

# **FWS Region 6**

## **New Holland Action Plan**

### **Findings and Recommendations**

**First Draft 3-16-2007**



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**Item I.A.**  
**New Holland Incident**

**Finding I.A**

Burn complexity was accurately summarized as Moderate, but several complexity elements relating to on and off site values, public interest, fire behavior and risk of escape were underestimated as low. It appeared that the burn plan preparer and reviewer often evaluated complexity on the average conditions rather than on the worst-case scenario or conditions at critical holding points. This may have affected the quality of subsequent holding and contingency planning. The worse case scenario would be something similar to any one or combination of the following; winds at the high end of the prescription, winds shifting to an opposite direction, spot fire escaping containment and burning towards town, or relative humidity dropping below predictions.

**Review Team Recommendations:**

**I.A.1**

Burn plan preparers and reviewers must be able to consistently and realistically complete the complexity analysis

**Task Statement I.A.:**

1. Review the issue and make recommendations for methods to help burn plan preparers and reviewers consistently and realistically complete the complexity analysis used in the Interagency Prescribed Fire Plan Template
2. Make recommendations on how burn plan preparers and reviewers in the region should specifically address the worst-case scenarios as described in the findings.
3. Make recommendations on how we can do better job of integrating the risk management process into our planning, briefing, and training activities.

**Task Group Members:**

- Doug Downs
- Bob Rebarchik
- Chris Roed
- Bill Waln
- Joe Flores
- Brad McKinney
- Lorenz Sollmann

**Task Group Recommendations:**

**Task Statement 1.** The group recommends that the Interagency Prescribed Burn Complexity Planning Guide be followed. Insure that the complexity analysis is completed accurately according to the upper end of the prescription (worst case scenario), following the guidelines within the Prescribed Fire Complexity Rating System Guide. Complexity analysis preparers should involve the local agency administrator early in the process and have the agency administrator sign off on the complexity analysis prior to submitting the burn plan for review.

**Task Statement 2.** Insure that the complexity analysis is completed accurately according to the upper end of the prescription (worst case scenario), following the guidelines within the Prescribed Fire Complexity Rating System Guide. Complexity analysis preparers should again involve the local agency administrator in the process and have the agency administrator sign off on the complexity analysis prior to submitting the burn plan for review.

**Task Statement 3.** Use the current guidelines we have to address risk management. The current briefing outline in the burn plan addresses risk management and is a requirement listed in the go no-go check list that must be signed off prior to initiation of the burn.

**Item I.C.  
New Holland Incident**

**Finding I.C.**

The Holding plan addressed pre-burn preparations rather than holding considerations, and did not address all of the criteria identified in the Fire Management Handbook (FMH).

**Review Team Recommendations:**

**I.C.1**

Holding plans should identify critical holding points or areas of particular concern, and identify the means and resources needed to mitigate those concerns.

**I.C.2**

BEHAVE spot and contain runs should be used to help in estimation holding resource needs.

**I.C.3**

Because of the wide prescription and range of potential fire behaviors, it may be useful to utilize a matrix of holding resources and qualifications in future burn plans. This allows the plan to identify the need for additional holding resources as fire behavior increases. It also helps to identify the minimum qualifications needed within the burn organization.

**Task Statement I.C.**

1. Review the Interagency Prescribed Fire Plan Template and develop recommendations on how burn plan preparers should address holding considerations, including critical holding points and areas of particular concern.
2. Develop guidance for the Regional Office to send out to the field (and to be incorporated into training) addressing how burn plan preparers should determine the number and kind of resources required on the fire, including how Behave “SOPT” and “Contain” model runs could be used in estimating resource needs.
3. Along with I.D. and I.E. below, evaluate the recommendation to utilize a matrix of holding resources and qualifications in future burn plans. If examples used by other agencies/ units are useful, develop recommendations for a template to be used in Region 6. Include suggested guidance on how such a table would function, e.g., would it be advisory or required that such forces be in place for a specified set of conditions?

**Task Group Members:**

- Jay Peterson, Colby Crawford, Jeff Dion, Joe Flores, Mike Granger, Tracey Swenson, Dave Carter, Shane Del Grosso

## **Task Group Recommendations:**

**Task Statement I.C. 1** The Interagency Burn Plan Format includes a critical holding section under Element 16B. Within the Critical Holding Points Section, critical holding points should be listed with measures taken to mitigate each. In addition to the subsection, critical holding points, or areas of particular concern, should also be added to the burn day briefing. This addition would ensure the critical holding points are conveyed to holding resources. The task group believes the above is currently occurring during the burn plan writing process.

### **Task Statement I.C. 2**

Determining the number of resources required to complete a prescribed fire is an “art” and not a science. Several models are available to assist the burn plan preparer in making this determination, such as SPOT and CONTAIN in the BEHAVE program. But, these models cannot replace knowledge acquired through experience. The burn plan preparer should use these models as a tool in making the determination, but ultimately, the burn plan preparer will use their best judgment, based on experience, to make the final determination. The burn plan reviewer is also responsible for ensuring the burn plan preparer adequately addresses resource needs. Ultimately, the Burn Boss (with the Refuge Manager concurrence) will make the final determination dependent upon onsite conditions the day of the burn. The task group has determined that the process described above is currently being used in the determination of staffing levels, and the group does not recommend a change in current policy regarding how staffing levels are formulated for prescribed fires.

The group recommends the Regional Office implement a policy that requires all prescribed fires to be staffed at the “**most efficient level**” instead of just the “minimum staffing level”. The “most efficient level” is described as a staffing level that would be commensurate with the maximum fire behavior derived from the burn prescription. An exception will be if the Burn Boss evaluates the onsite conditions and, in his/her judgment, can conduct the burn with fewer people than required by the maximum fire behavior prescription. This decision will be documented in the Go-No-Go checklist, approved by the Refuge Manager, and approved by the next supervising level in the Fire Organization. The group believes the latitude should be available to the Burn Boss to make such a decision, but the burn boss exercising the latitude should be an uncommon occurrence.

The group has determined the document created by Shane Del Grosso titled “Staffing Matrix” does not directly pertain to the tasks this group was assigned, but the group has determined the document will benefit the prescribed fire community. The document could be used the day of the burn to help burn boss develop their skills in the evaluation of variables within a prescribed fire or used as a teaching instrument during classes. The group recommends the document be completed and then presented to the Regional Office for dissemination to the field.

### **Task Statement I.C. 3**

The task group discussed utilizing a matrix scenario for the formulation of holding resources. The group decided the matrix approach could become so complex that it would only add a cumbersome step in the burn plan process without providing an increase in effectiveness to the staffing level determination process.

**Item I.D.**  
**New Holland Incident**

**Finding I.D**

The contingency plan was not based on the potential fire behavior at the high end of the prescription.

**Review Team Recommendations:**

**I.D.1**

Contingency plans must consider the potential fire behavior and what resources and tactics will or will not be effective under those conditions. A matrix approach is often useful.

**I.D.2**

Behave spot and contain runs should be used to help in estimation contingency resource needs for head and or flanking fire of an escape fire.

**I.D.3**

Contingency plan should identify those values which must be protected.

**Task Statement I.D.**

1. Review the Interagency Prescribed Fire Plan Template and develop recommendations on how burn plan preparers should address the contingency plan (including what to do when potential fire behavior is at the high end of the prescription) and identification of values to be protected.
2. Develop guidance for the Regional Office to send out to the field (and to be incorporated into training) addressing how burn plan preparers should determine the number and kind of contingency resources required on the fire, including how BEHAVE “SPOT” and “CONTAIN” model runs could be used in estimating resource needs.
3. Along with I.D. and I.E. below, evaluate the recommendation to utilize a matrix of holding resources and qualifications in future burn plans. If examples used by other agencies/ units are useful, develop recommendations for a template to be used in Region 6. Include suggested guidance on how such a table would function, e.g., would it be advisory or required that such forces be in place for a specified set of conditions?

**Task Group Members:**

- Jay Peterson, Colby Crawford, Jeff Dion, Joe Flores, Mike Granger, Tracey Swenson, Dave Carter, Shane Del Grosso

**Task Group Recommendations:**

**Task Statement I.D. 1**

The group has determined the contingency plan should be viewed as a precalculated response to possible scenarios. Fire behavior that occurs within the predetermined prescription parameters should not be considered as a contingency. The contingency section should cover actions to be

carried out in the event of unexpected events, to include all values that will need to be protected and how predetermined strategies and tactics will protect those values.

**Task Statement I.D. 2**

The burn plan preparer should consider Contingency Resources during the same process as described in the response to Task Statement I.C.2. The BEHAVE modules of SPOT and CONTAIN should be used as tools during this process to supplement the preparer's personal/professional judgment.

It is noted that resources at the “**most efficient level**” would consist of both holding and contingency resources. This thought process addresses the resource element of the contingency planning section and would align with the intent of the “Interagency Burn Plan Template” and “Planning and Implementation Reference Guide”. The required resources on scene would be able to suppress the highest anticipated fire behavior that could occur within the set prescription.

**Task Statement I.D. 3**

Same as Task Statement I.C.3

**Item I.E.**  
**New Holland Incident**

**Finding I.E**

The burn organization identified the minimum resources needed to implement the plan at the low end of the prescription, and identified optional resources. However, it did not identify any type of considerations for determining when the optional resources would be needed, and did not clearly address the need for the minimum number and qualifications of arduous fitness rated staff to meet holding and contingency needs.

**Review Team Recommendations:**

**I.E.1**

Consider using a matrix to better display the number and type of resources required at certain fire behavior or weather triggers. Ensure that these identified resources adequately cover holding and contingency needs under those conditions.

**Task Statement I. E.**

Identify and develop recommendations for how to determine when optional resources would be needed.

**Task Group Members:**

- Jay Peterson, Colby Crawford, Jeff Dion, Joe Flores, Mike Granger, Tracey Swenson, Dave Carter, Shane Del Grosso

**Task Group Recommendations:**

**Task Statement I.E. 1**

The task group finds recommendations are not needed for the determination of optional resources. The question for determining optional resources is addressed in the response to the recommendations made in I.D.3. Maximum fire behavior, based prescription elements will dictate staffing levels. Optional resources would be considered any resources above the “**most efficient level**”. The decision to increase staffing above the “**most efficient level**” would be made by the burn boss, and or the Agency Administrator, and would be entirely based on their experience and comfort level.

**Item I.F.**  
**New Holland Incident**

**Finding:** The reviewer did not identify plan deficiencies as identified below.

**Review Team Recommendations:**

**I.F.1**

Reviewers must adequately review plans and ensure deficiencies are corrected.

**I.F.2**

Reviewer should enter the entire date (DD/MM/YY) of review rather than month and year.

**I.F.3** It may be helpful to review plans earlier in the season so that there is no rush to complete the review and correct and deficiencies.

**I.F.4** Burn plans should be approved by the appropriate line officer in advance of the burn day to assure adequate time to review, discuss, and revise the plan as needed.

**I.F.5** The Project Leader's Go/No-Go Pre-Ignition Checklist was signed the day of burn and can be completed up to 15 days prior to the ignition of the Prescribed Fire. It is recommended that the checklist be signed ahead of ignition date to eliminate additional headache on the day of the burn.

**Task Statement I.F.**

1). Identify, evaluate and make recommendations on how the Region 6 burn plan review process standard operating procedures could be improved.

2). Develop recommendations to assure that agency administrators (at both the field and R.O. level) are providing adequate management oversight of burn plan preparation, reviews, and the approval process.

Consider (at a minimum):

- The recommendations should identify how the burn plan reviewer adequately reviews plans and ensures that deficiencies are corrected.
- Identify and incorporate time lags that must be considered in order to assure thorough reviews and adequate time for the agency administrator approval process.
- How could we best provide "quality control" checks of the burn plan reviews in the region to ensure that reviewers are doing what they are supposed to do?
- Are there prescribed burn plan review decision traps that should be addressed, e.g., plunging in without being familiar enough with the situation, shortsighted shortcuts such as making assumptions, letting marginal plans slide by, complacency, etc.?

**Task Group Members:**

Chase Marshall, Dave Martin, Tracey Swenson, Nathan Hawkaluk, Tom Zick, Rick Willoughby

**Task Group Recommendations:**

**Task Statement 1.F.1**

Identify, evaluate and make recommendations on how the Region 6 burn plan review process standard operating procedures could be improved.

