



Prescribed Fire Escapes and Near Miss Lessons Learned

Using the High Reliability Organizing
Concept of Mindfulness
to Better Anticipate and Contain
Unexpected Events on Prescribed Fires



Information Collection
Team Report
October 2008



My Background

- 10 Seasons with the Zion Fire Use Module
- Involved with 5 Escapes/Conversions
 - North Gate Peaks (1999)
 - Sanford (2002)
 - Long Jim (2004)
 - Walla (2008)
 - Lava (2009)
- RXB2(t)



National Fire Training Centers

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Apprenticeship Program



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Fire Use
Training Academy



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Objectives

1. Brief Review of High Reliability Organizations
2. Highlights of The Report:



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3. Update on Fire Use Training Academy
(Time permitting)



High Reliability Organizations (HRO)

Definition: “...is an organization that operates in a **high risk environment** and yet—when compared to other organizations—maintains a relatively **low accident/error rate**.

This low accident/error rate associated with HROs is attributed to a process for thinking about the work environment that is called ***mindfulness***.”

High Reliability Organizations (HRO)

Mindfulness: “...a rich awareness of **discriminatory detail** and an enhanced ability to **discover** and **correct** errors that could escalate into a crisis.”

High Reliability Organizations (HRO)



High Reliability Organizations (HRO)

MANAGE THE UNEXPECTED

Anticipate

and

Contain



HRO: Managing the Unexpected

5 Principles, 2 Categories

'Anticipation' of the Unexpected:

- Track Small **Failures**
- Resist **Oversimplification**
- Remain Sensitive to **Operations**

HRO: Managing the Unexpected

5 Principles, 2 Categories

'Containment' of the Unexpected:

- Maintain capabilities for **Resilience**
- Take advantage of shifting locations of **Expertise**

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Business
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INNOVATIVE SOLUTIONS TO THE
PRESSING PROBLEMS OF BUSINESS

Karl E. Weick
Kathleen M. Sutcliffe

Managing the Unexpected

Assuring High
Performance in an
Age of Complexity

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SECOND EDITION

MANAGING THE UNEXPECTED



Resilient Performance in an
Age of Uncertainty

KARL E. WEICK AND
KATHLEEN M. SUTCLIFFE



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Methods AND Data Set

Agencies

- US Forest Service
- Bureau of Land Management
- National Park Service
- US Fish and Wildlife Service
- The Nature Conservancy
- 1 State Forestry Department

Methods AND Data Set

Geographic Locations (GACC)

- Northwest
- Northern California
- Rocky Mountain
- Northern Rockies
- Eastern Great Basin
- Southern Areas

Methods AND Data Set

Data Set

- **10 Escapes or near misses that occurred between 2004 and 2007**
- **20 interviews**
 - Burn Bosses and Trainees
 - Ignition Specialists
 - Holding Bosses
 - Fire Management Officers

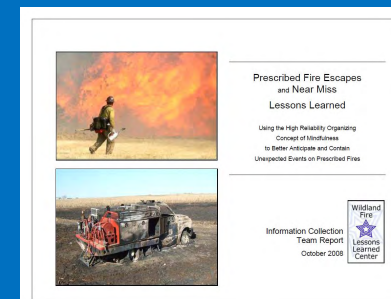
Methods AND Data Set

Disclaimer

- *“The number of escaped fires analyzed in this report **is numerically insufficient to determine or indicate trends.** This report, therefore, is **not intended to be comprehensive or definitive.**” (pg 38)*

The Report

Intent: *“This report is specially designed to help all prescribed fire practitioners—especially burn bosses and agency administrators—improve their skills in planning and implementing prescribed burns.”*



REPORT KEY POINTS:

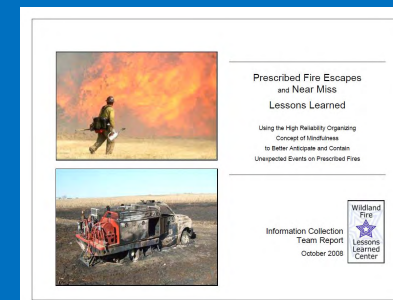
11 Findings, 4 Functional Areas

1. Overall Program Observations

2. Planning and Preparation

3. Implementation

4. Pressures and Expectations

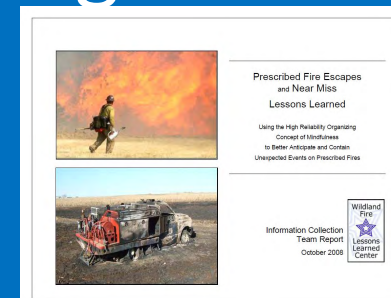


KEY POINTS: Overall Program Observations

1. Mindful Communications

Key Finding

- The success of a prescribed fire is dependent on the **continuity of open and comprehensive conversations** between the agency administrator, planners, cooperators, dispatch centers, and those actually implementing the burn plan.

