FACILITATED LEARNING ANALYSIS

PASTURE 3B ESCAPED PRESCRIBED FIRE REVIEW

Corrected -- June 19, 2013

Dakota Prairie National Grasslands
April 3, 2013

Grand River Ranger District
Lemmon, South Dakota

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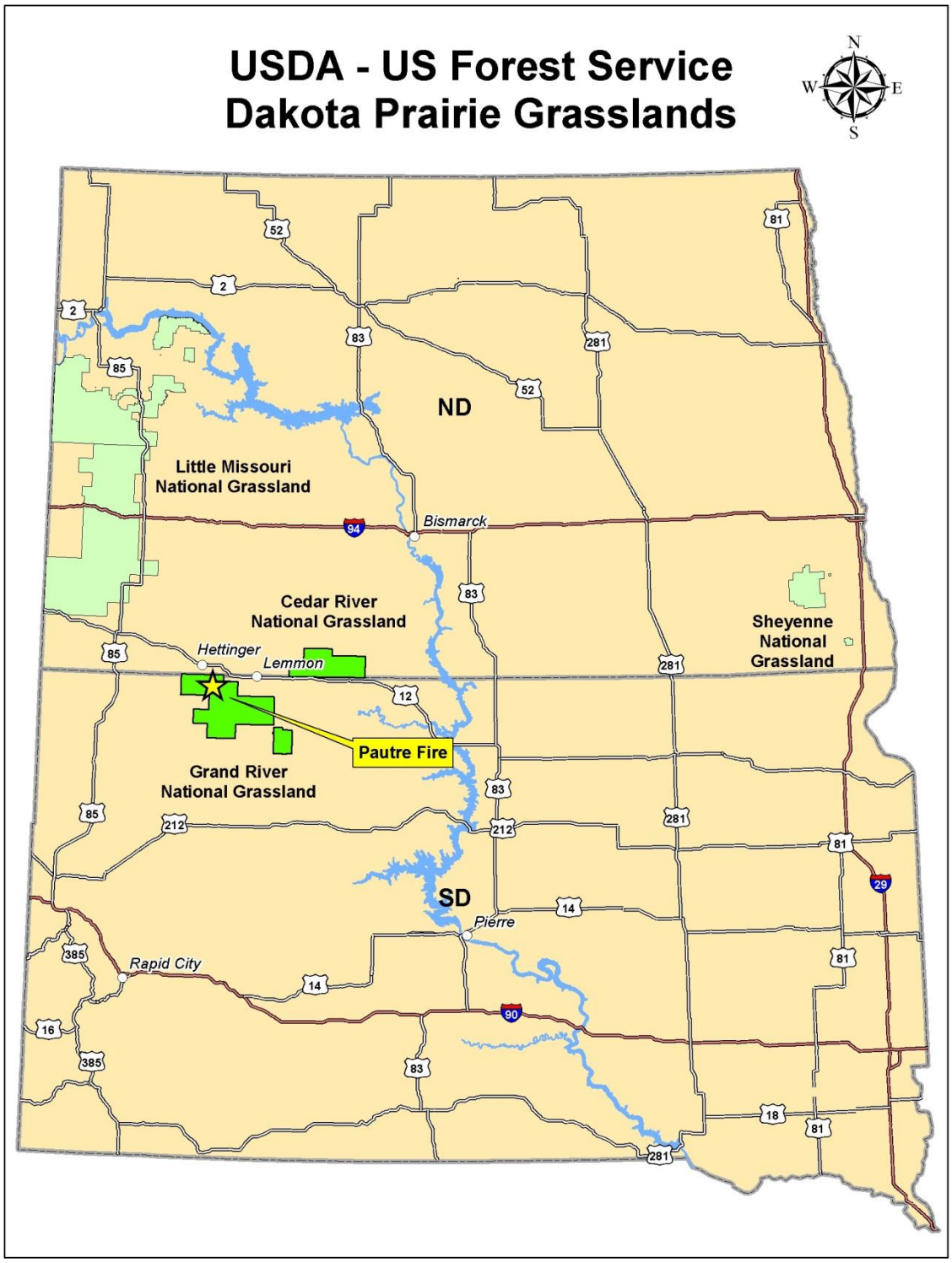
VICINITY MAP



INCIDENT SUMMARY

On Wednesday April 3, 2013, the Pasture 3B prescribed fire was ignited approximately ten miles southeast of Hettinger, North Dakota in Perkins County, South Dakota. Two units in the Pasture 3B plan were in prescription that day and the Prescribed Fire Burn Boss (RXB2) decided to proceed with unit 3B East due to smoke concerns and potential availability of completing 3B West (181 acres) later that day. This was the first burn of the season and a test fire was initiated at 1156, after the passing of a small rainy cell that morning.

