West 83 Prescribed Burn Review

June 22, 2018

Executive Summary

On May 3, 2018, a district conducted a prescribed burn that resulted in an escape, which the Burn Boss declared a wildfire. Suppression forces contained the wildfire at 3.2 acres, of which 2.95 were on private land. PMS 484 (Interagency Prescribed Fire Planning and Implementation Guide) requires an outcome review when a wildfire is declared. This review meets that requirement.

The review team identified three primary factors that contributed towards the escape. These are:

Environmental – Brief but significant precipitation occurred when lighters were igniting the area that had previously (during line preparation) caused the greatest concern for potential escape. The precipitation resulted in a "dirty burn" in an area having thick, riparian vegetation that held heat longer than the surrounding grassland.

Tactical – The AAR (After Action Review) took place at a location that was a 30-minute drive from the fire line. The AAR occurred before crews had finished mopping up to the required standard, likely because of pressure to get resources on the road home. The majority of resources were released directly from the AAR rather than returning to the line to complete mop-up operations.

Procedural – The burn plan was written in 2009 and had not been updated to match procedural protocols across the Unit. For example, it authorized the Burn Boss to declare a wildfire rather than the having the decision be made in consultation with the Agency Administrator and the Forest FMO as other burn plans on the NBF have been modified. Notifications listed in the burn plan were not consistently followed. The contingency plan for the wildfire could not be followed as written because the majority of resources had been released prior to the escape being detected.

Setting

The West 83 Prescribed Fire Plan, rated as moderate in complexity, was originally written in 2009 and signed off as reviewed for accuracy in April, 2018. The seven units that comprise the West 83 prescribed burn total 3,130 acres. Since 2009, the district has conducted prescribed burns on portions of the overall acreage, but for various reasons, never the 189.7 acres that resulted in the escaped fire that is the subject of this review. For the remainder of this discussion, "West 83" refers to the prescribed burn conducted on May 3, 2018.

The RXB2 who wrote the burn is still on the unit and was the Burn Boss. The technical reviewer (also an RXB2) is the Zone FMO for the unit. The Zone FMO was present at the morning briefing but left the prescribed burn before ignition started for a prior commitment to teach a fire class. The AADM has been a District Ranger on the Forest for more than 15 years and has acted as AADM for numerous prescribed burns on his and the other units on the Forest. The AADM and the District Ranger (DR) have known each other for 30 years.

Much of West 83's terrain is flat to gently rolling and faces all aspects (Figure 1). The burn area (illustrated by the red line in Figure 2), however, is bisected by an intermittent creek bottom with steep sides. In addition to being relatively steep, thick and decadent vegetation exists in the bottom of the drainage at the point of escape (Figure 3).

Figure 1: The West 83 staging area, representative of much of the terrain.

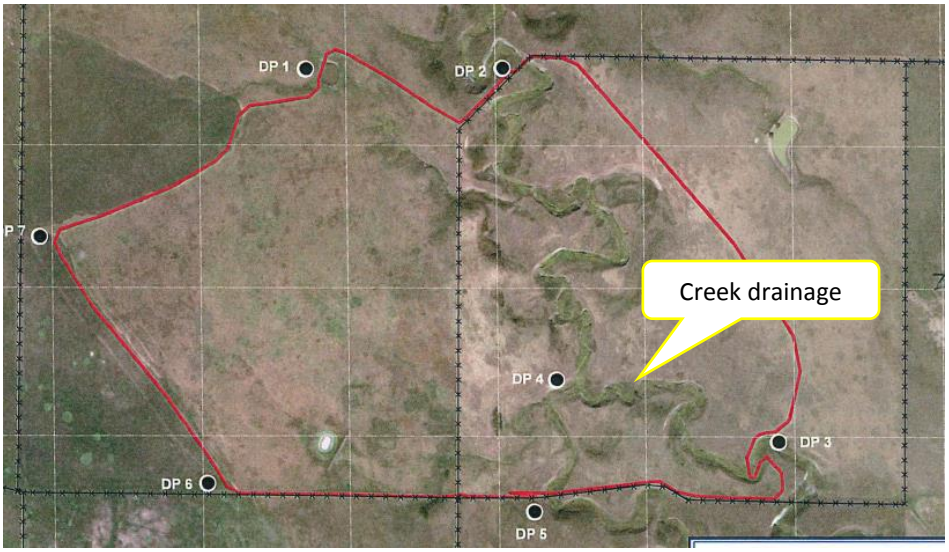

Figure 2: Map of West 83 Prescribed Burn, showing the creek drainage and the location of escape at DP-5.

