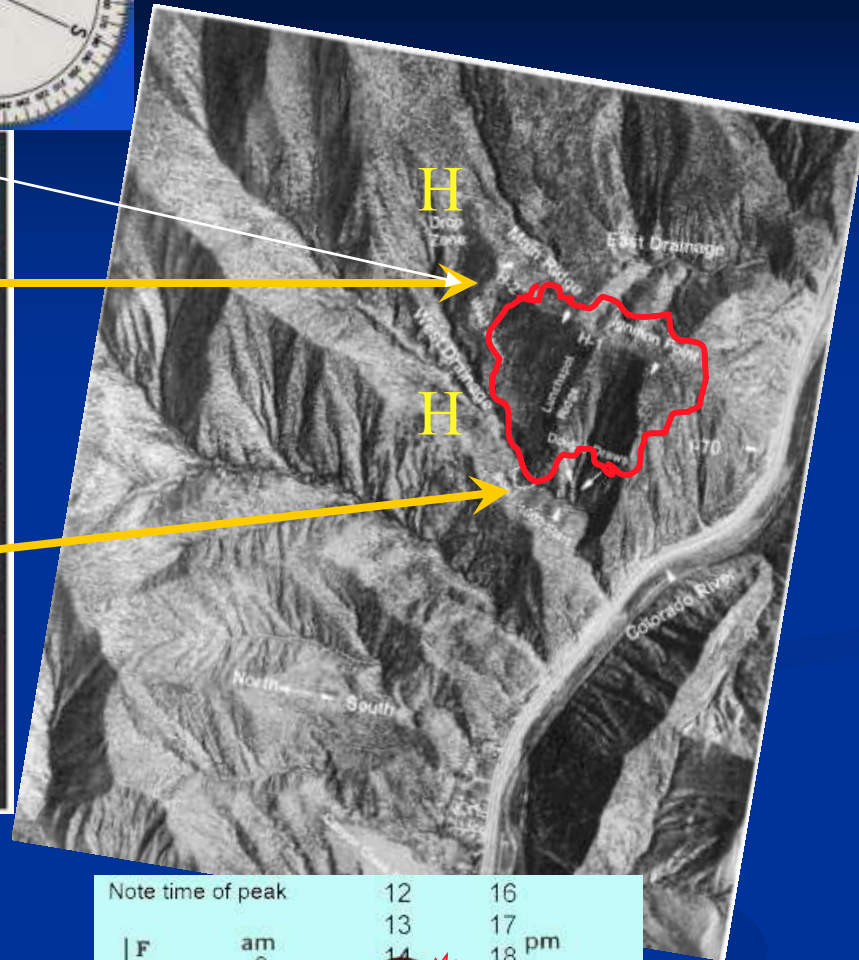
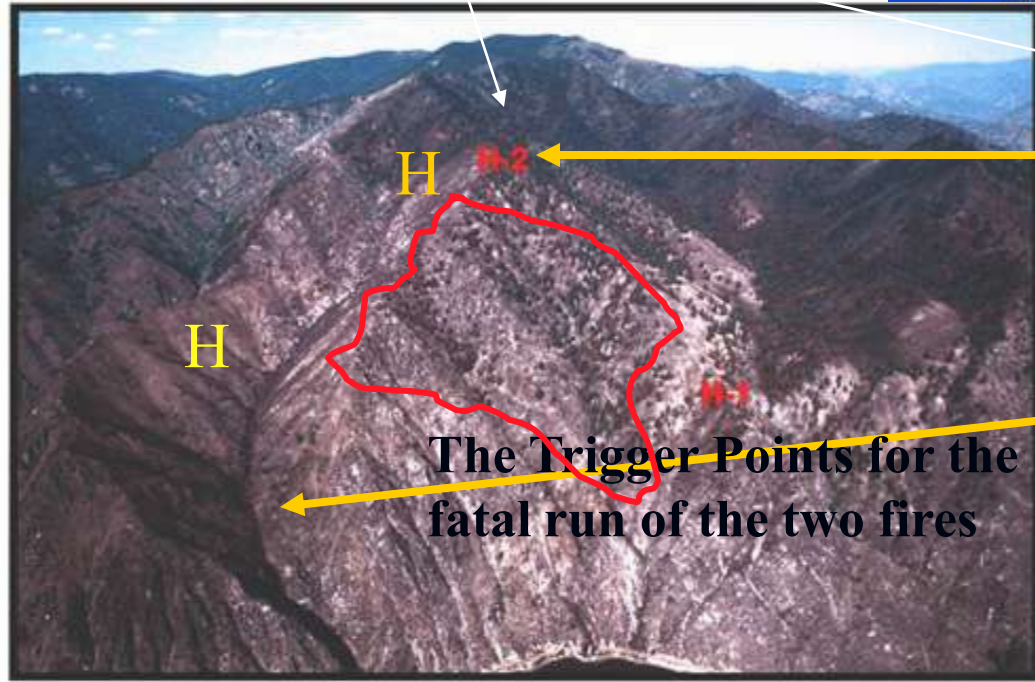
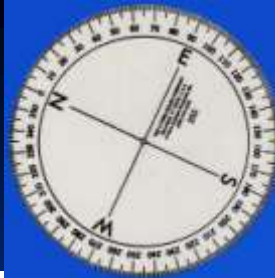
The similarities are plain to see between the South Canyon fatal burnover and the Cramer burnover.

