



Fire Protection Training

Procedures Handbook 4300

VEGETATION FIRES

TOPIC: Use of Water on Wildland Fires

TIME FRAME: 1 Hour

LEVEL OF INSTRUCTION:

BEHAVIORAL OBJECTIVE:

Condition: A written quiz

Behavior: The student will list and describe the proper methods of using water on vegetation fires.

Standard: With a minimum of 70% accuracy

MATERIALS NEEDED:

- Water vs Fire booklet
- Appropriate visual aids
- Audio visual equipment

REFERENCES:

- Wildland Firefighting, Clayton, Day, McFadden, Chapter 8
- Gaylor, Harry, Wildfires Prevention and Control
- IFSTA, Ground Cover Fire Fighting Practices, 2nd Edition, Chapter 5
- USDA, Forest Service, Water vs Fire

PREPARATION:

Because of its heat absorbing capability, water is a fast and cost effective wildland firefighting tool. Moreover, when compared to other extinguishing agents, water is relatively plentiful. To maximize water's heat absorbing qualities and its cost effectiveness, it must be properly applied.



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USE OF WATER ON WILDLAND FIRES

PRESENTATION	APPLICATION
<p>I. WATER AS AN EXTINGUISHING AGENT</p> <p>A. Best Single Extinguishing Agent</p> <ol style="list-style-type: none">1. Absorbs 10 times the heat of other extinguishing agents<ol style="list-style-type: none">a. Expansion of 1700 times when converted to steam at 212oF.2. Available in large quantities3. Easy to transport, handle, and apply4. Penetrates into the fuel5. Economical6. Breaks the "heat" side of the fire tetrahedron <p>II. WATER ADDITIVES (CHEMICAL RETARDANTS AND WETTING AGENTS)</p> <p>A. Wetting Agents and Foams</p> <ol style="list-style-type: none">1. Short term2. Breaks surface tension of the water so the water soaks deep into the fuel3. This Reduces the Amount of Water for Extinguishing	<p>Name some reasons why water is used as an extinguishing agent</p> <p>Explain the fire tetrahedron</p> <p>Heat Fuel Oxygen Chain reaction</p>



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<ul style="list-style-type: none">4. Lessens the Possibility for RekindleB. Fire Retardant<ul style="list-style-type: none">1. Long term2. Retardant Action Continues after the Water Content Evaporates3. Types:<ul style="list-style-type: none">a. Fire-trolb. Phos-checkC. Desired Effects<ul style="list-style-type: none">1. Smother fire2. Cover unburned fuel (pretreating)3. Absorb heat4. Penetrate the fuel <p>III. USE OF FIRE STREAMS</p> <ul style="list-style-type: none">A. Solid Fire Streams<ul style="list-style-type: none">1. Greater distance or reach<ul style="list-style-type: none">a. Example: snags, hot spots, tree tops, etc.b. Fire too hot for close work2. Greater penetration of duff, matted grass, needles, etc.3. Usually operated at 50 psi nozzle pressure	<p>What are the advantages of a solid stream nozzle?</p>



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<p>B. Straight or Fog Streams (Combination Nozzle)</p> <ol style="list-style-type: none">1. To absorb or protect from intense heat2. Covers a larger area of fire's base3. Usually operates at 100 psi nozzle pressure<ol style="list-style-type: none">a. Requires higher nozzle pressure to effectively break up water into a spray or fog pattern <p>IV. TECHNIQUES OF APPLYING WATER ON VEGETATION FIRES</p> <p>A. Water Should be Directed at the Base of the Burning Fuel</p> <ol style="list-style-type: none">1. Absorbs most heat2. Cools the fuel3. Helps prevent fire spreading to the crown <p>B. Parallel with the Fireline with Tight Fog Stream</p> <ol style="list-style-type: none">1. Cools the fuel already burned2. Extinguishes the burning fuel3. Pretreats the unburned fuel4. Prevents burning embers from being blown into unburned area5. Safest place to work <p>C. Work the Nozzle Close to Fire</p> <ol style="list-style-type: none">1. Better accuracy with water	<p>What are the advantages of a combination nozzle?</p>



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<ul style="list-style-type: none">2. Waste less water3. More penetration into fuel4. Less chance of missing or leaving fire behind5. Continuous application of water around perimeter <p>V. USE OF WATER DURING MOP-UP</p> <p>A. Water Conservation</p> <ul style="list-style-type: none">1. Reduce pressure2. Reduce size of hoselines3. Reduce size of nozzle tip4. Apply water only on hot fuel5. Work nozzle very close to fuel6. Use finger over nozzle tip to make a spray7. If you are not watching where the water is applied, then you are applying water ineffectively8. Shut nozzle off when changing locations9. Use back pumps10. Do not be overly conservative with water<ul style="list-style-type: none">a. Rekindle may occurb. Too time consuming	<p>What are some methods we can use to conserve water during mop-up operations?</p>



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<p>11. Use wetting agents</p> <p>B. Water Use In Conjunction with Hand Tool</p> <ol style="list-style-type: none">1. Apply small amount of water2. Rake and stir with hand tools3. Let fuel steam and cool4. Apply more water as needed5. Re-rake and stir fuels6. Feel for heat with back of hand7. Use pulaski to chop, strip, scrape, or peel heavy material <p>VI. SAFETY CONSIDERATIONS</p> <p>A. Wear and Use All Required Protective Gear</p> <ol style="list-style-type: none">1. Nomex2. Gloves3. Goggles4. Safety helmet5. Forest fire shelter6. Canteen <p>B. Use Proper Hand and Arm Signals</p> <ol style="list-style-type: none">1. Maintain safe working pressure and volume2. Can increase pressure if needed without delay <p>C. Don't Waste Water, It may be Needed Later</p> <ol style="list-style-type: none">1. Spot fire	



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<ul style="list-style-type: none">2. Flare up3. New fireD. Mop-up<ul style="list-style-type: none">1. Cool stump holes and other very hot areas gradually, there is always a danger of steam burns and caution is necessary2. Don't stand over stump holes when applying water3. Use a spray or fog to cool areas of extreme heat<ul style="list-style-type: none">a. Stump holesb. Beds of coalsc. Hot ashes4. Avoid straight streaming hot areas, hot material will explode back on anyone nearby5. Don't straight stream objects directly overhead, stand to one side to avoid falling material6. Use the lowest GPM nozzle or tip that will safely do the job7. Watch for rekindle around retardant drops	<p>Explain danger of steam burns</p> <p>Wear goggles</p>



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SUMMARY:

Water is an extremely effective fire extinguishing agent. It is critical that water conservation practices be followed especially where water is in limited supply or shuttling will take excessive amounts of time.

EVALUATION:

A written quiz.

ASSIGNMENT:

To be determined by instructor(s).