

Module 1: Preparedness, ICS, and Resources

Topic 1: Introduction

Module introduction

Narration Script: Becoming a wildland firefighter means you've got a lot to learn—and a lot of “prep” work to do. A wildland fire is a kind of classroom and everyday is like preparing for a new pop quiz. You'll need to be physically ready and know how to maintain your stamina over the long haul with the right foods and fluids. You also need to know that you've brought along the right gear and that you've maintained it in tip-top shape to effectively fight the fire. You'll need important personal items to make your time on the line more comfortable.

And if you understand your role in the incident command system and the chain of command, you will have a positive impact on the incidents you respond to. Fighting fires requires lots of resources—from aerial support to heavy machinery cutting fireline—you'll have to adapt to working on different crew types and with different types of people.

So get prepared to jump into this module and learn the foundations of preparedness, the incident command system, and the many resources enlisted to fight a wildland fire. By the end of this module, we want you scoring an “A” on your real-world fireline exam.

Module overview

Before going out on the *fireline*, there are “i’s” to dot and “t’s” to cross. Preparing equipment and continuing your wildland firefighting education are on top of the list.

This module will give you an overview of:

- **Common fire fighting terms and parts of a fire**
- ***Personal protective equipment (PPE)* and how to keep it in tip-top shape**
- **Ways to combat dehydration and fatigue**
- ***Incident command system (ICS)* and how you fit in**
- **Types of *crews* and the importance of respecting your co-workers**

Narration Script: There's a lot to cover before you can go out on the fireline. And that's what we're doing in this module. We'll start with a quick review of some common fire fighting terms and parts of a fire just so you'll know your flank from a flank steak. Then we'll talk about what the well-dressed firefighter is wearing this year and how to keep that PPE looking sharp, safe, and ready for action. We'll also remind you to eat and rehydrate with quality foods and liquids to keep you fresh and fit during the dog days of wildland fire fighting. We'll cover the incident command system from “C” to “P”—trust us; you'll understand what we mean when you get through the ICS Topic. And finally, we'll look at crew types, culturally diverse crew members and how it all comes together under the incident command system.

Topic 2: Basic Terminology

Topic introduction

Arming yourself with the knowledge of basic wildland fire fighting terminology should be your first positive step to success in your firefighter training. You've had good exposure to the basics in the Introduction to Wildland Fire Behavior (S-190) course, but until you know the fundamentals like the back of your hand, we want to take you back through a quick review of some key concepts.

This topic covers foundational wildland fire fighting knowledge including:

- **Parts of a wildland fire**
- *Fire behavior* terminology
- **Additional useful terms and concepts**

Go ahead and take a read through to refresh your memory. In this case, it's a matter of sound mind, sound body.

Narration Script: Your firefighter training doesn't start in the field but rather upstairs, and we mean between your ears. Even the most experienced of wildland firefighters will turn to their trusty Incident Response Pocket Guides and Fireline Handbooks to refresh themselves on the all-so-important basics. In this topic, we'll take you back to the Introduction to Wildland Fire Behavior course and explore some familiar terms. Your goal should be to take the somewhat familiar and make it the "know-it-like-the-back-of-my-hand" type.

Parts of a wildland fire

Part of "talking the talk" is having a diverse wildland fire fighting vocabulary. All firefighters working on wildland fires will use certain terms, and you need to be "in the know." In this section, you'll learn about the parts of a wildland fire. These parts are named for their unique characteristics and locations.

Some of the most common names you'll hear associated with the main fire are:

- **Origin**
- **Head**
- **Fingers**
- **Pocket**
- **Perimeter**
- **Rear**
- **Flanks**
- **Islands**

Read the following to refresh your knowledge of the lingo.

Origin

The *origin* is the area where the fire started. It is also the point from which the fire spreads, depending on the fuels present and the effects of wind and slope.

When the fire is human caused, you often find the origin next to a trail, road, or highway, but a lightning strike or campfire can result in a very inaccessible point of origin. Protect the area of origin for subsequent investigation of fire cause whenever possible.

Head

The *head* is the part of a wildland fire with the greatest forward rate of spread (ROS). Because wind and slope affect the rate and direction of spread, the head is normally either on the edge of a fire opposite to the direction from which the wind is blowing or it is toward the upper part of a slope.

The head of a fire often burns intensely and may move with alarming speed. Some large fires may have multiple heads. Ultimately, you have to control the head(s) and prevent the formation of new heads to suppress a wildland fire.

Fingers

Fingers are typically long, narrow strips of fire that extend from the main body of a fire. They form:

- When a fire burns into mixed fuels; slowing in heavy fuel, but spreading quickly in light fuels
- Due to variations in terrain or wind direction
- When the head is split by natural features such as fields, water, or rock outcroppings

Caution—uncontrolled fingers may form new heads. If possible, knock them down when they're small and manageable.

Pocket

A *pocket* is the unburned area between the main fire and any fingers.

Perimeter

The *perimeter* is the outer boundary—or the distance around the outside edge—of the burning or burned area. Also commonly called the *fire edge*, don't confuse the perimeter with the *control line* (an inclusive term for all constructed or natural barriers and treated fire edges used to control a fire) or *fireline* (the part of the control line that is constructed by firefighters). Obviously, the fire's perimeter continues to grow until you get it controlled and extinguished.

Rear

The *rear* or *heel* of a wildland fire is the end opposite the head—that is, relatively closer to the point of origin than to the head. Because fire at the heel usually burns *into* any prevailing wind, it generally:

- Burns with low intensity
- Has a low rate of spread (ROS)
- Is generally easier to control than the head

Flanks

The *flanks* are the sides of a wildland fire, roughly parallel to the main direction of fire spread. Flanks are identified as either left or right as you are looking from the heel of a fire toward the head. Control flanks as soon as possible, because:

- A shift in wind direction may quickly change a flank into a head.
- Fingers often extend from flanks.

Islands

Islands are unburned areas inside the fire perimeter. Because they are unburned potential fuels, patrol them frequently and check for spot fires.

Islands close to a control line *may* flare up later and start spot fires across the control line. You may want to burn islands out, consuming fuels between the perimeter (fire edge) and the control line.

Narration Script: Every profession has its jargon. You need to learn and use the correct wildfire terminology the same way a doctor or paramedic uses special terms to describe the human body. Of course, there are a few other terms that we'll get to in a moment, but these are the main ones you'll use to describe a fire.

Additional wildland fire terms

A few other common terms relate to the perimeter (*fire edge*) and what's inside and outside the edge. A few more terms are:

- Spot fire
- Slopover
- Green
- Black

You will investigate each of these terms on the pages that follow.

Narration Script: One of the most common bits of advice you'll hear on the fireline is to “get in the black.” If you don't know what that means, you're putting yourself and others in unnecessary danger. So get in the black, and learn a few more common wildland fire terms.

Spot fires

Spot fires are small fires burning beyond the main fire boundary. As gases rise from a fire into the *convection column*, sparks, embers and burning twigs are carried aloft. Spot fires result as these hot and burning items fall back to the ground or are blown across a fireline by winds. Spot fires can also result when embers or burning *fuels* roll downhill across the fireline into unburned fuels beyond the main fire.

If spot fires burn unchecked, they may form a new head or another major fire. If this happens, firefighters could be trapped between two fires or the fire may move in an unanticipated direction.

Narration Script: Depending on the size of a wildland fire as well as weather conditions and the type of fuels involved, spot fires can ignite miles from the main fire. That would make your job a little harder, wouldn't it? And there's not much you can do about it. On a smaller scale, you can help control spot fires by being vigilant and building appropriate control lines, which you'll learn about in just a bit.

Sloper

Sloper occurs when fire crosses a control line or *natural barrier* intended to contain the fire. Sloper and spot fires differ mainly in their location relative to the control line:

- Sloper occurs immediately across and adjacent to the control line.
- Spot fires occur some distance from the control line.

The green

Any area that's not burnt—but is adjacent to an involved area—is called the green. Fuels in the green may be:

- *Live fuels*, including:
 - Vegetation with a high *moisture* content that is relatively slow to ignite
 - Vegetation with lower moisture content and that is highly flammable
 - Dense, golden-yellow annual grasses and other similar fuels with low moisture content that may burn vigorously
- *Dead fuels*—dried vegetation that is highly flammable and will go up like kindling

The term *green* certainly does *not* define a safe area. It is simply the opposite of the black, or burned, area. The edge of the green is usually where you construct a control line.

Narration Script: Don't get hung up on colors here. While the term "green" may refer to the color of some fuels in an area, the "green" may not be green at all. If you're in a stand of dead, leafless oak trees with lots of forest debris, you better realize you're in the green. And if you're looking at an active fire, you better realize you are not safe—it's as if you are standing in a pile of kindling!

The black

The opposite of the green—the *black* or the *burn*—is the area (including both *surface* and *aerial fuels*) in which the fire has consumed, or “blackened,” the fuels.

Whether the black is safe or not depends on a few factors. If it is completely burned over and little, if any, unburned fuel remains, the black is a relatively safe area during a fire. However, the black is not always safe.

Hazards of the Black

The black, or burn area, may not be safe for a few reasons:

- In steep terrain, exposure from adjacent unburned fuels can cause reburn
- Residual heat and smoke
- Hot spots and smoldering snags (standing dead trees), stumps, and downed trees
- Falling snags

Warning—Reburns

If a surface fire leaves aerial fuels more or less intact in the black, or vice versa, a reburn can occur when burning conditions are more favorable—for example, if the winds shift or humidity drops. This often occurs when fire moving quickly through an area fails to consume all fuels.

Narration Script: In many cases, getting into the black is a good safety move. But you’ve got to be smart about it. The black has its own hazards that can get you even if the main fire front doesn’t.

Fire spread

You know how to describe the parts of a fire. Now, you also need to master terms describing the behavior of the fire itself. The terms you’ll learn about here refer mostly to how the fire *spreads*.

Fire spread is simply the movement of the fire, classified as *rate of spread* (ROS) and given in chains per hour. A chain is a surveying term and equals 66 ft. (20 m).

A good rule of thumb is to watch the fire spread for a minute. Since there are 60 minutes in an hour and just over 60 ft. (18 m) in a chain, using the rule of thumb will give you a reasonably accurate measurement of the fire’s forward progress. For example:

1 ft. (0.3 m)/minute = 1 chain/hour

10 ft. (3 m)/minute = 10 chains/hour

Narration Script: “Fire Behaving Badly” is not a TV series, but it is something you may be forced to watch on the fireline. Now that you know how to describe the parts of the fire, you also need to master some terms about the behavior of the fire itself and how it spreads.

Since there are 60 minutes in an hour and just over 60 feet in a “chain,” if you watch the fire for a minute you can estimate the number of “chains per hour” it is spreading. For example, if the fire moves 1 foot per minute, then it is moving at a rate of 1 chain per hour. And if the fire moves at 10 feet per minute, then the R-O-S is 10 chains per hour.

Fire behavior terms

So, what are the terms you need to know about that deal with fire spread? We’ll take a look at these terms in the next few pages:

- Smoldering
- Creeping
- Running
- Backing
- Spotting
- Torching
- Crowning
- Blowup

You’ll notice a pattern with some of these terms. Smoldering generally refers to smaller fires, while crowning may appear on large, out-of-control fires. The ones in the middle refer to fire spreads somewhere between those two extremes.

Narration Script: From smoldering fires to crowning fires and everything in between, you need to be familiar with the terms that describe how a fire is spreading.