Figure 3: Picture of the drainage at DP-5. You can see it drops off steeply from the upper bank and contains thick vegetation.

Prescribed Fire Objectives

The goal of the West 83 prescribed burn is to "reduce flammability and create a vegetation disturbance in areas that have not been burned or grazed in several years." The burn plan states that the aim is to consume a minimum of 50 percent of the 1-hour fuels. The specific resource objectives listed are:

- Decrease flammability of the unit for up to two years
- Increase insolation to the ground surface (e.g., allow sunlight to reach the ground)
- Increase the nutritional value of forage for wildlife and livestock
- Increase vigor of desirable species
- Improve habitat

Prescription

The burn prescription lists the following parameters:

Parameter	**Lower Limit**	**Upper Limit**
Smoke dispersal	Fair	Unlimited
Wind direction	Any	Any
Rate of spread (chains / hr)	.1	200
Probability of ignition	10%	73%
Flame length (feet)	.1	13.9

The burn was solidly in prescription for the duration, except perhaps for a brief period of several minutes when an unexpected rain shower occurred. The rain shower was brief and extremely variable in nature such that the lighters on the southern side had water running off their hardhats, but the

northern end only had a few sprinkles. The heaviest precipitation occurred on the area of the burn that caused the most concern of escape – the southern end of the unit, adjacent to private land, from DP-5 to DP-3 (Figure 4).

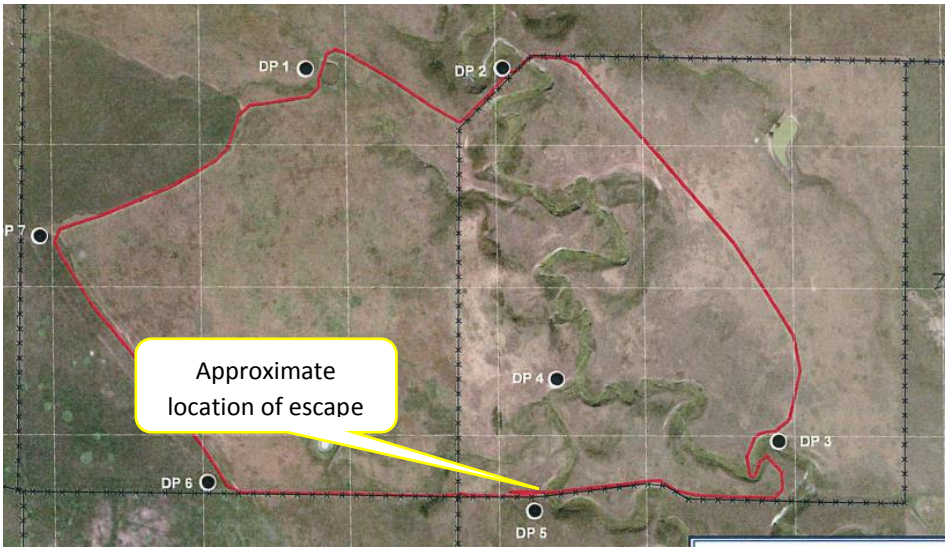

Figure 4: Approximate location of point of origin of escape.

In preparing the burn unit, staff had recognized that the drainages needed extra precautions. For instance, the burn plan calls for mowing at least 20 feet; at DP-5, however, staff mowed lines 40-feet wide. They also dug a hand line to dirt from the drainage bottom to the bank and weed-whacked the weeds on this same hillside.