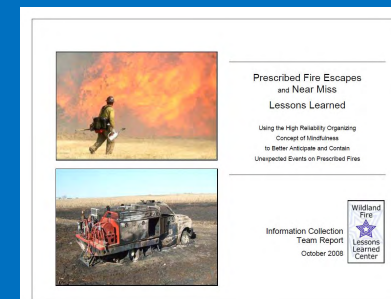


KEY POINTS: Overall Program Observations

1. Mindful Communications


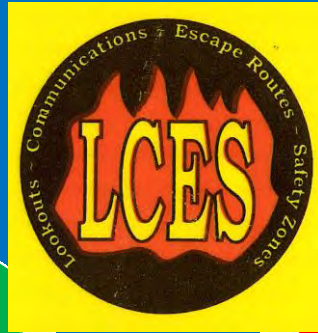
Key Finding

Gaps or weaknesses in coordination and communication greatly increase the probability of failure of the burn.




KEY POINTS: Overall Program Observations

1. Mindful Communications




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A lesson is truly learned when we modify our behavior to reflect what we now know.

A photograph of three men in uniform, likely firefighters or forest supervisors, engaged in a conversation outdoors. They are wearing light-colored shirts and caps. The background shows trees and a building.

Line Officer Lessons Learned

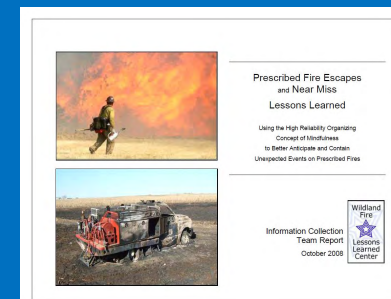
The LLC staff recently interviewed ten forest supervisors, park superintendents, state fire managers and district rangers from around the United States regarding their notable successes, difficult challenges, effective practices and training recommendations for managing wildland fire incidents. These line officers also shared advice and guidance for other line officers and fire managers. Special thanks are extended to these agency administrators for sharing their significant lessons and practices with the wildland fire community.

KEY POINTS: Overall Program Observations

2. The Snowball Effect


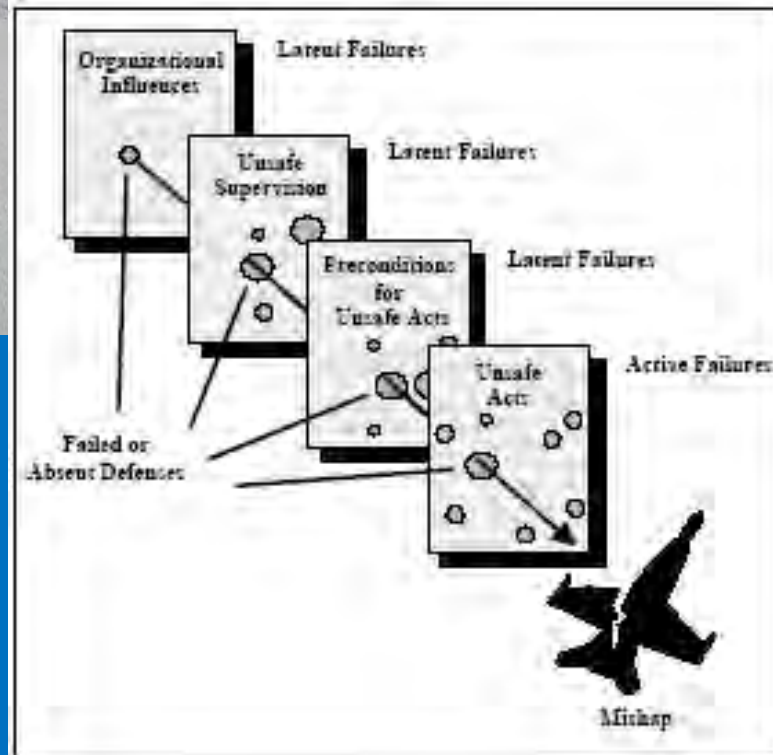
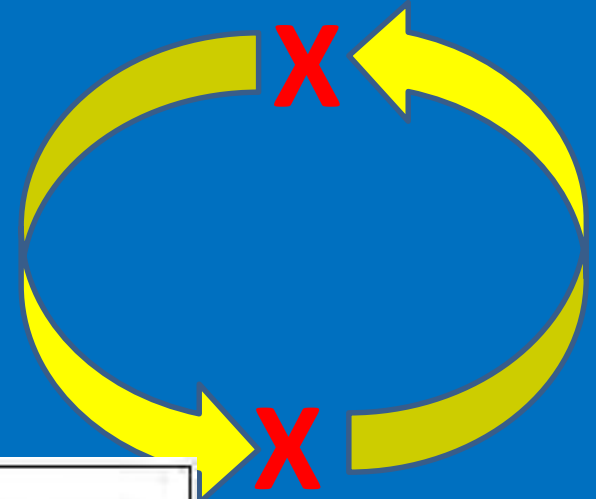
Key Finding

- Problems encountered throughout the entire prescribed fire process will have a **cumulative effect** that can significantly reduce the probability of success for the burn.