Smoldering and creeping fires

Two terms refer to fires that are spreading very slowly:

- A *smoldering* fire is one that burns without a flame and is barely spreading
- A *creeping* fire burns with a low flame and spreads slowly

Running and backing fires

A *running* fire is one that spreads rapidly with a well-defined head. Compare and contrast this to a *backing* fire, where the fire moves *away* from the head, downhill, or against the *wind*.

Narration Script: A running fire is one that spreads rapidly with a well-defined head. This type of fire can overrun anything in its way in a few seconds.

Spotting

A fire is *spotting* when sparks or embers produced by the main fire are carried by winds or a convection column. Obviously, spotting causes spot fires in advance of the fire’s head.

Narration Script: Sometimes fires have winds and convection columns that carry sparks and embers ahead of the fire, starting spot fires in advance of the fire head.

Crowning and torching

A fire is *crowning* when it advances across the tops of trees or shrubs more or less independent of the *surface fire*. Crown fires are sometimes classed as *running* or *dependent* to distinguish the degree of independence from the surface fire. Use the terms *crown fire* and *crowning* carefully because they describe a very serious fire situation.

A term commonly confused with a crowning fire is a *torching* fire. Unlike a crowning fire, a torching fire periodically ignites the crown of a single or small group of trees or shrubs before returning to the surface. A torching fire is not as serious as a crown fire.

Narration Script: A crowning fire burns largely at the tops of the trees rather than on the surface. This is a very serious fire condition.

Blowup

A *blowup* occurs when there's a sudden increase in ROS sufficient to prevent or rule out direct *control* of the fire. A blowup will most likely be a setback to existing *suppression* plans. A *flare-up* is any sudden acceleration in the ROS or intensification of the fire. Unlike blowup, a flare-up is of relatively short duration and does not radically change existing control plans.

Keep your eyes open because:

- Blowups and flare-ups can occur on smaller fires or on isolated portions of large fires.
- Most fires are innocent in appearance before blowups or flare-ups occur, such as fires in the *mop-up* stage.
- Flare-ups generally occur in deceptively *light fuels*.
- Blasts of air from low-flying helicopters and *air tankers* have been known to cause flare-ups.

Narration Script: Blowups are a big deal—they can be deadly. Flare-ups are a common occurrence and don't often require firefighters to change tactics.

Knowledge Check 1

Sequencing—select the number from the pull down list to put the items in the correct sequence.

Can you describe the ROS of a fire?

Place the following terms in order from the lowest ROS to the highest.

Crowning
Running
Smoldering
Creeping
Torching

The correct order is as follows:

Smoldering
Creeping
Running
Torching
Crowning

Additional wildland fire terms

Just a few more terms to know and you're on your way to bigger and better training concepts. Here are a few other common terms related to wildland fire fighting:

- Control line
- Fireline
- Anchor point
- Mop-up
- Class of fire

We'll cover each of these terms in sequence.

Narration Script: The terms we just described deal mostly with the fire itself. Now we'll identify some terms mostly describing your fire fighting efforts.

Control line, fireline, and anchor point

The terms control line, fireline, and anchor point are closely related.

- *Control line* refers to all constructed or natural fire *barriers*. It's also used to describe the treated fire edges used to contain the fire.
- A *fireline* is any cleared strip or portion of a control line where flammable material has been removed by scraping or digging down to *mineral soil*.
- The *anchor point* is any good place where you can start constructing a fireline. Generally, a fire barrier is a safe anchor point. Using an anchor point minimizes the chance of being outflanked by the fire while the line is being constructed.

Narration Script: The terms control line, fireline, and anchor point are closely related, so let's look at them together. The terms control line and fireline are basic to any discussion of attack methods, and they are often confused with the term "fire edge." While "control line" refers to all constructed or natural barriers, "fireline" applies only when you are dealing with a portion of a control line where flammable material has been removed by scraping or digging down to mineral soil.

There are a number of other terms used in various regions to describe different types of lines. Among these terms are *wet lines, retardant lines, scratch lines, hand lines, dozer or Cat lines, hot lines, undercut or underslung lines, cold lines, and open lines.* As you can imagine, some of these terms actually describe a "control line" instead of a "fireline" and indicate both the line's method of construction and its width.

When you start building a fireline, however, it must always be started from an "anchor point," such as a road, lake, pond, stream, earlier burn, rock slide, or cliff. This type of barrier provides a safety point for you that will keep you from getting outflanked by the fire.

Mop-up

If you hear the term *mop-up*, it's a good thing. It means the end of the fire is near. The mop-up phase marks the final extinguishing of a fire after it has been completely surrounded by control lines. But always be on the ready—blowups and tragedies have occurred in the mop-up stage.

During mop-up, you will extinguish all smoldering material within a specified distance from the control line as conditions indicate. Mop-up must be thorough because a small spark or flame left along the line could rekindle hours or days later, starting another and perhaps larger fire.

Class of fire

To tell one type of fire from another, firefighters classify them from A to G.

Class A—0 to 0.2 acres (0 to 0.1 ha)

Class B—0.3 to 9.9 acres (0.2 to 4 ha)

Class C—10 to 99.9 acres (4.1 to 40.4 ha)

Class D—100 to 299.9 acres (40.5 to 121.4 ha)

Class E—300 to 999.9 acres (121.5 to 404 ha)

Class F—1,000 to 4,999.9 acres (405 to 2,024 ha)

Class G—5,000 acres (2,025 ha) or more

Don't be too worried, you don't have to memorize this. Just be aware, a class A fire is the smallest fire and class G is the largest.

Narration Script: Some fires simply have more class than others. When you hear the term "Class A" fire, that doesn't mean it's a good fire, just a small one and that's not as good as no fire at all.

Knowledge Check 2

Matching—select the match you choose from the pull down list.

You are called to work on a Class G fire and need to know your stuff.

Match each term with the MOST appropriate description.

Control line

Fireline

Anchor point

Mop-up

Green

Black

The correct matches are as follows:

Control line: Refers to all constructed or natural fire barriers

Fireline: Involves removing flammable material down to mineral soil

Anchor point: Minimizes the chance of being outflanked by the fire

Mop-up: Begins after a fire has been completely lined

Green: Refers to an area that is not burnt

Black: Contains hot spots, smoldering snags, stumps, and downed trees

Topic conclusion

In this topic, we gave you a quick refresher on some basic wildland fire behavior concepts and principles. We looked at:

- **Parts of a wildland fire**
- **Fire behavior terminology**
- **Additional useful terms and concepts**

Knowing the key terminology used by other wildland firefighters will help you communicate more effectively when the time comes.

Narration Script: Fire is fire whether it's in the woods or inside a building. The woods just give it a little more elbow room, an endless supply of oxygen, and an abundance of fuels. And that means you need to understand the parts of a wildland fire and know how to communicate what you're seeing. So make sure you are able to communicate and understand all these terms in your wildland vocabulary.

Topic 3: Preparedness

Topic introduction

Preparing for life on the *fireline* is complicated business. There are many steps to get ready for the *fire season*. Is your gear in good condition and organized? If you're assigned to a suppression crew, do you know what personal items you'll need to bring along? How's your fitness level?

This topic will help you prepare for life on the fireline by discussing:

- **Properly using and maintaining your gear**
- **Being accountable for agency or organization-issued gear**
- **Identifying what personal items to bring along for an *extended attack***
- **Preparing physically and nutritionally to fight *wildland fires***
- **Knowing what actions to take when first aid is called for**

By the end of this topic, you should be squared away and ready to roll.

Narration Script: Successfully fighting a wildland fire doesn't start at the fireline; it begins long before that—with preparation. While “prep work” may sound tedious, it makes all the difference. Crew members who can't be relied on because they can't find their gear or keep asking to borrow your limited personal items or who just aren't physically up to the job of fire fighting are not only irritating, but potentially unsafe to you and themselves. By taking time to check your gear, pack the right stuff, and hit the treadmill and weights, you'll be able to work at higher performance level, stay healthy, and become a valued member of a wildland crew.

Personal protective equipment

It should come as no surprise that the type of protective clothing you wear is a factor in any emergency response. Wildland fire fighting presents unique conditions that require specially designed *personal protective equipment (PPE)*. The design of personal protective clothing for wildland fire fighting balances the need for adequate protection from the hazards created by the fire with the need to wear the clothing for long periods in a very hot and hostile environment.

Narration Script: OK. Learning about personal protective equipment, or clothing, may not be as exciting as suppression methods, but it's important to enter the wildland environment in the right clothes—both for safety and comfort. This topic will cover the PPE types specifically intended for use on wildland fire fighting operations.

Knowing the types, use, and care of clothing recommended for fighting wildland fires will contribute to your safety and comfort under the wide range of conditions you will encounter on the fireline. As you will hear over and over, personal protective clothing should not only be wearable in a hot and hostile environment, it also should be something you're able to wear for long periods of time. And we mean a long time.

Personal protective equipment overview

Specifically, this topic's PPE section will introduce you to:

- **Minimum PPE requirements**
- **Proper use of wildland PPE**
- **What you can and can't expect from your PPE**
- **How to keep your PPE wearing and looking its best**
- **How to identify problems with your PPE**

Narration Script: Because PPE is close to your skin, it should also be close to your heart. We'll find out what the well-dressed wildland firefighter is wearing this year.

Personal gear

You might be assigned to a crew with a total of up to 20 firefighters. That many firefighters are bound to have a lot of stuff. To anticipate space and weight limitations, get your gear down to these weight limit guidelines:

- **Total individual gear weight—65 lb. (30 kg)**
- **Web gear weight without water—20 lb. (9 kg)**
- **Personal gear weight—45 lb. (21 kg)**

Once you've "suited up," you're ready to join your crew.

Narration Script: The well-dressed firefighter isn't going to show up on the cover of GQ or Glamour magazine, but the right PPE does make a safety statement. However, remember there is no "entourage" carrying your "beauty supplies." You'll be responsible to get them where you are going by yourself.

Radiant heat and hostile ambient temperatures

Wildland firefighter protective clothing is designed to protect you from:

- **Personal injury**
- **Radiant heat**
- **Hostile ambient temperature conditions**

While it has to protect you, it can't be too bulky. Because of the strenuous work you do, and often for long periods of time, wildland protective clothing cannot be too heavy or bulky.

Read the following to learn all you can about personal injury, radiant heat, and hostile ambient temperature conditions.

Personal Injury

The safety gear you're issued will help protect you while on the fireline. But, it must be properly used and maintained. For example:

- **Gloves**—protect your hands from cuts, scrapes, and blisters
- **Protective footwear**—protects your feet from the harsh wildland environment
- **Hard hat (helmet)**—protects your head from falling items
- **Eye protection**—keeps dust, sparks, and debris from damaging your eyes
- **Hearing protection**—a much overlooked piece of equipment that preserves your hearing

Radiant Heat

The outer surfaces of the personal protective clothing withstand moderate levels of radiant heat. Realistically, this means the material will not burst into flames, but it will not protect you from burn injuries if you are exposed to significant levels of radiant heat.

Hostile Ambient Temperatures

In addition to the radiant heat of the fire, you will also operate in a wide variety of hostile ambient temperature conditions in the wildland, ranging from below freezing to in excess of 100° F (38° C). While the design of protective clothing reflects the need to protect you from this wide range of ambient temperatures, you will usually manage these temperature variations by varying what you wear beneath your protective clothing.