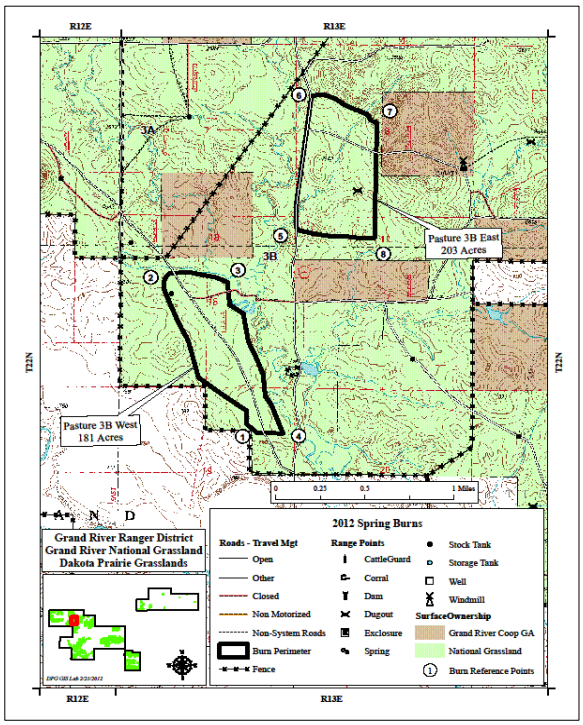


Figure 1: Unit 3B East and West

Unit 3B East was planned for 210 acres in a mostly flat grass fuel model. The test fire in the northeast corner was successful and the decision was made to proceed with burning the unit. From the northeast corner, ignitions proceeded south along the east line and west along the north line. Ignitions continued slowly, with pauses in lighting to allow fuels to consume and to widen the burned area adjacent to the mowed control lines. In total, five small slop-over areas crept through the wet line between 1230 and 1340. These slop-overs were areas that burned into the mowed control line (a recently cut fuel break of 2-3" tall grass stubble) and ranged from roughly six inches to a few feet in diameter. All spots were quickly extinguished by the holding crew using UTVs with 70 gallon tanks and spray nozzles.

Patrols were conducted along all flanks of the burn, and at 1352, a slop-over on the east flank was reported on the radio with urgency to respond. At the time of discovery, the slop-over (ultimately the escape) was found moving past the east containment line and had already burned approximately one tenth of an acre into the tall grass. This slop-over and escape coincided with the passage of a cold front and an increase in wind speed within the unit. Two engines and an additional UTV responded, but within minutes, the escape advanced rapidly in taller cured grass adjacent to the unit, lined up with a small saddle, and quickly "ran over the hill". The escape rapidly exceeded the containment efforts and the RXB2 then transitioned to initial attack incident commander, transferring burn oversight to another individual to complete the few yards of ignition and holding.

The escape rapidly progressed, assisted by topography, drought conditions, and increased winds. Additional resources were called to respond to the escaped fire. The Pasture 3B prescribed fire was declared a wildfire, renamed to Pautre fire, and burned a total of 10,679

acres (3,519 acres federal and 7,160 acres private). Multiple structures were threatened, one structure was lost (old school house), and damage to personal property occurred. Fire suppression operations were completed with no injuries, deaths, or loss of livestock. No additional acres were burned after 2300 on April 3rd. The Pautre fire was called controlled April 7, 2013.