KEY POINTS: Overall Program Observations

2. The Snowball Effect



Prescribed Fire Escapes and Near Miss Lessons Learned

Using the High Reliability Organizing Concept of Resilience to Better Anticipate and Control Unsuspected Events on Prescribed Fires



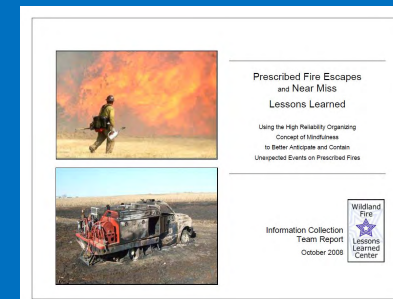
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KEY POINTS: PLANNING AND PREPARATION

3. Smoke Management

Key Finding

- Smoke is an unavoidable product of prescribed fire that can be managed if appropriately modeled.

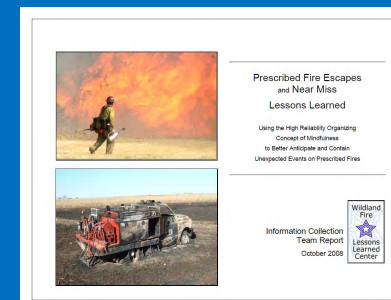


KEY POINTS: PLANNING AND PREPARATION

3. Smoke Management

Key Finding

- **Smoke problems can quickly unite the public against prescribed fire.**

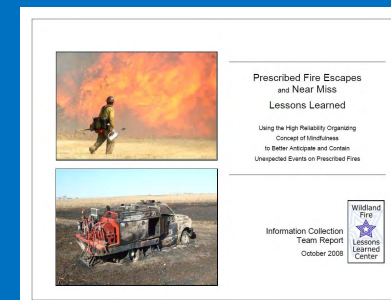


KEY POINTS: PLANNING AND PREPARATION

3. Smoke Management

Key Finding

- Great care must be taken to avoid negative impacts to public health and safety.



KEY POINTS: PLANNING AND PREPARATION

3. Smoke Management



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KEY POINTS: PLANNING AND PREPARATION

4. Heavy Fuel Loadings

Key Finding

Use caution when “...**planning or igniting burns with heavy fuel loadings that have the potential to extend into an area’s normal fire season...**”



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Concept of Excellence
to Better Anticipate and Contain
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KEY POINTS: PLANNING AND PREPARATION

4. Heavy Fuel Loadings




Figueroa Mountain Prescribed Burn Escape Facilitated Learning Analysis




Los Padres National Forest
Santa Lucia Ranger District

December 2010




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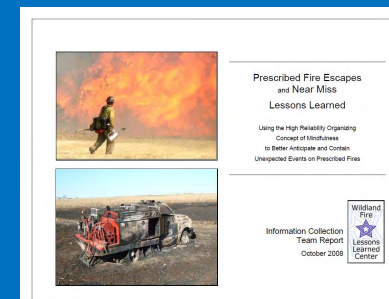


KEY POINTS: PLANNING AND PREPARATION

5. Contingency Planning

Key Findings

“The ability to successfully manage the unexpected is dependent on having **comprehensive contingency plans.**”



KEY POINTS: PLANNING AND PREPARATION

5. Contingency Planning

Element 17. Contingency Planning

*“...If the objectives are not being met, the Contingency Plan, **a required component of the Prescribed Fire Burn Plan** is implemented.”*

Interagency Prescribed Fire
Planning and Implementation Procedures Guide

PRESCRIBED FIRE PLAN

AGENCY/EXECUTIVE SITING: _____

PRESCRIBED FIRE NAME: _____

PREPARED BY: _____ DATE: _____
(Name & Quality Control Agency)

TECHNICAL REVIEW BY: _____ DATE: _____
(Name & Qualification Category)

COMPLEXITY RATING: _____

MINIMUM RISK REQUIREMENTS: _____

APPROVED BY: _____ DATE: _____
(Agency Representative)

July 2008

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KEY POINTS: PLANNING AND PREPARATION

5. Contingency Planning

Key Findings

- Those who lost burns felt their contingency plans were adequate...