Narration Script: Although you may be exposed to significant levels of radiant heat and hostile ambient temperatures, you'd have heat exhaustion in an hour if you tried cutting fireline in the kind of gear structural firefighters wear.

Basic PPE items

When fully equipped as a wildland firefighter, here's the *minimum* required PPE you should have:

- **Protective outerwear (clothing)**
- **Gloves**
- **Protective footwear**
- **Hard hat (helmet)**
- **Eye protection**
- **Hearing protection**
- **Fire shelter**

You will investigate each PPE item in turn, including the steps for care and maintenance.

Narration Script: There are several required PPE items that will protect you from the hazards we just described, including special outerwear, gloves, footwear, hard hat or helmet, eye protection, hearing protection, and a fire shelter.

Protective outerwear styles

You will wear outerwear over other clothing or directly over cotton undergarments. Be sure your undergarments are cotton, not synthetic—you don't want them melting to your skin. Completely fasten all garment closures. Doing so will prevent hot embers from getting between your clothing and skin.

Your protective outerwear consists of:

- A coat or shirt—Shirts must be made of a flame-resistant material and have long sleeves that you secure at the collar and wrists. Your supervisor will tell you when it's safe to unbutton or loosen your shirt. Keep your shirt tucked into your trousers. Painting your name or placing decals on your clothing could make them less flame resistant.
- Trousers—Wear cuffless loose-fitting trousers made from flame-resistant material. Wear your trousers over your boot tops to keep out embers—just make sure the trouser ends aren't frayed or you could attract open flames. And cinch this look with a wide, leather belt, if possible.

Narration Script: Since safety is of the utmost importance, let's discuss protective outerwear. You will wear your outerwear over your clothing or over cotton undergarments.



Caption: A firefighter demonstrating the proper personal protective equipment, or PPE.

Undergarments

As we mentioned earlier, what you need beneath your protective outerwear depends on the design of the protective outerwear and the environmental conditions you encounter.

Think about these two factors:

- **Synthetic fibers—don't wear synthetic fibers that are not flame/heat resistant because they may melt when exposed to heat**
- **Layers of clothing—adjust the amount of undergarments you wear to suit environmental conditions; use more layers of clothing when it is cold, fewer when it is hot**

Narration Script: Carefully consider the clothing or undergarments you wear beneath protective garments. Your choice in undergarments can help keep you cool or warm.

Cleaning for outerwear

And one final thing when considering protective outerwear—whatever type of protective clothing you use, clean it according to the manufacturer's recommendations as often as necessary. Nomex®, the most common fabric used for protective clothing, and other similar materials may lose some of their fire-retardant capabilities if there is excessive dirt or foreign substances on or within their fibers.

Never begin an operational period with clothing or PPE that has gas, oil, or other flammable material on it. And if your PPE becomes contaminated with oils or liquid fuels, thoroughly wash and dry it before using it again. If your clothing becomes damaged, replace it immediately.

Knowledge Check 3

Matching—select the match you choose from the pull down list.

It's time to put on your outerwear! Let's see if you can put it all together.

Match each clothing item with the MOST appropriate description.

Nomex

Cotton

Non-flame/heat-resistant fibers

Synthetic fibers

The correct matches are as follows:

Nomex: Most common fabric used for wildland protective clothing

Cotton: A recommended fabric for undergarments

Non-flame/heat-resistant fibers: Not recommended for undergarments

Synthetic fibers: Can melt when exposed to heat

Gloves

During routine fire fighting on wildland fires, you will need gloves to protect your hands from blisters, scratches, small cuts, and minor burns. Leather gloves are standard for most

work. To prevent hot embers or other foreign debris from entering your gloves and causing injury, gloves are designed to close tightly around your wrists.

Besides protecting your hands during routine fire fighting, you'll need protection in more severe conditions, such as deploying a *fire shelter*. When deploying a fire shelter, gloves must be able to protect your hands from burning while you are holding down the hot shelter surface.

Narration Script: Gloves are required PPE during wildland operations. Your hands are exposed to a number of hazards during wildland fire fighting, and you can protect them by wearing your leather gloves.

Glove care

Care for your gloves in the same way you care for your protective outerwear, and be sure to replace any gloves that are damaged or worn through. Gloves are one of the least costly pieces of protective clothing you have, so replace them as soon as you doubt their protective capability.

Narration Script: Take care of your gloves as you do your other protective outerwear, and replace them as soon as you doubt their protective capability. Yes, it can be a pain to break in a new pair of gloves, but not as big a pain as a blister or a burn.

Wildland fire fighting boots

No surprise here—fighting wildland fires means being on your feet much of the time. You may be required to wear your boots for days or even weeks at a time. With this in mind, be sure your boots fit very well and provide good ankle support. Wildland fire fighting boots are designed to allow you to operate in a wide variety of terrains.

Narration Script: When fighting wildland fires, you may be operating anywhere from rocky slopes to marshlands. So good boots are an important tool of the trade.

Boot construction—tops

Let's examine the construction of wildland fire fighting boots—all but the soles. We'll discuss soles shortly.

Boots

Boots should be made of leather—except for the soles. Obviously, synthetic materials that may melt when exposed to heat or that are easily frayed or damaged should not be used in boot construction.

Laces

Boots should be a lace-up design, and even laces should be made of leather to ensure they can withstand the same conditions as the rest of the boot. Just make certain your boots don't lace to the toes. Limbs and debris can get caught under the laces and cause you to fall.

Height

Boots should measure at least 8 in. (203 mm) from the bottom of the heel to the top.

Narration Script: Wildland fire fighting boots should be constructed in a manner that will reduce the risk of burns to your feet. For example, some boots have padding at the very top. While comfortable, this material may create a potential fuel source.

Boot sole types

The terrain that is most typical in your area will determine the design of the boot soles. Consult with your agency or organization about the types of boot soles recommended for your terrain. Boot soles may be:

- Flat bottoms
- Ripple soles
- Lug soles

Even though your boots provide incredible protection, avoid or limit walking on hot ashes or coals. Your boots will burn and disintegrate, and you may get severe burns on your feet before you realize it. In addition to heavy soles with deep tread, your boots should have a heel of not less than 1/2 in. (13 mm).

Steel-toed or zippered boots

Wildland fire fighting boots should not have steel safety toes—and there are some good reasons for that. Steel-toed boots:

- Tend to be heavy
- Attract enough heat to cause burns
- Are uncomfortable when you wear them for long periods of time
- May cut the top of your foot in steep terrain

Zippered boots or boots made from synthetic materials—which can melt—are also a bad idea on the fireline. If you're not sure about the right boot for the job, ask your agency or organization for guidance.

Narration Script: If you think about it, steel-toed boots on the fireline are a pretty bad idea. In a wildland response, you spend a lot of time close to your heat sources. A hotfoot you *don't* need.

Boot maintenance

Like the rest of your protective clothing, keep your boots in good repair. If you see loose stitching or other deterioration, get them repaired as soon as possible. If possible, clean your boots daily, and apply boot oil as often as necessary to keep the leather supple.

Narration Script: You don't have to see your reflection in your boots, but keep them in good repair and well-oiled.

Socks

Now that your boots are in order, it's time to put a sock in them! While you're fighting wildland fires, the best boot in the world won't be very comfortable if you don't have good, dry socks.

Consider these sock tips:

- Tip 1—use socks made of natural fibers
- Tip 2—use a sock liner
- Tip 3—take extra socks

Read the following to explore more details about each sock tip.

Sock Materials

Socks should be made of natural fibers, not synthetic. You'll get added thermal protection from socks that are medium-weight wool, or mostly wool. Wool will also wick the moisture away from your skin. This will help keep your feet cooler and drier than with other fabrics and will also reduce the likelihood of developing blisters—a common fire fighting injury.

Sock Liners

When you have to hike long distances, you may experience added comfort if you wear a sock liner or a lighter sock under a heavier sock. These socks are often called *wick socks* and are specifically designed to transfer moisture away from your feet and into your outer sock. Sock liners appropriate for wildland fire fighting are made of natural material.

Extra Socks

If you are dispatched to a large-scale incident, take extra socks. If you don't have extra socks, wash and dry the ones you are wearing daily.

Narration Script: What is a good pair of boots without the proper socks? Here are some sock tips.

Knowledge Check 4

Matching—select the match you choose from the pull down list.

Do you think you're ready to protect your feet? Let's find out!

Match each type of material with the appropriate description. You may use each material more than once.

Leather

Synthetic materials

Leather

Steel

The correct matches are as follows:

Leather: Most common material for boots (all but the soles)

Synthetic materials: Most are not recommended for boot construction

Leather: Used for lace construction

Steel: Not appropriate for wildland boot construction

Hard hats—general

For wildland protective hard hats (helmets), keep in mind that the main purpose of a hard hat is to protect your head from bumps or falling debris. The protective helmets used in wildland operations closely resemble a typical construction-type hard hat.

Narration Script: Your head is probably quite important to you, so let's talk "brain buckets"—I mean hard hats! If you want to protect your head, use your brains and wear your helmet.

Helmets—adjustable suspension system

Hard hats must fit properly to adequately protect your head. An adjustable suspension system and a chin strap attached directly to the helmet shell help ensure that fit. By the way, a proper fit doesn't include wearing your helmet backward. Save that look for a baseball cap. Your head won't get the protection it needs if you're wearing your hard hat backward.

The suspension system or headliner in the helmet is designed to protect you from a blow to the head by absorbing and dissipating the energy of the blow. The other thing the suspension system does is provide ventilation space between your head and the helmet shell. To make your helmet more visible in the dark, attach reflective material or chemical light sticks to it if available.

Narration Script: Your hard hat should have an adjustable suspension system to protect you from a blow to the head and provide ventilation. Be sure you have a chin strap, and keep that helmet facing forward.

Helmets—optional equipment

Based on local preferences, you can add items to your hard hat, such as:

- Neck shroud—attaches to your hard hat and is made of flame-resistant material to protect shoulders and neck from embers or heat.
- Headlamp—for use during nighttime operations. It is similar to the lamps worn by search and rescue (SAR) teams. Just be sure to pack along some extra batteries and a spare bulb.
- Goggle brackets—holds your goggles to the helmet.

These items are not the only accessories that can be added to a helmet. Just remember that any accessories you add or modifications you make must not compromise the integrity of the helmet or void the manufacturer's warranty.

Narration Script: Fashion is all about accessories. But in our situation, you can also use them to increase the safety and efficiency of your helmet. When adding accessories or making modifications, don't compromise the integrity of the helmet or void the manufacturer's warranty.

Helmets—cleaning

Clean your hard hat with warm, soapy water. Never use cleaning solvents on it because they may cause chemical degradation of the helmet shell.

If you use your helmet a great deal, clean the headband, suspension components, and chin strap daily. Look for cracks and other damage.

Knowledge Check 5

Multiple choice—check the box of the answer(s) you choose

There are a few don'ts for helmet use.

Identify TWO things you should NOT do with your wildland helmet.

- Don't attach reflective tape to your helmet
- Don't attach a neck shroud to your helmet
- Don't wear your helmet backward
- Don't use soap to clean your helmet
- Don't use cleaning solvents to clean your helmet
- Don't wear your helmet forward

The correct answers are don't use cleaning solvents to clean your helmet and don't wear your helmet backward.

Eye protection—general

Airborne *ash*, embers, smoke, dust, and other particles all have their aim on your eyes. Luckily eye-protection devices are available to prevent eye injuries from these assailants.