Technical Reviewer - New guidance any RxB2 can review a burn plan

**Task Group Recommendations:**

- R6 FWS has higher requirement, recommend R6 continue maintain this higher requirement

Discussion about maintaining current R6 certification of technical reviewer process

**Task Group Recommendations:**

- Recommend keep in place and
- Recommend develop panel to certify the technical reviewer that would include: ZFMO, RO Staff, and Project Leader

Current certifier process needs to be standardized across the region

**Task Group Recommendations:**

- Develop an SOP for a regional certification process or white paper guidance to provide continuity across regional

Current policy every 10<sup>th</sup> plan reviewed must be sent to Zone FMO for quality control

**Task Group Recommendations:**

- Recommend continue process

Current FWS technical review checklist is adequate

**Task Groups Recommendations:**

- Except - comments could be expand
- Any changes to review format be approved by at Regional level (RFMC) to provide for uniform review of plans across the region
- Recommend Districts have “review of burn plans” meeting

Assist project leaders with adequate management oversight

**Task Groups Recommendations:**

- Recommend PFTC Line Officer training (2 day course)
- Recommend FMO mentor and assist line officer with review process
- Vacancy of FMO at Huron could have contributed to the review process errors
- Additional recommendation: encourage development of landscape burn plans to limit number of burn plans and assist in the review process allowing time for a through process.

**Task Group Recommendations:**

**Task Statement I.F.2** Develop recommendations to assure that agency administrators (at both the field and R.O. level) are providing adequate management oversight of burn plan preparation, reviews, and the approval process

Consider (at a minimum):

- The recommendations should identify how the burn plan reviewer adequately reviews plans and ensures that deficiencies are corrected.

**Task Group Recommendations:**

- Recommend PFTC Line Officer training (2 day course) Agency Administrator Workshop like at PFTC be developed for R6 or made available in the region
- Recommend District FMO mentor and assist line officer with review process
- Additional recommendation: encourage development of landscape burn plans to limit number of burn plans and assist in the review process allowing time for a thorough process
- Identify and incorporate time lags that must be considered in order to assure thorough reviews and adequate time for the agency administrator approval process.

**Task Group Recommendations:**

- Recommend cut off date prior to traditional Rx implementation season
- Recommend land manager/biologist prioritize burn treatments prior to a cut off date set in relation to the traditional Rx implementation season
- Recommend development of “Landscape” burn plans, then use of an IAP for the burn would meet a quick turn around for implementation
- How could we best provide “quality control” checks of the burn plan reviews in the region to ensure that reviewers are doing what they are supposed to do?

**Task Groups Recommendations:**

- **Develop an SOP for a regional certification of technical reviewers or develop a white paper guidance to provide continuity of reviewers across R6**
- Are there prescribed burn plan review decision traps that should be addressed, e.g., plunging in without being familiar enough with the situation, shortsighted shortcuts such as making assumptions, letting marginal plans slide by, complacency, etc.?

**Task Groups Recommendations:**

- Recommend development of “Landscape” burn plans
  - This should provide participation in the development of the plans in conjunction with the District FMO
- Recommend development of a panel to certify the technical reviewers
  - Include minimum: ZFMO, RO Staff, and Project Leader

- Recommend reviewer insures the complexity analysis and recommend staffing align with the burn plan prescription weather (or have noted changes are addressed associated with long term weather conditions, i.e. drought)
- Recommend burn plans reflect staffing based on complexity analysis not on availability of resources in the area
- Recommend continue policy of every 10<sup>th</sup> burn plan reviewed by a technical reviewer be reviewed by next level (Zone FMO)

**Other Task Group Recommendations I.F.2**

- This should be and is policy

**Other Task Group Recommendations I.F.3**

- Recommend cut off date prior to traditional Rx implementation season
- Recommend land manager/biologist prioritize burn treatments prior to a cut off date set in relation to the traditional Rx implementation season
- Recommend development of “Landscape” burn plans, then use of an IAP for the burn would meet a quick turn around for implementation

**Other Task Group Recommendations I.F.4**

- Maintain current approval process
- Recommend each Fire Management District adopt a deadline process for the review process of burn plans, timeframe associated with the local burn implementation season

**Other Task Group Recommendations I.F.5**

- Recommend Project leader/or designee and District FMO/Burn Boss continue to communicate prior to actual implementation of the burn; even if the go/no-go checklist has been signed several days/2 weeks from the burn

**Item I.K.**  
**New Holland Incident**

**Finding I.K.**

The Prescribed Fire/ Pile Burning Report Form that Northern Great Plains Interagency Dispatch Center (GPC) requests of all agencies was not completed nor faxed to GPC. This information allows GPC to track burning activity on any given day.

**Review Team Recommendations:**

**I.K.1**

Ensure that Prescribed Fire/Pile Burning Form is completed and faxed to GPC at least two days prior to implementation. This will allow for accurate communication between GPC and agencies.

**Task Statement I.K.**

Review the Interagency Prescribed Fire Plan Template and develop recommendations on how burn plan preparers should address holding considerations, including critical holding points and areas of particular concern.

**Task Group Members:**

Brad McKinney, Colby Crawford, Jeff Olson, Bruce Winters, Dave Martin, Shane Del Grosso

**Task Group Recommendations:**

1. After discussion with Great Plains Dispatch Center, the task group recommends changing the wording regarding the notification of prescribed fires in the 2007 Mobilization Guide. Currently, the MOB guide requires prescribed fire notifications to be made to GPC two days in advance, using their notification form. This process does not allow for daily and hourly changes occurring in the field. The group recommends wording in the 2007 MOB state, "Individuals must notify GPC prior to burning. The notification will preferably be made one day in advance. An email will be the preferred method of notification but other forms will be allowed."
2. The group recommends individuals conducting prescribed fires notify GPC by the following methods. The methods are ranked in the order the notifications would be preferred to be received by GPC.
  1. E-mailing the GPC Rx Fire form
  2. Faxing the GPC Rx Fire form
  3. Phone calls
  4. Radio (state wide truncated system)
3. The group has found the Service needs to do a better job of maintaining a current GPC e-mail contact group. The list should be updated quarterly by all Refuges sending notifications to GPC

The current notification contact list for GPC is as follows:

[cjfox@fs.fed.us](mailto:cjfox@fs.fed.us)

[Kenneth.wesche@state.sd.us](mailto:Kenneth.wesche@state.sd.us)

[ahinker@fs.fed.us](mailto:ahinker@fs.fed.us)

[Megan.jaros@state.sd.us](mailto:Megan.jaros@state.sd.us)

[asolvie@fs.fed.us](mailto:asolvie@fs.fed.us)

[preiter@fs.fed.us](mailto:preiter@fs.fed.us)

[mrothleutner@fs.fed.us](mailto:mrothleutner@fs.fed.us)

4. The group recommends notifications emailed to GPC be sent to each individual on the list. This will insure the notifications are conveyed to GPC when one or more individuals are out of the office.
5. The group recommends the Service send a letter to GPC relaying that a review was conducted regarding issues identified with the notification process of prescribed fires. The letter should also relay the suggested outcomes of the review, regarding the notification process. A draft letter is attached.



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

**ND/SD Zone FMO  
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Internet: R6RW\_HUR@FWS.GOV**

March 22, 2007

Cheryl Fox, Center  
Northern Great Plains Interagency Dispatch Center  
4250 Fire Station Rd, Suite 2  
Rapid City, SD 57703

Manager

Dear Cheryl:

A serious incident occurred in the FWS ND/SD Zone in April 2006 when a fire engine with two firefighters inside were entrapped by the flaming front of a wildfire after a prescribed fire escaped on the New Holland WPA in South Dakota. We are very fortunate that this incident did not result in two fatalities but only minor injuries and the total loss of an engine. We now have the opportunity to learn from what took place and improve our practices in the future.

The FWS is currently in process of reviewing the findings contained in the New Holland Report and one of the findings in the report stated the "Prescribed Fire/Pile Burning Report Form that Northern Great Plains Interagency Dispatch Center (GPC) requests of all the agencies was not completed or faxed to GPC". As an agency, we are committed to addressing each of the findings in the report and find ways to mitigate them from happening again.

On February 08, 2007, a FWS New Holland Task group contacted you to discuss different solutions and/or alternative procedures to prevent this finding from ever happening again. Based upon our discussions, I am writing this letter to as a follow-up regarding the procedures we discussed.

1). FWS employees in the GPC zone will notify GPC prior to implementing any prescribed burns. Notifying GPC can be done by:

5. E-mailing the GPC Rx Fire form (this is preferred but not mandatory)
6. Phone calls
7. Radio (state wide truncated system)
8. Faxing copies of the burn plan specifics with a note  
(Note\* one day advance notification is preferred but is not mandatory)

2). GPC agreed to change the 2007 MOB Guide so the wording was not so restrictive only using the prescribe burn form. Changes to the MOB Guide would simply state prior to burning individuals must notify GPC in advance (one advance notice is preferred).

3). FWS need to do a better job of maintaining and keeping an up-date current GPC e-mail contract groups and all e-mails must be sent entire GPC group. We recommend at a minimum the contact list be reviewed and sent out to the field quarterly. The current contact list for notifying GPC is as follows:

[cjfox@fs.fed.us](mailto:cjfox@fs.fed.us)  
[ahinker@fs.fed.us](mailto:ahinker@fs.fed.us)  
[asolvie@fs.fed.us](mailto:asolvie@fs.fed.us)  
[mrothleutner@fs.fed.us](mailto:mrothleutner@fs.fed.us)  
[preiter@fs.fed.us](mailto:preiter@fs.fed.us)  
[Kenneth.wesche@state.sd.us](mailto:Kenneth.wesche@state.sd.us)  
[Megan.jaros@state.sd.us](mailto:Megan.jaros@state.sd.us)

Unless we agree upon something different, all FWS personnel in the GPC zone will follow these procedures regarding notifying GPC of any prescribed fire operations.

If you have any question please feel free to give me a call.

Sincerely,

Shane Del Grosso  
ND/SD Zone FMO

**Item I.L.1 & I.L.2.**  
**New Holland Incident**

**I.L. Finding:**

Burn operations generally went well at the beginning of the burn, but it was obvious that staffing was stretched since nobody was assigned to be a fire behavior and weather monitor, and the RXB2(T) was also doing some interior lighting as well.

**Review Team Recommendations:**

**I.L.1.**

The use of a dedicated fire behavior and weather monitor is recommended to ensure that good observations are taken (that can help refine future prescriptions) and allow the RXB2 to focus on operations and the big picture.

**I.L.2**

RXB2(T) and FIRB should be focused on maintaining situational awareness and directing fire fighters rather than doing the actual firing.

**Task Statement I.L.:**

- Evaluate the report's findings and develop recommendations that will be incorporated in the regional guidance regarding:
  - (**Task 1**) Utilizing personnel in multiple capacities on prescribed burns.
  - (**Task 2**) The use of dedicated fire behavior and weather monitor(s) with the sole responsibility of monitoring weather and fire behavior conditions during the implementation of the burn.

**Consider (at a minimum):**

- Should it be mandatory that some positions be identified as prohibited from filling multiple roles or responsibilities on the fire line?

**Task Group Membership:**

Fenn Wimberly-Chairperson, Joe Guariglia-Scribe, Bob Rebarchik, Chase Marshall, Doug Downs, Art Canterbury, Bill Waln, Brad McKinney

**Task Group Recommendations I.L.1 and I.L.2**

- **Task 1: Utilizing personnel in multiple capacities on prescribed burns**

Unfortunately there is no simple answer to this question.

Our task group recommends that the position of RXB1 and RXB2 be filled as a single source position (no multitasking) with the following exception.

The burn boss may lead the ignition and holding forces if this has been clearly identified in the prescribed fire plan, is within the span of control, and is only involved in supervision and direction, (for example -- the burn boss should not need to have a drip torch or Pulaski "in hand" and be "heads down,") and the a need for a ignitions or holding specialist have not been separately identified in the prescribed fire plan and all actions are within NWCG / FWS guidance and policy. It is of the utmost importance that the burn boss retains situational awareness at all time, have the

“big picture” in mind, maintain control of assigned resources and constantly adjust operations in order to maintain control of the prescribed fire.

In addition the transition to an escaped fire must also be clearly defined and clearly understood by field personal. In the rapid paced change from controlled burn to uncontrolled wildfire each individual on the prescribed fire must know what their role will be in the suppression phase and be able to change into it quickly. If there is any thought that having the burn boss lead ignitions or holding might jeopardize the operation, then the position’s of ignition and holding specialist should be filled and the burn boss operate without any multitasking.

For the Burn Boss Type 3 (RXB3) we recommend allowing the burn boss to operate in a multitasking mode. This assumes that the type 3 burn meets the definition of a type 3 burn according to interagency prescribed fire standards (for example – limited to pile burning, and simple broadcast burns such as small islands of grass surrounded by water, and the burn boss supervises no more than 3 to 4 persons). If a type 3 prescribed fire presents conditions or has elements that are of moderate complexity, the burn should be moved into the type 2 category, and the guidelines for a type 2 prescribed fire would then apply.