- **UNTIL THE ESCAPE**



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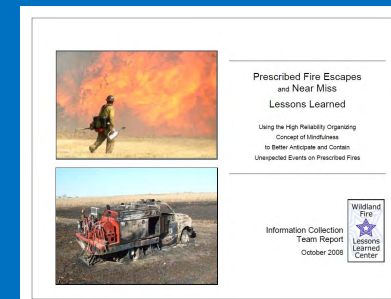


KEY POINTS: PLANNING AND PREPARATION

5. Contingency Planning

Key Finding

- Mitigate transition (RX->Suppression) problems through “...more complete planning and development of contingency plans prior to the prescribed fire’s ignition.”

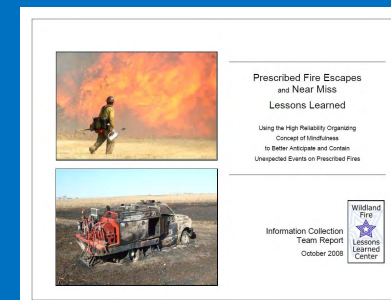


KEY POINTS: PLANNING AND PREPARATION

5. Contingency Planning

Key Finding

- Know the suppression capabilities of your burn personnel.

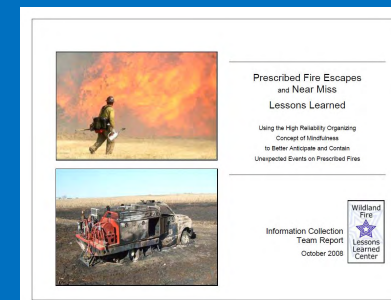


KEY POINTS: PLANNING AND PREPARATION

6. Using Management Action Points

Key Finding

- Incorporate **Management Action Points (MAPs)** into contingency plans

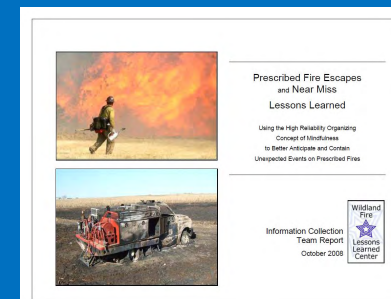


KEY POINTS: PLANNING AND PREPARATION

6. Using Management Action Points

Key Finding

- MAPs can be **spatial** (geographic) or **temporal** (time dependent)



KEY POINTS: PLANNING AND PREPARATION

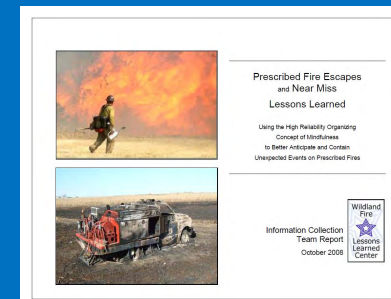
6. Using Management Action Points

Key Finding

- MAPS should be pre-planned and include:


