The BP11 Escaped Prescribed Fire
Lessons Learned Review

The "Blue Hole" located on the northeast border of the Pine Heights subdivision.

National Key Deer Wildlife Refuge,
U.S. Fish and Wildlife Service,
Big Pine Key, Florida

"We seek to improve our abilities in prescribed fire, emergency response, and capitalize on organizational learning."

From the October 24, 2011 Delegation of Authority Letter to the Lessons Learned Review Team

Contents

The Lessons Learned Review Team

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Lessons Learned Review

"The purpose of a LLR is to focus on the near miss events or conditions in order to prevent potential serious incidents in the future. In order to continue to learn from our near misses and our successes it is imperative to conduct a LLR in an open, non-punitive manner. LLRs are intended to provide educational opportunities that foster open and honest dialog and assist the wildland fire community in sharing lessons learned information. LLRs provide an outside perspective with appropriate technical experts assisting involved personnel in identifying conditions that led to the unexpected outcome and sharing findings and recommendations."

From the *Interagency Standards for Fire and Aviation Operations* (Red Book), Chapter 18 –Reviews and Investigations

"We need more discussion about what could go wrong."

Agency Administrator

1. Introduction

A. Incident Summary

On September 15, 2011, the National Key Deer Wildlife Refuge, located on Florida's Big Pine Key, ignited the 21-acre BP11 Prescribed Fire. The test fire, conducted at approximately 1030 hours, was deemed successful and firing operations began on the unit.

The State of Florida and the Florida Keys. Big Pine Key is the home of the National Key Deer Wildlife Refuge.

At approximately 1130 hours, multiple spot fires ignited across the unit's south boundary. A concerted effort to contain the spot fires was unsuccessful. Prescribed fire personnel pulled back to reassess and prepare for a firing operation to contain the fire.

Because the nearby Pine Heights subdivision, located south of the prescribed fire, was threatened, at 1610, the decision was made to convert the prescribed fire to a wildfire (known as the Blue Hole Fire). At this time, the order was also given to evacuate the subdivision.

The firing operation was successful. At 1900, the Pine Heights subdivision evacuation was lifted. By 2000, the Blue Hole Fire was contained at 100 acres—all of which were inside the refuge's boundary. No private property was damaged.

B. Lessons Learned Review Process

Prior to this Lessons Learned Review (LLR), the BP11 Escaped Prescribed Fire Review (click to follow), conducted by an interagency team, was completed on September 22, 2011—seven days after the event. Not everyone involved in the prescribed fire operation and response to the subsequent wildfire was involved with this earlier review effort.

The National Key Deer Wildlife Refuge staff was interested in further learning from this event. Therefore, on October 24, 2011, a Delegation of Authority was developed for a follow-up Lessons Learned Review (see Appendix A). On November 9, 2011, this Lessons Learned Review Team was assembled onsite to facilitate a one-day discussion with personnel involved in the planning, operations, and wildfire response.

The team's primary goal was to aid the people involved in this incident, develop a collective understanding of what transpired, and identify recommended subsequent changes in behavior. The team's secondary goal was to capture these lessons in a report that could possibly help other prescribed fire practitioners.

The one-day discussion included input from members of: the local fire department, local law enforcement, Region 4 U.S. Fish and Wildlife Service, Florida Forest Service, National Weather Service, Monroe County Emergency Management, National Park Service, U.S. Fish and Wildlife Service law enforcement and fire staff from multiple refuges, and the local Agency Administrator. A total of 29 people attended this facilitated session.

This vicinity map shows the 21.2-acre BP11 Prescribed Fire unit and the four nearby housing subdivisions.

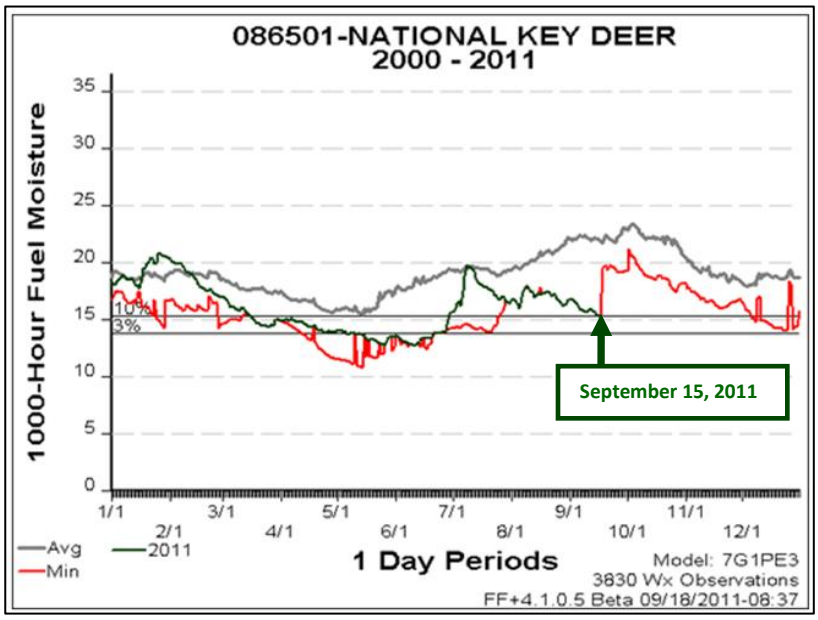
2. Background

A. The BP11 Prescribed Fire Plan

According to the BP11 Prescribed Fire Plan, the primary objective of this project: "*is to reduce the existing wildland fire hazard to both agency and adjacent private lands while improving wildlife habitat for the federally endangered Key Deer.*"

In March 2011, refuge staff began development of the BP11 burn plan. In August, refuge staff began preparing the unit for the burn. In mid-September, an off-refuge fire management professional completed the technical review. After numerous reviews, the Agency Administrator approved and signed the plan on September 15.

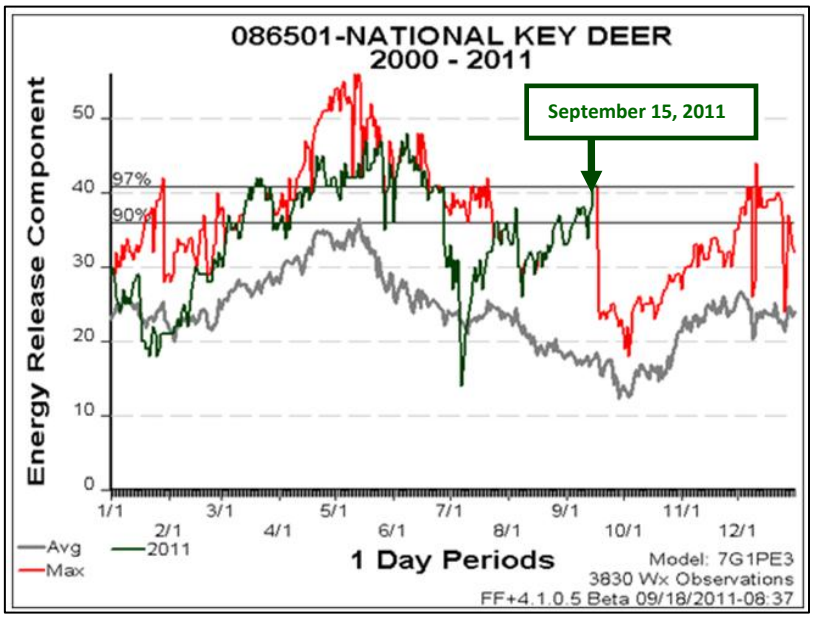
(See Appendix C for the BP11 Prescribed Fire Plan portions regarding burn prescription, contingency resources, and wildfire conversion.)



