



S-130 NWCG Instructor Guide S-130 Unit 5: Risk Management

Summary:

The intent of this unit is to serve as an introduction to the 10 Standard Firefighting Orders, 18 Watch Out Situations, Common Denominators of Fire Behavior on Tragedy Fires, and their connectivity to Lookouts, Communications, Escape Routes, and Safety zones (LCES).

Incident Position Description (IPD) Alignment:

This unit aligns with the following FFT2 IPD specific duties

(<https://www.nwcg.gov/positions/fft2/position-ipd>):

- Establish Lookouts, Communications, Escape Routes, and Safety Zones (LCES) before they are needed, according to IRPG guidance.
- Apply the Standard Firefighting Orders and Watch Out Situations to your assignment, as stated in the IRPG.
- Use Look Up, Down and Around in the IRPG to help maintain situational awareness. Adjust actions accordingly.

Objectives:

Students will be able to:

- Describe the 10 Standard Firefighting Order and provide examples of their application.
- Describe the 18 Watch Out Situations and provide examples of their application.
- Identify the common denominators of fire behavior on tragedy fires.
- Define Lookouts, Communications, Escape Routes, and Safety Zones (LCES) and describe factors that influence escape time and safety zone size.
- Describe how LCES is related to the 10 Standard Firefighting Orders and 18 Watch Out Situations.
- Identify elements of Risk Management in the Point Fire case study.

Unit at a Glance:

Topics	Method	Duration
10 Standard Firefighting Orders	Presentation	20 Minutes
18 Watch Out Situations	Presentation	30 Minutes
Common Denominators	Presentation	15 Minutes
LCES	Presentation	15 Minutes



Safety Zone and Escape Time	Presentation	15 Minutes
Point Fire Case Study	Presentation	30 Minutes
Total Unit Duration		2 Hours, 5 Minutes

Materials:

- Incident Response Pocket Guide (IRPG), PMS 461, <https://www.nwcg.gov/publications/461>.
- NWCG RT-130, Wildland Fire Safety Training Annual Refresher, <https://www.nwcg.gov/publications/training-courses/rt-130/operations/op820>.
- Notebook for participants.
- S-130 Student Evaluation Task Sheet.
- Ability to display images and video on large screen.
- White board or easel access for group breakouts.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 1



NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 2

Objectives

Students will be able to:

- Describe the 10 Standard Firefighting Orders and provide examples of their application.
- Describe the 18 Watch Out Situations and provide examples of their application.
- Identify the common denominators of fire behavior on tragedy fires.

S-130 Unit 5: Risk Management 2

- ☐ Review unit objectives.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 3

Objectives

Students will be able to:

- Define Lookouts, Communication, Escape Routes, and Safety Zones (LCES) and describe factors that influence escape time and safety zone size.
- Describe how LCES is related to the 10 Standard Firefighting Orders and 18 Watch Out Situations.
- Identify elements of risk management in the Point Fire case study.

S-130 Unit 5: Risk Management 3

- ☐ Review unit objectives.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 4



Pre-Video Discussion

- The 10 Standard Firefighting Orders are very useful tools to ensure minimized risk of injury during firefighting activities.
- Some home units may require firefighters to memorize the 10 fire orders. You do not need to memorize them for this class.
- They are on the cover of your IRPG, so you can reference them quickly when needed. Always keep your IRPG on your person.
- As your wildland fire career progresses, these orders should become muscle memory instinctively kicking in every time you engage a wildfire.

☐ Play Video

Title Standard Firefighting Orders

Summary Introduction to the history and intent of the 10 Standard Firefighting Orders.

Time (04:18)

Audio

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 5



- ☐ Reference Standard Firefighting Orders in *Incident Response Pocket Guide (IRPG)*, PMS 461, <https://www.nwcg.gov/publications/461>.
- ☐ Discuss fire behavior group:
 - When arriving at an incident, you need to know what the fire is doing and what it might do before establishing safety zones and escape routes:
 - #1. Keep informed on fire weather conditions and forecasts.
 - #2. Know what your fire is doing at all times.
 - #3. Base all action on current and expected fire behavior.