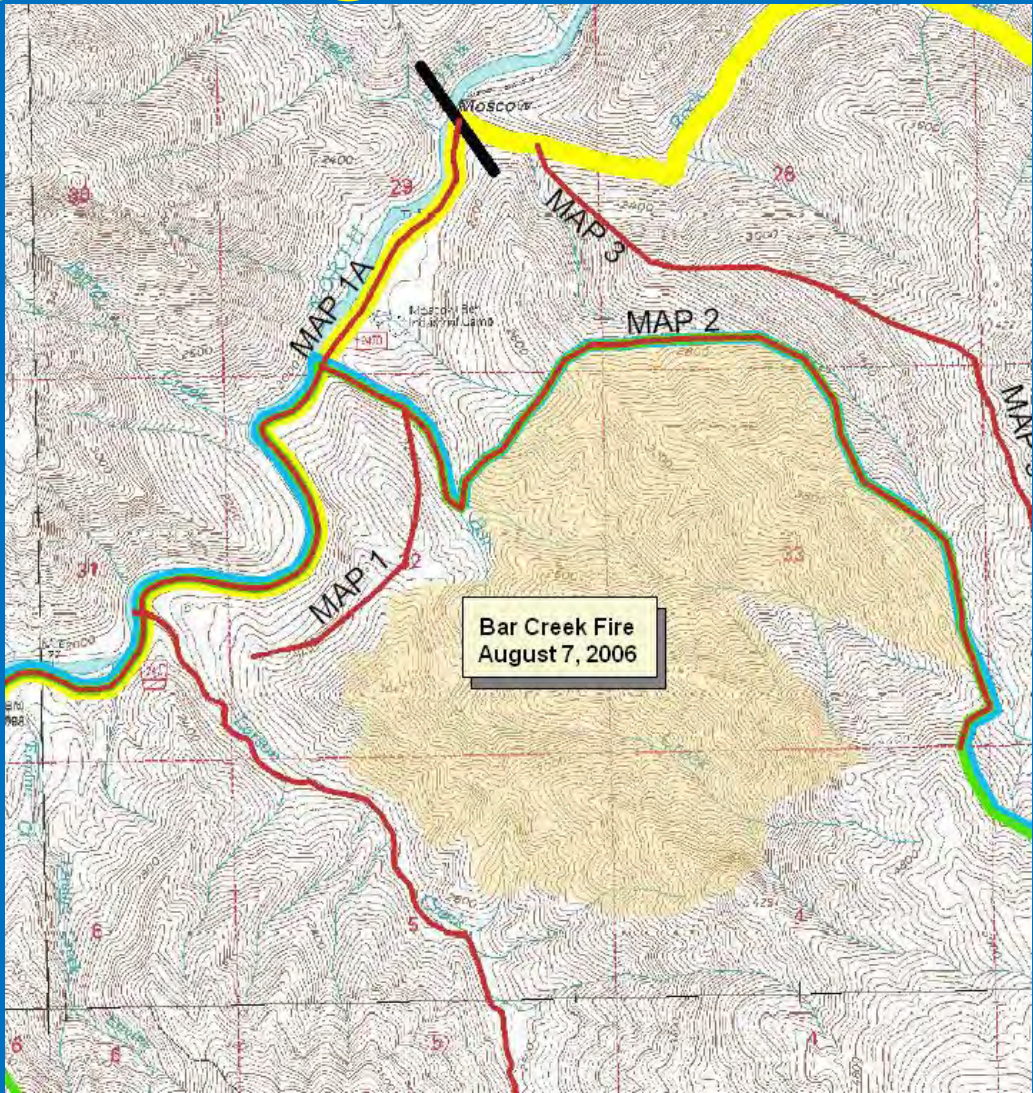
- 1. Appropriate Response**

- 2. Resources Needed**




KEY POINTS: PLANNING AND PREPARATION

6. Using Management Action Points




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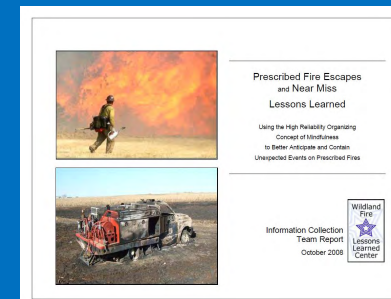


KEY POINTS: IMPLEMENTATION

7. Reassessing on Short-Duration Burns

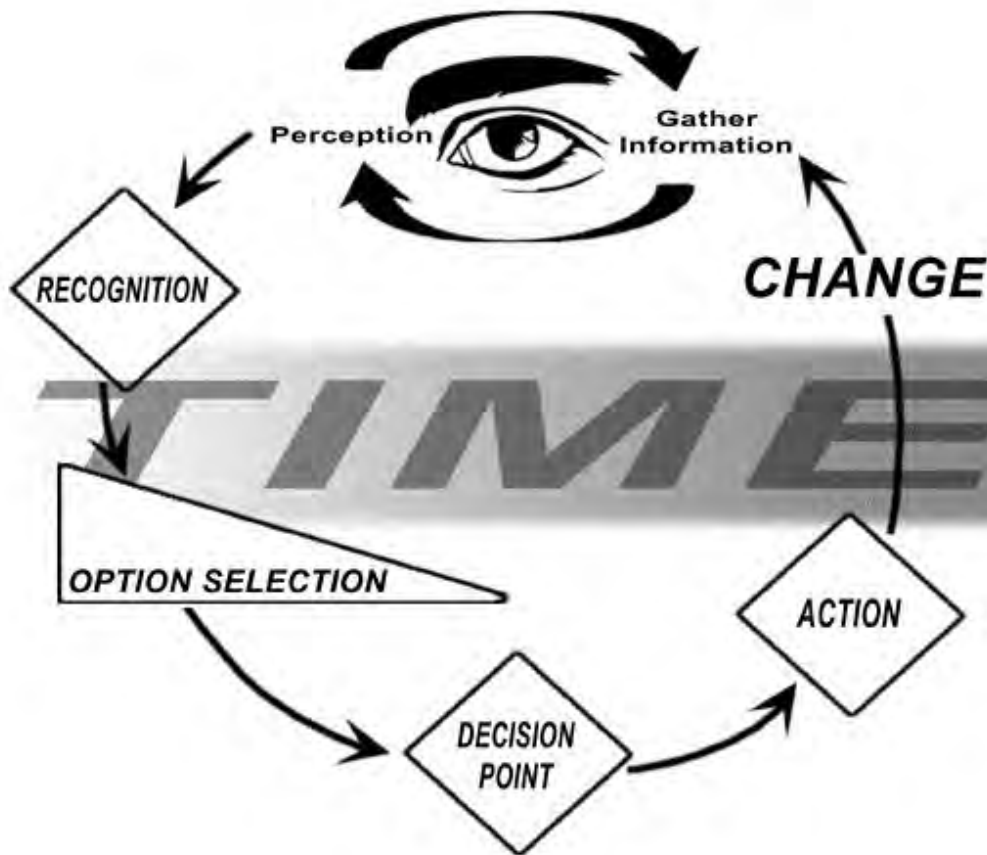
Key Finding:

