

STUDY NOTES

for

Using Water Effectively in the Wildland/Urban Interface

DVD Program



Using Water Effectively in the Wildland/Urban Interface

a presentation of the

National Fire Protection Association

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Flame Guard Gel courtesy of Fail Safe Safety Systems, Inc., Rockville, MD

Class A FIREFOAM 103B, courtesy of Fire-Trol Holding LLC, Phoenix, AZ

STUDY NOTES for
***Using Water Effectively in the
Wildland/Urban Interface***

ABOUT THESE NOTES

This is a collection of notes that may be useful for instructors and in self-study. This is not a full instructional guide with lesson plans, activities and other audio-visuals. It is intended, as is the video, to encourage thought and consideration in discussions and planning for more effective fire protection for all fire emergencies.

Of course, no one videotape or training package contains exhaustive information on any one subject. All fire fighters and officers are encouraged to continue to explore and adjust operations to meet the changing demands of a dynamic problem such as the wildland/urban interface.

TAKE AWAY MESSAGES

During the video, the narrator makes several statements that encourage thought and discussion. The topics dealt with in the video include planning for water supplies, fire attack strategies and changing tactics, community involvement, and the adaptation of technologies for improved protection. In all, the key messages for the viewers to remember are:

1. Water is finite and often difficult to get it to where it needs to be.
2. Planning is key to success, practice, and simulation; practice and simulation are key to successful suppression.
3. Firewise Communities, properly maintained, will require fewer resources because of mitigation practices within and around the boundaries and around the homes.
4. Technology offers help in water conservation through the use of water additives (foams and gels).
5. Training equates to safety (e.g., driver training, application training).
6. Fire fighters should be engaging homeowners to do the clearance in advance of interface fires as this maintenance should not be the responsibility of fire fighters who could be better assigned to fire attack and suppression.
7. Fire departments not already doing so should consider the use of remote, portable water sprinklers, fire gels and Class A foams.
8. Fire departments should be adept at changing strategies (from offensive to defensive) and accompanying tactics that are often required during interface fires.

These points are key to understanding and applying the information in the video. Instructors should use these to reinforce the information and relate it to local conditions.

Background Information

An earlier product of the National Wildland/Urban Interface Fire Program was *Operation Water: Planning for Water Supply and Distribution*, a video and booklet provided explained how to determine the quantity of water needed for key structures and how to locate adequate water sources and construct dry hydrant systems to access remote water supplies. This publication and video recognized the unusual demands of fires in interface areas in which both burning vegetation and structures posed a more difficult situation than either of the fire incidents independently. If your fire department is exploring the use of alternative water supplies for expanding areas of protection, we suggest, as a start, you use *Operation Water*, based in part on NFPA 1142: *Standard for Water Supplies for Suburban and Rural Fire Fighting*.

This new program, Using Water Effectively in the Wildland/Urban Interface, will help you develop new approaches to using your water supplies as well as helping to change the way your department addresses the risk to interface residences and structures, through Firewise Communities preparation and mitigation.

This project was launched in 2003 by the National Wildland/Urban Interface Fire Program to stimulate thought and discussion among officers and members of local fire departments as to how to best use an important resource. Once the department has done the planning, located possible water sources, signed agreements for the access to and the use of those water sources, and installed dry hydrants (as needed), the testing and maintenance of the system along with regular practice in using them helps to ensure that the fire protection level of service has indeed been improved.

It is believed that a wise use of resources in the wildland/urban interface is the preparation of homes and structures to withstand a wildland fire through Firewise mitigation measures.

Research and case studies have shown that home ignitions are most often the result of ember showers that deposit firebrands into small crevices and on flammable materials near or part of the house. Ignition of structures usually occurs from 30 minutes to two hours after a major fire front has passed. This time will allow for fire departments to use water more effectively and protect the lives of fire fighters and residents by not putting either in the path of a wildland fire. In fact, properly created and maintained, Firewise mitigation measures will allow fire departments to better use ALL resources.