These eye-saving devices have to be approved by the Occupational Safety and Health Administration (OSHA) and include:

- Goggles
- Safety glasses
- Helmet-mounted faceshields

It is generally accepted that eye goggles and safety glasses will protect you from about 85 percent of all eye hazards. In the subsequent sections, we'll concentrate our discussion on the most common of these—eye goggles.

Narration Script: Use eye protection, such as goggles, safety glasses, or helmet-mounted faceshields to ensure the health and safety of your eyes. Eighty-five percent of all eye hazards can be prevented with eye goggles alone.

Goggles

Goggles are the most commonly preferred form of eye protection for wildland fire fighting. They provide the greatest amount of protection against foreign objects contacting or entering your eyes. Goggles are held in place by an elastic strap that is either worn around the back of your head or attached directly to your helmet.

Maintenance is pretty straightforward:

- Clean your goggles with soap and water or a cleaning solution suggested by the manufacturer
- Replace your goggles if they become damaged or have excessively scratched lenses

Hearing protection

Fighting wildland fires is a dirty business—and a loud business. You might spend a long time around pumps or other noisy equipment that can damage your hearing.

Play it safe and wear your hearing protection—earplugs or ear “muffs”—when working around:

- Chains saws
- Pumps
- Helicopters or aircraft
- Any loud piece of equipment or vehicle

Narration Script: A lot of noise can go along with fire fighting. Chain saws, pumps, and helicopters all make for a loud wildland experience. If you want to avoid having ears that do not hear, wear your hearing protection.

Fire shelters—general

Perhaps the most critical piece of safety equipment that you will carry for all wildland fire fighting is the fire shelter. A fire shelter is an effective, life-saving device that allows you to protect yourself in place should you be overrun by a fire with no option for escape. New generation fire shelters have a “baked potato” shape, while older shelters have a pup-tent shape.

New generation shelters come in two sizes. The large version is recommended for firefighters who are taller than 6 ft. 1 in. (185 cm) or whose girth is larger than 53 in. (134 cm) at any point. Firefighters who are shorter than 5 ft. 7 in. (170 cm) may have difficulty deploying and holding down the large fire shelter.

Warning

Fire shelters are intended to be deployed only as a last resort to survive a fire entrapment. Attempt all other reasonable means of escaping the fire before deploying the shelter.

Narration Script: If you have no option for escape from a fire, somebody, somewhere has made a terrible mistake—and you’ll have to use your fire shelter. It has saved many lives and prevented many serious burn injuries. We’ll discuss some specifics of fire shelters now and talk more about deployment later in the course. For a while, you may see two styles of fire shelters out there. Federal agency firefighters started using “new generation fire shelters” at the end of the 2006 calendar year. All other firefighters are expected to make the transition by the end of 2008.



Caption: An example of a new generation fire shelter.

Knowledge Check 6

Multiple choice—check the box of the answer(s) you choose

All of the following are considered part of the MINIMUM wildland fire fighting PPE, EXCEPT

- eye protection.**
- gloves.**
- protective footwear.**
- respiratory equipment.**

The correct answer is respiratory equipment.

Web gear

You'll use *web gear* to carry various tools in canvas pouches. Remember, your web gear weight without water is supposed to be 20 lb. (9 kg) or less.

Web gear is ideal for carrying:

- Canteen**
- Weather kit**
- Fire shelter**
- First-aid kit**
- Fusees**
- Portable radio**
- Food**

Read the following for more details on canteens, first aid kits, and fusees.

Canteen

Let's face it; wildland fire fighting is a hot and sweaty business. You'll have to drink a lot of water to stay hydrated. Be sure to:

- Carry as much water as you can**
- Supply each apparatus with an ample supply of drinking water**

Refill your canteen or collapsible bladder with clean water at every opportunity. Keep them as clean and sanitary as possible under the conditions, and don't share your canteen with other crew members.

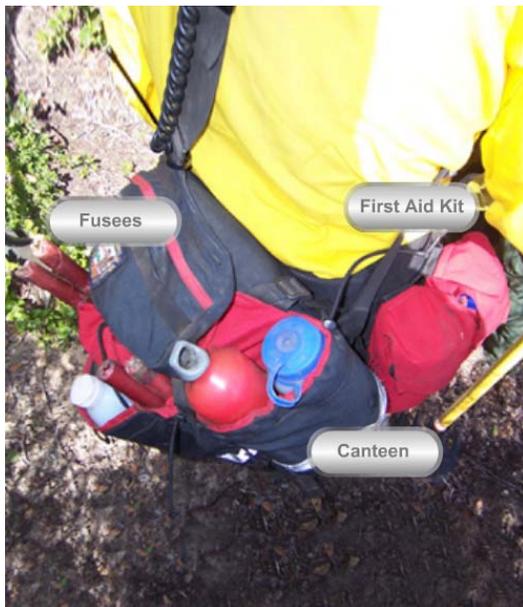
First Aid Kit

Minor injuries on the line can often be handled with the help of a first aid kit. We'll talk more about first aid later in this topic.

Fusees

Be careful when carrying fusees in your web gear. Since fusees are designed to burn, you can imagine that they are a safety hazard in some situations. Discard them if there is any danger that they will be exposed to direct flame impingement. And never take them into your fire shelter!

Narration Script: You will use web gear to tote a lot of other gear that you will want to have with you on the fireline. Web gear is a versatile piece of equipment that makes it possible for you to carry all sorts of things including the items listed here.



Caption: An example of a firefighter wearing web gear. The gear can hold such items as fusees, drinking water, and first aid kits.

Knowledge Check 7

Multiple choice—check the box of the answer(s) you choose

Web gear is a versatile piece of equipment you can use to carry essential items.

Select THREE examples of items you can carry on your web gear.

- Canteen**
- Fusees**
- Pulaski**
- Helmet**
- Fire shelter**

The correct answers are canteen, fire shelter, and fusees.

Additional required items

You will have a personal gear bag (red bag) for carrying items you may need at camp or items that are too bulky to carry on your web gear. You will probably have a sleeping bag in your red bag. A lightweight sleeping bag is essential, especially for the western part of the country where evenings cool down dramatically. Use your red bag to sock away extra clothing for up to 14 days. Remember, your personal gear weight limit is 45 lb. (21 kg).

In addition to stuff in your web gear and red bag, make sure you have these items readily available:

- **Chain saw chaps**—Chain saw operators and swampers must wear chain saw chaps when operating chain saws. When hiking, they can be folded up and used as a pad under the saw on the shoulder.
- **Flat (bastard) files**—These 10- and 12-in. files come in handy for sharpening tools and can be carried in web gear.
- **Food**—You must carry at least one to two high-energy meals in your web gear.
- **Incident Response Pocket Guide (IRPG)**—The IRPG gives you helpful reminders about risk management, strategies for direct and indirect attacks, first aid guidelines, and hazardous materials considerations. In short, this little book can be a big help in getting you out of many sticky situations. Keep it with you at all times in your shirt or pants pocket. You can also access the complete IRPG in the resources that accompany this course.

Narration Script: In addition to the items in your web gear, you will also have additional items to carry. As you can tell, there's a lot of equipment and PPE that goes into wildland fire fighting. It may seem like a lot, but it's all there to protect you and keep you up and running during the often rugged hours on an incident.

Optional items

The following items are optional but have been known to come in handy:

- **Hard hat shroud**
- **Tent**
- **Jacket or coat for night wear**—a hot day can easily turn into a cold night
- **Extra clothing, such as pants, shirts, and socks**—but choose carefully or your pack will be too heavy
- **Personal hygienic gear**—for example, foot powder helps to prevent sore feet

The bottom line is that you need to be able to take care of yourself and your things for extended periods of time even in demanding conditions.

Narration Script: Of course, you don't want to end up lugging around a 100-pound pack in steep terrain, but there are few more items you may want to consider bringing along. If there are any other items critical to your comfort—toothpaste comes to mind—then don't forget to pack it!

Personal items

You should consider also keeping some other personal items ready when possible. What you carry is based upon your own needs and comforts and can include items such as:

- Matches (in a waterproof container)
- Watch
- Pocketknife
- Eyeglasses and sunglasses, if needed
- Prescriptions, if needed
- Water
- Rain gear
- Compass
- Toilet paper
- Spare boot laces
- Bandanas
- Flip flops to wear in shower stalls
- Small towel
- Small flashlight
- Instant hand sanitizer

Narration Script: Personal items can help preserve your health and add to your comfort as long as you don't go too heavy. Nonessential items, like your camera or music player, won't be replaced if they are lost or damaged. Keep that in mind when you think about bringing along that favorite new "thing" to the fireline. A list of the items to bring on the fireline is available in the resources that accompany this course.

Use and maintenance of PPE

We've spent a lot of time talking about PPE and how to care for it. When it's time to actually use it, be sure to start by inspecting it at the beginning of each work shift—and even more frequently during a fire. Most important, follow your agency's guidelines and the manufacturer's recommended inspection procedures. And if you want your PPE to work properly when you're on the line, button all buttons, zip all zippers, and wear your gloves, goggles, and helmet shrouds.

Some additional points to consider regarding PPE include:

- All personal protection items must meet applicable local, state/provincial, and national standards.
- You must *always* wear full wildland PPE when working on or around the fireline.
- Contract workers also need protective clothing if working outside the incident base.

Knowledge Check 8

Multiple choice—check the box of the answer(s) you choose.

Let's see if you've learned which PPE is for show and which is for dough.

All of the following are optional items to bring, EXCEPT

- jacket or coat.
- extra clothing.
- sleeping bag.
- music player.

The correct answer is a sleeping bag.

PPE summary

Before we move away from this discussion of PPE, a few summary points are in order. You will always have a better chance of surviving on the fireline if you understand the capabilities and limitations of PPE and know how to properly wear it. We'll go into even greater detail about specific parts of your PPE, such as the fire shelter, later in this module.

Narration Script: Your safety is the most important factor while fighting a wildland fire. Knowing about the types, use, and care of the PPE available to you helps to provide that safety. Also, having your PPE in good condition and prepared to go at any time helps ensure you actually get to fight fire rather than having to stay at the command post in some support roll. Your incident commander will never let you near the fireline without complete and proper PPE.

Accountability

The gear you've been issued is worth more than \$500. Your agency or organization needs you to take care of this gear. Follow these steps to be a master of personal accountability:

- Maintain your PPE in top form
- Know how to properly use your gear
- Routinely inspect your PPE for signs of wear
- Get any repairs done or replace necessary PPE before the start of the fire season

Narration Script: You are accountable for the PPE you've been issued. PPE is expensive and may be difficult to replace when you're busy fighting a wildland fire. You don't want to lose your place on the fireline because you've lost a vital piece of gear.

Accountability in camp

Being accountable for your gear extends to the fire camp as well and offers several advantages:

- Maintains a professional appearance for the crew
- Prepares you for moving on short notice
- Lessens the chance of losing items
- Minimizes impact to the environment

Narration Script: Keeping your personal gear and assigned area in fire camp clean and organized offers many advantages for you and your crew.

Physical preparation

Life on the line is hard work and dangerous. You must be physically ready to survive those adversities. Examine some preparation steps to help your body deal with the worst a fire can dish out:

- Getting acclimated
- Fluids
- Food
- First aid

In the pages that follow, you can examine each preparation step to see how it can affect your body.