It is one of the duties of the Prescribed Fire Plan Technical Review to ensure that a reasonable amount of resources have been assigned to a particular prescribed fire / prescribed fire plan.

For the majority of the type 2 and all type 1 prescribed fires conducted by FWS R6 the burn boss should be an exclusive role.\*\*

\*\* This was topic of detail discussion for the group. Many members felt the RXB2 and RXB1 should all ways be exclusive use roles. The reasoning behind this made very good sense.

An equal number of members felt that the role could be multi tasked, if defined in the prescribed fire plan as doing so, and met span of control guidelines, etc. This also makes good sense.

**Both discussions are valid, the group was unable to come to decision one way or the other, and we have left this topic open for further discussion.**

The entire group did agree that the Burn Boss (what ever level) must maintain situational awareness, the “overall big picture” and should not be heads down running an ATV drip torch, Pulaski etc. The burn boss needs to be in control of the entire operation.

We have included the following from the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide to remind people of the duties of the positions as assigned to prescribed fire. Remember FWS is a National Signature on this guide, and thus it should not be difficult to implement and follow this guidance.

**Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide excerpts<sup>1</sup>**

## Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide

During prescribed fire planning and operations, all federal agencies will accept each other's standards for qualifications. The minimum qualifications standard is National Wildland Fire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualifications System Guide, 2000 (PMS 310-1). State, local cooperators and contractors working on federal agency prescribed fires must meet the NWCG PMS 310-1 standards unless local agreements specify otherwise. No less than the organization described in the approved Prescribed Fire Plan may be used for implementation. The complexity of each prescribed fire or phase of fire(s) determines the organization(s) needed to safely achieve the objectives specified in the Prescribed Fire Plan. Minimum Supervisory Qualifications determined by prescribed fire complexity:

Minimum Supervisory Qualifications determined by prescribed fire complexity:

Table 1. Qualifications requirements related to Prescribed Fire Complexity. <sup>1</sup>

Table 1. Qualifications requirements related to Prescribed Fire Complexity. 1

Position	Complexity		
	High	Moderate-Low	Low
RXM1	Optional	Optional	Optional
RXM2	Not Allowed	Optional	Optional
RXB1	Required	Optional	Optional
RXB2	Not Allowed	Optional	Optional
RXB3	Not Allowed	Not Allowed	Required
FIRB	Optional	Optional	Optional
<b>Holding Specialist:</b> Holding functions will be managed by personnel qualified at the appropriate ICS wildland fire operations positions as required by complexity, assigned resources and operational span of control. For some projects, there may be no holding requirements or the holding duties are assumed by the Burn Boss.			

High, Moderate, and Low Complexity prescribed fires are determined through the required NWCG Prescribed Fire Complexity Rating System Guide.

### Prescribed Fire Burn Boss Type 3 (RXB3)

Adoption of the RXB3 position is up to each agency. Non-federal RXB3s must meet the qualifications as listed in the table below unless local agreements specify otherwise.

An RXB3 will only be allowed to implement low complexity prescribed fires where the possibility of spread or spotting outside the project area is negligible to non-existent; multiple fuel models are not involved; and aerial operations are not involved.

Table 2. Prescribed Fire Burn Boss Type 3 Requirements:

Training:	Required: S-290 Intermediate Wildland Fire Behavior Suggested: S-234 Ignition Operations
Prerequisite Experience:	Incident Commander, Type 5 OR Advanced Firefighter / Squad Boss AND Satisfactory position performance as a Prescribed Fire Burn Boss Type 3
Physical Fitness:	Moderate
Other Position Assignments that will Maintain Currency:	Prescribed Fire Burn Boss Type 2 Prescribed Fire Burn Boss Type 1 Fire Use Manager Prescribed Fire Manager Type 1 Prescribed Fire Manager Type 2

**Examples developed by the task group:**

Example 1: Twenty acres of grass are to be burned on level ground, surrounded by roads and water, personnel are in sight of each other and the potential for escape is very low, and surrounding fuels won't support fire, a type 3 burn boss and three to four people may be able to conduct the burn as a type 3 burn, multi tasking the burn boss with a drip torch.

Example 2: Twenty acres of grass are to be burned with a moderate potential for escape or a safety hazard such as oil and gas sites are within the unit. This is no longer a type 3 burn, and should be moved into the type 2 category, thus changing the entire role of the burn boss.

To further explain our position the task group recommend that the following positions be considered for use on prescribed fires and filled (multi tasking or no multi tasking) as suggested by the Interagency Prescribed Fire Guide.

**Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide excerpts <sup>1</sup>**

**Prescribed Fire Burn Boss (RXB1/RXB2/RXB3)**

The Prescribed Fire Burn Boss is responsible to the Agency Administrator, Prescribed Fire Manager, or FMO/local fire management organization for implementing the Prescribed Fire Plan.

The Prescribed Fire Burn Boss is responsible to:

1. Review the Prescribed Fire Plan prior to implementation and ensure all required elements and objectives are addressed.
2. Inspect the burn unit to validate Prescribed Fire Plan elements including areas of special concern as well ensuring that holding/contingency plans adequately address expected fire behavior outside the unit(s).
3. Obtain current weather and smoke management forecasts, updates, and special advisories from a meteorologist.

4. Maintain communication with the Agency Administrator, Prescribed Fire Manager, or FMO/local fire management organization.
5. Ensure that the Agency Administrator Pre-Ignition Approval Checklist is valid (See Burn Plan Template, Appendix B)
6. Take to the field those portions of the Prescribed Fire Plan necessary for completing the briefing and safe project implementation.
7. Complete and sign the Prescribed Fire GO/NO-GO Checklist (See Burn Plan Template, Appendix B).
8. Ensure availability of any contingency resources and management of those resources if deployed.
9. Ensure that all operations are conducted in a safe manner and in accordance with the approved plan and established standards and guidelines.
10. Verify qualifications of all assigned personnel. Conduct the personnel/safety briefing to ensure a safe operation.
11. Conduct the test fire and document the results.
12. Supervise assigned personnel and direct the ignition, holding and monitoring operations. The Prescribed Fire Burn Boss will be responsible for implementation including mop-up and patrol unless otherwise assigned to other qualified personnel.
13. Declare the prescribed fire out unless the responsibility for it is formally passed to another Prescribed Fire Burn Boss, Prescribed Fire Manager or the local fire management organization.
14. Determine when the prescribed fire is not within prescription parameters (both short and long term) or is not meeting objectives.
15. Declare an escaped prescribed fire a wildfire (if responsibility is assigned in the plan).
16. Manage the incident or oversee the transition to another Incident Commander if an escape occurs.
17. Ensure that reports are completed.
18. Coordinate with adjacent landowners, cooperators and permittees as designated in the Prescribed Fire Plan.

**Firing Boss (FIRB) (formerly known as the Ignition Specialist (RXI2))**

The Firing Boss reports to the Prescribed Fire Burn Boss and is responsible for supervising and directing ground and/or aerial ignition operations according to established standards in the Prescribed Fire Plan.

The Firing Boss is responsible to:

1. Review the Prescribed Fire Plan and the burn unit prior to implementation.
2. Brief personnel on project objectives and ignition operations.
3. Complete the test fire according to the ignition plan at the direction of the Prescribed Fire Burn Boss.
4. Conduct ignition operations in a safe manner according to the ignition plan.
5. Identify the impacts of ignition on the control and desired fire effects.
6. Coordinate ignition operations with the Holding Specialist.

**Holding Specialist**

The supervisory position in charge of the holding forces reports to the Prescribed Fire Burn Boss. There is no specific NWCG approved prescribed fire position for this function. This position is assigned by name and title using PMS 310-1 mnemonics. Holding functions will be managed by personnel qualified at the appropriate Incident

Command System (ICS) wildland fire operations standard and as required by the prescribed fire complexity, assigned resources, and operational span of control.

The Holding Specialist is responsible to:

1. Review the Prescribed Fire Plan and the burn unit prior to implementation.
2. Brief holding personnel on project objectives and holding operations.
3. Conduct holding operations in a safe manner according to the holding plan.
4. Coordinate holding operations with the Firing Boss.
5. Confine the fire to a predetermined area, mop up, and patrol.
6. Maintain communication with Burn Boss on holding progress and/or problems.

For some prescribed fires, there may be no holding requirements or the holding duties are assumed by the Prescribed Fire Burn Boss.

### **Fire Effects Monitor (FEMO)**

The Fire Effects Monitor (FEMO) is responsible for collecting the onsite weather, fire behavior, and fire effects information needed to assess whether the fire is achieving established resource management objectives.

The FEMO is responsible to:

1. Review the monitoring plan prior to implementation.
2. Monitor, obtain, and record weather data.
3. Monitor and record fire behavior data throughout the burn operations.
4. Recon the burn unit/area assigned.
5. Plot the burn area and perimeter on a map.
6. Monitor and record smoke management information.
7. Monitor first order fire effects.
8. Provide monitoring summary of the fire.
9. Provide fire behavior and weather information to burn personnel as appropriate.

### **Helitorch Manager (HTMG)**

The Helitorch Manager is responsible to manage the helitorch operation, supervise the mixing operation, and provide technical assistance to the Prescribed Fire Burn Boss/Ignition Specialist. The HTMG may also serve as Helicopter Manager and Helitorch Manager or Helicopter, Parking Tender (but not both).

### **Plastic Sphere Dispenser Operator (PLDO)**

The Plastic Sphere Dispenser Operator (PLDO) is responsible for the preparation, operation, maintenance, and care of the dispenser. The PLDO reports to the Ignition Specialist.

### **Helitorch Mixmaster (HTMM)**

The Helitorch Mixmaster (HTMM) is responsible for supervising the mixing/filling operations. The HTMM may also serve as Helitorch Manager or Helicopter Manager.

## **Task 2: The use of dedicated fire behavior and weather monitor(s) with the sole responsibility of monitoring weather and fire behavior conditions during the implementation of the burn.**

There is no cut and dry answer for this task. The flexibility to assign and type resources to a prescribed fire lies within the planning portion of prescribed fire plan and the discretion of the

burn boss. If the preparer of the prescribed fire plan feels a need, or prescribed fire circumstances dictate, that a weather / fire monitor needs to be assigned to the operation then the type of monitor, and qualifications should be clearly addressed in the resource planning section of the prescribed fire plan.

The qualifications of the weather monitor should be based upon FWS and NWCG policy. Some possible qualifications for filling a position of this type might be Fire Effects Monitor (FEMO), Field Observer (FOBS), or Fire Behavior Analyst (FBAN). The level of experience and the specific qualifications will have to be addressed on a case by case basis, dependant upon the data to be collected and the use of that data.

### **Examples developed by the task group:**

Example 1: A prescribed fire is planned with tight tolerance weather parameters such as wind, temp; tight fire behavior parameters; or research is needed to track and develop new prescriptions -- then a weather / fire monitor should be assigned, and this would be their only responsibility. The minimum qualifications desired for this type of position would be determined by the prescribed fire plan preparer and would need to meet NWCG / FWS / Interagency standards for the specific position. A FEMO might fill this position well.

Example 2: Prescribed fire is planned with a broad prescription, and is in the lower range of the moderate complexity (Type II) burn. The prescribed fire plan prepare may indicate that weather observations will be taken on site every 30 minutes by a member of the engine crew. In order for this type of multi - tasking role to be effective the prescribed fire plan preparer and burn boss must take into account what other roles this person (in this example an engine crew) will be filling. It is not appropriate to assign weather observations duties to the holding boss, or even a single resource; these positions have specific supervisory responsibilities and duties that must be fulfilled and they must remain focused on situational awareness during the entire prescribed fire operation.

### **Other supporting documentation from the Interagency Prescribed Fire Guide:<sup>1</sup>**

#### **Technical Reviewer**

**Recommend that we continue to follow the FWS R6 standards which are more restrictive the than the interagency guidelines listed below.** The interagency guidelines are listed for reference only.