Note to Instructor

- This photo was likely taken in the morning. Note the drift smoke.
- Note the puff of smoke above the thermal belt on the left side of the image.
- Thermal belt/inversion can affect fire behavior as the burn period progresses.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 6



- ☐ Reference Standard Firefighting Orders in *Incident Response Pocket Guide (IRPG)*, PMS 461, <https://www.nwcg.gov/publications/461>.
- ☐ Discuss fireline safety group:
 - Once you know what the fire is doing, you have the information you need to establish your fireline safety.
 - The fireline safety group comes next:
 - #4. Identify escape routes and safety zones and make them known.
 - #5. Post lookouts when there is possible danger.
 - #6. Be alert. Keep calm. Think clearly. Act decisively.

Note to Instructor

- The firefighters in the image have a more than adequate size safety zone. Vehicles could fit in this safety zone.
- Firefighters appear calm and alert.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 7



- ☐ Reference Standard Firefighting Orders in *Incident Response Pocket Guide (IRPG)*, PMS 461, <https://www.nwcg.gov/publications/461>.
- ☐ Discuss organizational control group:
 - You know what the fire is doing and what it might do, escape routes have been identified, and lookouts posted.
 - You are calm and alert.
 - When prompt communication is established, clear instructions are given, and control is maintained:
 - #7. Maintain prompt communications with your forces, your supervisor, and adjoining forces.
 - #8. Give clear instructions and ensure they are understood.
 - #9. Maintain control of your forces at all times.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 8



- ☐ Reference Standard Firefighting Orders in *Incident Response Pocket Guide (IRPG)*, PMS 461, <https://www.nwcg.gov/publications/461>.
- ☐ Review overall fire order intent:
 - First, know what the fire is doing and what it might do (fire behavior group – orders 1 to 3).
 - Second, escape routes have been identified and lookouts posted (fireline safety group – orders 3 to 6).
 - Third, communication is established, and clear instructions have been given (organizational control group – orders 7 to 9).
 - What's left:
 - #10. Fight fire aggressively having provided for safety first.
- ☐ Discuss that although in a list format, the intended use of the orders is not to check off 1 through 10 as you would a checklist, but to act as reminders of conditions that need to be continuously maintained and assessed throughout each operational period.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 9



Pre-Video Discussion

- The original Watch Out Situations were introduced less than ten years after the 10 Standard Fire Orders were developed.
- ☐ Discuss that the Watch Out Situations are indications to personnel that if positive action is not immediately taken, you could endanger yourself or your crewmembers.
- ☐ **Play Video**

Title Watch Out Situations

Summary This video is an introduction to the history and intent of the Watch Out Situations and a review of the watch outs.

Time (06:10)

Audio

Note to Instructor

Discuss that the intended use of the Watch Out Situations is to continually reassess situational awareness in an operational setting. is not to check off 1 through 10 as you would a checklist, but to act as reminders of conditions that need to be continuously maintained and assessed throughout each operational period.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 10



Note To Instructor

This slide is intended as an opportunity to introduce students to the Firefighting Orders and Watch Out Situations Immersive Activity available on the NWCG RT-130, Wildland Fire Safety Training Annual Refresher (WFSTAR) website: <https://www.nwcg.gov/publications/training-courses/rt-130/operations/op820>

The Immersive activity is designed as an opportunity for students to apply the 10 Standard Firefighting Orders and 18 Watch Out Situations in simulated fire scenarios.

The activity does require internet access. If that is not an option in the location the course is being facilitated, it is recommended that this slide serve as a reminder to take time to advise the students about them and how to access them. This can be an optional activity to conduct outside of class.

If internet access is not an issue in the classroom, directions on how to facilitate this activity are provided under Module Tools on the activity link provided.

Slide 11

1977. The International Fire Chief 43(9): 9-10, 12-15.

Forest Fires!

Fatal and Near-Fatal Forest Fires The Common Denominators

by Carl C. Wilson

Fighting large forest fires often is compared to military operations. Each involves a highly structured organization with a "general" at the head, massive movements of men and equipment, tactical aerial support and long periods of combat and stress until the enemy finally is conquered. Yet, there is one major difference between military and firefighting strategy: in suppressing large fires we do not take the calculated risk of losing fire fighters. In spite of this policy, many people have lost their lives in forest fires in the United States.