Can you do the following?

- **Establish the Trigger Point** where the fire will change Signatures to an aligned head fire.
- Draw the **wind direction** arrow.
- Identify the **track** that the fire will run.
- Identify a **time tag** to reevaluate tactics.

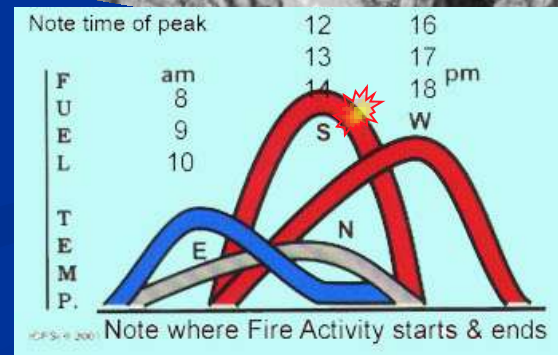


The location should have a time tag before placement of the firefighters.



Cramer and South Canyon similarities

Both burnovers happened within 1/2 hr of 1600 when full force alignment was between the position of the fire and the firefighters.

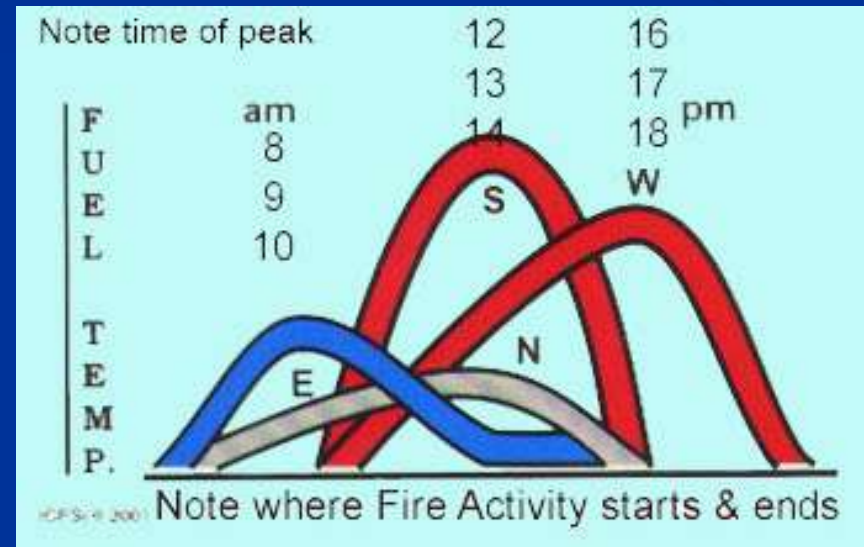


Accident Avoidance

- Firefighters....
- Must be able to recognize the fire's potential.
- Must be committed to make and to act on predictions.
- Must be able to recognize when and where others are endangered.
- Must not repeat historical errors.

Summary

- Use:
 - Time Tags
 - Trigger Points
 - Force alignment graphics on maps....wind and hot slopes.
 - Identify fire Signatures that are hazardous.
 - Make fire behavior predictions.
 - Move before the fire moves!!
 - LIVE!



The Campbell Prediction System

- Courses are available from Wildland Fire Specialists @ 805-646-7026
- Information and prices are available:
- E-mail: doug@dougfire.com
- Web site: www.dougfire.com
- Agency trainers list is available on request.