The Technical Reviewer is responsible for reviewing each Prescribed Fire Plan element for content as well as evaluating the risk and Complexity Analysis to ensure that the stated goals and objectives can be safely and successfully achieved when properly implemented. The Technical Reviewer shall be qualified or previously qualified as a Burn Boss at or above the level of project complexity. At a minimum, NWCG qualifications will be accepted. The Technical Reviewer should have local knowledge of the area, experience burning in similar fuel types, and/or conduct an on-site review. **The Technical Reviewer must be someone other than the primary preparer of the plan.** An off-unit technical review is encouraged to provide an additional independent perspective. It is acceptable for other specialists to review certain portions of the plan however; a primary Technical Reviewer must be designated as technical review signatory. For example, a fire behavior

analyst may review the fire behavior calculations; the aviation manager may review the air operations plan; and/or a resource specialist may review impacts to their resource of interests. It is recommended that at least once every year, each unit should send a moderate or high complexity Prescribed Fire Plan off-unit for technical review.

The Technical Reviewer is responsible to:

1. Ensure that Prescribed Fire Plans meet agency policy and direction.
2. Ensure that the Complexity Analysis accurately represents the project, so the Agency Administrator understands the identified risks and the mitigating measures enacted. This may require onsite review in Wildland Urban Interface (WUI) or high complexity situations by the Technical Reviewer.
3. Check the prescription parameters against the fuel types to ensure that the project as planned has a reasonable chance of meeting the resource management objectives.
4. Ensure that the fire behavior calculations and/or prescription parameters are appropriate and within the acceptable range.
5. Ensure that the ignition, holding and contingency plans are consistent with the predicted fire behavior.
6. Complete and sign the Technical Review Checklist (See Burn Plan Template, Appendix B) and the Prescribed Fire Plan signature page.

### **Prescribed Fire Plan Preparer**

For the purpose of this document, the Prescribed Fire Plan Preparer is defined as the individual responsible for the preparation of the Prescribed Fire Plan. Several people may be involved in the preparation of the Prescribed Fire Plan, but the Prescribed Fire Plan Preparer is responsible for the final plan content. The primary preparer of the Prescribed Fire Plan will sign the signature page.

The preparer is responsible to:

1. Prepare the Prescribed Fire Plan in accordance with this guide's policy and direction.
2. Coordinate with the resource management and/or technical specialists to ensure that the plan meets management and operational objectives.
3. Interact with the Technical Reviewer to ensure that all plan elements are adequately addressed.
4. Complete and sign the Complexity Analysis.

### **References:**

1. Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide. [http://www.nifc.gov/fuels/downloads/directions/RXFireGuide\\_08.30.06.pdf](http://www.nifc.gov/fuels/downloads/directions/RXFireGuide_08.30.06.pdf), National Interagency Fire Center, 2006. The indented text is from this reference.
2. Interagency Standards for Fire and Aviation Operation 20007 aka "The Red Book" National Interagency Fire Center, January 2007.
3. U.S. Fish and Wildlife Service Fire Management Handbook.

**Item I.O. & I.R.**  
**New Holland Incident**

**Finding I.O**

The span of control on the fire was stretched because of the lack of individuals qualified at the single resource boss or advanced firefighter level. The RXB2 (t) was supervising all assigned firefighters working multiple flanks with multiple engines.

**Review Team Recommendations:**

**I.O.1**

Service policy recommends an ENOP to be assigned to each engine on the burn.

**I.O.2**

FFT1's should be utilized to lead firing teams and improve the span of control.

**Task Statement I.O.:**

In conjunction with IR, below, evaluate the report's findings and develop recommendations for how to increase the number of individuals qualified at the single resource boss or advanced firefighter level within the Region 6 fire program.

Consider (at a minimum):

Address both fire funded and collateral duty fire staff.

Note: the use of the ENOP position is being addressed at the national level

**Finding I.R**

Wildfire qualifications and experience levels must be considered when making holding and contingency assignments for employees assigned to prescribed fires. The high proportion of moderate fitness rated firefighters assigned to the prescribed fire significantly limited the RXB2's options for dealing with slopovers /escapes.

**Review Team Recommendations:**

**I.R.1**

The FWS should continue to develop the experience level and qualifications of its staff to ensure that the appropriate fire skills are being learned which will enhance prescribed fire program.

**I.R.2**

FWS personnel should be encouraged and allowed to participate in wild fire assignments to build knowledge base and capability.

**Task Statement I.R.:**

In conjunction with I.O. above, develop recommendations on:

1. How to improve the experience level and qualifications of our staff in order to enhance the region's prescribed fire program.
2. How to encourage and allow active participation by field staff on wildfire assignments to build fire management knowledge base and capability.

Consider (at a minimum):

Address both fire funded and collateral duty fire staff

Address which “appropriate fire skills” are needed to enhance the region’s prescribed fire program.

**Task Group Members:**

Troy Davis – *Chair*, Suzanne Beauchaine – *Vice Chair*, Fenn Wimberly – *scribe*, Roger Hollevoet, Barron Crawford, Art Canterbury, Jeff Olsen, Bruce Winters, Darwin Schultz, Joe Guariglia, Todd Schmidt, Ken Kerr

**Task Group Recommendations for I.O and I.R:**

**1. Manager support is a key factor to increasing the number of individuals qualified at the ENGB and FFT1 level.**

A. A statement from regional leadership as to the importance of increasing fire qualifications throughout the Service would be beneficial to making this a priority. Regional guidelines promoting increased training and fire experience for all staff are important to reaching the goal of an increased number of individuals with higher fire qualifications.

*The increased number of individuals at higher qualification levels will create a professional program with the highest level of safety.*

B. We need to make sure Line officers understand the importance of encouraging and supporting employee development to higher fire qualifications (FFT1, ENOP, ENGB, FEMO, ect.)

Regional / Service Wide priority

C. Developing higher levels of fire training *is a priority*. It needs to be supported regardless of series / title and funding should be made available through any means necessary (fire / station / any combination).

D. Fire funds should be tied to the development of qualified individuals. Stations that promote development by providing increased training and experience should receive the highest priority for funding.

Stations that do not support fire qualification development because they don’t feel it is a priority should have their fire funding pulled.

**2. Fire training should be made available and accessible to all employees.**

A. Identify current fire qualification levels of all employees; to identify courses, training , and experience needed to get individuals to higher qualification levels

B. Identify training needs at the local / district / zone level and provide training at these levels to increase availability of courses, field training, and experience opportunities Use IQCS or a matrix to track employee Qualifications and identify training needs

- C. Include fire training needs and skill development in all employees Individual Development Plans and Performance Plans (Fire staff and FMO's can help to identify courses, experience needs, and realistic timelines for individual to gain the qualification level needed.
- D. Offer training locally, especially 100 & 200 level courses needed for FFT1 and ENGB level; include training as part of annual refresher. Make hands on training and drills available for all employees.
- E. Provide regular in-service training and make it available all employees. (A 30 minute – 1hour in-service available every week provides an additional 2-4 hours of fire training / practice every month with little impact on the work program).
- F. Coordinate training needs and scheduled courses with district / zone FMO's.
- G. Ensure that course are offered throughout the region / zone and are open to everyone (other refuge staff, staff from different refuges, interagency, cooperators – i.e. we are all on the same team).
- H. Send employees to regional / national training academies. These academies often provide needed training opportunities in a logical order of courses available during the same time period and allow for great networking with other agencies. (Colorado Wildfire Academy, Arizona WFA, New York, FUTA, PFTC, ect.) Employees can be required to bring information gained in the training back to the refuge and present it at in-service trainings and safety meetings.
- I. Use the ENOP position as a *Stepping Stone* position between FFT1 and ENGB. It should be the goal of programs to develop all engine supervisors to the full level of ENGB to promote professionalism and the highest degree of safety. **Refuges should not settle for only the ENOP level because this is all they need to get by, this is a poor way to do business.**

Current FWS guidelines (Fire Management Handbook-2007) allow for the use of the ENOP position in place of an ENGB on refuge lands. The ENOP position is an agency specific position. Qualifications and Fitness requirements for this position are included in the FMH.

The agency specific use of the ENOP position is currently being looked at the National level.

*ENOP is not a prerequisite position to qualify for the ENGB position.*

- J. Develop Regional / Zone Prescribed fire modules to help carry out burn projects. This should be promoted and encouraged at the national level, this task group supports the development and use of such modules

These modules could supplement staffing needs on larger or high priority burns

Provide additional higher level qualified persons to carry out burns

Provide mentors / trainers to develop employee experience

Provide training opportunities

**K. Develop a Regional Engine Academy Curriculum that can be taught at the local / district / zone level**

Include required training for ENGB / ENOP

Include in-depth practice and training in Engine Module Safety, Driving skills, Engine tactics, maintenance & troubleshooting, fuels, entrapment avoidance, etc.

Develop a forum to share ideas and issues (networking)

Train with equipment and crew members in simulated situations

Curriculum should create some consistency from place to place

**L. Incorporate Simulations, Tactical Decision Games and Sand Table Exercises into all training sessions (including annual refresher) to help develop decision making skills**

**M. The **tactical use of engines** and **driving skills** are lacking in current training requirements, include this training as a critical part of local training, in-service training, tailgate safety sessions, and in regional engine training curriculum . Encourage the practice of these skills at every opportunity.**

**3. Participation in the fire program should be encouraged at all levels.**

**A.** Encourage all employees to participate in the fire program

**B.** If you have employees that do not participate in the fire program, sit down and discuss it with them to determine why, sometimes all it takes is an invitation to get them involved.

**C.** Promote fire program development for all employees.

There may be some employees who have no interest in a position on the fireline, but that does not mean that they could not participate in the fire program. There are many positions that support fire (dispatch, GIS / mapping, logistics, pay, documentation, information, etc). Positions utilizing these skills can provide the burn boss and incident commander with support that can ensure a safer project. By developing and promoting skills and training in these all areas of fire we can create a strong program that promotes safety, teamwork, and professionalism.

**D. Integrate fire training into development for all new employees**

Refuge Managers / Project leaders should review their stations work needs and fire management plans. They may need to strongly encourage new incoming employees to become red carded. This may include working with HR to change / modify some PD's to include "other duties as assigned – fire". These choices would be left up to the local unit / complex managers.

**4. Employees must be given the opportunity to gain fire experience through prescribed fire, fire suppression, and training assignments.**

- A.** Take advantage of fire details during slower times of the year (fall / winter). There is usually opportunity to assist with prescribed burning or wildfire suppression activities in the south / southeast regions.
- B.** Encourage employees to participate in details that compliment their training needs
- C.** Start an exchange program with other refuges / agencies in other areas or regions – this can help meet targets and provide training opportunities during slower periods at home and provide resources at times when additional resources are needed and the other regions are in there slow period  
(Support and coordination for this program at the zone / region level would be helpful to promote participation, set priorities, policies, and funding guidelines)
- D.** Continue to encourage and combine resources from district / zone refuges to create detail opportunities that compliment training needs (ie. Engine details. Engine strike teams, handcrews , IA modules, helicopter modules)
- E.** Develop partnerships with other agencies and cooperators to share in training opportunities and create a larger available work force in your area.
- F.** Encourage PL's and RM's to make all staff available for wildfire assignments.

Some of the benefits include:

Promoting a teamwork atmosphere in the FWS and fire program

Increasing professional development of all employees  
Salary savings

Providing necessary experience opportunities to gain higher qualifications

- G.** Promote mentoring at a local level. Match employees with fire training / experience needs up with qualified individuals. The mentor can provide guidance, work with task book evaluation needs, and help identify the strengths / deficiencies of an individual to promote development, etc.

## **5. Clarify and use existing policies, before making recommendations for changes**

- A.** Clarify existing fire management policies and identify gray areas in the policies to avoid various interpretations of the rules.

*Make sure that the regional / national office is sending out clear messages, remove the conflict and confusion of the “red book, FWS Handbooks, and the NWCG 310-1” There are too many rules that don’t make sense or contradict each other.*

- B.** Evaluate policies and make recommendations at Regional / National level if we feel changes are needed.
- C.** Don’t necessarily need a new policy. We need to clarify policies already in existence; there are way too many interpretations of policies already in existence.
- D.** Use Guidance in 310-1 for qualifications ( *Circumstances that require variance should be the Exception, not the Rule*)
- E.** Policy must be easily accessible for everyone to find, make policy documents and interpretations available in a central site like R6 fire website.
- F.** Ensure changes in policy are communicated through the chain of command from national level down to each refuge / WMD level . Use email, web site, phone calls, staff meetings, conference calls, etc. to ensure this critical information gets communicated and that is clear.
- G.** Key policy items / changes should be sent out each year and included in the fire refresher, safety meetings, briefings, and should be documented at the refuge level.

## **Item I.P New Holland Incident**

**Finding I.P:** The firing sequence was reasonable given the spot forecast predicting wind from the SW later in the afternoon. The west ignition (4) progressed well, but may have gotten out of sync with east ignition (3). The RXB2 (t) on an ATV may have been too aggressive when igniting the flanking strip along the south side of the windrow. The rationale was legitimate, but timing was poor considering the ignition on the east flank had slowed due to the sparse fuel.