*This 1000-hour fuel moisture graph provides information about the dryness of 1000-hour fuels (click to follow link). 2011 is represented in **green**. On September 15, 1000-hour fuels were establishing record minimums (for the years 2000-2011).*

B. The 2011 Fire Season

As indicated by the two graphs on this page, conditions are dry. On the day of the prescribed fire, standing marsh water is located in and around the burn unit, which is a prescriptive element "needed to produce the desired fire behavior" of the BP11 Prescribed Fire Plan. (See Appendix C.) In addition, the other necessary prescriptive elements (temperature, relative humidity, and 1- and 10-hour fuel moistures) are forecasted to be within the allowable limits. On the morning of September 15, the environmental factors were favorable and refuge staff determine that the BP11 Prescribed Fire Unit is "in prescription" for burning.



*This Energy Release Component graph provides another good indication of overall seasonal dryness. 2011 is represented in **green**. On September 15, ERC levels were at maximum high seasonal values. Read more about ERC here (click to follow).*

C. Burn Preparation

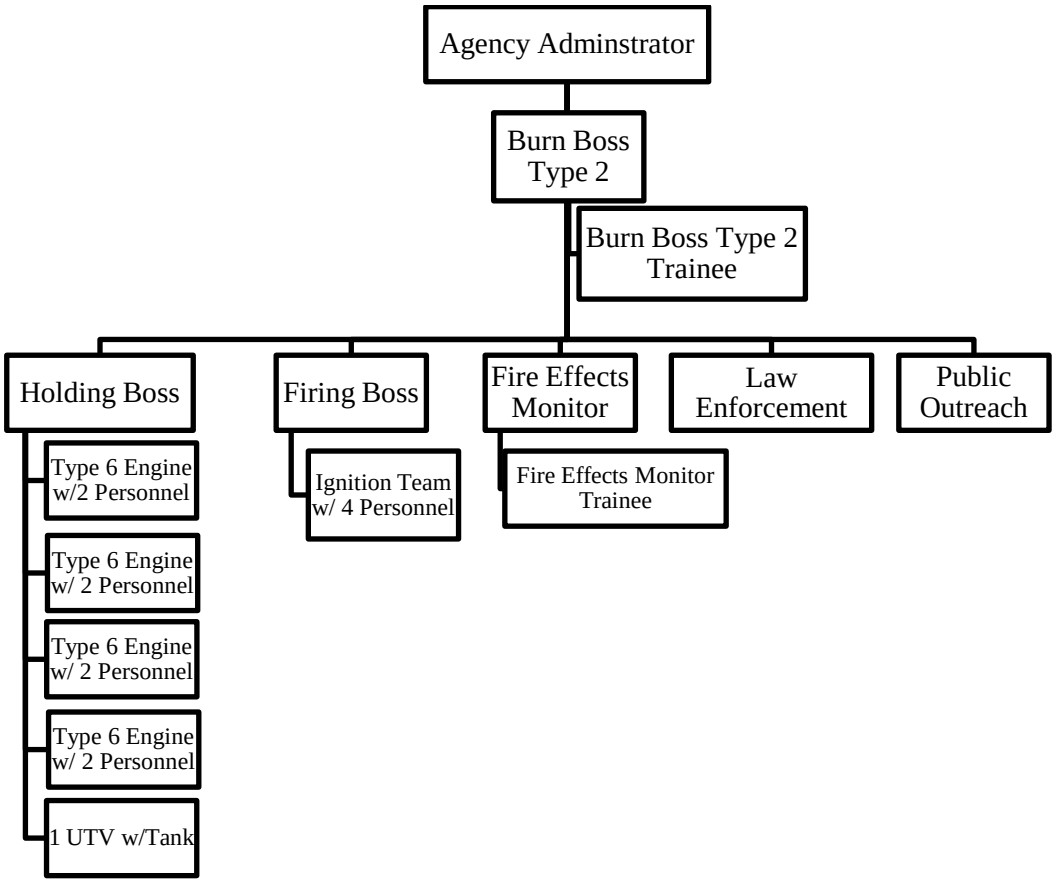
On Wednesday, September 14, refuge staff set up and filled a water tank to supply a hose lay that surrounded the burn unit.

Public notifications on this day included the distribution of flyers, social media postings, and press releases. Radio interviews with the National Key Deer Wildlife Refuge staff (conducted earlier in month) received air time throughout the day prior to the burn. (In addition, radio interviews designed to inform the public about prescribed fire objectives and effects were aired from August through September.)

On the evening of September 14, a planning meeting with prescribed fire overhead was held at 1700 to put together the Incident Action Plan. At this time, it was decided who would take on the role of Incident Commander if there was a need to convert to a wildfire. This person would be on scene at the prescribed fire, but not assigned any specific operational role.

D. The Prescribed Fire Organization

The prescribed fire organization for the September 15 BP11 Prescribed Fire:



"We all know the Incident Command System, but there were times when it wasn't followed."

Engine Captain

3. Incident Chronology

A. Pre-Ignition Activities

At 0600 on September 15, as part of pre-ignition preparation activities, the Prescribed Fire Burn Boss submits a Spot Weather Forecast request to the National Weather Service (NWS). After a Spot Weather Forecast is produced at 0644, the Burn Boss makes a follow-up call to the NWS to clarify the dispersion element of the forecast. Based on that discussion, a second forecast with a revision to the dispersion index is issued at 0709. (See Appendix B.)

By 0730, the prescribed fire briefing is underway at the National Key Deer Wildlife Refuge administrative site (located three miles from burn unit). The refuge does not have a waiver to ignite before 0900 (Florida State Burn Regulations). At 0900, weather conditions are outside the prescribed wind parameters, less than 2 mph on the "low end". (See Appendix C for the BP11 Prescribed Fire Burn Plan elements, including the Prescription Parameters.)

B. Ignition

0930

- All prescribed fire resources arrive at the burn unit.