Of course, the best mitigation measures are taken long before fire season. Engaging homeowners and residents in the process of community fire mitigation is yielding effective and long-term mitigation. When residents form Firewise committees or boards within the development, they are on the first steps to becoming recognized as a Firewise Communities/USA site. Demonstrating citizen commitment and agency cooperation in reducing wildfire risk is what is making a difference in the wildland/urban interface – house by house, neighborhood by neighborhood, community by community. For more information on the Firewise Communities/USA Recognition Program, write to: Firewise Communities, 1 Batterymarch Park, Quincy MA 02169 or visit www.firewise.org/usa.

ISO Public Fire Protection Ratings and Water Supplies

Fire suppression depends on the availability of water. As a primary element of a fire protection delivery system, plentiful water resources are the key to effective suppression. Too many times fire departments lamented that they could have saved a structure if they hadn't run out of water.

Besides the need for plentiful water, the best fire departments constantly seek the most effective and efficient ways to get the water to a fire. In fact, the community's insurance rating depends on how well the fire department can demonstrate their ability to fight structure fires.

The Insurance Service Office's (ISO) Public Protection Classification (PPC™) is the most used measure to assess a fire department's level of service to the citizens of its community. In determining the Public Protection Classification for a community, ISO evaluates the community fire department's capacity to fight structure fires. We then assign a Public Protection Classification from 1 to 10. Class 1 represents the best public protection, and Class 10 indicates no recognized protection.

By classifying a community's ability to suppress fires, ISO provides crucial information for understanding the entire landscape of risk associated with a specific property. We have extensive information on more than 43,000 fire-response jurisdictions. Here's how it works:

Fire alarms

Ten percent of the overall grading is based on how well the fire department receives fire alarms and dispatches its fire-fighting resources. ISO field representatives evaluate the communications center, looking at the number of operators at the center; the telephone service, including the number of telephone lines coming into the center; and the listing of emergency numbers in the telephone book. Field representatives also look at the dispatch circuits and how the center notifies fire fighters about the location of the emergency.

Engine companies

Fifty percent of the overall grading is based on the number of engine companies and the amount of water a community needs to fight a fire. ISO reviews the distribution of fire companies throughout the area and checks that the fire department tests its pumps regularly and inventories each engine company's nozzles, hoses, breathing apparatus, and other equipment. ISO also reviews the fire-company records to determine the type and extent of training provided to fire-company personnel, the number of people who participate in training, fire fighter response to emergencies, and the maintenance and testing of the fire department's equipment.

Water supply

Forty percent of the grading is based on the community's water supply. This part of the survey focuses on whether the community has sufficient water supply for fire suppression beyond daily maximum consumption. ISO surveys all components of the water supply system, including pumps, storage, and filtration. To determine the rate of flow the water mains provide, ISO observes fire-flow tests at representative locations in the community and, finally, evaluates the distribution of fire hydrants.³

Currently, over 17,000 fire departments in the United States are at the lowest ISO Classes (9 and 10), largely due to the availability of water and an effective means to deliver it to a fire. Water is a foundation of fire suppression, whether for structures or for wildland fires.

NFPA 1142: Standard for Water Supplies For Rural And Suburban Fire Fighting

This public fire protection standard from the National Fire Protection Association provides guidance in determining the total amount of water that might be required for a structure fully involved in fire. The formulae in the standard base the quantity on the total volume (cubic feet/meters) of the structure, its construction and occupancy classifications, and exposure hazards and do not provide indications of rates of flow (gpm).

The assumption for total quantity is that, because of a lack of essential personnel required to operate safely at a fire scene, a delay in getting the alarm of fire or responding to the fire, or other reasons, the fire could not be stopped before total involvement – a worst case scenario.

For that reason, strategic thinking is required about:

1. Which hazards in the community present major threats to life safety (nursing homes, hospitals), exposure (chemical or flammable storage) or the sustain ability of the community (major employer).
2. Where the most appropriate source; and,
3. The most effective and efficient method of transporting water to the location might be.

The standard also provides information in its annexes on the construction and locations of dry hydrants, water hauling from point to point and the text of the ISO Guide to Fire Flow Determination.