### **Review Team Recommendations:**

#### **I.P:**

- A much shorter strip or waiting until the black lining had been completed would have been more prudent.
- Continue or improve communications with all resources during lighting.

**Task Statement I.P:** Evaluate the report's findings and develop recommendations for how to improve the "lessons learned" from this and other incidents within Region 6 and the Fish and Wildlife Service fire program.

### **Task Group Members:**

- Richard Sterry (Facilitator), Chad Wimer (Lead), Doug Downs, Joseph Guariglia, Roger Hollevoet (Troy Davis unable to attend).

### **Task Group Recommendations I.P.:**

- General consensus among group members that report took too long to get to the field. RO did send out reminders to the field based on initial findings. Continuing to do this and get the report out to the field as soon as possible may prevent a similar event in the near future.
- Report needs to be more thorough. Many of the facts needed to get a good understanding of what happened were left out of the Review. The number of personal, qualifications, position held, personal accounts of incident, maintenance records of equipment and time tabled maps to show progression of events may aid in understanding how or why things happened.
- Recommendations should be based on current policy. Policy that is not followed should be listed in the recommendations as a reminder to others. Unfortunately, Lessons Learned come from the mistakes or misfortunes of others and we need to point these out as a reminder so they are not repeated.
- Review team should be conducted by as many interagency partners as possible. Including personnel from the National Weather Service or Local VFD may be able to provide additional insight to how or why things happened.
- If policies are followed, are there other issues with leadership, the review process or experience? We need to ensure that are personnel have been provided all the tools and opportunities to continue learning and developing in their positions. We rely heavily on the Northern Rockies to provide training when many classes could be put on locally by bringing instructors to us or utilizing the experience from the Zone or Regional level.

- Establish how qualifications are obtained within our region. The region or each zone or district needs to establish a red card committee to review taskbooks prior to an individual being certified in a position? This has worked well with other agencies and can sometimes catch some mistakes made in taskbooks etc. Usually a red card committee only needs to meet once a year to review completed taskbooks, since it would be highly unlikely that someone could be issued a taskbook and complete everything satisfactorily and need to be certified all within one fire season.

We all know we can be very proud of our FWS fire team and over the years the manuals, policies, and guidance we operate under are first class. We should, however, consider experience, leadership, and the review process so our implementation is as rock solid as we can provide.

## **Item I.Q. New Holland Incident**

### **Finding I.Q**

The ignition on the west line to the row of trees had backed through the tree line when the unpredicted wind change of W to NW (instead of SW as predicted) hit the unit. This produced a head fire that the east line could not hold and which could not be safely or effectively attacked with burn resources. This was the primary cause of the escape.

### **Review Team Recommendations:**

#### **I.Q.1**

The Burn Boss situational awareness must include worst case scenario. This includes but is not limited to asking the following questions, what if there is a wind shift right now, T6 engines breaks down, lighters run out of fuel, communication stops between forces, lighting is taking longer than expected .

#### **I.Q.2**

Ensure that lighting and holding operations are coordinated.

### **Task Statement I.Q.:**

- Develop recommendations on how the situational awareness of the burn boss may be improved in regards to:
  1. Coordination of lighting and holding operations.
  2. What happens if the worst case scenario takes place at any point in time

### **Task Group Members:**

Suzanne Beauchaine, Red Rock Lakes NWR, ROS,-Chair; Rich Sterry -Facilitator and Scribe; Bruce Winter, Dave Martin, Bill Waln, Tom Zick.

### **Task Group Recommendations:**

- Develop recommendations on how the situational awareness of the burn boss may be improved in regards to:
  1. Coordination of lighting and holding operations.

### **Recommendation I.Q. 1a:**

Adding qualified and experienced personnel to the burn organization will better allow the burn boss to maintain situational awareness and provide for fire fighter safety during lighting and holding operations. The group supports the following recommendation in the review. See the New Holland Review Report I. Section Prescribed Burn Plan E. “The burn organization identified the minimum resources needed to implement the plan at the low end of the prescription, and identified optional resources. However, it did not identify any type of considerations for determining when the optional resources would be needed, and did not clearly address the need for the minimum number and qualifications of arduous fitness rated staff to meet holding and contingency needs.”

- Consider using a matrix, or other step up plan, to better display the number and type of resources required when pre-identified prescriptive thresholds are exceeded. Ensure that these identified resources adequately cover holding and contingency needs under those conditions.

The group discussed the following positions or duties that would assist the burn boss in maintaining situational awareness:

Holding specialist as defined by the Interagency Prescribed Fire Implementation Guide

The supervisory position in charge of the holding forces reports to the Prescribed Fire Burn Boss. There is no specific NWCG approved prescribed fire position for this function. This position is assigned by name and title using PMS 310-1mnemonics. Holding functions will be managed by personnel qualified at the appropriate Incident Command System (ICS) wildland fire operations standard and as required by the prescribed fire complexity, assigned resources, and operational span of control. Complexity of the incident will determine minimum qualifications for person designated as holding specialist. If the burn plan preparer determines that a holding specialist is not necessary (i.e. Type 3 burn) it should not be included in the burn plan.

→ We recommend that our prescribed fire plans list minimum fireline qualifications needed to serve as Holding Boss, if needed, based primarily on the complexity of the incident.

The holding specialist is responsible to:

1. Review the Prescribed Fire Plan and the burn unit prior to implementation.
2. Brief holding personnel on project objectives and holding operations.
3. Conduct holding operations in a safe manner according to the holding plan.
4. Coordinate holding operations with the Firing Boss.
5. Confine the fire to a predetermined area, mop up, and patrol.
6. Maintain communication with Burn Boss on holding progress and/or problems. For some prescribed fires, there may be no holding requirements or the holding duties are assumed by the Prescribed Fire Burn Boss.

Weather and smoke monitoring:

There are NWCG positions for field observers and fire effects monitor. The FWS typically utilizes a fire fighter to take weather and smoke observations. That person typically will have other duties. This duty is very important and could be filled by moderate duty collateral fire fighter to support refuge management activities.

→ We encourage interested refuge staff to become a FEMO and or FOBS to increase their knowledge of fire effects and weather which support refuge management activities but these NWCG positions are not required to conduct a prescribed burn.

Engine staffing.

The RMA requires as a minimum, 3 personnel on an engine. This has been determined through the RMA Operations Committee, and is directly related to facilitating LCES. The incident may specifically order engines meeting the National Mobilization Guide standard of 2 personnel if doing so does not compromise safety. We need to follow standard staffing of 3 firefighters per engine, but do have some discretion in using 2 firefighters as indicated previously.

→ We recommend that prescribed fire plans may need to address why we can use 2 firefighters per engine instead of 3.

**Recommendation I.Q. 1b:**

The situational awareness of a burn boss or any other fire fighter is primarily a function of the experience and training an individual receives.

→ Encourage personnel to work aggressively towards other fireline qualifications. Working towards qualifications for STEN, TFLD, and ICT4; working with different burn bosses and fuel groups, on wildland fires will all enhance the skills of a burn boss allowing them to better distinguish between perception and reality. Please see Task Group IO and IR recommendations for advancing training and qualifications of fire personnel.

**Discussion Thread:**

There was a lot of discussion on raising the minimum qualifications needed to become a RXB2. Many feel that we sign off on RXB2's too quickly. We shied away from recommending any increase in the minimum qualifications of a RXB2 because of the ramifications for the NWRs.

- i. IQCS (red card system) allows agency specific (such as FWS) qualifications but does not allow for regional (ie R6) qualifications. The system will allow users to select what qualifications to print on card. IQCS would show the person as qualified (based on NWCG and agency standards); so the users would have to be diligent to ensure that an RXB2 was qualified at R6 level before allowing RXB2 to be printed on red card. This could lead to red cards being issued to unqualified (R6 level) personnel.
- ii. Fire Management Handbook allows FWS to recognize qualifications of other agencies (ie FS, BLM, etc). However, it does not allow FWS regions to recognize qualifications of another FWS region (FWS regions have all had the same minimum qualifications for positions in the past so it was not an issue). Example, if R6 raised minimum quals of RXB2, a qualified FS burn boss could conduct a prescribed burn in R6 (based on FMH). However, a FWS burn boss from another region would not be able to conduct the same burn unless this individual met R6 minimum requirements.
- iii. If R6 raised minimum qualifications for RXB2, what would be done with current RXB2's that would no longer be qualified?

**Recommendation I.Q. 1c:**

There was much discussion in the group as to whether a RXB2 should have collateral duties as it affects the situational awareness of the burn boss. This task is also covered by Group I.L.

→ Burn Boss Trainees should not have collateral duties. A trainee is learning a new position and needs to concentrate on that task alone.

→ Depending on the complexity of the burn plan; the experience of the burn boss and burn day conditions, among other factors, we recommend minimizing the collateral duties for all other burn bosses.

**Recommendation I.O. 1d:**

→ Ensure good communications before and during the burn. Situational awareness is enhanced with open lines of communication and necessary for all personnel to be safe and to alert the burn boss of problems arising on the firing or holding lines.

**Task Group Recommendations**

- Develop recommendations on how the situational awareness of the burn boss may be improved in regards to:
  2. What happens if the worst case scenario takes place at any point in time?

**Recommendation I.O. 2a:**

→ Incorporate Sand Table exercises and other simulations and training at yearly meetings, refreshers and other opportunities as presented to assist firefighters plan for the unexpected.

**Recommendation I.O. 2b:**

→ Burn plans need to fully address contingency plans for the upper level of the prescription. At the pre-burn briefing the fire staff should be informed of the upper level of the prescription and assigned to positions in the case that the predefined elements in the burn plan are exceeded. During the burn, the burn boss should continually plan for the unexpected. Reviewing the contingency plan and actual conditions on the day of the burn may mean bringing your contingency resources with you or not burning.

**Recommendation I.O. 2c:**

→ Ensure good communications before and during the burn. Situational awareness is enhanced with open lines of communication and necessary for all personnel to be safe and to alert the burn boss or IC of problems arising on the firing or holding lines.

**Other comments**

There was discussion on the importance of the burn plan preparer to consider all contingencies and appropriate staffing levels and how having an FMO critically review the plan before approving it. It was decided that this discussion was outside of our focus and is being covered by another group.

**Item II.B**  
**New Holland Incident**

**Finding II.B**

The high proportion of moderate fitness rated firefighters assigned to the burn significantly limited the RXB2/ICT4s options for initial attacking the wildfire, and added an extra level of complexity to the situation.

**Review Team Recommendations:**

**II.B.1**

Ensure that there are adequate numbers of qualified and experienced staff assigned as contingency forces given anticipated fire behavior.

**Task Statement I.B.: develop recommendations on:**

1. How physical fitness ratings should be implemented e.g., should the region require an arduous rating for all fireline positions listed as arduous for suppression or should we identify which positions that are listed as arduous for suppression can be filled as moderate for prescribed fire? If the later option is chosen, a policy for how to use the positions, especially in the event that a prescribed fire escapes and becomes a wildfire, should be developed.
2. Ways to increase the number of arduous fitness rated personnel within the region.
3. Ways to increase the total amount of participation in fire management within the region.
4. Ways of developing and maintaining crew cohesion while meeting the goal of increasing the number of arduous fitness rated personnel working on prescribed fires.

**Task Group Members:**

Jim Kelton, Neal Beetch, Mike Rabenberg, Darwin Schultz – chair, Mike Granger, Todd Schmidt, Bill Waln

**Task Group Recommendations:**

1. How physical fitness ratings should be implemented e.g., should the region require an arduous rating for all fireline positions listed as arduous for suppression or should we identify which positions that are listed as arduous for suppression can be filled as moderate for prescribed fire? If the later option is chosen, a policy for how to use the positions, especially in the event that a prescribed fire escapes and becomes a wildfire, should be developed.