- Problems encountered on short duration burns (one operational period) **are often not visible** until the implementation phase is initiated.



KEY POINTS: IMPLEMENTATION

7. Reassessing on Short-Duration Burns



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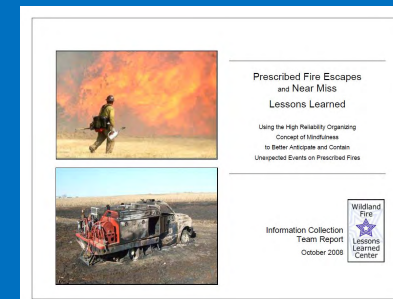
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KEY POINTS: IMPLEMENTATION

7. Reassessing on Short-Duration Burns

Key Finding:

- “...a **mindful infrastructure** that continually reassesses the situation is particularly valuable as time and opportunity to perceive problems—and react to them—is very limited.”

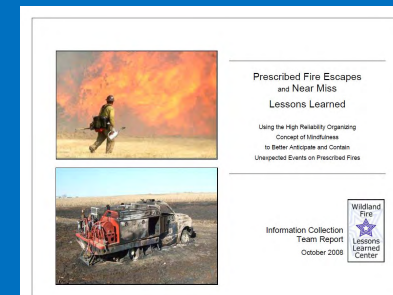


KEY POINTS: IMPLEMENTATION

8. Onsite Leadership

Key Finding

“...as the complexity of the burn increases and decreases, **the level of onsite leadership must be reassessed** to accurately reflect the current burn complexity.”



KEY POINTS: IMPLEMENTATION

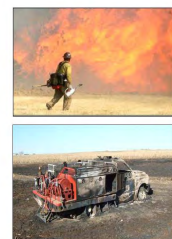
8. Onsite Leadership



RXB3

vs

RXB2/1



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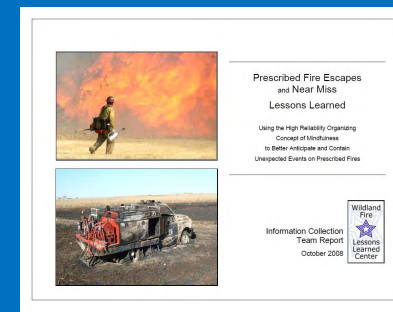


KEY POINTS: IMPLEMENTATION

9. Anticipating Needs on Long Duration Burns

Key Finding

Resource allocation priorities for long term burns (two or more operational periods) will change as conditions warm and dry, making it difficult to assure the availability of needed resources for future operations.

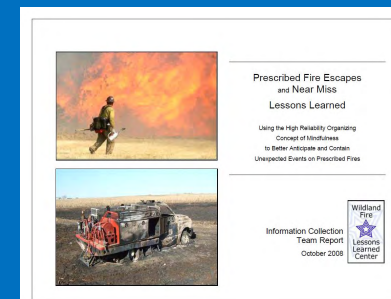


KEY POINTS: IMPLEMENTATION

9. Anticipating Needs on Long Duration Burns

Key Finding

Future conditions and resource needs should be anticipated as far in advance as possible.



KEY POINTS: IMPLEMENTATION

9. Anticipating Needs on Long Duration Burns



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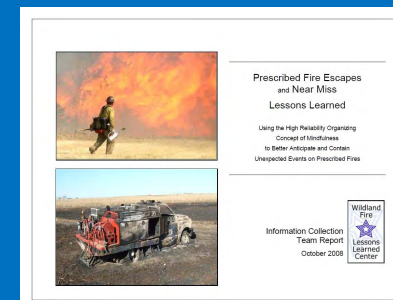


KEY POINTS: IMPLEMENTATION

10. Managing (or Coordinating) Multiple Burns

Key Finding

- Multiple burns have a large potential to either work to a burn boss's advantage or disadvantage. If all burns are successful, the cost per treated acre can be lowered significantly.