Narration Script: So now you know what PPE you need, how to maintain it, and what personal items to bring along to the fireline. You may think you're prepared. But are you prepared physically?

Acclimation

Fire fighting means you have to be prepared for the long haul. You may find yourself working shifts up to 16 hours, at high elevations on slopes in excess of 40 percent, and in temperatures more than 100° F (38° C). Fitness is mandatory.

As part of your training before being assigned on a wildland fire, become acclimated to working and hiking in typical wildland PPE during peak afternoon temperatures. Begin training for the fire season a minimum of six weeks before starting work. You must develop two types of fitness:

- Aerobic fitness—a measure of the maximum amount of oxygen you can take into your body and transport to the muscles
- Muscular fitness—includes both strength and muscular endurance

It is well documented that physically fit workers perform better in the heat, acclimate faster at high elevations, and are less likely to be injured on the fireline.

Narration Script: If you're familiar with the Incident Qualification and Certification System (formerly known as the "red card" system), you know about the pack tests. If your agency requires the arduous pack test, you'll have to do 3 miles with 45 pounds on your back in less than 45 minutes. There's a darn good reason for all these tests—you need to get acclimated!

Fluids

According to scientifically controlled tests, the heat you generate by exertion is more than twice what you'll get from the fire and the weather. That's good to know.

On top of that, you often have to work in high temperatures and low humidity. As a result, you will perspire profusely. It is not uncommon for firefighters to sweat out as much as 1 qt. (.95 l) of water per hour over a 12-hour work shift. As a precaution, drink an average of 1 qt. (0.95 l) per hour over your entire work shift.

If you want to be able to keep up and avoid developing heat cramps, heat exhaustion, or heatstroke, be sure to replace lost:

- Water
- Salt
- Potassium

Read the following to see how to replace each element in your body.

Replacing Lost Water

Drink lots of fluids to replace the water lost to perspiration. Avoid coffee and carbonated soft drinks—drink water instead. Drink 8 to 16 oz. (240 to 480 ml) of water or juice before starting a work shift. You can reduce your chances of suffering heat-stress disorders by drinking *at least* 2 qt. (1.9 l) of water before noon (prehydrating) and continuing to drink water or sports drinks throughout the day.

Carry canteens of water or bottled water on the fireline, and drink at every break (whether you're thirsty or not) and at every meal break. Never drink stream water unless you have an approved purification method.

Replacing Lost Salt

As a physically fit and acclimated firefighter, lightly salting your food at mealtimes is generally sufficient to replace salt lost through perspiration. If you are unacclimated or in less-than-peak condition, you might have to add a little more salt to your meals.

Caution—never take salt tablets because an excess of salt can interfere with your body's ability to regulate your core temperature. Salt tablets can also cause:

- Stomach distress
- Muscle soreness
- Fatigue

- Impaired heart function
- High blood pressure
- Mental confusion
- Loss of potassium

Replacing Lost Potassium

Potassium supports proper muscle function but is lost when you perspire for extended periods. To cover the loss, eat potassium-rich foods like bananas and other fruits at frequent intervals during fire fighting operations. Lemonade, tomato juice, and electrolyte replacement fluids or “sports drinks” can also help to replace lost potassium. (And you might want to drink a little water before downing those sport drinks—if you’re parched, they’ll tattoo your tongue for the rest of the day. It’s not pretty.)

Narration Script: If you can’t stand the heat, get out of the kitchen. But if you can stand kitchen heat, try fighting fires! Wildland fire fighting exposes you to heat from the fire, weather, and physical activity. And the bottom line is, you are going to sweat. A lot! You could lose as much as 1 quart of water an hour due to perspiration. And once you stop sweating, heat stroke comes next! As a precaution, drink an average of 1 quart per hour over your entire work shift.

Signs of dehydration

The best way to avoid dehydration is loading up on water and being on the lookout for signs of dehydration, including:

- Morning headaches
- Diminished or discolored urine
- Diminished sweating
- Constipation
- Irritability

Food as fuel

When you’re working on the fireline, you can burn anywhere from 300 to 600 calories an hour and over 6,000 calories a day. You need to eat—but you also need to make wise food choices that balance these basic components:

- Carbohydrates—should make up 55 to 70 percent of your caloric intake. The glucose and glycogen carbs provide energy for short intensive and long endurance activities. Good sources of carbs include whole grains, starchy vegetables, cereals, fresh fruit, pasta, and potatoes.
- Fat—good fats, like polyunsaturated oils and olive oil, have a role in your diet and should compose 20 to 30 percent of your daily calories.
- Protein—should make up about 10 to 20 percent of your daily calories; any more than that doesn’t contribute to performance or build muscle tissue. Overdosing on protein just strains the kidneys and causes dehydration.
- Fiber—keeps things moving. To keep your digestive system in top shape, pass up

refined flour and white sugar and opt for whole grains, cereals, fresh fruits, and vegetables.

- **Calcium**—vital for strong bones, and 1,000 milligrams (mg) per day is recommended. Low fat milk is good source of calcium with 250 mg in an 8 oz. (0.24 l) serving.
- **Vitamins and minerals**—it's always better to get your vitamins and minerals from a healthy diet. But if your diet isn't all that it should be, take a good multivitamin.
- **Sodium**—the recommended sodium intake is 2,400 mg per day—but the average intake in the United States is 5,000 mg. If you've been perspiring heavily, use a modest amount of salt to replace lost sodium. Never take salt tablets.

Narration Script: Wildland firefighters burn calories like crazy, and food is the fuel that keeps you going. But don't look at this as a license to eat just anything. A good, balanced diet will give you more energy to do the things that must be done.

Food and fluid tips

Here are a few more food and fluid tips to keep you performing well on the fireline:

- **Limit caffeine to 300 mg per day** (a cup of coffee has 100 mg)
- **Avoid alcohol**
- **Stay away from eating red meat two days in a row**
- **Limit eggs to one per day**
- **Choose whole wheat bread over white**
- **Substitute other seasonings for salt**
- **Eat lots of fruits and vegetables**
- **Avoid large amounts of sugar calories**
- **Concentrate on getting enough carbohydrates**

Food in vehicles

Working the line may put you far from the *incident base*, and hot meals may not always be available. Because of this, keep food in your vehicle whenever possible. Foods that do not require refrigeration, such as fresh fruit, packaged snacks, meals ready to eat (MREs), or commercially produced meals, can provide the necessary energy boost you need during a long shift.

Narration Script: Keep food available inside your vehicle whenever possible. A word of caution—don't leave empty water bottles or food containers to roll around inside the cab of a vehicle where they might interfere with the driver.

First aid

Another part of preparedness is knowing what to do when first-aid incidents happen. On large-scale incidents, the medical unit, when activated, is responsible for handling medical emergencies involving incident personnel. And in most cases, you'll have access to first-aid

facilities, supplies, and treatment on the line and at all incident facilities. However, since this may not always be the case, carry a basic first-aid kit on all engines.

Emergency situations that can occur on the fireline may include:

- The need for cardiopulmonary resuscitation (CPR)
- Strains, sprains, and fractures
- Burn injuries
- Snakebites and a variety of insect bites
- Poison oak and poison ivy
- Inhalation of oils from poisonous plants through smoke

Narration Script: Prompt first aid should be given for all injuries. To provide for this need, ICS organization now includes a line EMS position. However, you may still need to provide first aid on the line. Be sure to review your first aid procedures—the wildland fireline can be a very harsh environment.

Heat stress

High temperatures and low humidity combined with heavy manual labor over an extended period make you vulnerable to heat-related problems. Sudden temperature drops or forced bivouacs may lead to the reverse situation—hypothermia. On the fireline, pace yourself, take periodic short rest breaks, drink plenty of water, and monitor yourself and your crew for signs of fatigue or physical distress.

Heat and cold disorders are divided into these categories:

- Heat cramps
- Heat exhaustion
- Heatstroke
- Hypothermia

We'll cover each of these temperature-related illnesses sequentially.

Narration Script: Did you think we would let you get away with just a review reminder? Not! Because heat and cold disorders can be common in wildland fire fighting and because they can be so life threatening, we'll focus on first aid related to temperature-related illnesses in depth. Knowing how to recognize and treat these illnesses is an important survival skill for wildland firefighters.

Heat cramps

Heat cramps, a sometimes painful and debilitating condition, are caused by not replacing salt lost through perspiration.

Symptoms—muscle cramps in the legs and abdomen that can be quite painful

Treatment—encourage the patient to drink electrolyte replacement fluids

Heat exhaustion

Heat exhaustion is caused by a loss of both water and salt due to perspiration.

Symptoms—general weakness and fatigue, an unstable gait, and pale, cool, clammy skin. The patient may faint briefly but quickly regain consciousness.

Treatment—move patients into the shade, remove any outer clothing, and give them water or electrolyte drinks if tolerated. Have patients lie down with their feet slightly elevated.

Heatstroke

Heatstroke is a life-threatening emergency caused by a total collapse of the body's temperature-regulating mechanisms. When patients are exposed to excessive heat and stop perspiring, heatstroke will shortly follow. This condition requires cooling of the patient and transport to a medical facility as soon as possible.

The symptoms of heatstroke are:

- **Body temperature in excess of 105° F (41° C)**
- **Deep breaths followed by shallow breathing**
- **Rapid, strong pulse, followed by rapid, weak pulse**
- **Red, dry, hot skin**
- **Dilated pupils**
- **Loss of consciousness that may lead to coma**
- **Convulsions or muscular twitching possible**

Proper treatment of heatstroke is to:

- **Cool the patient**
- **Move patient out of the sun and away from heat sources**
- **Place cold packs or ice bags under each arm pit and around each wrist, each ankle, each side of the neck**
- **Monitor vital signs**
- **Treat for shock**
- **Transport to a medical facility as soon as possible**

Warning!

Cool heatstroke patients immediately and aggressively with cool water and transport them to a medical facility as soon as possible. Delaying treatment can result in brain damage or death!

Hypothermia

Hypothermia can be life threatening!

Symptoms—lower than normal body temperature, shivering, slurred speech, apathy, disorientation, drowsiness, and unconsciousness.

Treatment—Immediately move the patient into a warm or sheltered area and check pulse and breathing. Get the patient out of any wet clothes and put in dry clothes, sleeping bag, or blankets. If conscious, have the patient drink warm nonalcoholic beverages.

Knowledge Check 9

Multiple choice—check the box of the answer(s) you choose

The proper and immediate treatment of heatstroke can be the difference between life and death for a victim.

Select THREE of the treatments for heatstroke.

- Place cold packs on the area where the patient has cramps**
- Move patient out of the sun and away from heat sources**
- Administer salt tablets**
- Cool the patient**
- Transport to a medical facility as soon as possible**

The correct answers are cool the patient, move patient out of the sun and away from heat sources, and transport to a medical facility as soon as possible.

Serious injury

Sadly, another possibility that you need to prepare yourself for is the chance of serious injury—or even a fatality. When serious injuries occur, follow these steps:

- Give first aid—call for medical aid and emergency transportation**
- Do not release victim's name, except to authorities, nor use it on the radio**
- Do not allow unauthorized picture-taking of victim or release of pictures**
- Notify your supervisor, who will pass notifications up the chain of command**

Narration Script: Wildland fire fighting is tough and often dangerous work. Nobody wants to think it can happen to someone in their crew, but injuries or even fatalities do happen. Even beyond proper first aid, you need to know what to do when something goes wrong. Your agency should have policies, like the ones shown here regarding how to deal with personnel who have been seriously injured or killed. Know and follow your agency's policies.