**Recommendation 1.A – *alternate view point (requirement of arduous rated only)***

*The group felt that an alternate view point should be included on this issue for comparison and discussion.*

**Assumptions – For the purpose of this discussion fire refers to prescribed fire and wildfire suppression interchangeably (fire is fire ). It considers that even though prescribed fire is a**

**planned event and wildfire is unplanned that every prescribed fire has the potential to become a wildfire.**

**The moderate rating exemption now in use is very narrow in scope (all positions on a burn do not qualify to be moderate fitness rated). The use of moderate rated employees only applies to Prescribed Fire Crew Member (agency only position), Firing Boss (310-1), and Burn boss positions 1,2, & 3 (310-1, FMH), other positions such as Engine Boss, Engine Operator, and other single resource boss positions still need to meet the arduous rating set forth in the 310-1, “red book”, and FWS Fire Management Handbook.**

**The moderate fitness exemption does not apply to every refuge / WMD. (*Exceptions to the standard are necessary when a refuge analysis of prescribed fire operations reveals that terrain, tactics and fuels present require physical fitness standards may be more restrictive than a "Moderate" standard for a specific prescribed fire project. Refuge personnel will meet the highest physical fitness category required to safely conduct prescribed fire operations on the Refuge, determined by terrain, tactics and fuels. – FMH chapter 14*)**

- The conversion to the use of arduous rated firefighters on fire would be a move in the direction of creating a more *professional* fire organization and can be implemented *consistently* across the region / service as a whole.
- All agency firefighters performing duties on service lands would be fitness rated at the highest level. They would all have to go through the same medical certification process, work capacity test, and would be able to respond to escaped fires, initial attack of wildfires, and would be available to provide interagency response to fire incidents nationally (if they so desired, *they would not be drafted into service*).
- One of the task groups (IO & IR) was charged with determining how to increase the level of qualifications across the service to more individuals qualified at the Firefighter Type 1 (FFT1) and Engine Boss (ENGB) level. Both of these positions (FFT1 & ENGB) require wildfire assignments to complete the taskbooks to obtain qualification at these levels. Moderate fitness rated fire staff are unable to participate in these assignments because they are only qualified to participate on prescribed burns, therefore Moderate fitness rated employees can not earn higher qualifications regardless of experience.
- Requiring all personnel to perform at arduous fitness level provides for a consistent fire response. *The basis for using moderate rating is that light fuels, gentle terrain, and use of equipment (not the use of hand tools) are present. Firefighters can respond to fire in all types of terrain, all fuels, and with all available firefighting tactics if arduous is required.*

### **Recommendations (cont.)**

- 2. Ways to increase the number of arduous fitness rated personnel within the region.**
- 3. Ways to increase the total amount of participation in fire management within the region.**

### **Background/Assumptions:**

Participation of collateral staff in the fire program is ultimately influenced by managers. They have the ability to adjust workloads and time schedules to allow collateral staffs to participate in fitness programs, fire training, and staffing of the fire crew on burns. As with most all decisions, the managers must weigh the costs and benefits to the refuge by allowing and encouraging participation in the fire program. As a group, the following recommendations were discussed as options for managers to consider for supporting the fire program. Also identified were subjects that inhibit collateral staff from participating to the fullest extent and should be considered by management for clarification or changing of policy.

**Recommendations:** Since the two tasks are very similar in nature, the following responses will address both tasks.

- *Supporting collateral staff participation:*
  - Allow collateral staffs work time to complete training courses and physical fitness with fire staff – building team cohesion.
  - Allow collateral staff to work on wildfire assignments, but don't require them to work wildfires unless they want to even under preparedness levels 4 and 5.
  - Allow collateral staff to assist Rx burning at other refuges.
  - Reward participation for assisting fire staff and maintaining fitness – possibly through reduced workload, cash awards, etc.
  - Personnel need training and wildfire assignments to get qualifications for burning at home units and gain situational awareness.
  - Try to incorporate fire participation into new position descriptions where it's applicable.
  - Encourage employee fitness to promote a happy, healthy self and more productive work on the job leading to better ecosystem management.
  - - Ensure individual development plans contain a fire training path for goal achievement.
  
- *Subjects potentially inhibiting collateral staff participation:*
  - Participation in the fire program doesn't mean either being on an engine or mopping up after a burn. There are several positions where assistance is needed by the fire program that are not on the fire line. Get this information out to the field or could be posted on the web or distributed by other means.
  - Allow LEOs to utilize one physical for both occupations.

### **Recommendations (cont.)**

- 4. Ways of developing and maintaining crew cohesion while meeting the goal of increasing the number of arduous fitness rated personnel working on prescribed fires.**

## Background/Assumptions:

Cohesion can be increased in organizational units by maximizing member familiarity within the units and by providing challenging tasks (drills and exercises) within an organizational and leadership climate that emphasizes the overall value of such experiences. The dilemma however is that often we are attempting to build a functioning unit within fire management operations where members have not had an opportunity to become familiar with each other. In these instances we must rely on the organizational model. Time is not given, or does not exist depending on nature of the required response, to allow these human barriers to be broken down. Our fire management organizations are geographically dispersed making it difficult to drill or perform training together. This is not only true in our Region and fire management districts but across the entire country. How often do our firefighters work with the same individuals on every incident they respond to? The easy answer is seldom if ever. We must place greater emphasis/trust on the organizational model over the individual firefighter. “Know your job, know your supervisor and follow LCES.” This simple statement if followed can increase the ability, efficiency and safety for an organizational unit to function at a high level even if members within the unit are not familiar with each other.

Leadership, not leadership positions, is the key to this process. The leader (FMO/Burn Boss) is responsible for assuring that the steps necessary to build the minimum cohesion is establish prior to initiating operations. Those in command/leadership roles should not be so concerned about managing the fire as much as managing the human resource.

## Recommendations:

However it is important that even with the difficulties or barriers that were listed in the previous paragraph there are steps that can be taken to increase an organizational unit’s ability to function more effectively.

### 4.1. Train together:

Time needs to be given rather than taken advantage of to train together. When possible this should include all employees who may potentially work together on the fireline. Skills are added and strengthened which will allow for a more efficient response, resulting in an organizational unit transforming into a team. Members will become more familiar with each other. Strengths and weakness will be exposed.

### 4.2. Ensure lines of communication are open and free flowing:

This may be as simple as a more thorough operational briefing. Taking extra time and being more thorough will increase familiarity within the defined organizational unit. Understanding what is expected of them in the many potential scenarios that may occur during the course of any incident should be the goal.

### 4.3. Maintain existing crew/resource organizations:

When possible keep pre-established crews together. This will maintain a minimum level of operability/efficiency when/if the environment and larger organization degrades.

### 4.4. Assign “pick-up” crews to tasks that are not as critical

In situations where it is not possible to maintain integrity of a unit then placement of that resource in the larger organization needs to be considered. A put together crew, one where all members are not familiar with each other, should be assigned non critical roles. In the situation where this is not possible it should be recognized by all within the organization that the complexity of that incident has increased where any failure in that organization will be magnified.

4.5. Consolidate fire funded positions at one field unit when possible.

The assumption in this recommendation is that these fire funded individuals will fill the majority of critical fire line leadership roles on most incidents. With this in mind developing crew cohesion or a sense of teamwork within this group is vital to increase safety and efficiency.

**Item II.F  
New Holland Incident**

**Finding II.F**

The RXB2 (t)/ENGB assigned to the engine initially attacking the escape should have disengaged sooner given the engine’s effectiveness and safety considerations. His situational awareness and ability to effectively make this decision was likely affected because he was operating the hose on a very active flaming front.

**Review Team Recommendations:**

**II.F.1**

The primary responsibility of an ENGB is maintaining situational awareness and providing for the safety of the engine and assigned staff.

**Task Statement II.F.:**

**Task 1: How many people should be required per engine by Region 6.**

**Task 2: How to best maintain LCES on grassland fires when working with fire engines.**

**Task Group Members:**

Mike Bryant, Fenn Wimberly – Chairperson, Shane Del Grosso – Notes, Mike Granger, Joe Flores, Jeff Dion, Sean Cross, Rick Liztinger

**Task Group Recommendations:**

**Task 1: How many people should be required per engine by Region 6.**

The task group recommends that at this time we stay with the NWCG guidelines of a minimum of two persons per engine with the following stipulations for prescribed fire.

- Any engine sent off the home unit will come with an ENGB + FFT2
- Careful planning and thought must go into the prescribed fire plan when determining the amount, type, and quality of resources to be assigned to the prescribed fire. The prescribed fire plan should clearly indicate what type of resource, and the minimum numbers of staff to be assigned to that resource.
  - For example. In the resource section of a prescribed fire plan you state that you will need the following.

<b>Prescribed Fire Organization Table (Example Only)</b>	
<b>Position / Equipment</b>	<b>Quantity</b>
RXB2	1
Ignitions (RXI2)	1

FFT2	2
Type VI Engines (2 people per engine)	2 (4 people total)
ATV's – with water for holding (1 person per ATV)	2
Type VI Engine (3 people per engine)	1 (3 people)
Holding Specialist – STEN	1
<b>TOTAL MINIMUM # OF PERSONNEL REQUIRED =</b>	<b>14</b>

- Staffing and type of resources should be based upon holding needs, fuel types, terrain, topography, and physical size of the burn unit.
- The prescribed fire plan preparer and the burn boss should retain the flexibility to recommend or exceed the minimum
- Skill levels of the individuals assigned the resource position should also be taken into consideration:
  - Example; Place experienced ENGB / ENOP with an inexperienced FFTR and an additional experienced FFTR. This provides for better training, safety, and overall operations.
- Resource needs and assignments in the prescribed fire plan should be carefully reviewed by the technical reviewer, and line officer to ensure that reality check has been made. The reviewers and line officer should ask the question -- Do we have enough resource to safely, and reasonably accomplish the operation?
- We recommend that FWS R6 (and the FWS National Fire Office) adopt the following Guidelines for engine staffing:
  - Engine Module Staffing: Engines of any type responding to off-refuge assignments will be staffed by a Single Resource Boss-Engine (ENGB) and the appropriate number of module members.
  - Type 6 or 7 engines may be supervised by an Engine Operator (ENOP) on in-refuge fires (wildland or prescribed) only.
  - On Type 6 or 7 engines supervised by an ENOP that is used for initial attack (on in-refuge fires only), the ENOP must also be qualified as an Incident Commander, Type 5 (ICT5) or higher.
  - Type 3, 4, or 5 engines, regardless of assignment location, will be minimally supervised by an ENGB.
  - Type 6 and 7 engines will have a minimum crew of two-an ENGB or ENOP (in-refuge only) and an Engine Module Member.
  - Type 3, 4, and 5 engines will have a minimum crew of three- an ENGB, an ENOP, and one Engine Module Member or an ENGB and two Engine Module Members.
  - Engines may travel from point to point with less than the minimum required staffing. In order to be considered “in service” and fully operational they must meet the minimum staffing guidelines for the assignment.
    - Example - A Type VI engine may leave Flint Hills NWR travel to Browns Park NWR with one (1) driver. Once arriving at Browns Park the engine is

staffed with 2 additional persons, making the total crew ENGB + 2 FFT2's. The engine is now considered "in service" and fully operational.

**Task 2: How to best maintain LCES on grassland fires when working with fire engines. Prescribed or Wildland Fire:**

It is of the utmost importance that the burn boss / incident commander / operations leader retains situational awareness at all time, have the "big picture" in mind, maintain control of assigned resources and constantly adjust operations in order to maintain control of the prescribed or wildland fire.

For prescribed fires the transition to an escaped fire must also be clearly defined and clearly understood by field personal. In the rapid paced change from controlled burn to uncontrolled wildfire each individual on the prescribed fire must know what their role will be in the suppression phase and be able to change into it quickly. If there is any thought that having the burn boss lead ignitions or holding might jeopardize the operation, then the position's of ignition and holding specialist should be filled and the burn boss operate without any multitasking.

- Each prescribed fire plan preparer and reviewer should carefully consider the roles of multi tasking people, and the number and type of resources that should be assigned and determine if these are appropriate.
- Burn Boss's / Incident Commanders / Operation leaders should pay particular attention the these points:
  - Rapid Rates of Spread
  - Topographical limitations of vantage points for look outs and observers.
  - Everyone must be responsible to maintain LCES.
  - Minimize the impact of multi tasking people and positions.
    - If more resources are needed based upon conditions then operations should be delayed until these resources can be assigned, or conditions change resulting the need for fewer resources
    - Multi tasking is a role that must be reviewed on a case by case basis, and its implementation carefully executed.
    -

**Recommendations that address both Tasks:**

***How to deal with limited staffing due to cutbacks in overall program budgets.***

- Increase the use of FWS resources and promote sharing of resources within the region.
- Utilize interagency neighbors as much as possible
- Increase the collateral duty fire staff by
  - Encouraging other disciplines to participate in wildland and prescribed fire.
    - Enhance overall program well being.
    - Expand each individual's horizons.
    - Enhance the overall safety of the entire program.
  - Recommend that Refuges / WMD with active fire (suppression or prescribed) require a minimum of 30% of the non-fire staff to be arduous duty, field going fire fighter, red carded, with a minimum of one per station (round to the nearest whole number).