The concern is with the differences and the similarities between those fires in which someone dies and those in which someone has a very narrow escape. As this article will show, the line is thinly drawn and depends on many factors, the most vital and most uncertain being that of

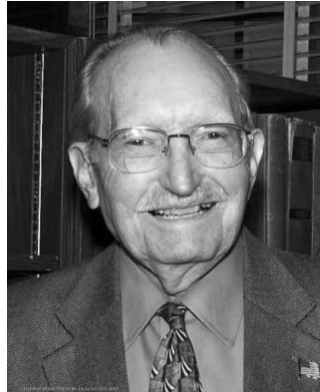
A review of the U.S. Forest Service's records between 1926 and 1970 shows that 145 men died on 41 fires from lightning-induced injuries. There have been no heavy losses in recent years. The largest losses in single fires occurred in the Blackwater fire in Wyoming in 1937 and on the Rattlesnake fire in California in 1953 (Table 1). In each case, 15 people died. A similar analysis made of people lost on fires in areas protected by other Federal agencies and State, county and private agencies reveals 77 fire-induced fatalities on 26 fires. The one fire responsible for the largest number of deaths was the 1933 Griffith Park Fire in southern California, which accounted for 23 fatalities and 128 injured people (Table 2).

The data in these tables and in the two additional tables listing 'near-fatal' fires (Tables 3 and 4) help demystify these related fire types. It is possible to identify some commonalities between the behaviour in both fatal and near-fatal fires. It should be stressed at the very beginning, however, that all fires differ and the change of one small factor can result in an entirely different picture. A glance through the four tables should convince any reader of the immense variability between the circumstances surrounding any one fire. The tables also show that fatal and near-fatal fires often involve some of the same behaviours and occur under seemingly innocuous conditions. Finally, we need to exercise the potential for future tragically fires and offer some suggestions and guidelines to the man who is going to be out there on the fire line tomorrow.

Common Denominators of Fatal Fires

1. Most of the incidents occurred on relatively small fires or isolated sectors of larger fires.

The International Fire Chief



Carl C. Wilson

Stephen Rosen

- NWCG S-130 NWCG Instructor Guide S-130 Unit 5: Risk Management

NWCG Instructor Guide S-130 Unit 5: Risk Management

- Annual grasses contribute to fine dead fuel moisture, a primary indicator of expected fire behavior as well as the primary carrier of the fire.
 - #3. When there is an unexpected shift in wind direction or in wind speed:
- Frontal passage, thunderstorm out flows, foehn winds, and diurnal wind shifts all cause change in wind direction or wind speed.
 - #4. When fire responds to topographic conditions and runs uphill:
- On average, when slopes reach 30 percent the fire rate of spread will double.
- The rate of spread will double again when slope reaches 55 percent.
- Canyons and steep drainages act like a chimney, funneling the fire up hill, drying and preheating available fuel making vegetation more readily available for volatile fire consumption.
 - #5. Critical burn period between 1400 and 1700:
- 2014 WFSTAR report: 19 of 26 separate fatality burnover incidents have occurred in this time period.
- An average time from increased fire behavior to entrapment is 24 minutes.
- Be within 10-15 minutes of an approved safety zone (adequate for number of people, expected fire behavior, surrounding fuels, etc.) during this critical burn period.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 12



Pre-Video Discussion

- At the heart of the 10 Standard Fire Orders is Lookouts, Communications, Escape Routes, and Safety Zones (LCES).
- Paul Gleason produced the concept of LCES following his involvement on the Dude Fire near the Mogillon Rim in Arizona in 1990 where six members of an inmate crew lost their lives.
- Paul Gleason's fire career spanned five decades. He coined the phrase "Be a student of fire".

☐ Play Video

Title LCES

Summary An introduction to the history and intent of LCES.

Time (03:19)

Audio

Post-Video Discussion

- ☐ Reference LCES in *Incident Response Pocket Guide (IRPG)*, PMS 461, <https://www.nwcg.gov/publications/461>.
- ☐ Discuss each element of LCES following bulleted items in the IRPG.
 - "Lookouts need to be in a position to see both the objective hazard and the firefighters" lookouts are used for tree falling activities, steep terrain with rolling rocks and debris, air-tanker or helicopter drops, etc.
 - LCES is not meant to replace the 10 Standard Fire Orders but work with them as a quick safety reminder of the essential Fire Order safety elements for crews progressing in the fire environment throughout each burn period.

