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**COURSE OBJECTIVES**

- ☆ Identify and discuss the three sides of the fire triangle.
- ✧ Identify the environmental factors of wildland fire behavior that affect the start and spread of wildland fire.
- ✧ Recognize situations that indicate problem or extreme wildland fire behavior.

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**Unit 1 Objectives**

- 1. Describe the fire triangle
- 2. Identify three methods of heat transfer
- 3. List the three env. elements affecting fire behavior.
- 4. List three fuel factors that affect wildland fire.
- 5. List 3 weather factors that affect fuel moisture
- 6. Describe how wind affects wildland fire spread
- 7. Describe the effect of slope on wildland fire spread
- 8. List 4 topographic factors that affect wildland fire behavior
- 9. Describe the dangerous conditions that can develop in a box canyon & steep narrow canyon

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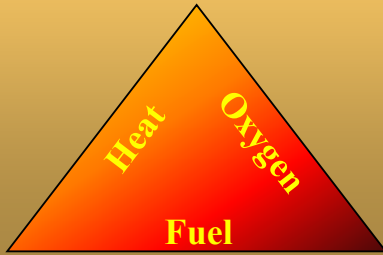
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***Fire Triangle***



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**Heat Transfer**

***Radiation***

***Convection***

***Conduction***

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Three Principal Environmental Elements Affecting Wildland Fire Behavior

→ Fuels

→ Weather

→ Topography

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# FUELS

- Fuel Type
- Fuel Moisture
- Size and Shape
- Fuel Loading
- Horizontal Continuity
- Vertical Arrangement

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**Fuel Moisture:**

The amount of water in a fuel expressed as a percentage of the oven-dry weight of that fuel

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**Categories of Fuels**

**Light fuels:**

**Grass, Leaves, Shrubs**

**Heavy fuels:**

**Limbs, Logs, Stumps**

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**Fuel Loading:**

The quantity of fuels in an area.

Generally expressed in Tons per Acre.

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**Horizontal Continuity:  
Uniform vs Patchy**

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 **Vertical Arrangement**

- Ground
- Surface
- Aerial

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**Ground Fuels**

All combustible materials lying beneath the surface including deep duff, roots, rotten buried logs, and other organic material.

**Usually called a  
"PEAT FIRE"**

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**Surface Fuels**

All materials lying on or immediately above the ground including needles or leaves, grass, downed logs, stumps, large limbs and low shrubs.



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## Aerial Fuels

All green and dead materials located in the upper forest canopy including tree branches and crowns, snags, moss, and high shrubs.



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## Weather

Temperature

Wind - Increases supply of oxygen

- Drives convective heat into adjacent fuels.
- Influences spread direction and spotting.
- Carries moist air away replacing it with drier air.
- Dries Fuels.
- Raises fuel moisture if the air contains moisture.

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## Weather

Temperature

Relative Humidity - As RH increases, fuel moisture increases

Precipitation - Increases fuel moisture

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Soldier Fire - July 23, 1999  
T15N R10E sec34

## Topography

- **Aspect** - direction a slope faces
- **Slope** - Steepness.
- **Position of Fire** - Top, middle, or bottom of slope.
- **Shape of Country** - Narrow canyons & box canyons.
- **Elevation** - Relates to curing of fuels, precipitation, length of fire season, etc.

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## Aspect

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Soldier Fire - July 23, 1999  
T15N R10E sec34

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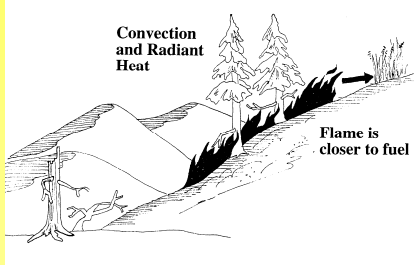
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## Steep Slopes Cause Rapid Fire Spread



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Soldier Fire - July 23, 1999  
T15N R10E sec34

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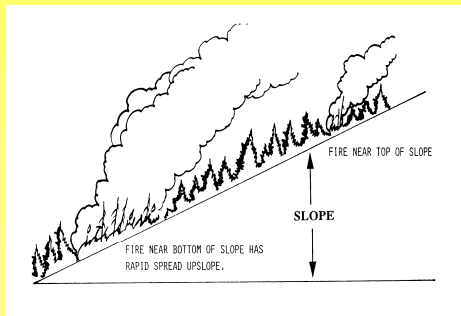
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## Position of Fire on Slope



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Soldier Fire - July 23, 1999  
T15N R10E sec34

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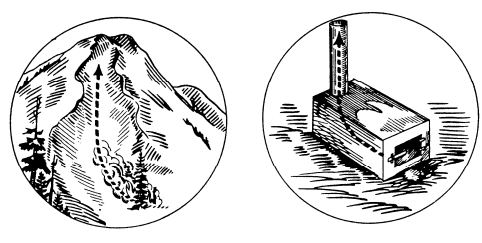
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### Box Canyon & Chimney Effect



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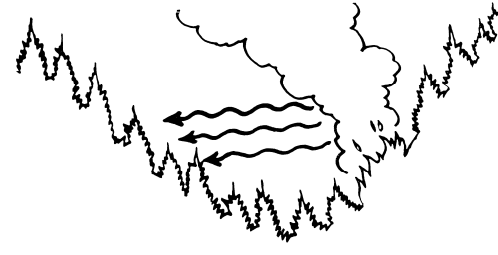
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### Radiant Heat Across Narrow Canyon



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## Spotting Across Narrow Canyon



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## Mountains Cause Channeling of Wind



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Soldier Fire - July 23, 1999

T15N R10E sec34

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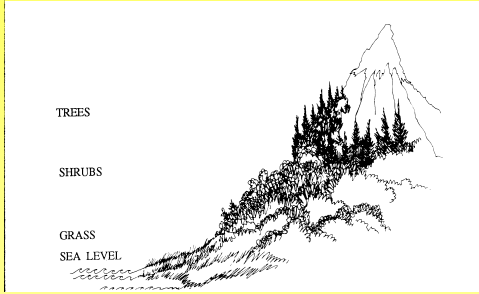
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# Elevation



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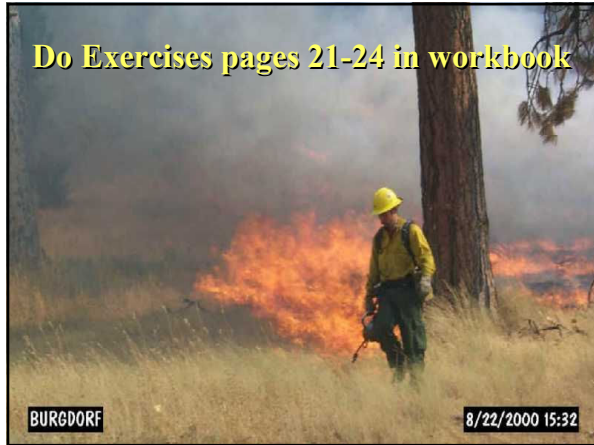
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Do Exercises pages 21-24 in workbook



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8/22/2000 15:32

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