³ Source: www.ISO.com

Questions for Discussion or Thought

These questions are provided to stimulate discussion and are not the only issues that might come up in a presentation on the subject of effective water use in wildland/urban interface fires. In some cases, at least one suggested response is supplied for each question.

1. A home or community built with Firewise principles in mind could resist ignition without assistance. Give an example of how water could be wasted around a Firewise structure. *Spraying water on a fire-resistant roof would waste resources and time.*
2. The way a property is maintained can mean the difference between success and failure. Give an example of how maintenance can help a structure survive. *Making sure metal screens are in good condition on windows, gutters are clear of pine needles and dry leaves, and flammable materials (wood piles, patio furniture, etc.) are not close to the house.*
3. It's not the tall flame front that causes the majority of structure losses in an interface fire. This fact is supported by experimentation and experience, and observation. One of the most revealing reports is one concerning the Los Alamos NM fire of 2000. A copy of the report is included at the back of this guide. Discuss how this could be true in your area and how to prevent the small ignitions from destroying or damaging homes.
4. As a wildland fire approaches and directly threatens a residential development, it's definitely time to shift from what kind of strategy to another one. Offensive to defensive or defensive to offensive. Which? HINT: Instead of trying to *stop* the fire, you'll now have to do your best to prepare homes in the fire's path so that they'll *withstand* it – without your forces being placed in danger.

gaps around doors, windows and siding joints; and light fuels under a wooden deck ignited by firebrands.

- The more prepared and maintained homes are long before the fire approaches the better their chances of survival.
- Firewise homes significantly reduce the need for individual concentrated protection from stretched resources.
- Firewise homes with Firewise landscapes have provided fire crews safety zones and staging areas as the wildfire passed around them.
- However, the preparation and maintenance of the home ignition zone is best and most appropriately done by the homeowner or resident on a continuing basis rather than relying on busy fire fighters to “clean up the yard” during a major emergency.

INTERVIEWS USED IN SECTION 4

LEE BULLER (Creston, Montana, Fire Department)

1. *In doing mitigation we try and go in and limit the use of water to start with. And try and remove the brush and debris away from the house and off of the house.*
2. *If they've got a garden house or a spigot, outside, we'll try and use that water to wash off the deck or the roof or the pine needles and try and just use their water instead of using the water that's in the truck.*
3. *If there's a lot of debris in the gutters, in the gutters drain systems, or up on the house, we'll try and remove those. If it's easier to just take the gutter down, sometimes that's very feasible and especially with light plastic or vinyl gutters, they have a chance to catch on fire and be the ignition source of the house. If they have a bunch of lawn furniture or stuff sitting on the deck, we'll take it and remove that from the house and get it away. That kind of stuff catches a lot of embers and we try and do this all before the fire comes and then we will have our water available to use if it does start burning, we'll be able to use that water to put that out.*
4. *And if it keeps you from having to go to the dump tank one time, then you're able to stay there, it just helps you prolong your time before you have to leave that house to go get more water or have more people bring you water. Every little bit helps, so any time you can save water, you try and look for that.*
5. *Using gels over plain water buys you a lot of time. If you put water on a house it'll dry up and be gone. Even after the gel dries it still does you a lot of good on the house and a lot of times you'll have time to come back and pre-treat the house - just wet that gel down a little bit.*

JEFFREY STANOVICH (Massachusetts Forestry Service)

1. *What we look for is the proximity of the vegetation to the structure. If we're dealing with a lot of vegetation within a 30 foot buffer zone, we want to try and thin that down as much as best we can, as quick as we can depending on the rate of the spread of the fire. We don't have to clear everything out, but we want to try and get good separation in the tree canopy 15, 20 feet, so maybe every other tree of something you might want to thin out at the location.*
2. *I can put that garden hose into my booster tank, to recover what water I'm using so I'll still have as close to a full tank supply in my engine. And as the fire approaches, that's when I start using my water, very sparingly. As I get ignition, I try and get extinguishments.*