Outcomes

The notable outcome from the West 83 prescribed burn, and the subject of this review, is an escape that totaled 3.2 acres as shown by the yellow-striped polygon in Figure 5. Of this, 2.95 acres was on private land and 0.25 acres on National Forest System lands outside of the burn unit. The escape was observed at 1821 hrs and declared a wildfire 26 minutes later, at 1847 hrs.

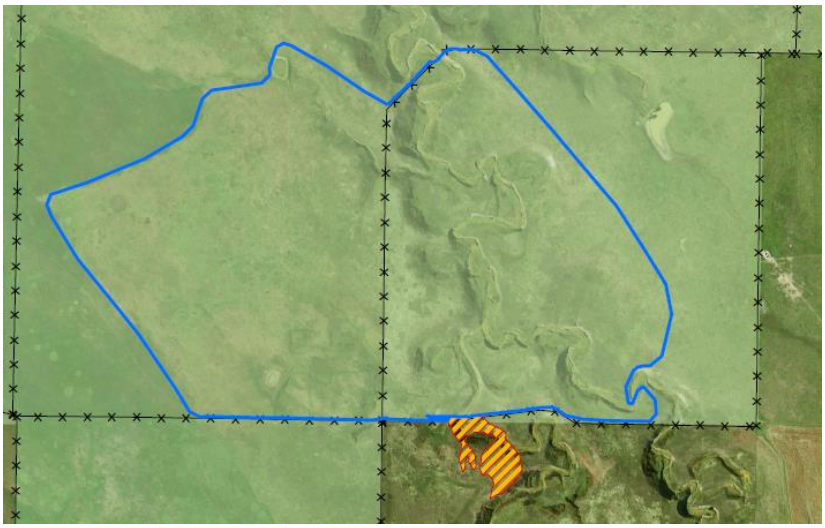

Figure 5: Extent of the West 83 escape (3.2 acres, the yellow striped area)

Narrative and Chronology

The RXB2 leading the West 83 prescribed burn has worked on the district for over a decade and has been a Burn Boss since July, 2008. He found that they got the best results when they ignited later in the day, after the dew had dried off the grass and the air had warmed. So at 1250, he briefed the resources and sent them to their assigned positions. The burn was to start at DP-1. Before they could start lighting, the winds switched to an unfavorable direction (Figure 6). The RXB2 adjusted his plan to start lighting at DP-7, and re-assigned some resources to accommodate the change. At first, some crews found the change confusing and even an unconventional use of resources. For example, between DP-5 and DP-3, some of the holders were re-assigned as lighters under the new plan. As firefighters do, though, the crews quickly adapted. One set of lighters left DP-7 towards DP-1, and the others towards DP-6. The plan was to have them tie in on the east line between DP-2 and DP-3 (Figure 6).