Fatalities

If a fatality occurs, follow these steps:

- Do not move the body except as necessary to establish positive identification
- Do not release the victim's name, except to authorities, nor use it on the radio until next-of-kin is notified
- Do not allow unauthorized picture-taking of the victim or release of pictures
- Notify your supervisor, who will pass notifications up the chain of command

Narration Script: When the unthinkable happens, you need to know what to do.

Fire fighting conditions

During wildland fire fighting operations, you will need frequent rest and *rehabilitation*. You are engaged in one of the most exhausting jobs around! For example, you may have to work in conditions that include:

- 12- to 24-hour shifts on the fireline
- High temperatures from the weather *and* the fire
- High humidity
- Sparse oxygen at high elevations

If that isn't enough, you may arrive at your assignment already physically exhausted. Perhaps you had to hike long distance, at a high elevation, over steep terrain, and after constructing a *scratch line* along the way!

Get the drift? When people get tired, that is when they get hurt! Rehab is a must.

Narration Script: To avoid needing first aid in the first place, you have to stop from time to time to get some rehab. Frequent rest and rehab can help prevent or overcome the effects of being hot, tired, and exhausted.

Extreme conditions—in addition to the normal fatigue from working hard—combined with a lack of oxygen at high elevations create a situation where you will be vulnerable to the heat-related problems you learned about in this topic. This is enough to take a terrific toll on even the fittest firefighters. And if you are in less-than-ideal condition, you'll suffer even more.

Firefighter rehabilitation

Your supervisor is responsible for ensuring rehabilitation takes place. But don't rely on your supervisor alone—operate as a team and look out for each other. Fatigue compromises safety because when you are fatigued you have less control over your tools and may become less alert to changing fire conditions.

Rehab consists of the following :

- **Monitoring personnel**
- **Adjusting work pace**
- **Taking rest periods**

We'll cover each aspect of rehab in turn.

Narration Script: Fire fighting requires you to be skilled and alert at all times. Fatigue and sleep deprivation can produce the same physical symptoms and impaired judgment as intoxication. So, rest is not optional—it's a requirement.

The primary responsibility for arranging for rehab belongs to your supervisors. Their job is to set and maintain the work pace so that you are productive but not exhausted before you complete your assignments.

Your responsibility is to pace yourself and take frequent short breaks, drink plenty of water, and monitor each other for signs of physical distress. But even when you are extremely fatigued, resist the temptation to take a nap along the fireline.

Monitoring personnel

Supervisors constantly have to think about how the temperature, humidity, topography, and workload will affect the crew and must provide fluids and breaks to maintain the crew's health and safety. However, also it's up to you to monitor your own condition and that of your buddies.

If you notice any of these symptoms, get the affected persons off the line immediately, evaluate them, and treat them for heat-related illnesses:

- **Perspiring more than the others**
- **Behaving abnormally**
- **Dizzy, chilled, or nauseated**
- **Showing signs of excessive fatigue**

Adjusting work pace

Whenever possible, adjust the pace of your work to fit the conditions:

- **Do the heaviest work during the coolest hours of the shift**
- **Change tools or jobs occasionally either to work different muscles or work the same muscles in different ways**
- **Take frequent short breaks to catch your breath and to get a drink of water**

Narration Script: When you're working as part of a team, you don't want to feel you're holding anyone back. It's natural. Wildland firefighters are a proud, and sometimes competitive, bunch. But everyone has his or her own pace and you won't do anyone any good if you give yourself a heart attack by overexerting yourself.

Taking rest periods

Your supervisor should schedule work breaks for you as the work and working conditions dictate. Generally, the harder the work and the hotter the weather, the more frequent the rest periods should be.

The length of the breaks is also a matter of judgment but should take the following into account:

- Whenever allowed by your supervisor
- In the shade if available
- For at least long enough for your heart rate (pulse) to return to normal
- In general, the work/rest ratio should be 2 to 1—that is, 16 hours of work should be followed by 8 hours of rest

Knowledge Check 10

Multiple choice—check the box of the answer(s) you choose

Identify the set of terms that best fills in the blanks in the sentence below.

To minimize fatigue and injury, _____ and _____ to ensure you're still fit to fight the fire.

- stop working when you choose, stay in the shade
- take short breaks to catch your breath, change tools to work different muscles
- do the heaviest work at noon, rest on the weekends
- drink salty water, eat predominantly green and yellow foods

The correct answer is take short breaks to catch your breath, change tools to work different muscles.

Personal hygiene

You can expect to come in from the fireline tired and dirty—and those qualities can easily lead to illness. Here are a few tips to keep you healthy and actively involved on the fireline:

- Wash hands *often*—especially before eating; if soap and water aren't around, use a hand sanitizer
- Take showers when you can, but balance with the opportunity to sleep
- Cough or sneeze on your arm—not your hand—and away from co-workers
- Change socks and underwear frequently
- Use foot powder
- Monitor yourself and co-workers for symptoms of illness
- Take supplements if you're feeling tired and a bit under the weather
- Read the first tip again—keep those hands clean—it's the best way to avoid sickness!

Narration Script: Just like the fireline is a dirty place, life at camp is a germy place. Your hands might find themselves in drip-torch mix, saw dust, and dirt to name a few. And all that time you spend together with co-workers means a lot of sharing—which could include swapping colds, viruses, or other nasty infections. Getting sick usually means being sent home from the fire. Don't let this happen to you. Keep it clean—especially those hands.

Knowledge Check 11

Multiple choice—check the box of the answer(s) you choose

It isn't easy staying clean on the fireline—but dirt and grime lead to sickness.

Select the BEST means to avoid illness during a wildland campaign.

- Grab some chow and then a quick shower**
- Catch naps on the fireline when you can**
- Wash or sanitize your hands frequently**
- Rest until you have the energy to eat**

The correct answer is wash or sanitize your hands frequently.

Topic summary

As a wildland firefighter you must remain vigilant—and that starts even before you get on the fireline itself. This topic covered all the basics of getting yourself prepared to fight a fire including:

- Wearing your PPE properly**
- Cleaning and maintaining your gear regularly**
- Being accountable to gear that has been issued to you**
- Keeping your gear organized—even in camp**
- Preparing yourself physically and nutritionally for the fireline**
- Knowing how to deal with emergency first-aid situations**
- Monitoring yourself and your co-workers for signs of physical distress**

The most essential elements you can bring to the line are your preparedness and professionalism.

Narration Script: The topic of preparedness is hefty but so is the price you'd have to pay if you face a wildland fire unprepared.

Topic 4: Incident Command System

Topic introduction

Wildfires can be planned for long before they happen. And once they do occur, they can evolve from small to large—and you need to be able to adapt.

This topic will introduce you to:

- *Incident Command System (ICS)* concepts and functions—you need to know how you fit into this emergency-response organization, whether it's a single unit or a massive federal effort
- The chain of command—and how this line of authority is used to make decisions and work assignments
- Large fire management organization—and how the ICS can grow in response to a growing fire

Narration Script: This topic covers the incident command system, and a wildland fire is a kind of incident, just like hurricanes, floods, or search and rescue operations. We'll also explore the aspects of ICS you'll need when you face a major wildfire. And whether you're facing a small fire or a major event, you need to know how the Incident Command System works. Let's get started.

Defining and developing the ICS organization

To best achieve objectives, the size and complexity of the wildland fire organization must match the size and complexity of the *incident*. On small incidents, the organization may be small initially. For example, it may only involve an *incident commander (IC)*, who may also act as the *safety officer (SO)*, and members of his or her *crew*.

However, as a fire grows, the fire fighting organization must grow with it. As the size and complexity of the organization grow, certain management principles *always* apply. The three most important ones are:

- Unified command
- Span of control
- Personnel accountability

We'll cover each of these principles in turn.

Narration Script: An organization is a group of people working together to achieve a common objective. If you've got a small incident, you need a small organization. If you've got a major incident, you better be able to coordinate a large-scale organization. That's where the incident command system, or ICS, comes in.

Unified command

Unified command is an effort in the ICS allowing all agencies with responsibility for the incident, either geographical or functional, to manage the incident by establishing a common set of incident objectives and strategies. In unified command, there is a single incident command post and a single operations chief at any given time.

While the IC retains full authority in the wildland fire fighting organization, even the IC must respect the chain of command and issue orders only to direct subordinates. Typically, this means the advanced firefighter or squad boss or the single resource boss.

There is *one* exception to this rule, and it's an important one:

Firefighter safety trumps the chain of command!

The safety officer has the organizational authority to order *any* officer or firefighter to cease any unsafe activity at any time.

Narration Script: Unified command means there is an established and common set of incident objectives and strategies for the incident. In unified command, there is a single incident command post and a single operations chief at any given time. Safety will be enhanced if everyone at every level in the organization follows the approved objectives.

Unified command is the name of the game during any response, but it's particularly important on large-scale incidents involving a lot of officers and a lot of egos. **NOBODY** is above this rule, except the safety officer. If the safety officer sees something unsafe, it is his or her responsibility to yell, "Stop the presses!" We'll talk about the safety officer and other ICS functions shortly.

Span of control

In the *National Incident Management System (NIMS)*, an effective *span of control* ranges from three to seven subordinates per supervisor. Of course, there are a couple of variables affecting how many people can be effectively managed. These include:

- **Proximity**—If all subordinates are within sight of the supervisor and can communicate effectively with each other, the number of subordinates can be higher than when they are widely separated.
- **Similarity of function**—It is easier to supervise subordinates who are all performing the same or similar functions, so the number of subordinates can be higher than if they are all doing very different tasks.

If an effective span of control is maintained, it is much easier for supervisors to keep track of their subordinates and to monitor their safety.

Narration Script: Trying to manage too many subordinates at once is such a bad idea that span of control has become a fundamental component of ICS. And ICS is a fundamental part of the new National Incident Management System, or NIMS.

Personnel accountability

There's no doubt about it—wildland fires generate some of the most dangerous fire environments you will run into. If fire conditions change suddenly and dramatically, a quick but orderly retreat may be called for. If you become separated from your crew, you may have to decide for yourself when to use your escape route to get to a safety zone. Therefore, it is critically important for supervisors to keep track of every firefighter on the scene.

Narration Script: Unified command and span of control both promote one of the most important fireground safety concepts—*personnel accountability*. When you're cutting line, you probably can't see the fire. You depend on your supervisor who in turn depends on your lookout for warning if the fire takes an unexpected turn. A supervisor better be able to tell the IC that he got all his people out when the whistle blew.

Personnel accountability components

All command and management systems provide various means of tracking *resources* assigned to a given incident.

Personnel accountability includes all of the following:

- *Check-in*
- *Incident action plan (IAP)*
- *Unified command*
- *Span of control*
- *Division/group assignment list*
- *Resource tracking*
- *Resources unit*

As an incident grows from an *initial attack* to an *extended attack* or to a *large fire* incident, these basic principles and procedures must continue to be applied through incident briefings, IAPs, and debriefings.

Narration Script: A growing fire means a growing level of accountability. It's important to put out the fire, but it's also important to keep everyone safe, so the IC needs to know where you are at all times.

Knowledge Check 12

Multiple choice—check the box of the answer(s) you choose

Identify the term describing the ability to manage a certain number of subordinates.

- Unity of objective
- Unified command
- Span of control
- Personnel accountability

The correct answer is span of control.