1025

- The Fire Effects Monitor (FEMO) records a temperature of 89 degrees and relative humidity (RH) at 61 percent. These readings, and all other prescription elements, are within the prescribed parameters.
- With the wind primarily out of the north, the priority is to blackline the unit's southern boundary.
- A test fire is conducted at DP (Drop Point)-3.
- The test fire is deemed successful. Ignitions continue from DP-3 east toward DP-2.

The 21.2-acre BP11 Prescribed Fire unit.

"Ideally, the weather service would call if there were changes, but at the time, they didn't think it was a big deal. But looking back, they emphasized that the dry air mass made it a terrible day to burn."

Burn Boss

1100

- A shift in weather is recorded—the RH drops from 61 percent to 49 percent. The temperature increases from 89°F to 94°F.
- Several spot fires occur across the south line.

1120

- One of the holders begins suffering from heat-related illness and leaves the fireline.

C. Spot Fires and Medivacs

1130

- Fire behavior increases significantly, producing numerous additional spotfires which quickly grow together. All personnel work to contain this large spot.

1142

- The local fire department responds to the heat-related medical emergency. This individual is evacuated to an area hospital.

1210

- A second heat illness emergency occurs with one of the prescribed fire personnel. This firefighter is removed from fireline duties to recover.
- All resources are withdrawn from active suppression of the spot fire and assembled for a head count.

1220

- The Agency Administrator is called and is updated on the situation.
- The prescribed fire overhead gathers to scout and discuss tactical options.

D. Reorganization

1240

- The prescribed fire overhead completes their planning and decides on a plan of action.

1300

- All resources are at Blue Hole (see Vicinity Map on page 4). The individual pre-determined in the Incident Action Plan as the conversion Incident Commander (IC) assumes operational command and provides a briefing. The plan involves installment of a mow line and an eventual firing operation to contain the fire and protect the Pine Heights subdivision.
- The prescribed fire has not yet been converted to a wildfire.
- The Burn Boss and several personnel begin containment operations at the north end of the original burn unit.

"Onsite contingency resources were worn out and unable to help once the burn transitioned."

Engine Captain

*"They [*additional fire resources*] may have come a bit too soon. But if we had waited, it may have been too late."*

State Cooperator

"When people were told to evacuate, they should have been told to go to the shelter that was set up."

Local Fire Department

- The IC briefs the Monroe County Fire Rescue Battalion Chief and explains that there is no unified command at this time.
- The majority of resources rest and rehydrate in vehicles while contingency lines are prepared for firing.

1430

- The Monroe County Sherriff's office closes Key Deer Boulevard. Burn Boss is notified of this closure by local media.

1500

- Contingency helicopter arrives on scene and starts bucket work.
- Burnout operations on the original BP11 Prescribed Fire unit are completed. The southern (DP-4 to DP-5) and western (DP-3 to DP-5) contingency lines are prepped for firing operations.

1600

- Firing operations begin between DP-4 and DP-5 along the southern contingency line. (See map on page 11.)

E. Wildfire

1610

- Due to the need to evacuate a subdivision, the decision is made to convert the prescribed fire to a wildfire, which becomes known as the Blue Hole Fire. The evacuation of Pine Heights subdivision is ordered. A unified command with local responders is established. (See Appendix C for Wildfire Conversion Element of the BP11 Prescribed Fire Burn Plan.)

1615

- The sheriff's office is requested to help with the evacuation.

1645

- The IC takes an aerial reconnaissance flight.

1700

- The Monroe County Emergency Management Office is first aware of the evacuation.

1830

- The firing operation is complete.

1900

- Evacuation and road closure are lifted.

2000

- The wildfire is declared contained. Mop-up and patrol activities are underway.

This overview shows the boundaries of the 100-acre escaped BP11 Prescribed Fire—which became known as the Blue Hole Fire. The fire was contained within National Key Deer Wildlife Refuge boundaries. No private property was burned.

"There was a lot of effort focused on the neighborhoods north of the unit because—in contingency planning—we expected an escape to go north, not south like it did."

Agency Administrator

"The sooner we are involved in the incident command structure, the sooner we can deploy resources."

Local Fire Department

4. Lessons and Follow-Up Actions from Prescribed Fire Participants

During the Review Team's discussion with the BP11 Prescribed Fire participants, the group was asked to identify lessons that emerged as a result of this prescribed fire's outcome. In addition, participants were challenged to provide specific actions associated with the lessons that they identified. In other words, to identify and share the specific behaviors that they will change—based on these lessons.

Therefore, each "lesson" in this section is joined with an associated "action."

This chapter is divided into the following sections:

A. Interagency Planning
B. Prescribed Fire Planning
C. Communications
D. Organizational Development

A. Interagency Planning

1. Cohesion Between Federal and Non-Federal Emergency Responders

Lesson

There are excellent opportunities to continue to build cohesion between Federal and Non-Federal emergency responders.

Action

Conduct annual simulations that allow members of each community the chance to gain familiarity with one another. The Advanced Incident Command System (I-300) class and annual simulations were suggested as opportunities to do so.

2. Pre-Plan Evacuation and Structure Protection

Lesson

Planning for potential residential evacuations was not included or referenced in the prescribed fire burn plan or planning process. The evacuation and structure protection actions by local fire departments were organized and efficient, but these actions were not planned—they just happened.

Action

Pre-plan this organization. Do not count on it just happening. Work with cooperating agencies to establish a comprehensive evacuation plan. Provide a reference to an evacuation plan in the prescribed fire burn plan and Incident Action Plan (IAP).

3. Trigger Points for Unified Command

Lesson

Not everyone was clear on when the unified command was initiated, nor was there a physical location for commanders to meet.

Action

Develop unified command trigger points based on a predetermined process. Determine what personnel will be included and where the Incident Command Post (ICP) will be located.

B. Prescribed Fire Planning

1. Involve Non-Federal Cooperators in the Pre-Planning Process

Lesson

Contingencies focus on Federal and State responders and not county and municipal responders.

Action

Involve Non-Federal cooperators in pre-planning process. Work to define unified command processes and expectations.

2. Complete Prescribed Fire Plans Well in Advance

Lesson

The prescribed fire plan was not completed far enough in advance of the implementation.

Action

Finalize the prescribed fire plan at least three months prior to the ignition target. Involve relevant personnel with this planning.

3. The Inclusion of Dispatcher

Lesson

There is not a federal dispatcher involved in the implementation of prescribed fires.

Action

Build the position of dispatcher into the command structure and involve this person in pre-planning activities.

4. Contingency Resource Confusion

Lesson

Resources listed as “contingency resources” were utilized to implement the actual prescribed fire.

Action

Do not use the term or concept of “onsite contingency resources.”