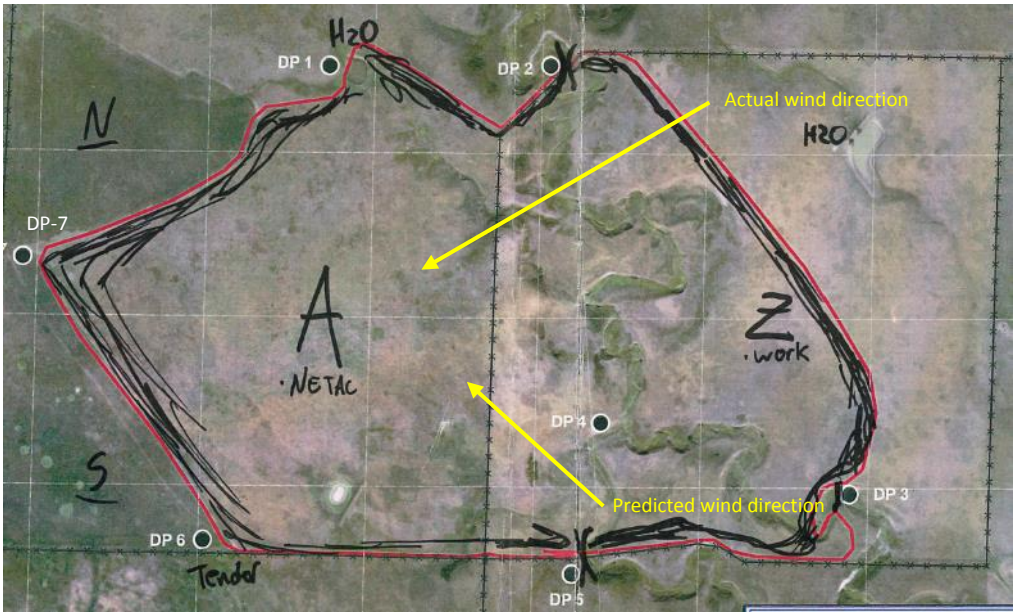

Figure 6: A field map showing the predicted and actual wind direction.

It started raining as the lighters were at DP-5, where the vegetation was thickest. The skid steer operator warned some of the holders that the grass thatch from mowing was pretty thick in some spots and that his foam line would not penetrate it very well. He asked them to keep an eye on it because he wouldn't be able to get foam line exactly where it was needed, so the lighters would have to clean the area with no foam line as backup.

Because of the rain, the lighters struggled to get a good black line between DP-5 and DP-3. Once tied in and the outside perimeter lit at 1604 hrs, two of them conferred with the TFLD and, along with a UTV, went back to DP-5 to clean up the line. They burned off about a ½- to 1-acre pocket about 100 yards east of DP-5 and continued to mop-up. They had not been mopping up for long when at 1725 hrs, they were instructed to return to the briefing area for what one described as a "very lengthy AAR." One crew member elsewhere on the burn remembers thinking that the AAR would probably be quick because they had only been able to mop up to about 50 feet and kept getting smokes so they needed to go back out. Instead, the AAR lasted about 45 minutes and the majority of resources were released to head home after it ended.

After the AAR, two engines, a UTV, a TFLD, and the RXB2 returned to the prescribed burn to patrol the perimeter. At about 1820 hrs, one of the engines saw what appeared to be black smoke within the drainage near DP-5, and confirmed that fire had crossed the line and the fence to the south a minute later, at 1821 hrs (Figure 7). The RXB2 radioed dispatch to request assistance from the local Volunteer Fire Department. Three of the engines that had been released, hearing about the escape on the radio, also returned to the burn area to assist with the emerging situation.

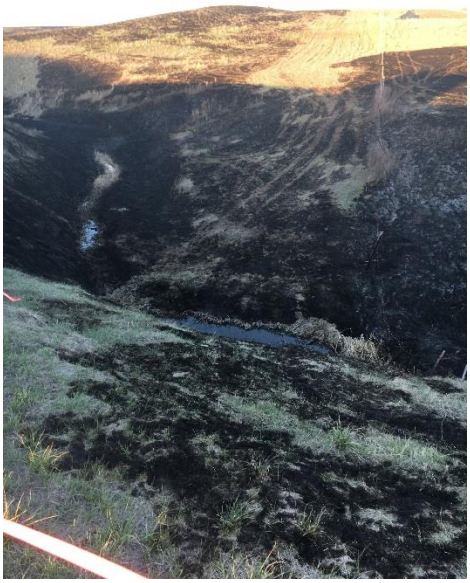

Figure 7: Point of origin of escaped prescribed burn, at DP-5.

The RXB2 called his District Ranger to report the escape at 1823 hrs. The District Ranger called the AADM several times but was unable to reach him. He learned later that the AADM, after receiving a positive text message from the District Ranger earlier that ignitions were completed, had put his phone away to charge and never heard it ring. Meanwhile, at 1825 hrs the RXB2 decided to implement the contingency plan after seeing the fire's rate of spread, behavior, and potential to spread. He requested two more engines and a water tender from the local VFDs. At 1841 hrs he called his District Ranger to report that the fire had moved onto private land, onto an owner's place who was against prescribed burning. The District Ranger, still unable to contact the AADM, started packing coolers to get supper for the crews.

Because resources were coming on scene to suppress an escaped fire on private land, the RXB2 decided to declare the escape a wildfire at 1845. All forces were on site and engaged with the fire at 1855 hrs, which was contained at 2216 hrs that night and called controlled at 1810 hrs on May 4, 2018.