NWCG Instructor Guide S-130 Unit 5: Risk Management

Slide 13

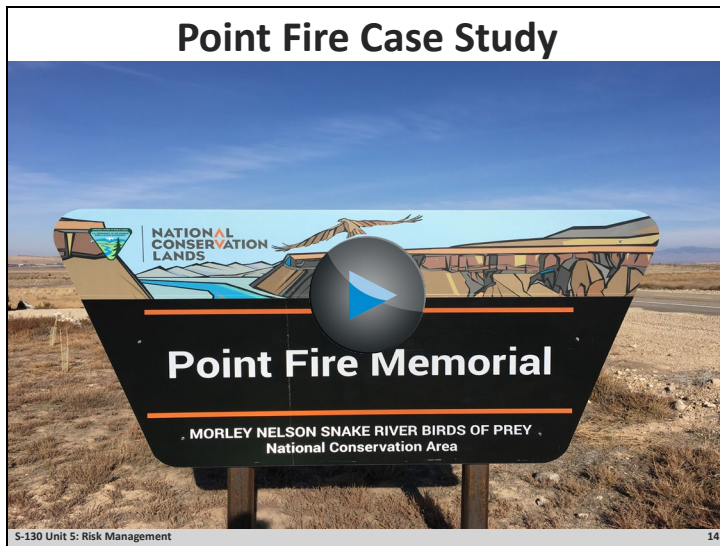


- ☐ Reference Safety Zones in *Incident Response Pocket Guide (IRPG)*, PMS 461, <https://www.nwcg.gov/publications/461>.
- ☐ Discuss factors that influence safety zone size:
 - Survival does not depend on deploying a fire shelter.
 - Surrounding fuel type and vegetation height.
 - Radius equal to at least four times the flame length present.
 - Wind speed and topography influencing radiant heat.
 - Need to accommodate vehicles and equipment.
 - The IRPG's specific distance recommendations assume there is no slope and no convective heat transfer from wind.
- ☐ Discuss variables that influence escape time:
 - Based on the time needed for the slowest person to reach the safety zone.
 - Fatigue and temperature factors as the shift/day progresses.
 - Barriers that may increase travel time, such as topography, loose soils, rocks, and vegetation.
 - Length of route as the crew progresses further along the fire perimeter and away from safety zone.
 - Escape time versus the fire's rate of spread (ROS)
 - Proximity of vehicles to crew.

Note to Instructor

- Not all firefighters are created equal. Some travel on foot faster than others.
- Always consider escape time, the time it takes for all crew members to make it to a safety zone, when selecting escape routes.
- Determining when to seek refuge in a primary or secondary safety zone might not always be obvious. Reassess safety zone location as progressing along the fireline.

Slide 14



Note to Instructor

- Josh Oliver, one of the victims of the Point Fire, was in his first season. He represents the intended audience of this course.
- Encourage these first-year firefighters to be empowered not only to commit these topics to their mental slide show from the very beginning of their fire career but speak up or ask questions when they perceive something might be amiss.

Pre-Video Discussion

- Burnovers account for about 20 percent of fatalities during wildland firefighting operations.
- Firefighter fatalities are also attributed to factors not related to fire behavior. Factors such as aviation incidents, vehicle crashes, falling trees, rolling rocks, and heart attacks or other medical causes make up the majority of firefighter fatalities.
- Risk management applies to every aspect of our job even when we are not actively suppressing fires.

☐ Play Video

Title Point Fire Revisited

Summary A case study of the Point Fire (Idaho, 1995).

Time (15:38)

Audio

NWCG Instructor Guide S-130 Unit 5: Risk Management

Post-Video Discussion

- ☐ Ask the students, if they were Josh Oliver, what would they do in this situation? How would they handle this?
- ☐ Discuss that the Point Fire accident investigation identified communications as one of the contributing factors to the fatalities.
- ☐ Discuss why communication is identified in numerous places in fire education:
 - Fire Order #7
 - Watch Out Situation #7
 - 'C' in LCES

Slide 15

Objectives

Students will be able to:

- Describe the 10 Standard Firefighting Orders and provide examples of their application.
- Describe the 18 Watch Out Situations and provide examples of their application.
- Identify the common denominators of fire behavior on tragedy fires.

S-130 Unit 5: Risk Management 15

- ☐ Review unit objectives.

Slide 16

Objectives

Students will be able to:

- Define Lookouts, Communication, Escape Routes, and Safety Zones (LCES) and describe factors that influence escape time and safety zone size.
- Describe how LCES is related to the 10 Standard Firefighting Orders and 18 Watch Out Situations.
- Identify elements of risk management in the Point Fire case study.

S-130 Unit 5: Risk Management 16

- ☐ Review unit objectives.