5. Contingency Plan Trigger Points

Lesson

The contingency plan trigger points were not known to relevant personnel.

Action

Clarify trigger points and include discussion of the contingency plan in pre-burn briefing and Incident Action Plan. When appropriate, announce the implementation of the contingency plan.

6. What Contingency Plans Should Include

Lesson

Resources responding to the contingency action and escape did not have access to an Incident Action Plan.

Action

Ensure that Incident Action Plans have the appropriate command structure, maps, etc.—and are made available to contingency resources.

7. Concerns Regarding Implementation Costs

Lesson

Concerns regarding the costs of implementation—whether real or perceived—affect the prescribed fire planning process when planners consider minimum resources required for implementation.

Action

Plan for what is needed and work with regional personnel to sort out the finances.

8. Develop an Escaped Fire Resource Order

Lesson

An escaped fire "pre-order" or "run card" would have helped speed the conversion process.

Action

Develop an escaped fire resource order and stage it with the appropriate dispatching office prior to the prescribed fire implementation.

9. Invite All Relevant Personnel to Pre-Implementation Meeting

Lesson

The pre-implementation meeting, where the Incident Action Plan was developed, should include invitations to all relevant personnel, including the Agency Administrator.

Action

Ensure that this critical meeting is announced to all relevant personnel.

10. Clarify Differences between Agency Administrator 'Go/No-Go Pre-Ignition Approval' and the Prescribed Fire 'Go-No-Go Checklists'

Lesson

Confusion exists about the intent of each Go-No-Go checklist.

Action

Make sure that everyone is aware that:

- The Agency Administrator's Go/No-Go Pre-Ignition Approval evaluates whether the compliance requirements, the Prescribed Fire Plan's elements, and internal and external notification(s) have been completed—and expresses the Agency Administrator's intent to implement the Prescribed Fire Plan (to be completed well in advance of the implementation).

- The Prescribed Fire Go-No-Go Checklist is completed every day of ignition and is the responsibility of the Burn Boss.

11. Prescribed Fire Briefings

Lesson

Prescribed fire briefings should include an opportunity for the operational overhead to provide an overview of their plans. "Break-out" sessions should be conducted by key operational overhead, including the Firing Boss and the Holding Specialist.

Action

Plan the prescribed fire briefing with key operational overhead prior to the full briefing. Allow these leaders the chance to actively participate in this briefing.

12. Prescription Elements

Lesson

The prescription was focused primarily on two elements ("Fine Dead Fuel Moisture" and "Wind"). This focus allowed other elements to avoid appropriate operational scrutiny.

Action

All prescription elements need to be reexamined to provide an inclusive, flexible overall prescription that is functional.

13. Onsite Weather Observations

Lesson

Weather observations should be consistently derived from one source (weather station or sling pyschrometer).

Action

Prior to prescribed fire implementation, decide how this will be accomplished and stick to the plan.

14. Medical Emergency Plan

Lesson

The medical emergencies were not communicated over the radio. Cell phones were used for this communication.

Action

Spell out communication protocol in the "Medical" potion of the Prescribed Fire Plan and include this in the Incident Action Plan and briefing.

15. Practice Reorganizing

Lesson

The 1300 "reorganization" briefing helped regain control. It was calm, clear, and deliberate.

Action

Plan and practice reorganizing (simulations).

16. State of Florida's 0900 Start Time Burn Regulation

Lesson

The lack of a waiver from the State of Florida's 0900 ignition start time—which had been approved for prior burns—caused ignition delays that had significant impacts later in the operation.

Action

A waiver from the State of Florida could allow for greater operational flexibility. This waiver—and the relationships necessary to obtain it—provides for greater operational flexibility. Contact appropriate state officials and continue the relationship building process. Obtain waivers for all future prescribed fire projects.

C. Communications

1. Public Notification

Lesson

The public needs to be notified about prescribed fire operations earlier and more effectively.

Action

Develop a public information plan with monthly, weekly, daily checklists, including:

- Roadside message board in place two weeks prior to ignition.
- Signs at appropriate locations.
- Mailers used to notify public.
- Reverse 911 to notify public.
- Public Information Officer (PIO) on every prescribed fire.
- PIO as a contingency resource for escape.

2. Interagency Pre-Burn Notifications

Lesson

Pre-burn notifications would benefit by including the lead operational personnel of cooperators in addition to dispatch centers.

Action

Modify pre-burn notifications to include operational contacts for each cooperating agency (not just a dispatch office).

3. Conversion Notifications

Lesson

Conversion notifications should have included several relevant partners, including law enforcement.

Action

Modify conversion notifications to include direct contacts to law enforcement agencies.

4. Offsite Contingency Resource Notification

Lesson

Offsite contingency resources were not aware of their status as contingency resources.

Action

Add a two-step process for all resources listed as offsite contingencies:

1. Initial notification one to two days prior to implementation.
2. Follow-up notification on day of implementation.

5. Operational Radio Communications

Lesson

Operational radio communications were burdened with multiple problems that prevented optimum communication.

Action

1. Develop interim fixes with all relevant local cooperators. Emergency responders develop a memorandum of understanding (MOU) covering radio operations.
2. Pursue a long-term fix to the numerous interoperability issues, including "P25 standards" (a suite of standards for digital radio communications by federal, state and local public safety agencies for communicating with other agencies and mutual aid response teams in emergencies), bandwidth, etc.

6. Radios

Lesson

Prescribed fire operations were hampered due to an insufficient number of radios.

Action

- Identify all available radios.
- Provide radios to all appropriate personnel.
- Include minimum radio requirement in the prescribed fire plan.

7. Communication with National Weather Service

Lesson

There was not a plan with the National Weather Service about how changes in forecasted weather would be communicated during prescribed fire operations.

Action

In your planning with the National Weather Service, specify how any change in forecasted weather will be communicated.

D. Organizational Development

1. Prescribed Fire Implementation Group

Lesson

An experienced, cohesive core prescribed fire implementation group—consisting of staff from various units—can be essential to prescribed fire success.

Action

Work to build internal capacity and develop a cohesive implementation group by involving as many personnel as possible.

2. Inexperienced Personnel

Lesson

Inexperienced personnel may require additional guidance and explanations. Consider this when placing these personnel in critical functional areas.

Action

Determine if there are new firefighters involved. At every opportunity, make a concerted effort to explain things to them.

3. Develop a Clear Implementation Command Structure

Lesson

The prescribed fire command structure was not able to smoothly transition between the event's phases. Additional resources arrived—ordered outside of the chain of command. The command structure was not entirely clear. Reference to Incident Command Structure (ICS) positions was inconsistent.

Action

Develop a clearly understood command structure that can make the transition from implementation to contingency actions to escaped fire actions. In both the prescribed fire briefings and Incident Action Plan: Articulate and develop clear prescribed fire command structure, specify contingency organization and wildfire conversion organization, as well as the resource ordering process. Rely on standard prescribed fire and ICS terminology to identify the engaged resources.