Initial attack

Well-planned initial responses *control* about 90 percent of all wildland fires. An initial-attack response may range from a single engine to a large number of personnel, several pieces of *apparatus*, heavy mechanized equipment, and aircraft.

The composition of the response is based on pre-incident plan information and current conditions, including:

- Location of the fire
- *Fuel* types
- Values at risk
- Weather conditions
- Travel time
- Available resources

Perhaps the biggest difference between an initial attack and a larger incident is the way in which *Command* operates.

ICS Functions

On small fires, the supervisor of the first-arriving unit wears a lot of hats:

- **Command of the incident**—The IC personally runs the scene unless and until the incident grows beyond his or her span of control.
- **Initial scene assessor**—One of the most important initial actions includes proper size-up, reporting on conditions, and ordering additional resources.
- **Safety officer**—The IC either does this personally or delegates the authority for this critical ICS role.

Narration Script: Before we get into the many ICS functions that may be employed on a larger fire, let's study the response structure you are going to use most often. In most cases, you will be able to control a fire with an initial attack. In this case, the incident command may be the supervisor of the first responding unit. He or she may assume multiple ICS functions for a brief period of time.

ICS functions

The ICS provides a framework for quickly adding resources to a response and managing those resources effectively. ICS was developed to fight wildland fires in the 1970s. ICS provides consistency across incidents but is flexible. While we will cover several positions, note that only those positions necessary to manage the incident are staffed, and no more.

For those who are fond of using acronyms to remember things, we will study the ICS sections in the following order:

- **Command**
- **Finance/Administration**
- **Logistics**
- **Operations**
- **Planning**

The first letters of each item make up the “C-FLOP” acronym.

Narration Script: If you’ve been in the fire service for more than about five minutes, you have some familiarity with the functional roles making up the Incident Command System. We won’t preach to the converted; we’ll just fill you in on how ICS is particularly suited to wildland response, which should hardly be surprising, since it was developed in the early 1970s specifically to deal with wildfires.

For the sake of another acronym, we’ll introduce you to the ICS sections in a slightly different order, so get ready for “C-FLOP.”

Command

Command’s job is to direct the overall management of the incident. The incident commander is responsible for:

- **Determining overall incident objectives**
- **Selecting strategies**
- **Ensuring that tactical activities support the selected strategies**
- **Approving the IAP**
- **Making maximum use of all assigned resources**

To relieve the IC of various tasks not directly related to controlling the incident, the IC may appoint one or more members of a command staff, including:

- **Safety officer**
- **Liaison officer**
- **Public information officer**

Read the following for more information about each officer to find out who’s helping the IC.

Safety Officer

The safety officer assesses hazardous and unsafe situations and develops measures for ensuring personnel safety. This person has emergency authority to stop and/or prevent unsafe acts, so you definitely don't want someone shy in this role.

Liaison Officer

Many large-scale responses involve multiple agencies. The Liaison Officer acts as point of contact for representatives of all agencies assisting or cooperating in the incident.

Public Information Officer (PIO)

The public information officer (PIO) develops accurate and complete information regarding the incident and your responses. After obtaining IC approval on all releases, this person then acts as the point of contact for the media and other governmental agencies that desire information about the incident.

Narration Script: As you can imagine, the IC needs a lot of help on large incidents. And in addition to the command staff, the IC may appoint one or more section chiefs to the general staff to help manage things. The positions that make up the General Staff are the chiefs of each section Finance/Administration, Logistics, Operations, and Planning. We'll get into all of these sections shortly.

Unified command—crossing jurisdictions

When a large wildland fire crosses jurisdictional boundaries, a more complex command structure is required. In this situation, representatives from each of the involved or threatened jurisdictions combine to form one unified command.

The members of the unified command may designate one member to be the IC, or they may work together as a team. (The IC is most often the representative in whose jurisdiction the fire is currently burning or in whose jurisdiction there is the greatest amount of fire involvement.) The role of IC may transfer from one representative to another if a fire burns out of one jurisdiction into another or if a fire burns for more than one operational period.

Unified Command

Here are a few other things to keep in mind about unified commands:

- There must be only *one* incident command post (ICP) and only *one* set of incident objectives.
- Common objectives and strategies should be in writing because they form the basis for the IAP.
- There is only *one* Operations Chief who is responsible for implementing the plan that is agreed upon by the members of the unified command.

Narration Script: An IC's legal responsibility and authority do not extend beyond his or her own jurisdiction. Therefore, when a fire jumps political boundaries, a unified command structure is usually put into place to ensure all responding agencies and jurisdictions have a voice in the creation of objectives and strategies.

Individually and collectively, unified incident commanders are responsible for all the normal IC duties we just discussed. And you should still be reporting to just one person. Unity of command—more than ever!—still applies.

Knowledge Check 13

Multiple choice—check the box of the answer(s) you choose.

All of the following are functions of the IC or unified command, EXCEPT

- determining overall incident objectives.**
- delegating strategy selection.**
- appointing command staff.**
- approving the IAP.**

The correct answer is delegating strategy selection.

Finance and administration

The *Finance/Administration* Section helps those agencies requiring cost recovery and other administrative services. Fire fighting is expensive, and someone has to pay.

Because finances are so important, all of these positions fall under the finance/administration umbrella:

- **Finance/administration section chief—responsible for all financial, admin, and cost analysis aspects of the incident**
- **Time unit leader—responsible for time recording and for managing the commissary**
- **Personnel time recorder—records the time for all the personnel assigned to the incident**
- **Commissary manager—responsible for the commissary's operation and security**
- **Procurement unit leader—administers all financial matters related to vendor contracts, leases, and fiscal agreements**
- **Equipment time recorder—keeps track of the length of time that equipment assigned to an incident was used**
- **Compensation/claims unit leader—manages and directs all compensation for injury and claims-related activities for an incident**
- **Compensation for injury specialist—administers financial compensation resulting from serious injuries and fatalities**
- **Claims specialist—manages all claims-related activities, other than injury, for an incident**
- **Cost unit leader—collects all cost data, performs cost effectiveness analyses, and provides cost estimates and cost saving recommendations**

Narration Script: Finance and administration may not be as glamorous as Operations, but it gets moved up in the world to jibe with the C-FLOP acronym. But when you think about it, getting paid is pretty important, right? The Fireline Handbook gives more details about the responsibilities of each of these positions.

Finance and reimbursement

Finance/administration personnel work closely with the Logistics section to see that all incident activities are properly documented. This helps ensure entities requiring compensation or reimbursement for their involvement in the incident are paid fairly and quickly.

Logistics

The primary function of the *Logistics* Section is to provide all support needs (except aircraft) on an incident. Because of the range of logistical needs on a large incident, this section may be split into *Service* and *Support* branches. While all Logistics section functions are important, two of the most critical are the services of the communications and medical units within the services branch.

Here's the logistics on Logistics. Under the direction of the Logistics Section Chief, the section is specifically responsible for:

- Ordering fire fighting resources from off-incident locations
- Providing incident facilities and supplies
- Developing the incident traffic plan
- Providing incident transportation, equipment maintenance, and fuel
- Feeding incident personnel
- Developing the incident communications plan
- Providing incident communications services
- Developing the incident medical plan
- Providing medical services to incident personnel (including rehabilitation)

To learn more about all of the roles that fall under the Logistics umbrella, refer to your *Fireline Handbook*.

Narration Script: As former U.S. General Norman Schwarzkopf once said, "Strategy is for amateurs. *Logistics* is for professionals." If you want to eat, use your radio, or get medical attention, you better have a Logistics section in place. It's another not-so-glamorous but critical ICS function. Like other ICS sections, logistics can be broken into branches that are further subdivided into units.

Operations

Operations gets its hands dirty and achieves the objectives outlined by the IC and the IAP. The *operations section chief* manages all incident tactical activities and assists in the development of the IAP.

While there is only one operations chief during any operational period, this person may appoint one or more deputies or other managers to maintain span of control, including:

- **Branch directors**
- **Division supervisors**
- **Group supervisors**
- **Resource coordinators**

Think OBDGR to remember the order.

Narration Script: Operations is where firefighters tend to be most comfortable. It's where you get to spray water, set fires, and cut line. Operations implements the tactics outlined in the incident action plan. Like Logistics, Operations can be broken into branches to handle ground and air operations and may also involve smaller divisions and groups.

As an example of these command levels, consider this scenario. Operations may include an Air Operations Branch consisting of fixed-wing and rotary-wing aircraft and run by an Air Operations Branch Director, or AOBD. The AOBD may communicate with an Air Tactical Group Supervisor, ATGS, who, in turn, may coordinate airborne activity through a Helicopter Coordinator and a Fixed-Wing, Air Tanker Coordinator.

Building up to a 20-person hand crew

In the initial stages of an attack, a four- to six-person squad may be all that's necessary to tame the wildfire. One squad boss supervises this crew. But as the fire grows, the organization must grow as well. This means more firefighters and more squad bosses. Finally, when the 20-person crew limit is reached, a crew boss is added to supervise the squad bosses. This process maintains the span of control, and no supervisor is tasked to supervise more firefighters than he or she can safely handle.

Operations positions

The Operations section includes a number of key individuals who develop and implement tactics and strategies. Operations may be divided geographically or functionally. In other words, Operations will perform tasks fitting the situation.

Narration Script: Within the Operations section, you'll find branch, division, and group supervisors. As you might expect, division group supervisors are usually assigned to specific geographic areas.

Other operations areas

The other key areas of responsibility under the Operations Section include:

- *Task force leader*
- *Strike team leader*
- **Crew representative**
- **Single resource boss (crew, engine, dozer, felling, firing, tractor-plow)**
- **Advanced firefighter or squad boss**
- **Firefighter**
- **Air operations**
- *Staging area manager*

So, you'll be working with a lot of dedicated people on a significant incident.

Narration Script: A task force is a different sort of animal. It's a group of unlike or mixed resources. For example, two engines, one hand crew, and one dozer can all make up one task force. A strike team leader could be in charge of each group of like resources, be they tractors, dozers, engines, or hand crews. So, the difference between a task force and a strike team is that the task force is made up of mixed resources, while the strike team is made up of like resources.

Staging

The operations chief identifies the locations of staging areas and appoints a staging area manager for each area. This person in turn keeps the operations chief informed of resource status and requests needed food, fuel, etc., from Logistics to support the staged resources.

Narration Script: The other primary responsibility of the Operations section is staging. Staging is an ICS component that requires a little extra attention. Staged resources must be available to respond within three minutes of being called. So, staging areas need to be conveniently located and efficiently run.

Planning

The Planning Section collects, evaluates, and disseminates assignments through the IAP. Under the direction of the planning section chief, the section is specifically responsible for:

- **Maintaining information on the current and expected situation**
- **Maintaining information on the status of assigned resources**
- **Preparing and documenting the IAP**
- **Preparing incident maps**
- **Planning demobilization**

Planning also analyzes incident data and develops tactical alternatives. In preparing the IAP for each operational period, planning may employ one or more technical specialists, such as:

- **Engineers**
- **Meteorologists**

- **Field observers**
- **Fire behavior analysts**
- **Fuels specialists**

These specialists help evaluate current conditions and forecast additional resource requirements.

Narration Script: Planning lets the IC know about any changes in the fire incident and prepares for what's coming. To learn more about the roles and responsibilities of Planning, consult the Fireline Handbook.

Knowledge Check 14

Matching—select the match you choose from the pull down list

Let's put C-FLOP to work.