Lessons Learned

From the Participants

1. Everyone was very flexible at adapting to the initial change in the lighting plan as well as throughout the execution of the burn.
2. The escape was caught quickly and kept to a small acreage.
3. The AAR should be secondary to the holding and patrolling of the unit. Don't rush to have an AAR just to get folks home. If there is still work to be done, you better do it. AARs are important, but there are times when leaving the incident staffed is much more important than having an AAR for a few outgoing resources.
4. The AAR should take place in close proximity to the project rather than a long drive away.
5. It would help to have the AADM's phone number on the signature page of the go/no-go checklist to make it easy to find – in this situation, no one could find the AADM's alternate phone number. Having an organizational chart in the paperwork also would have helped.

6. The AADM for a prescribed burn needs to be able to be reached until all resources are released and at their home units. Just because ignitions are complete, does not mean the project is finished.
7. It rained while ignitions were being conducted in the area of escape. The rain caused higher relative humidities, which contributed to a "dirty burn" and incomplete ignitions. This, along with a riparian fuel type, created a potential for the area to hold heat longer that the adjoining areas.

From the Review Team

8. *Logistical considerations may have taken priority over tactical ones.* The traditional prescribed burn conducted on the unit consists of resources traveling in the morning, conducting a small burn, and then traveling home. This may have put pressure on the RXB2 to consider the logistics of resources traveling above tactical awareness. Further, some Forest Service resources on scene were to be used on other projects the next day and had to return to their home unit. Non-Forest Service resources could not be used overnight because there is no manner of compensating them for overnight stays.
9. *The method by which the wildfire was declared was not consistent across the Unit.* To declare or not to declare the escape a wildfire were equally valid choices according to the burn plan and Forest Service policy. The burn plan had not been updated to match the rest of NBF standard for AADM, the Forest FMO, and the RXB2/IC to consult before any declarations are made.
10. *Personnel need to be familiar with updates to standards, rules, and policies of the agency having jurisdiction.* The RXB2 on this unit often works with the Fish & Wildlife Service, which declares an escape a wildfire when it moves onto private land regardless of size or timing. The rules and policy governing a wildfire, however, are those of the agency with jurisdiction over it.
11. *Having and following an updated burn plan could have helped remedy the unclear lines of authority and communication.* Some of the participants have worked together for many years. The close relationships developed over time, combined with somewhat unclear lines of authority, may have influenced who called who when the escape happened. For example, the AADM was from another district; the District Ranger directly supervises the Burn Boss; the Burn Boss called the DR and the Zone AFMO instead of the AADM and the Forest FMO; the Forest FMO was not clear who was the IC until the wildfire was declared.
12. *Ensure proper communication channels are provided and followed.* Some personnel and overhead used two phones, a government and a personal. Several messages were left on one phone and not the other, or on the phone that someone wasn't using.
13. Though the escape was stopped relatively quickly, the contingency plan outlined in the burn plan could not be followed because most of the resources listed in the contingency plan had been released.
14. *Complexity and expectations.* Quality people at any GS level can accomplish highly complex tasks or assignments. The amount of tasks the captain position at Ft. Pierre directly assists or does himself is impressive. With the political complexity that accompanies any prescribed fire, especially in South Dakota, we question whether that is a burden that should be placed at the captain level position. Additional positions, such as a fuels

technician or fuels specialist, could help alleviate some of the burden currently placed on the engine captain.

15. *Commitment of resources.* Resources were asked to be at their home units the following day for another prescribed burn. As a result, resources were released possibly prior to accomplishing mop-up standards. Our Forests continue to and should be commended for adapting – for example sharing resources - in order to accomplish mission critical targets. Do we have sufficient resources to manage everything that we want to accomplish?

Recommendations

A. Consider releasing resources without an AAR, or conducting two separate AARs so a burn area is not left unstaffed.
B. Ensure that all Burn Plans on a unit reflect current policy and guidance.
C. Ensure that AADMs, District Rangers, and Burn Bosses are up to date on current FS policy.