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5. Lessons from the Review Team

The lessons in this section were developed by the Lessons Learned Review Team. They are intended to be more universal in scope—to benefit both the National Key Deer Wildlife Refuge personnel as well as emergency responders and prescribed fire practitioners everywhere.

A. Involve Offsite Contingencies

Email your contingency resources the Incident Action Plan and maps when you check in with them the day of ignition.

B. Contingency Task Force

In your contingency plan, consider including the overhead necessary to manage your contingency resources. Can you pre-identify a Task Force of resources (with leader) as part of your contingency plan? The Task Force Leader can be on scene and informed—but unassigned. This individual could be ready to respond to contingency actions, or internal medical emergencies, and—should the need arrive—could also serve as the leader for additional incoming resources.

C. Prescribed Fire Project Complexity

Acreage has nothing to do with complexity. It is common in our culture to equate small acreage with simplicity, but there is actually no correlation (acreage is not considered in the complexity rating).

D. Preliminary Complexity Ratings

In the complexity rating process, preliminary ratings often contain mitigating strategies. This is not the intent of the preliminary rating. In the preliminary rating, you should rate the existing element as it now stands; in the final rating, list mitigations if there is a change.

E. Whatever Your Plan Is, Follow It

Base the plan on experience, and ensure that the elements of the plan are realistic and achievable. Work on the plan until everything makes sense—and then do exactly what the plan says.

F. Pre-Burn Notifications

There are numerous notifications to be made prior to ignition. Can this function be delegated? Is this something that a Prescribed Fire Manager (RXFM) could take on, if this position was used?

G. Medical Response

Medical personal are often identified as being within the burn organization at the briefing. For example, from the BP11 Burn Plan:

> *"Individuals with current medical qualifications (i.e. First Responder, EMT, Paramedic) will be identified at the pre-burn briefing."*

When we do this, how helpful are these individuals without equipment? Is this the way we should do business?

H. Fire Behavior Experience

In the planning process, ask what fire behavior is associated with the fuel in this age class. What has historically occurred under these conditions? Seek out and involve those people with the appropriate burning experience/knowledge.

I. The Contingency Phase

There is confusion surrounding the "contingency" phase of a prescribed fire. Most contingency plans consist of calling in offsite resources. Can we think of prescribed fire operations in three phases? (Knowing most operations will not leave the first phase).

1. **Planned**: The phase where everything is going as planned.
2. **Contingency (still in prescribed fire)**: The phase where pre-identified offsite resources augment your existing organization (which will likely work for "Holding").
3. **Conversion to Wildfire**: The phase where a pre-identified IC assumes command of the entire organization.

J. The Scalable Prescribed Fire Organization

Consider applying the PACE (click to follow) (Primary, Alternate, Contingency, Emergency) planning tool to the specific organization (exact type of equipment and personnel) to be used for each phase:

Primary – The organization you will use for planned phase during your desired implementation conditions (the middle of your prescription).

Alternate – The organization you will use for either the "high end" or "low end" of your prescription (still in the planned phase). The "high end" alternative would likely be based on an organization with increased operational capacity, and would include more personnel, equipment, overhead and time. Conversely, if appropriate, the "low end" alternative might include a scaled-down organization.

Contingency – The organization you will use in the contingency phase (additional resources to those already on scene).

Emergency – The organization you will use in the wildfire phase (convert to a wildfire).

K. How Do We Use Our Burn Plans?

Is it possible that, in some instances, there is a disconnect between the *writing* of a prescribed fire plan and the *use* of the plan? There are multiple occasions of escaped prescribed fires in which those on scene *"did not follow the plan"*. Do we actually intend to use the plan as an operational guide in the field? Or, do we write the plan to gain approval, and once we have approval, operate more intuitively like we do on unplanned ignitions? Does the "copy and paste" practice of writing plans support this notion (just get it approved so we can go get the actual job done)?

L. Consequences of an Escape

Is it possible to "mitigate" the potential consequences of an escape? The consequences of the fire escaping and burning into a subdivision include: Private homes burn. An emergency evacuation is ordered. Public support for the prescribed fire program is severely degraded. Can we *really* mitigate these actual consequences of an escape? We can certainly mitigate the *potential* for an escape and the technical difficulty of the operations. But does this actually change the *consequences* of outcomes not going as planned? In instances in which the consequences of escape are high, should we put more effort into the planning of exactly what we will do in the event of an escape?

M. Fitness Exemption

The current U.S. Fish and Wildlife Service "Prescribed Fire Fitness Exemption" has the potential to place fire personnel in a difficult decision space. If a prescribed fire is staffed with individuals utilizing the exemption and the prescribed fire is converted to a wildfire, a dilemma faces those individuals and the burn overhead. This policy dictates that we not utilize these individuals to catch the fire. It is likely that most people will be tempted to ignore policy to do what seems like the right thing at the time (use whoever you have to help catch the fire). (See Appendix D.)

N. Organizational Improvement

Consider the concept of the Johari Window (on right).

This model—named after Joseph Luft ("Jo") and Harry Ingham ("hari") —speaks to human interaction and personal awareness.

By using this tool as an assessment process, individuals can work to expand the "Known Self" while minimizing the other quadrants (see below).

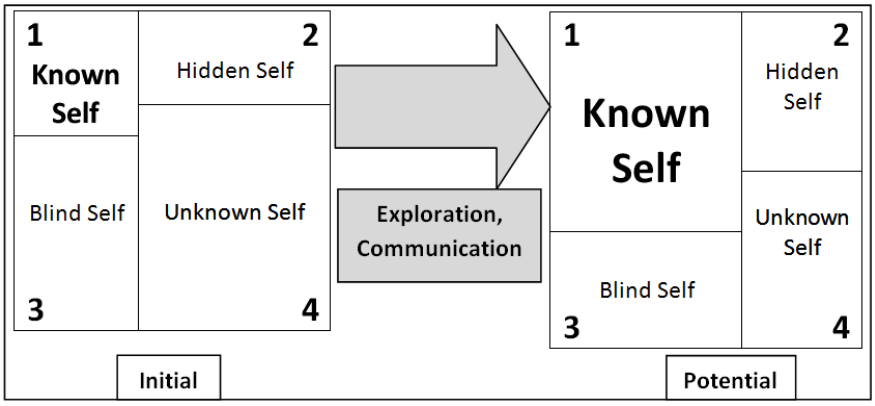
Can we apply this concept to our organizations? What do you really know about your organization? Is there cohesion? Is there trust? Are tough questions being asked during planning processes?

The Johari Window.