For example if Lake Andes has a total of 7 permanent collateral duty staff (non-fire funded) their goal would be to have a minimum of 2 individuals engage and participate in wildland and prescribed fire operations.

#### **References:**

1. Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide. [http://www.nifc.gov/fuels/downloads/directions/RXFireGuide\\_08.30.06.pdf](http://www.nifc.gov/fuels/downloads/directions/RXFireGuide_08.30.06.pdf), National Interagency Fire Center, 2006. The indented text is from this reference.
2. Interagency Standards for Fire and Aviation Operation 20007 aka “The Red Book” National Interagency Fire Center, January 2007.
3. U.S. Fish and Wildlife Service Fire Management Handbook.
4. U.S. National Park Service, Reference Manual 18 (RM-18), Wildland and Prescribed fire Operations.

**Item II.G.  
New Holland Incident**

**Finding II.G:** All 3 engines had vehicle problems on the wildfire.

**Review Team Recommendations:**

**II.G.1.** Further investigation into engine problems is needed to insure engines are maintained in a fire ready state.

**II.G.2.** Review engine maintenance schedule.

**II.G.3.** Assigning staff to single engines and requiring comprehensive engine checks on the day of the burn may alleviate potential problems. Engine check checklists are commonly available.

**Task Statement II.G:** Develop recommended guidelines to field station staff throughout the region and/or recommendations on:

1. Additional items (such as fuel filters) that should be carried on each piece of fire equipment
2. Field conditions when extra precautions or actions should be taken to ensure proper equipment operation
3. Equipment maintenance guidelines, including maintenance record documentation that will assure accountability at all levels

**Task Group Members:**

Neal Beetch (Facilitator), Jeff Dion (Lead), Harris Hoistad, Mike Bryant, Chad Wimer, Chris Roed, Chase Marshall, and (Sean Cross unable to attend).

**Task Group Recommendations:**

**Task Statement 1.** The group recommends that the Interagency Standards for Fire and Fire Aviation Operations Appendix AA (Red Book – NFES 2724, January 2006) continue to be used as a guideline for minimum stocking levels on engines with one change. Appendix AA does not list air filters as a required item. NPS lists them as optional. The group recommends that 1 engine air filter and 1 pump air filter be added as a required item.

**Task Statement 2.** The group recommends that the Burn Boss discuss during briefing the affects of field conditions on engines to increase situational awareness of the ENOP.

The group also recommends the use of aftermarket high performance air filters, such as K&N or True Flow, to reduce the risk of a plugged air filter.

The group also recommends that factory air intake systems on some Ford engines be replaced with aftermarket intakes. If current factory intakes pull air from the wheel well, they should be replaced with an aftermarket or factory upgrade which pulls air from the front of the vehicle providing for cleaner air. This was the upgrade BLM recommended everyone upgrade to in a memo sent out in 2002 and was discussed by the National Fire Equipment Committee in October 2002.

This link is for a Ford built air intake upgrade for 1999-2002 engines.

Shortcut to:

[http://shop.ivalueinternet.com/shopdiesel/index.cfm/action/shop\\_by\\_subcat/category\\_id/357.htm](http://shop.ivalueinternet.com/shopdiesel/index.cfm/action/shop_by_subcat/category_id/357.htm)

The following site shows some alternative brands for intake upgrades for different models as well.

Shortcut to:

[http://shop.ivalueinternet.com/shopdiesel/index.cfm/action/shop\\_by\\_subcat/category\\_id/2.htm](http://shop.ivalueinternet.com/shopdiesel/index.cfm/action/shop_by_subcat/category_id/2.htm)

**Task Statement 3.** The group recommends that 2 standardized maintenance checklists be developed for use in R6. Checklist 1 would be used as a daily or post-burn checklist. Checklist 2 would be used as a periodic, 3,000 mile or annual checklist.

OR

The group recommends that FWS R6 use the BLM Fire Engine Maintenance Procedure and Record developed in 1999.

## **Daily or Post Burn Inspection**

**Date**

**Cab & Chassis**

Mileage

Oil

Coolant

Power Steering Fluid

Brake Fluid

Transmission Fluid

Washer Fluid

Air Filter

Belts - Tension/Wear

Hoses - Wear

Check battery level and clean connections

Fuel Level

Check body & frame for damage, cracks

Check Flatbed Mounts

Tires - Inflation/Wear

Hubs/Lug Nuts

Wheel Chocks

Horn/Siren

Wipers

Check all lights, including backup light and alarm and strobe lights

Back-up Alarm

Radio

Log book & Credit Card

Fire Extinguishers

First Aid Kit

**Other- Required if equipped**

Check hydraulic system for leaks and change filters and fluid

Check air brake and air system for leaks

Slack Adjusters

**Pump Package**

Hours

Tank Water Level

Oil Level

Fuel Level

Air Filter

Grease Pump - 2-4 Squirts every 8 Hours

Pump and Draft Operation

Override Switch

Valves-Leakage/Operation

Check Panel, Gauges & Lights

Torch fuel/Gas Cans  
Chain Saw  
Portable Pump  
Coolers

## **Oil Change or Annual Inspection**

### **Date**

#### **Cab & Chassis**

Mileage

Check engine area for leaks, included condition of heater, fuel and vacuum hoses

Check Motor Mounts

Check and or Change Oil and Filter

Change diff oils

Check all u-joints and grease

Check anti freeze level and protection point and change filter

Check Power Steering Fluid

Brake Fluid

Check front brakes & lines

Check rear brakes & lines

Check brake pedal for proper operation

Check park brake

Check and repack front wheel bearings and or change oil

Check all steering connections and grease

Check trans level and or change filter and fluid

Change oil in standard trans

Check clutch free play

Washer Fluid

Check and or change air filter

Check belts - Tension/Wear

Check battery level and clean connections

Check and or change point, plug wire, dist. Cap  
compression test if possible

Fuel Level

Change fuel filter

Check fuel tank for damage

Check exhaust system for leaks

Check shocks & springs

Check body & frame for damage, cracks

Clean skid plates

Check Flatbed Mounts

Tires - Inflation/Wear

Hubs/Lug Nuts

Check Mud Flaps

Wheel Chocks

Jack/Lug wrench

Check Heater/AC and Fan

Check Gauges

Horn/Siren

Mirrors/Glass

Wipers  
Check all lights, including backup light and alarm and strobe lights  
Check trailer plug in  
Back-up Alarm  
Radio  
Seat belts  
Check doors, window for proper operation, and alignment, and cracks  
Log book & Credit Card  
Accident Forms  
Fire Extinguishers  
First Aid Kit  
Check winch & cable  
**Other- Required if equipped**  
Check hydraulic system for leaks and change filters and fluid  
Check air brake and air system for leaks  
Check Slack Adjusters  
**Pump Package**  
Hours  
Tank Water Level  
Check Water Tank Mounts  
Check External Toolbox Locks & Mounts  
Check and or Change Oil and Filter  
Fuel Level  
Check and or change Fuel Filter  
Air Filter  
Grease Pump - 2-4 Squirts every 8 Hours  
Check Pump Motor Mounts  
Check Hose Reel Mounts  
Pump and Draft Operation  
Override Switch  
Valves-Leakage/Operation  
Pressure test pump  
Check Panel, Gauges & Lights  
Torch fuel/Gas Cans  
Chain Saw  
Portable Pump  
Coolers  
Inventory Check

## **Item II.I. New Holland Incident**

### **Finding II.I:**

There was not an adequate AAR at the end of the shift because of the desire to get firefighters on the road due to previous commitments.

### **Review Team Recommendations:**

#### **II.I.1:**

AARs should be conducted after all incidents, particularly ones where escapes and injuries have occurred. An After Action Debrief was held later in the week. The results of AARs should be

### **Task Statement II.I:**

Develop a statement with guidelines to field station staff regarding timeliness of AARs, the essential elements of AARs, and the need to consider other critical agency policies (i.e. work rest ratio, travel policies, etc.).

### **Task Group Members:**

Chris Roed, Fenn Wimberly, Lorenz Sollman, Kyle Kelsey, Colby Crawford, Rick Litzinger, Joseph Flores, Rick Willoughby (facilitator).

### **Task Group Recommendations:**

All members felt that the AAR is an invaluable process and when executed correctly can lead to a better fire management organization. The Group also agrees that the structure of the AAR is the best form to follow.

1. Follow the instructions on the Wildland Fire Lessons Learned website <http://www.wildfirelessons.net/AAR.aspx> , “An AAR is performed as immediately after the event as possible by the personnel involved.” In a rare event that an AAR cannot occur the day of the burn or that all personnel cannot attend a record should be kept with a justification. The AAR should happen at the earliest possible time. This delay in timing of the AAR can also be discussed in the AAR when it does occur.
2. Include in the “Post Burn Activities”- Element 21, a requirement to have an AAR following the guidance from AAR site.
3. Include in the briefing that an AAR will be done after the burn. This will let all personnel know that it will occur and expect it. It should be understood that there may be more than one AAR, i.e. an AAR on the day of the burn, the next day during patrol the burn escapes. A second AAR should occur to capture these events.
4. AAR training. The group discussed that there was more of an ignorance of the process than a resistance to it. Training can both teach people how to use it as well as help firefighters become comfortable with it. There is a training package available on the website. This training can occur at three different levels:
  - a. Each person can go to the AAR website and review the material on the website.
  - b. District FMOs give the training within their district.
  - c. Training can occur at the regional FMO meeting or in conjunction with other training needs that may arise from this exercise.

- d. Leaders should review and with focus on the Conclusions of “Improving of After Action Review Practice” by Michael T. DeGrsoy. This paper will be submitted as an attachment.

## **Improving After Action Review (AAR) Practice**

**Michael T. DeGrosky**

### **Abstract**

The After Action Review (AAR) is a process technique that uses a review of experience to avoid recurrent mistakes and reproduce success. Initially developed by the United States Army, many organizations have adopted the AAR; and military, governmental, industrial, and not-for-profit organizations have embraced and employ the process. The AAR has gained widespread acceptance among organizations whose personnel work in high-risk environments; those in which common human error can produce unacceptable consequences. Among those organizations, U.S. wildland fire agencies first began conducting AARs in the late 1990s, with the process entering this environment through an evolving leadership-training curriculum. Today, a significant part of the wildland fire workforce now understands the purpose and intent of the AAR, and many fire units conduct some type of AAR process. However, anecdotal evidence suggests that effective AAR practice has not penetrated wildland fire operations as thoroughly as might be hoped, and too few resources are optimally conducting AARs. As a vehicle for capturing and learning from experience, the AAR provides an effective tool of continuous learning for the organization. It is within this organizational learning context that this paper suggests ways to improve AAR practice within wildland fire agencies, and advocates three strategic actions necessary to systematically and comprehensively use the AAR process in wildland fire agencies.

### **Introduction**

Whether viewed as a tool, a technique, or a process, an After Action Review (AAR) uses an appraisal of experience to improve performance by preventing recurrent errors and reproducing success. An AAR enables key participants in a mission-critical activity to review their assignments, identify successes and failures, and look for ways to continue successful performance or improve deficient operations in the future. (Army1; Garvin, 2000; Gurteen, 2000) The U.S. Army first developed the AAR as a learning method in the mid-1970s to facilitate learning from combat training exercises. The AAR has since become standard Army procedure in both training and operations, providing an avenue for feedback, a means of promoting evaluation, and a mechanism for improving unit cohesion. (Garvin, 2000; Gurteen, 2000; Shinseki & Hesselbein, 2004)

Many organizations have adopted the AAR as procedure; in many cases, adapting it to their own needs; and one can see the process at work in diverse environments including military, governmental, medical, industrial, retail, service, and not-for-profit organizations. (Darling, Meador & Patterson, 2003; Garvin, 2000; Graham, 2001; Parry & Darling, 2001; Sexton & McConnan, 2003; Shinseki & Hesselbein, 2004; Signet Consulting Group, 2005) The AAR has gained broad acceptance among organizations operating in high-risk environments, in which common human error can produce unacceptable outcomes. Among those organizations, elements of U.S. wildland fire agencies have been conducting AARs since the late 1990s, with the process entering these agencies through the evolving National Wildfire Coordinating Group (NWCG)

leadership development training curriculum. Through the influence of the NWCG leadership training initiative, a significant part of the wildland fire workforce now understands the purpose and intent of the AAR, and conducts some type of AAR process. However, anecdotal evidence suggests that skilled AAR practice has not thoroughly penetrated wildland fire operations, and relatively few fire units are optimally conducting AARs. (Braun, 2003; DeGrosky, 2003A; DeGrosky, 2003B; DeGrosky 2004)

### **Discussion**

By learning from collective experience, organizations can capture and spread knowledge and apply learning so that they may understand events and improve performance. One might consider these traits as characteristic of “learning organizations.” A learning organization is one “...skilled at creating, acquiring, interpreting, transferring, and retaining knowledge, and at purposefully modifying its behavior to reflect new knowledge and insights.” (Garvin, 2000) In the broader context of organizational learning, the AAR provides organizations with a simple, powerful tool enabling them to continuously learn from their daily experiences. Consequently, the AAR not only arms the learning organization with a useful field-level technique for making learning routine and improving the effectiveness of personnel, but adoption of the AAR process can move the organization toward broader organizational learning and a learning culture.