SETH CARBONARI

1. *The nice thing about sprinklers is we don't have to be there when the fire comes through, you're able to back off and leave that sprinkler in there, you're still applying the water as long as water sources [are] available.*
2. *You're able to set up a bunch of sprinklers to treat a lot more area to the same amount of time - continuously treating the areas whereas one person bumping from nozzle to nozzle's going to take a lot longer to treat that same area.*

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1. Are additives, such as foams and gels, used in your department? Do they work? What would you say to recommend them to other departments?
2. If the wildfire is imminent, what should be your action regarding water or water additives on the structure? *Wet the side of the structure that will take the radiant heat exposure. And then spray any vulnerable places such as the flammable inside-corners and under decks.*
3. Whether you're using additives or water or dealing with light or heavy fuels, you want the water or additive to do what, according to the video? *You want the water or additives to soak in, not run off.*

INTERVIEWS USED IN SECTION 6

SETH CARBONERI

It's really important to go back in and check out each structure after the fire's passed through. It can be any number of things duff, or heavier fuels that still are, still have some kind of fire in them that could spread back into a structure.

JIM STANOVICH

Firebrands and embers will hide themselves into the most unbelievable locations in and around the structure. So hours after you leave that structure doing structural protection, you may return and find that home has ignited. So you want to go back and really double check everything two three times. Over a good long duration of time, three four five six hours, sometimes even ten hours you want to go back and return. The embers can get into some real crazy places, smolder a while, and uh, then you get ignition and you've got a problem if no one else is around.

LEE BULLER

You're usually dealing with just a small spot fire. You're dealing with a handful of pine needles that are burning, and a half a gallon of water will put that out. Whereas if you wait for fifteen twenty minutes, you're going to be looking at two or three trucks to actually put that out and its going to be a whole lot more of a problem.

Questions for Discussion or Thought

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1. What does the narrator imply by the statement that “*not all* fires present an imminent danger to structures”?
2. At what point might a back-pack pump be your best water delivery device? Why? *It will extinguish most small ignitions — and permit your crews to cover a lot of ground quickly. You won't need a lot to put out a spot fire. Even a shovel-full of dirt could to the trick.*
3. How might you patrol more structures in a more efficient time during mop up? *Designate an engine to patrol the neighborhood and resupply the hand crews.* Are there other methods that you have used or would like to try?

7. CONCLUSION: PLAN IN ADVANCE

KEY POINTS

- A successful operation begins long before a wildland fire arrives.
- The residents in your community play a crucial role in your effectiveness.
- By applying basic Firewise principles they can make the difference between your success and a disaster.
- Success also requires a new way of thinking.
- As we've seen in this scenario, how you *get* your water matters less than how you *use* it.
- And being mobile and thinking on your feet matters more than how much water you have.

YOUR NOTES

Questions for Discussion or Thought

These questions are provided to stimulate discussion and are not the only issues that might come up in a presentation on the subject of effective water use in wildland/urban interface fires. In some cases, at least one suggested response is supplied for each question.

1. After viewing this video and discussions, how might your strategies and tactics for interface fires be adjusted to accommodate more Firewise structures in the area?
2. Discuss the possibilities of extreme fire behavior in an interface fire and what impact extreme behavior might have on your water supply plan and operation.

Other resources for more information:

- Effective Fire Protection: A National Concern
- *Public Protection Classification (PPCTM) Service*
ISO website: www.iso.com

- *Fire fighter Safety in the Wildland/Urban Interface Video Series* (Training Guide, 3 videos and CD-ROM or Training Guide and 1 DVD)
Available through the Firewise website: www.firewise.org

- NFPA 1142: *Standard for Water Supplies for Rural and Suburban Fire Fighting*
- NFPA 1143: *Standard for Wildland Fire Management*
- NFPA 1145: *Guide for the Use of Class A Foams in Manual Structural Fire Fighting*
- NFPA 1150: *Standard Class A Foam Chemicals for Fire Fighting*
Available from the National Fire Protection Association: www.nfpa.org