What do others outside of your organization really know about you? What do you really know about them? Is there a benefit of consciously attempting to increase the "known" area (by decreasing the "Hidden" and "Blind" areas) of you and your area cooperators?

Conduct a Program Review

In the spirit of knowing your organization and assessing the level of existing cohesion, trust, and functionality, invite a group from outside to review your entire organization. Have someone ask the tough questions and provide some insight into the "Blind Self"—the things others know about us that we do not know about ourselves.



Seek out ways to increase the "known self".

6. Further Learning Opportunities

"Chances Are . . ."

Not everyone has the time or interest in reading the available numerous reports and reviews.

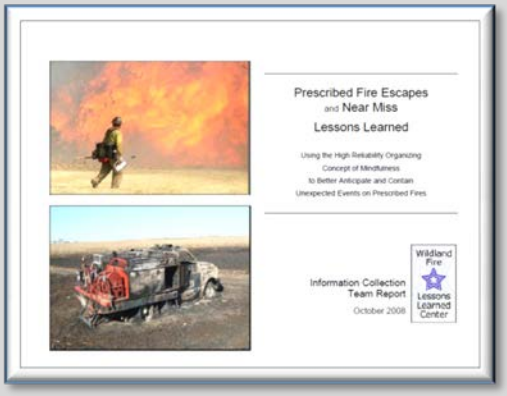
Therefore, the intent of this presentation is that one individual from a crew or module can read this review (see link below), become familiar with its details, and then provide this video presentation to his or her peers to generate discussion.

"Chances Are . . ." presentation (Click to follow.)

Click Image to open link.

Prescribed Fire Escapes and Near Miss Lessons Learned

This report, developed by the Wildland Fire Lessons Learned Center in 2008, examines similarities in prescribed fire escapes through the lens of High Reliability Organizing (HRO) concepts.



Click Image to open link.

Scan this QR Code to access the feedback form via mobile device.

Review Feedback

This link provides access to a feedback form on the effectiveness of this report.

Please help us improve how we review and learn from events like BP11.

Click Image to open link.

7. Commendations

To sustain our prescribed fire programs' strengths—locally, regionally, and nationally across all agencies—it is critical that we identify the commendable actions when and where they occur. A number of commendable moments emerged as the BP11 scenario unfolded, some of which are highlighted here.

A. Successful Fire Suppression Operation

When confronted with a very challenging set of circumstances, the fire suppression organization that emerged was effective at containing the escaped prescribed fire.

B. Protection of Private Property

Although the potential for damage to private property was significant, the suppression efforts proved effective at avoiding any damage to private property.

C. Minimized Exposure to Heat Emergencies

Based on the immediate lesson of the initial two heat emergencies that occurred to prescribed fire personnel, the command structure responsible for the escaped prescribed fire effectively managed firefighter heat exposure and intentionally removed firefighters from the elements. These decisions likely contributed to the overall successful outcome of the Blue Hole Fire.

D. Cooperators Functioned Very Effectively

When presented with an intimidating set of tasks (evacuation of the Pine Heights Subdivision, closure of Key Deer Boulevard, structure protection, emergency shelter management), cooperating agencies performed at a very high level. Responding personnel made numerous critical decisions—often without explicit instructions or guidance. These tasks were accomplished safely, and, in many cases, despite the numerous communication challenges that confronted the incident's first responders.

E. Commitment to Learning

The National Key Deer Wildlife Refuge staff chose to pursue further learning from this event. They should therefore be commended for inviting outsiders to aid in generating lessons and follow-up actions.

F. Valuable Discussion/Input from Facilitated Session Participants

All of the 29 participants who attended the November 9th facilitated session should be commended for their professional conduct, thoughtful participation, and valuable insights. The open nature of the discussions that occurred that day proved to be critical to the overall Lessons Learned Review process/outcome.

8. Appendices

Appendix A – Delegation of Authority to Lessons Learned Review Team

United States Department of the Interior

FISH AND WILDLIFE SERVICE
National Key Deer Refuge
28950 Watson Boulevard
Big Pine Key, FL 33043
Phone: (305) 872-2239 Fax: (305) 872-3675

October 24, 2011

Subject: Blue Hole Fire external Lessons Learned Review

To: Alex Viktora

You are hereby designated authority to lead and document an external Lessons Learned Review for the response to the BP11 escaped prescribed fire, (FL-FPR-011002)), National Key Deer Refuge. This review will be held Wednesday, November 9th at the City of Marathon Fire Department Training Room, Station 14, Marathon, FL. Your team of four will include individuals with unit fire management experience, burn boss qualifications, and writer/editor experience, and these individuals will be identified prior to your arrival. Costs associated with the team's work outside of base salaries will be charged to the fire (Fire Code GF8T).

You have the authority to tailor your team and this process to fit the situation and your style of facilitation, instead of following a rigid process or protocol. My intent is for you to provide leadership utilizing your experience and expertise to help maximize the learning opportunities presented by this event. We seek to improve our abilities in prescribed fire, emergency response, and capitalize on organizational learning.

The intent of this Lessons Learned Review is to improve performance by benefiting from the shared experiences of participants. In that light, I do have a few key items I would like you to keep in mind as you move through the process.

- Help participants develop their own corrective actions where necessary, and document those that are appropriate for the larger organizations involved.
- Highlight and dwell on those practices, decisions, or actions found to be effective or ineffective.
- Encourage open, candid, and safe discussions while maintaining respectful participation.
- Encourage each individual to seek feedback, and insist on effective and active listening.
- Provide final products (documents, presentations, questionnaires, videos, etc.) that highlight lessons and the processes used to discover them.

Please provide me or my delegate with a verbal debrief no later than November 10th at an agreed upon time. Please provide our refuge with final products, documenting your process and the significant findings of the analysis no later than 11/23/2011. Upon my approval, the final products will be made available online at the Wildland Fire Lessons Learned Center website with links to it from the National Key Deer Fire Management site.

If you need any assistance from me or my staff, please let me know. I have assigned Dana Cohen, Fire Management Specialist, to be your liaison or primary contact throughout the process. She will be participating as you see fit. Thank you for your time and assistance.

Anne Morkill, Project Leader
Florida Keys Wildlife Refuges Complex

Appendix B – BP11 Prescribed Fire Spot Weather Forecast

Spot Forecast for BP11 Burn

National Weather Service Key West (Florida Keys)
709 AM EDT Thu Sep 15 2011

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IF CONDITIONS BECOME UNREPRESENTATIVE,
CONTACT THE NATIONAL WEATHER SERVICE.

SPOT FORECAST FOR BP11...US FISH AND WILDLIFE
NATIONAL WEATHER SERVICE KEY WEST FL
709 AM EDT THU SEP 15 2011

FORECAST IS BASED ON IGNITION TIME OF 0800 EDT ON SEPTEMBER 15.
IF CONDITIONS BECOME UNREPRESENTATIVE...CONTACT THE NATIONAL WEATHER
SERVICE.