The AAR concept entered the federal wildland fire agencies when Interagency Hotshot Crew (IHC) Superintendents gained exposure to the process through nascent human factors and leadership training in the late 1990s. A group of IHC Superintendents began conducting, and consequently modeling and pioneering the concept in their agencies. (Personal correspondence with James R. Cook, October 25 & 26, 2004) As the NWCG leadership training initiative evolved, matured and gained the full support of agency management, thousands of emerging leaders were introduced to the AAR process. In 2002, the NWCG included AAR guidance in the Incident Response Pocket Guide (IRPG) and the Wildland Fire Lessons Learned Center began Panning AAR train-the-trainer workshops. Owing to the success of these initiatives, a significant part of the wildland fire workforce knows the purpose and intent of the AAR, and many crews, teams, modules and organizations conduct some type of AAR process.

However, while little hard data exists, field experience suggests that, while the AAR concept has made its way into fire agencies, skilled AAR practice has not thoroughly penetrated wildland fire operations. While some resources have made the AAR routine and have become quite skilled at it, relatively few fire units are conducting AARs routinely or using optimal practice. (Braun, 2003; DeGrosky, 2003A; DeGrosky, 2003B; DeGrosky, 2004) That is not to suggest that the agencies have underachieved in their effort to adopt the AAR as a technique for reviewing experience with the intent of improving performance. Indeed, the AAR concept also evolved slowly (over 20 years) in the U.S. Army, who created the process. (Garvin, 2000; Parry & Darling, 2001) AAR practice entered the wildland fire agencies via a grassroots effort. Much of this effort was directed at borrowing techniques from other industries and disciplines, with emphasis placed on rapid integration rather than optimal design, acceptance, and performance. (Personal correspondence with James R. Cook, October 25 & 26, 2004) Consequently, in a short, five-year period, a significant portion of the wildland fire workforce engages in some type of AAR process, though practical performance may be falling short of known best practices. Relatively little hard data exists to definitively describe the practical experience with the AAR method. However, available data collected both anecdotally and through a single quasi experiment study, suggest the following:

#### Technique Without Context

Fire agencies have adopted the AAR as a technique, not as a process within the context of, or contributing to, a broader organizational learning environment. It appears that many firefighters have been trained to understand the mechanics of AAR conduct, as a procedure, without embracing the desired outcome of the AAR, that being purposefully modified behavior reflecting insight and knowledge gained by reviewing experience. Consequently, the benefits that have accrued have been sub-optimal.

### Irregular Practice

AAR conduct is irregular. Braun (2003) surveyed 399 fire personnel on two Type 1 fires in 2003. When asked if they had ever participated in an AAR, 60.9% (n = 28) of “overhead” respondents indicated that they had not. In contrast, 81% (n = 79) of responding agency hand crew personnel indicated that they had participated in an AAR. Conversely, only 16.6% (n = 24) of respondents from contract hand crews had been involved in the review process. The dichotomies between agency hand crews and overhead and between agency and contract hand crews reflect the vector through which the process is entering the work environment, that being the NWCG leadership training curriculum. Braun (2003) also asked how many times the respondent had participated in an AAR that fire season but, unfortunately, did not report the results due to problems with the data. (Personal conversation with Curt Braun, April 6, 2005) There is an implication for future research here. While we know that fire crews have adopted the AAR, we do not know how routinely fire personnel engage in the AAR process. However, evidence suggests that often, AARs are conducted as one-off, infrequent events, not routinely as a discipline or standard procedure. AARs contribute to performance best when seen, not as an event, but as an ongoing practice, a disciplined approach to improving performance over time. (Darling, Meador & Patterson, 2003; Graham, 2001; Parry & Darling, 2001; Signet Consulting Group, 2005)

### Informal Practice

When asked, a significant portion of fire personnel report that they use debriefing techniques other than the AAR, or informally conduct AARs without employing the practices established by the leadership training and published in the Incident Response Pocket Guide (IRPG.) For example, field interviews with 19 firefighters on a 2003 fire found only one respondent (the Superintendent of a crew working toward IHC status) familiar with, and routinely using, established AAR practice. Helibase personnel interviewed on this incident indicated that they conducted debriefings using the form in the Interagency Helicopter Operations Guide (IHOG), which is similar to the standard AAR approach, but more specific to helicopter operations. However, notable was the fact that most personnel interviewed on this incident were unfamiliar with the terms “After Action Review” or “AAR.” While most indicated that they typically conduct some sort of debriefing with crewmembers on fire assignments, it appears that without using standard practice, these “AARs” may be missing the intended purpose of the process. (DeGrosky, 2003A) These findings align with the findings of a separate effort to interview eight experienced Type 2 Crew Bosses. While more familiar with the existence of the AAR process and IRPG guidance, only two of these eight crew bosses routinely used standard AAR practice as taught in the NWCG leadership training and found in the IRPG. Like other personnel interviewed elsewhere, most either used debriefing techniques other than the AAR or informally conducted AARs, without following standard practice as published in the IRPG. (DeGrosky, 2003B) A similar field study found that the AAR method might not have effectively penetrated the wildland fire use (WFU) environment. Findings from that incident suggest that very few WFU resources are routinely conducting AARs as designed or intended. On the incident studied, observers saw little evidence that the AAR process was being used as designed by the Fire Use Management Team, district

personnel, experienced Division Supervisors, or by most line personnel. A few line resources and district personnel were conducting “standard” AARs. (DeGrosky, 2004)

### Preparation Not Systematic

Currently, no systematic approach exists for preparing agency personnel to use the AAR tool at multiple agency levels or across a full-range of work environments. As mentioned earlier, AAR practice entered the wildland fire agencies, first through a grassroots effort, and later via the NWCG leadership-training curriculum and a small effort to conduct AAR train-the-trainer workshops. None of these efforts have sought, or received, a high level of management support or commitment. As a result, though AAR practice has become widespread within NWCG member agencies, agency managers have not actively encouraged or supported AAR practice. In fact, uncoordinated management actions have, more often than not, interfered with organizationwide acceptance, integration and performance. Consequently, it should be no surprise that AARs are common practice in portions of the wildland fire workforce while remaining nearly absent in others, and that approaches to AAR conduct vary dramatically.

### Facilitation Skills Lacking

More than 6,000 people have been exposed to the AAR concept through the NWCG leadership-training curriculum and the L-380 (Fireline Leadership) training in particular. This training represents, by far, the most significant mechanism for introducing the AAR concept to fire personnel. However, it should be noted that this training primarily enables the participant to understand the purpose of the AAR, and prepares them to effectively participate in an AAR. The training does little to prepare participants to facilitate the process. AAR train-the-trainer workshops conducted by the Wildland Fire Lessons Learned Center strive to address that need, but have reached very few people. AAR experts widely accept that skilled facilitation is essential to effective AAR practice (Army2; Darling, Meador & Patterson, 2003; Garvin, 2000; Shinseki & Hesselbein, 2004)

Braun (2003) reported that when asked to “Please give an example of one (or more) thing(s) you dislike about the AAR process” the responses of 84 survey participants (21% of all participants) fit into one of five categories.

- 1) Unintended/undesirable effects
- 2) Time and timing issues
- 3) Inappropriate AAR facilitation
- 4) Redundancy
- 5) Process modifications

Braun (2003) categorized only 5% of responses to this question as “inappropriate AAR facilitation.” However, on reexamination of the data, one realizes that the quality of AAR facilitation would bear directly on approximately 30% of the responses to this question.

## **Conclusions**

Like much of the effort to introduce human factors into the wildland fire agencies and improve leadership in the work environment of wildland firefighters, AAR practice entered the these agencies via grassroots efforts. The efforts to adopt techniques from other disciplines occurred in an environment that placed emphasis on rapid integration rather than optimal acceptance and performance. Admirably, the effort to import the AAR concept assured that within a five-year period, a significant portion of the wildland fire workforce began to engage in some type of AAR

process. On the other hand, it appears that practical performance is falling short of known best practices. In that context, it appears that the time has come for the NWCG and its member agencies to enhance and intensify their effort if they are to realize the full benefit of the AAR process, both as a useful field-level technique for improving performance, and as an element of broader organizational learning efforts. Actions called for include:

1) Adopting a culture of continuous learning. Learning organizations succeed because people at all organizational levels share information and learn from experience. Leaders in these organizations promote learning first by modeling, in other words, learning on a personal level. Second leaders advance learning by helping others in their units learn. Finally, the leaders of learning organizations create and contribute to an organizational culture promoting learning. Within this context, the AAR is a process for learning from experience, capturing and spreading knowledge, sharing information, and purposefully modifying behavior reflecting insight and knowledge gained by reviewing experience. To achieve the most benefit organizational leaders must focus on why they conduct AARs; consistently communicate that rationale to their personnel; and, once an AAR is done, disseminate learning to others who may be embarking on similar actions. Without adopting such a learning culture, there exists a danger of encouraging fire personnel to go through the motions of an AAR without clarity of purpose, turning AARs into a non-thinking ritual that does not adequately review experience, cause learning, or result in modified behavior that improves performance. (Sexton and McConnan, 2003)

2) Methodically making AAR practice routine, consistent, and as important as other organizational activity. AARs contribute to performance best when seen, not as an event, but as an ongoing practice, a disciplined approach to improving performance over time. By creating a discipline to capture and apply learning over time, the effects of AARs are cumulative. (Sexton and McConnan, 2003) The AAR process is most likely to improve organizational performance, and is most likely to be sustained, when there is a high level of management commitment and AAR practice is encouraged and supported. AAR conduct must become regular or routine and personnel must understand known best practices and conduct their AARs in accordance with them. While some within wildland fire agencies fear standardization and formal organizational adoption, experience suggests that the corollary, irregular and informal conduct, may actually represent a greater threat to the credibility and importance of the AAR in the eyes of the average firefighter. The NWCG and its member agencies will know that they have achieved a lasting; sustainable process for understanding events and improving performance when fire units routinely conduct AARs as a discipline or standard procedure, rather than one-off, infrequent events. AARs contribute to performance best when seen, not as an event, but as an ongoing practice, a disciplined approach to improving performance.

3) Systematically preparing people to lead an AAR by developing their facilitation skills. The NWCG leadership training curriculum prepares participants to effectively participate in an AAR. However, only a portion of the workforce attends this training, and the training does little to prepare participants to facilitate the process. AAR train-the-trainer workshops conducted by the Wildland Fire Lessons Learned Center reach relatively few people. Currently, no systematic approach exists for preparing agency personnel to facilitate the AAR process, and generally speaking, facilitation skills are lacking in the agency workforce. Since AAR experts agree that skilled facilitation is essential to effective AAR practice, this represents a situation requiring attention. Needed is an AAR train-the-trainer strategy, the goal of which would be to develop a sufficient cadre of AAR trainers nationally. The strategy should create that cadre strategically and systematically, with the intent of producing a sufficient number of qualified trainers that are

geographically and organizationally distributed while simultaneously maintaining standards and quality.

The After Action Review is a process technique that uses a review of experience to avoid recurrent mistakes and reproduce success. As a vehicle for capturing and learning from experience, the AAR provides an effective tool of continuous learning for the organization. It is within this organizational learning context that this paper has endeavored to suggest ways to improve AAR practice within wildland fire agencies. If they are to realize the full benefit of the AAR process, both as a useful field-level technique for improving performance and as an element of broader organizational learning efforts, it appears the NWCG and its member agencies must enhance and intensify their efforts to integrate to process into fire operations. Actions called for include adopting a culture of continuous learning, methodically making AAR practice routine, consistent, and as important as other organizational activity, and systematically preparing people to lead an AAR by developing their facilitation skills.

### **Implications for Future Research**

The conclusions reached here are based on available data collected both anecdotally through field studies, and through a single quasi-experimental study. While the author is confident of his conclusions, to fully understand the nature and extent of AAR use in NWCG agencies will require more, and more systematically collected, data. There is a need to comprehensively survey fire personnel about their AAR experience and practices.

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