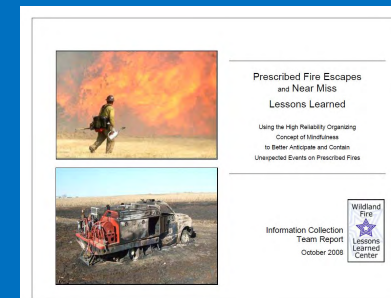


KEY POINTS: IMPLEMENTATION

10. Managing (or Coordinating) Multiple Burns

Key Finding

- However, if unexpected problems are encountered, existing resources are less likely to be able to achieve a favorable outcome.



KEY POINTS: IMPLEMENTATION

10. Managing (or Coordinating) Multiple Burns

National Wildfire
Coordinating Group



NWCG Task Book for the Positions of:

**PRESCRIBED FIRE MANAGER TYPE 2
(RXM2)**

**PRESCRIBED FIRE MANAGER TYPE 1
(RXM1)**

(POSITION PERFORMANCE REQUIRED ON A PRESCRIBED FIRE ASSIGNMENT)

PMS 311-70

JUNE 2009



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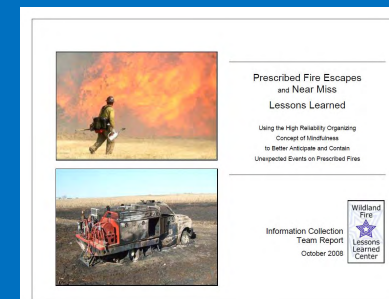


KEY POINTS: PRESSURES AND EXPECTATIONS

11. Self-Imposed Pressure

Key Finding

- Most direct pressure felt by burn bosses is **self-imposed** rather than applied by supervisors or program leaders.

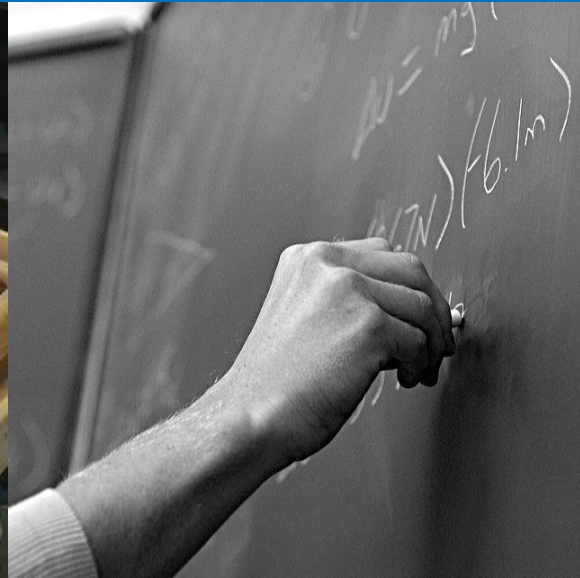


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III Significant Lessons Learned

A photograph of a charred landscape, likely a burn site. In the foreground, there is a piece of rusted metal debris, possibly a piece of a vehicle or structure, lying on the ground. The ground is covered in ash and charred remains. In the background, there is a line of trees, some of which appear to be dead or charred. The sky is overcast.

This chapter provides an inside look into the Information Collection Team's key findings.

Under each finding, the burn team organization's original expectations and assumptions are described.

A corresponding list of High Reliability Organizing mindfulness "prompts" (questions) are also outlined. These provide the reader an opportunity to perform specific sand table exercise-type discussions.

All of you who write burn plans are trained and qualified to do so. These sand table prompts provide you and your teams an opportunity to further expand your thinking. They offer a broader burn planning and implementing experience—without the risk.

Such learning activities can help hone your ability to become better at anticipating and containing unexpected events.

The chapter's findings and sand table prompts are presented and discussed under four main categories: Overall Program Observations, Planning and Preparation, Implementation, and Pressures and Expectations.

1. Mindful Communication

The success of a prescribed fire is dependent on the continuity of open and comprehensive conversations between the agency administrator, planners, cooperators, dispatch centers, and those actually implementing the burn plan. Gaps or weaknesses in coordination and communication greatly increase the probability of failure of the burn.

“Relationships must be well developed prior to the start of the burn.”

“We under evaluated during the planning phase.”

“Everyone knew the big picture, but didn’t put the [big picture] together well.”

From Information Collection Team interviews

Expectation

These quotes from burn personnel interviewed by the Information Collection Team indicate that there was an expectation that coordination and communication, at whatever the stage of the burn, would naturally fall into place.