.DISCUSSION...
ONLY ISOLATED SHOWER COVERAGE IS EXPECTED TODAY. MINIMUM RELATIVE
HUMIDITIES WILL BOTTOM OUT NEAR 50 PERCENT THIS AFTERNOON. LIGHT
EAST TO SOUTHEAST SURFACE WINDS BEFORE SUNRISE WILL SHIFT TO A
NORTHEAST DIRECTION BY THE MID-MORNING HOURS...WITH SURFACE WIND
SPEEDS NEAR 5 MPH. WINDS THIS AFTERNOON SHOULD BECOME NORTH TO
NORTHWESTERLY...WITH SURFACE WINDS SPEEDS INCREASING SLIGHTLY TO
BETWEEN 5 AND 10 MPH AFTER NOON. WIND SPEEDS WILL DIMINISH BELOW 5
MPH AFTER SUNSET TONIGHT. MAINLY DRY WEATHER SHOULD CONTINUE
TONIGHT AND FRIDAY WITH ONLY ISOLATED SHOWERS AND THUNDERSTORMS
POSSIBLE. MINIMUM RELATIVE HUMIDITY VALUES NEAR 55 PERCENT ARE
EXPECTED ON FRIDAY.


.TODAY...
TIME (EDT)      6 AM   8 AM   10 AM  NOON   2 PM   4 PM
SKY.............PCLDY  PCLDY  PCLDY  PCLDY  PCLDY  PCLDY
WEATHER TYPE....RNSHWR RNSHWR RNSHWR RNSHWR RNSHWR RNSHWR
CHC PRECIP (%)..10     20     20     20     20     20
TEMP (F)........83     83     86     88     88     88
RH (%)..........71     70     63     58     55     56
20 FT WIND......SE 2   E 3    E 5    NE 5   N 6    NW 7
20 FT WIND GUST.       5      7      7      9      10
EYE LEVEL WIND..SE 2   E 3    E 5    NE 5   N 6    NW 7
EYE LVL WND GST.       5      7      7      9      10
MIX HGT (FT)....300    2400   3000   4500   4500   4500
TRANSPORT WIND..NE 4   NE 3   NE 5   N 7    N 8    N 9
DISPERSION......3      24     30     37     37     37
LAL.............1      1      1      1      1      1

.TONIGHT...
TIME (EDT)      6 PM   8 PM   10 PM  MIDNGT 2 AM   4 AM
SKY.............MCLEAR MCLEAR MCLEAR PCLDY  PCLDY  PCLDY
WEATHER TYPE....RNSHWR RNSHWR RNSHWR RNSHWR RNSHWR RNSHWR
CHC PRECIP (%)..20     20     20     20     20     20
TEMP (F)........87     84     83     83     83     83
RH (%)..........58     65     68     69     69     70
20 FT WIND......NW 6   N 4    N 4    NE 2   E 4    E 4
20 FT WIND GUST.9      5      5      5      5      5
EYE LEVEL WIND..NW 6   N 4    N 4    NE 2   E 4    E 4
EYE LVL WND GST.9      5      5      5      5      5
MIX HGT (FT)....4500   3000   1000   300    500    500
TRANSPORT WIND..N 8    N 9    N 9    NE 9   E 9    E 9
DISPERSION......43     30     20     4      4      4
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BP11 Prescribed Fire Spot Weather Forecast (Continued)

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LAL.............1      1      1      1      1      1