CHRONOLOGICAL NARRATIVE OF EVENTS

Preparation for the Pasture 3B unit was completed in multiple stages from mowing containment lines in 2012 - and again two days before ignition, to burn plan completion by the Fuels AFMO, review by the Operations AFMO and approval from the District Ranger.
On Monday April 1st, discussions began about burning the Pasture 3B unit between the District Ranger, the Zone FMO, Fuels AFMO, and others involved in the project. The Dakota Prairie Grasslands employs seven full time fire staff and the use of fire-qualified "militia" or multidisciplinary staff and cooperators is required to implement a prescribed burn, especially in spring before seasonal employees are hired. In total, eighteen firefighters from the DPG, National Park Service and Lemmon Volunteer Fire Department (all fully qualified for their positions) participated in the Pasture 3B prescribed fire.

Notification of a potential burning window was completed by way of multiple phone calls between the Forest FMO and fire personnel at the various offices.

Tuesday April 2nd, the zone FMO engaged in conversations with the Rapid City National Weather Service (NWS) regarding conditions for the burn area. Three NWS offices (Bismarck, Rapid City, and Aberdeen) predicted a cold front passage early Wednesday; however, wind predictions were not consistent. Overall, conditions appeared acceptable and the pre-planning took place to mobilize resources the following day.

Wednesday April 3rd, weather observations were taken at 0830 and a spot weather forecast was requested from Bismarck NWS by North Dakota Dispatch Center. The burn plan indicated Rapid City NWS was to be used for spot weather; therefore a second request was sent to Rapid City NWS. The burn unit is located 3 ½ miles south of the North Dakota border and is within the Rapid City, SD NWS forecasting area. The spot forecast at 0830 recorded a temperature of 42 degrees with winds SSE at 6-8 mph. The relative humidity was 70%. The RXB2 had checked the Bismarck NWS website's color-coded fire danger forecast website which showed "yellow" for the burn area indicating "high" fire danger. When the RXB2 received the spot weather forecast from the Rapid City NWS office, their rangeland fire danger forecast was not included. That forecast indicated a fire danger rating of "very high".

Wednesday around 0930, the RXB2 had an initial briefing with the ignitions personnel, followed by a thorough briefing of all resources at 1000. Due to this prescribed burn being the first of the season, the resources were given ample time to thoroughly brief and prepare for the upcoming operations. Several firefighters remarked on the thoroughness of the briefing, including refreshers on the operation of the pumps on both types of engines and the need to proceed slowly and be heads up. Contingency plans were discussed including the location of a two-track road within the burn unit that could be used as a control point and several roads located outside the unit that could also serve as secondary or contingency control points. That morning a small rainy cell passed and that also allowed for additional time to prepare. The cell was consistent with the spot forecast. Also while waiting for this cell to pass, several firefighters (including the forest range specialist) dug a hole inside the unit to gauge soil moisture and discussed the probability of accomplishing resource objectives with the amount of moisture in the soil. All were not in complete agreement on this point but all agreed they had no concerns about keeping the prescribed fire within the unit boundaries. Weather was again taken at briefing time with winds 4-6 mph and gusts to 8 mph.

Picture 1: Firing Operations on Unit 3B East

The test fire was initiated at 1156. The RXB2 attempted to radio North Dakota Dispatch Center (NDC) that they were beginning the test fire. This was notable due to NDC recently gaining voice over internet radio capabilities and had not previously had any initial attack responsibilities. The radio communication proved challenging still and the RXB2 had to contact NDC via cell phone.

The test fire proved successful and the ignitions continued. At around 1215, firing operations reached a patch of little bluestem along the East line that had been identified by the burn boss as a potential problem area. Operations paused to allow this taller grass to consume. No issues arose and they continued on until pausing as they hit the small two-track road that goes through the middle of the unit. Again no issues arose so they continued.

The first of the slop-overs occurred on the east line in the section past the two-track road. These three slop-overs were all small in size and were basically a creep through the wet line. Seeing this, they adjusted their wet line tactics and continued after extinguishing the slop-overs. The west side ignitions paused at the NW corner to allow everyone to get caught up. The interior was being lit in point ignitions from corner to corner filling in the black.

Picture 2: Ignition operations

At 1307, the east side ignitions reached the southeast corner. They readjusted a lighting resource, strengthened the black line, and checked water levels in the engines at this point finishing the corner. Around this time, several fire whirls and dust devils were observed well within the unit boundaries and the RXB2 announced this over the radio as a heads up to all firefighters. At 1330, they continued to progress west along the south line, as well as along the west line effectively coming towards each other (at the southwest corner) in the rectangle.