Match each ICS functional area to an appropriate example.

Command

Finance/Administration

Logistics

Operations

Planning

The correct matches are as follows:

Command: Select strategies

Finance/Administration: Process property-damage claims

Logistics: Develop the incident medical plan

Operations: Achieve IAP objectives

Planning: Demobilize resources

Topic summary

In this topic, we covered the intricate teamwork operating behind the scenes of an incident. Knowing your place in the overall picture ultimately lends itself to a successful response.

Specifically, we looked at:

- **Incident Command System organizational and functional components**
- **The chain of command and your role as a link in this chain**
- **How the ICS can grow in response to a major fire**

You're focused on fighting a wildland fire, but you should know that there's a whole structure supporting you to keep you safe, supplied, and paid.

Narration Script: You may be on the fireline breathing smoke and swinging a Pulaski, but you should know that thorough planning went into your response before you got there and that the IC is working behind the scenes to ensure you have a smooth and effective attack.

You are a critical part of a large, coordinated response. If you gave your attention to this topic, you should understand how your fire fighting actions fit in to the big picture.

Topic 5: Resources

Topic introduction

Incident commanders (ICs) call on all the resources at hand to fight a fire depending on its size and intensity. Wildland firefighters themselves are just one cog in the fire fighting machine. Depending on the fire, an IC might call in bulldozers, helitack crews, or hand crews. Your roles, and how you manage yourself, are all determined before a single Pulaski is swung.

This topic discusses resources and resource management including:

- Firefighter responsibilities
- Crew types
- Working with culturally diverse crews

By the end of this topic, you'll have a better picture of how all the pieces fit together in one professional package.

Narration Script: Managing wildland fires requires careful consideration of the resources incident commanders have at their disposal. From calling in bulldozers to helicopters to more bodies, the IC will assign different types of crews to attack the fire.

As you gain more experience on the fireline, you'll learn the "ins and outs" of working with the crews who use all the tools of the trade—whether the tool is a shovel or a bulldozer. Keep in mind, the crews that battle fires come from all backgrounds, races, and religions. The good news is that the goals are one and the same for all professionals out in the field—stay safe and put the fire out!

Firefighter responsibilities

A fire's behavior seemingly has a mind of its own. Like a boxer counter-punching, you'll adjust your own million-dollar baby behavior to combat the incident. Mental preparation is as much a key to success as cutting line or marching through tough terrain.

You have responsibilities to attend to before you set foot on the fireline. As a wildland firefighter, you must arrive on the scene ready to:

- Ensure objectives and instructions are understood
- Perform work in a safe manner
- Maintain yourself in the physical condition required to perform the arduous duties of fire suppression
- Keep personal clothing and equipment in serviceable condition
- Report close calls, accidents, or injuries to the supervisor
- Report hazardous conditions to the supervisor

Narration Script: When the call comes in to fight a wildland fire, it's like hearing, "To your battle stations!" By the time you arrive on the scene, you must know what's expected of you. Being a part of a well-organized crew saves time and limits dangerous confusion. Each firefighter must be prepared and know the part that he or she will play in putting out a particular fire. So, be sure to run down your mental checklist of your own responsibilities before the physical assault begins.

Extended attack and large fires

After the first 24 hours of fighting a wildland fire, the nature of your response changes. It goes from an initial attack into an *extended attack* and, if the fire really blows up, a *large fire*. Many of the organizational characteristics of these two advanced phases are similar because they may require additional resources and more complex command structures.

The need for firefighters to understand their responsibilities and the role of the Incident Command System (ICS) are more important than ever. Unity of command, span of control, proper staging, and other considerations are vital with these extended attacks.

Read the following to learn about the next levels of fire response.

Narration Script: ICS shows its real usefulness when you are in for an extended attack or a large fire. By that we mean an attack that lasts beyond the first 24-hour operational period and into the foreseeable future. If you can't get it under control quick, you've got to settle in for a campaign fire. And ICS is just the command system you want in place to make sure things go smoothly. We'll scrutinize issues unique to each type of fire attack in the next couple of sections.

Extended fire attack

During *extended attack*, the IC may call up more resources by striking additional alarms or activating mutual aid agreements. To manage those resources, the IC may also begin filling *command* or *general staff* positions.

Whether the additional resources come from within the agency or from *mutual aid* sources, the ordering process is simplified if resources are requested in *strike teams* or *task forces*. Single resources may be assembled at staging and configured ("formed up") as *strike teams* or *task forces* to meet the needs of the situation.

Divisions and Functional Groups

Command must apply principles of unity of command and span of control as it adds resources to the fire organization. Often ICs must break down areas of responsibility into geographic divisions and functional groups. For example, the fire perimeter may be subdivided into divisions (designated alphabetically) starting at the heel (usually the point of origin) and progressing clockwise around the entire fire. Also, Command may assign certain tactical functions, such as structure protection, as a branch or group.

Narration Script: Larger incidents require more resources and therefore more command functions to manage them. Also, the fire perimeter itself may need to be broken up into divisions. Large wildland fires are frequently divided up for convenience just as you describe the sides of a burning building.

Large fire

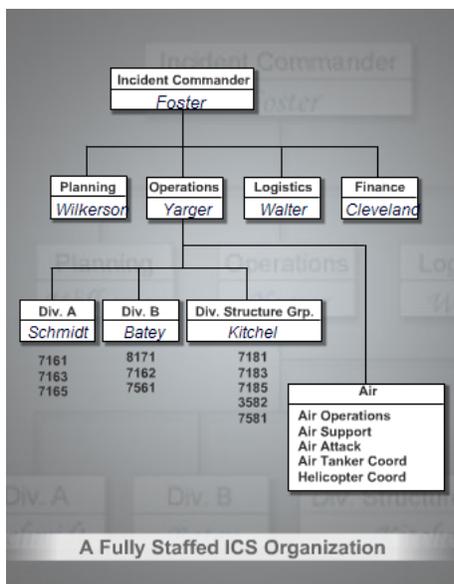
A large fire has gone beyond initial attack and has burned over 300 acres (121 ha) in light fuels or 100 acres (40 ha) in heavy fuels. In such cases, you need additional resources not only to attack the fire but also to provide relief for personnel who have been on the fireline for many hours.

Crews coming off the line need:

- Food, showers, and sleep
- Apparatus resupplied with hose, foam, etc.
- Equipment serviced and repaired

A large fire often requires an ICS structure with a full-blown command and general staff. Delegating to the staff allows the IC to maintain a manageable span of control. Similar delegation happens in each of the sections to maintain the span of control of each section chief. In addition, pre-designated incident management teams may be called in to assist on major incidents.

Narration Script: Low humidity, high winds, high temperatures, and difficult terrain can defeat the best laid plans. If a fire continues to grow beyond the second operational period, despite the addition of extended attack forces, the IC has no choice but to request more resources and expand the incident organization. This graphic shows an example of a fully developed and staffed organization for a large fire.



Caption: An example of an incident command flow chart.

Knowledge Check 15

Multiple choice—check the box of the answer(s) you choose.

You've been on the line for a while now. Let's see if you know what kind of incident you're on. Select the set of terms that BEST completes the following sentence.

A response to a grass fire lasting beyond the first operational period is referred to as _____, and one growing beyond 300 acres (121 ha) is _____ .

- an initial attack, an extended fire attack**
- an extended fire attack, a large fire**
- a large fire, a unified attack**
- a unified attack, an extended fire attack**

The correct answers are an extended fire attack and a large fire.

Crew readiness

Many different types of crews may be involved in wildland fire fighting, and they all need to be ready to perform at their best when called.

Let's take a closer look at:

- Hand crews**
- Engine crews**
- Helitack crews**
- Dozer and tractor plow crews**

Read the following about each crew type and its sizes and capabilities.

Hand Crews

Hand crews usually consist of from 10 to 20 members but may sometimes consist of as few as five. Hand crews have some of the most physically demanding assignments on the fireline—constructing a fireline by hand is not only arduous, it is often done in the worst atmospheric conditions and terrain possible.

Proper transportation of hand crews to assignments is critical. Think about it—if you have to hike for miles to reach your assigned section of fireline, how fresh and productive are you going to be when you finally *do* get there?

Under ICS, hand crews are *typed*—a Type 1 crew is the most capable.

Engine Crews

Engine crews have to be ready to perform when called. While these crews usually do not have to walk to their assignments, they may have to perform some very strenuous tasks.

For example, setting up a long progressive hose lay in difficult terrain can be very demanding.

Engine crews are not typed, but engines are.

Helitack Crews

Helitack crews are used for the initial attack on small, remote fires. They also manage the helicopter that carries ground crews to these locations. The size of the crew will vary according to the agency or organization and the type of helicopter.

Under ICS, helicopters are typed—a Type 1 helicopter has the most passenger seats.

Dozer/Tractor Plow Crews

Dozers and tractor plow units are used to construct firelines and support other ground forces. The “crew” is usually made up of an operator and a helper.

As with other types of crews:

- Dozers are classified from Type 1 to 3, with Type 1 being the heaviest and Type 3 the lightest.
- Tractor plows are classified from Type 1 to 6, with Type 1 being the heaviest and Type 6 the lightest.

Narration Script: When we’re talking about crews here, we’re talking about you and a lot of other resources! Whether you are on a hand crew or an engine crew, your job is a demanding one.

Cultural differences

Of course a crew is made up of individuals, and no two individuals are exactly alike. You might encounter cultural differences that affect:

- Food
- Housing
- Dress
- Religion

Social and ethnic distinctions could result in language barriers or even rivalries between ethnic groups. And mixed crews made up of men and women may make separate facilities a must. But differences don’t have to result in divisions or compromise safety. The keys are respect and a healthy dose of communication. Remaining respectful and courteous will build a cohesive crew where individuals focus on what they have in common—fighting a fire—and on watching out for each other’s safety.

Narration Script: Treating your fellow wildland firefighters with respect and professionalism—even if they don't look like you or share your beliefs—isn't just agency policy, it makes good sense. You need to be able to get along with people from diverse backgrounds.

Knowledge Check 16

Multiple choice—check the box of the answer(s) you choose.

Fighting fires requires teamwork, but you also have to *know thyself* and be ready.

Identify THREE personal responsibilities you must adhere to before fire fighting.

- Report hazardous conditions to news crews and command**
- Ensure objectives and instructions are understood**
- Identify accidents and injuries to area medical unit**
- Keep personal clothing and equipment in serviceable condition**
- Develop personal incident management plans**
- Maintain yourself in good physical condition**

The correct answers are ensure objectives and instructions are understood, maintain yourself in good physical condition, and keep personal clothing and equipment in serviceable condition.

Topic summary

Now that you've finished with this topic, you understand that the resources needed to fight a wildland fire vary depending on the fire's size and intensity. In a way, the fire gets to call the shots—at least until you and your co-workers arrive.

Your incident commanders (IC) may call for:

- Hand crews**
- Engine crews**
- Helitack crews**
- Dozer and tractor plow crews**

But the most important resource to arrive at the scene are the firefighters themselves. The fire fighting crew must understand their individual responsibilities and be prepared for an extended or even a large fire—while hoping for a quick mop-up.

Narration Script: Fighting wildland fires is complicated business—almost as complicated as the fires themselves. Equipment is gathered, people get involved from distinctively different backgrounds, and roles are assigned. But with good communication and coordination skills, all the pieces fit together in one professional package.