.FRIDAY...
TIME (EDT)      6 AM   8 AM   10 AM  NOON   2 PM   4 PM
SKY.............PCLDY  PCLDY  PCLDY  PCLDY  PCLDY  PCLDY
WEATHER TYPE....RNSHWR RNSHWR RNSHWR RNSHWR RNSHWR RNSHWR
CHC PRECIP (%)..20     20     20     20     20     20
TEMP (F)........82     83     86     88     88     88
RH (%)..........71     70     63     60     59     59
20 FT WIND......E 3    NE 2   NE 4   NE 5   NE 6   NE 8
20 FT WIND GUST.5             7      8      9      11
EYE LEVEL WIND..E 3    NE 2   NE 4   NE 5   NE 6   NE 8
EYE LVL WND GST.5             7      8      9      11
MIX HGT (FT)....500    2500   3000   4500   4500   4500
TRANSPORT WIND..E 9    NE 9   NE 9   NE 9   NE 9   NE 10
DISPERSION......4      25     30     49     49     49
LAL.............1      2      2      2      2      2
```

Appendix C- BP11 Prescribed Fire Plan Prescription, Contingency, and Wildfire Conversion Portions

Element 7 – Prescription from the BP11 Prescribed Fire Plan

ELEMENT 7 **PRESCRIPTION:** **ENVIRONMENTAL PARAMETERS**	**PROJECT NAME:**	**Big Pine FMU**
	BURN UNIT NAME:	**BP11**
	PRESCRIPTION COVERAGE:	**Fuel Reduction/habitat management RX Fire in Pine Rocklands**

DESCRIPTION OF ENVIRONMENTAL PARAMETERS NEEDED TO PRODUCE THE DESIRED FIRE BEHAVIOR:	**Growing Season, May-September**	
	Low Fire Intensity	**High Fire Intensity**
Temperature	65	95
Relative Humidity	90	40
Wind Speed (20’ forecast)	2	20
Transport wind direction/DI	S-SW-W-NW- N-NE-E	
Mixing Height	1700’ AGL (state minimum)	
Wind Speed (eye-level)	2	8
Wind Direction (eye-level)	WNW-W-SW-S, and NE-E-ESE	
Precipitation Parameters	Standing water in marshes in/adjacent to unit and/or 0.1" of rain within 24 hours of ignition	
1 & 10 hr. Fuel Moisture	.≥16	≥7

Element 17 – Contingency Resources from the BP11 Prescribed Fire Plan

ELEMENT 17 CONTINGENCY PLAN	PROJECT NAME:	Big Pine FMU
	BURN UNIT NAME:	BP11

TRIGGER POINTS:

Contingency planning is the determination of initial actions and additional resources needed if the prescribed fire is not meeting, exceeds, or threatens to exceed the potential trigger points.

If any of the following situations occur, contingency actions will take place:

1. More than three simultaneous spot fires and/or slop overs occur and wind is increasing.
2. Smoke management objectives being impacted.
3. Prescribed burn objectives not met.

Burn Boss will implement Contingency Plan.

ACTIONS NEEDED:

Describe actions to be taken to ensure the prescribed fire stays within prescription.

Weather observations will be closely monitored and any significant changes in behavior or weather will require the burn boss and holding boss to discuss the holding forces ability to maintain control. If weather parameters are found to be out of prescription parameters firing may cease at the discretion of the burn boss until weather conditions are once again suitable to meet prescription parameters

If the prescribed fire objectives are not being met and/or the prescribed fire threatens to exceed identified trigger points, Burn Boss will implement the Contingency Plan as defined above. If the contingency plan is implemented, resources will be managed within the prescribed fire organization until/unless prescribed fire is converted to a wildfire. The contingency resources will report to the Holding Boss. Ignition resources will be available to the Holding Boss as needed in coordination with the Firing Boss. Everglades Dispatch will be notified.

If the contingency actions are successful at bringing the project back within the scope of the Prescribed Fire Plan, the project may continue. If contingency actions are not successful by the end of the next burning period, the prescribed fire will be converted to a wildfire. The next burning period is defined as 24 hours from activation of the Contingency Plan. This determination will be made by the Burn Boss. An ICT4 will take over the wildfire. An RXB2 will remain attached to the burn unit.

In the event of an escape, interagency resources will be utilized. Estimated response times and locations of additional interagency resources will be listed in **Item C**. A list of available resources will be documented by the Burn Boss each day of the burn. The Burn Boss will contact adjacent Duty Officers and dispatch centers daily to confirm availability of resources.

The following resources are the minimum contingency resources. These resources will be on scene and available through all aspects of the prescribed fire implementation.

One Type 1, 3, 4, or 6 Engine (with a minimum of 3 people)

***Contingency Resources on scene are in addition to the planned holding crew.**

ADDITIONAL RESOURCES AND MAXIMUM RESPONSE TIME(S):

Florida Forest Service, Big Pine Station	**Type 4 Engine, 5 minutes away**
Big Pine Fire Rescue	**Type 1 Water Tender, 5 minutes**
Monroe County Fire/Rescue-Big Pine	**Type 1 Engine, 5 minutes**
Monroe County Fire/Rescue--Cudjoe	**Type 1 Engine, 20 minutes**
Everglades National Park Helicopter	**Type 3, 40 minutes**

Additional available forces will be listed specifically in the IAP developed for each burn day.

Element 18 – Wildfire Conversion from the BP11 Prescribed Fire Plan

ELEMENT 18 WILDFIRE CONVERSION	PROJECT NAME:	Big Pine FMU
	BURN UNIT NAME:	BP11

A prescribed fire will be declared a wildfire when the assigned Burn Boss determines that one or more of the following conditions or events has occurred or is likely to occur, and if these conditions cannot be mitigated within the next burning period by implementing the contingency actions in the prescribed fire plan by on-site holding forces and listed contingency resources staged during this operational period:

The prescribed fire leaves the planned unit boundary.

The fire behavior exceeds limits described in the prescribed fire plan and/or the fire is threatening to leave the planned unit boundary.

The fire effects are unacceptable.

Smoke production must be reduced because of adverse air quality impacts.

Local and/or geographic area fire activity escalates and resources committed as contingency or holding forces are needed for re-assignment to other incidents.

After wildfire declaration, a project cannot be returned to prescribe fire status.

Actions

When a prescribed fire is declared a wildland fire, managers still have the full range of suppression options available under the concept of the "Wildland Fire Response."

When a prescribed fire is declared a wildland fire and Prescribed Fire Crewmembers are being utilized, regulations outlined in the *Fire Management Handbook, Chapter 1, pgs. 13-1and 13-2 "Prescribed Fire Fitness Exemptions";* must be followed.

WILFIRE DECLARED BY:

Burn Boss

IC ASSIGNMENT:

Should a wildfire be declared, a qualified ICT4 will become the Incident Commander. The IC will organize all on-site resources for a safe and aggressive response. Personnel within the prescribed fire organization will transition into ICS wildfire positions they are qualified to carry out. The IC will order additional suppression resources identified in the Contingency Plan as well as any other required resources necessary to support the suppression effort.

Upon a wildfire conversion occurring, all overhead personnel will begin to document actions taken prior to wildfire conversion and subsequent actions on a Unit Log. After the incident is contained, the Prescribed Fire Burn Boss will submit a post fire report documenting weather, resources on site, ignition operations, holding actions, and other pertinent data. All prescribed fires declared a wildfire will have a review initiated by the appropriate level Agency Administrator. The level and scope of the review will be determined by agency policy.

During the briefing all personnel will be notified of who the IC is should a wildfire conversion occur.

NOTIFICATIONS:

Florida Forest Service, district FMO, Regional Fire Management Coordinator, and refuge management will be notified when prescribed burn is declared a wildfire. Burn boss or IC will call Florida Forest Service for assistance if needed.

EXTENDED ATTACK ACTIONS AND OPPORTUNITIES TO AID IN SUPPRESSION EFFORTS:

This area is well broken by single lane dirt roads which would provide ample opportunity for indirect attack on an escaped prescribed fire. If an escape should occur, structure protection must be considered immediately. Structure protection plans will be identified and discussed the morning of any active ignition operations and will be identified in the IAP developed for each burn day. Extended attack will follow policies and procedures set forth in the Fire Management Plan, including Notifications and completion of required reporting (Wildfire Decision Support System).

[See Appendix D for clarification on highlighted section (above).]

Appendix D– Prescribed Fire Fitness Exemption

[The U.S. Fish and Wildlife Service has a "prescribed fire fitness exemption." This exemption—spelled out below—is referenced in the conversion plan that is referenced in the BP11 Prescribed Fire Plan (see Appendix C).]

Excerpt from the U.S. Fish & Wildlife Service Fire Management Handbook:

Chapter 13 – Training and Qualifications

Prescribed Fire Fitness Exemption - If a Refuge Manager or Project Leader believes the arduous fitness requirement is not appropriate in their local prescribed fire operations they may request an exception using the Prescribed Fire Crewmember Exception Request found at the end of this chapter to use the Prescribed Fire Crewmember (RXCM) qualification at a moderate fitness level in lieu of Firefighter Type 2 (FFT2). This qualification cannot be used for suppression operations and prescribed fire burn plans must address contingency resources accordingly. A prescribed fire crew member can be used to hold an original prescribed fire perimeter while initial attack is being conducted on an escape by fully qualified suppression personnel. If suppression operations move into extended attack the entire fire must be staffed with resources qualified for suppression operations. Exception approval must be documented in the applicable Refuge Fire Management Plan and shall be used on approved Service managed lands only. State, local cooperators and contractors working on federal agency prescribed fires must meet the NWCG PMS 310-1 standards unless local agreements and/or contracts specify otherwise. For more information see the PMS 310-1, Wildland Fire Qualification Guide (2009), and the Interagency Prescribed Fire Planning and Implementation Procedures Guide. The Prescribed Fire Crewmember position (RXCM) is available in IQCS for use in tracking individual experience at a Moderate fitness level.