Prompts to be Used During Sand Table Exercises

- **Preoccupation with Failure:** As you prepared your burn plan, did you get diverse perspectives from your burn crew, line officers, meteorologists, or others on what could go wrong?
- **Wary of Oversimplification:** As you wrote the burn plan, what were the hardest areas to pin down because they were fuzzy or hard to explain? Did you find that you skimmed over these hard-to-explain spots in the plan? Was the preparation of the burn plan just an exercise of filling in the blanks, cutting and pasting?
- **Resilience:** Even after the burn plan was officially approved, did you take time to have an open and comprehensive discussion with your burn organization about the emergence of new clues that something might still be out of place? Did you discuss with your crew up and down the chain of command on how you would work together when an unexpected event occurred?

Wildland Fire Lessons Learned

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A lesson is truly learned when we modify our behavior to reflect what we know.



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National Transportation Safety Board Auditorium, L'Enfant Plaza, Washington, DC

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Search the database below to find historical documents from wildland fire incidents.

[Multi-Incident Comparative Analyses Documents Page](#)

A separate page has been created linking to documents which contain information on multiple wildland fire prescribed fires, and historical analyses.

Simple Search Extended Search

Searching for reports with:

Date Range: to

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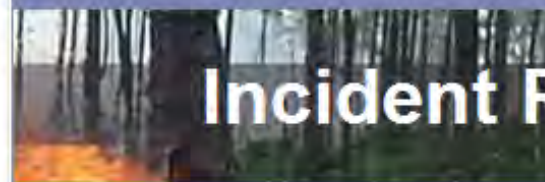
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 List incidents only if reports are available in this database

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Many of the incidents tracked documents available. It is also you are interested in was not therefore will not appear in yet more in the interagency com their experiences, we'll be ab and provide richer search res [Guidelines](#)

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Search the database

Multi-Incident Com

A separate page has prescribed fires, and

Simple Search

Searching for rep

Date Range:

State:

Incident Name:

AccidentType:

Organization:

View Option:

- Engine submerged
- Entrapment
- Entrapment Prescribed Fire
- Entrapment Shelter Deployment
- Entrapment, Burnover
- Entrapment, Deployment
- Entrapment, Equipment Burnover
- Entrapment, Escaped Prescribed Fire
- Entrapment, Shelter Deployment
- Entrapment/Burnover/Deployment
- Equipment Burnover
- Equipment Accident
- Escaped Prescribed Fire**
- Fall
- Fatality
- Fell 50 Feet
- Fell From Engine
- Fell into River
- Fire Training
- Firefighter Burned by Hot Embers on Ground - Sur
- Firefighter Fatality
- Firefighter Feet Burned Through Boots
- Firefighter Injury and Helicopter Incident
- Firfighter Fell Down Ridge
- Flying Debris
- Fractured Left Tibula, Severely Sprained Right Ank
- Fuel Tank Ignition Burns
- Hand Crew Close Call
- hard landing / fall from tree
- Hazardous Gas Exposure

All

All

List all incidents

List incidents only if reports are available in this database

Search

incidents.

Information on multiple wildland fire incidents

DISCLAIMER: RESULTS ARE LIMITED
 Many of the incidents tracked by NIFC documents available. It is also possible you are interested in was not reported therefore will not appear in your search more in the interagency community and their experiences, we'll be able add to and provide richer search results. [Sub Guidelines](#)

Click to use menu with keyboard



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Find Incident Reviews

Search the database below to find historical documents from wildland fire incidents.

[Multi-Incident Comparative Analyses Documents Page](#)

A separate page has been created linking to documents which contain information on multiple wildland fire incidents, prescribed fires, and historical analyses.

Search Results

Your search returned 57 results.

View Option:

- List all incidents
- List incidents only if reports are available in this database

[Return to search...](#)

Report(s) (Click to view)	Year	State	Incident Name	Accident Type	Org
	2004	Arizona	Long Jim III	Escaped Prescribed Fire	Fed
	2003	Arizona	Cherry	Escaped Prescribed Fire	Fed
	2003	New Mexico	Blanco	Escaped Prescribed Fire	Fed
	2003	Wyoming	Sink's Canyon	Escaped Prescribed Fire	Fed

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Sorting by: Year

Sort Direction is: Ascending

Records

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*“A lesson is truly learned
when we modify our
behavior to reflect what
we now know.”*



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Fire Use Training Academy (FUTA)

Update:



- FUTA is restructuring! We are not gone!
- The new FUTA will look different from the old FUTA.
- We have been charged with bridging gaps in several training areas:
 - Prescribed Fire Planning (Landscape Scale/RXB1?)
 - Fuels Management
 - Contracting, Monitoring, etc
 - Long Term Implementation
 - IC Workshops (ICT4/3)
- Delivery Methods
 - Virtual Training
 - We come to you



Fire Use Training Academy (FUTA) Update:



- Please take the time to fill out the questionnaire and talk with me.
- Take home message:
“Stay tuned we will be moving forward again shortly.”



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