It took roughly 15 minutes to reach the hilltop on the south line creating over 200 feet of black adjacent to the east line. Ignitions paused at that point with the south side at the hill and the west side held at a telephone pedestal site. At this time the interior fire "sucked together". The winds on the ground were still from the west, but at this time the upper level winds shifted towards the south. Interior ignitions then radioed "column shift".

Two more slop-overs occurred on the south line and the engines extinguished them quickly while the UTVs continued to patrol.

At 1352, "SPOT" was transmitted over the radio. A UTV patrol noticed the approximately 60 foot wide slop-over on the east line. He radioed for assistance and the two engines and one additional UTV were there within a couple minutes. They attempted to extinguish the area. The pump on one of the UTVs ran out of fuel as they began to attack the escaped fire. The RXB2 radioed the Firing Boss (FIRB)/Holding Boss asking what resources he needed and he replied, "All available engines".

Within minutes the slop-over "took off" and quickly went "over the hill". This slop-over ran to the east, aided by the wind and the alignment with a small saddle. The RXB2 pulled the resources from the burn to start flanking the escape, as well as ordering additional resources at 1406.

Several firefighters commented that when they heard the initial report of a spot fire at 1352 hours, they could tell by the urgency in his voice that the situation required immediate attention and was potentially dangerous. They did not wait for a request to assist but immediately responded. At the time of the spot there was also an increase in wind speed and a slight change in direction that was most likely caused by the passage of a cold front over the fire.

The RXB2 transitioned to the initial attack incident commander, leaving oversight of the burn to another member of the ignitions crew. The burn had around one acre left and was completed around 15 minutes later. The remaining ignitions crewmember held and patrolled the lines.

Picture 3: Site of the slop-over

For several hours, firefighting resources attempted to flank and extinguish the fire. The fire spread into many fingers and had jumped roads. Resources concentrated on structure protection and took extensive efforts to protect the life and property ahead of the blaze.

The winds pushed the fire to the south east approximately 5 miles in 2 ½ hours then directly south for an additional 4 miles, until forward progress was stopped at 2300. The fire traveled 160 chains per hour for the first 2 ½ hours then averaged 80 chains an hour for the next four hours. Winds were recorded at 4-9 mph (eye level) at 2100 and with relative humidity's between 53-57%.This information was derived from the Hettinger Airport weather station 10 miles northwest of the burn and the research weather station located 8 miles east of the burn site.

"It just wouldn't go out."

The escape was declared a wildfire at 1600 MDT by the Grasslands FMO and Forest Supervisor who were assisting from the Supervisor's Office in Bismarck, ND. Many resources assisted and ultimately the escape burned 10,679 acres.

All firefighters expressed surprise by how quickly the spot fire grew and by their inability to quickly extinguish it. The prescribed fire was almost complete, the east line was cold and black for 200 feet, and all previous slop-overs had been quickly extinguished up until that point. During the initial attack immediately following the escape, extinguished grass fuels rekindled repeatedly causing the breach of control lines on several occasions.

LESSONS LEARNED BY THE FIREFIGHTERS

Interviews were conducted with key personnel involved with the Pasture 3B Escaped Prescribed Fire. The FLA team and some members of the burn team revisited the scene and shared their stories and perspectives. Employees were asked what they learned for themselves from this event and what they believe the greater wildland fire community and agency could learn from the event.

Picture 4: site visit with the FLA team

The following are the subsequent lessons that the participants shared with the FLA Team that they believe could benefit others:

Weather

Potential effects of severe to extreme drought conditions in grass fuel models needs to be quantified and considered.

Additional weather information is needed in our spot weather forecasts, such as the daily fire danger index. There needs to be better communications to the field when fire weather forecasts are updated or changed.

During ignitions on the prescribed fire, and prior to the escaped fire, firefighters observed a dust devil and a fire whirl in two separate locations. While they did not contribute to the escaped fire, we need a planned response for these kinds of events.

A frontal passage that came through after the fire escaped, contributed to the escaped wildfire's rate of spread and fire behavior. Our time frames need to be broad enough to deal with potential escaped fires, prior to significant changes in fire weather.

Prescribed Fire Plan

Presently our prescribed fire plans designate a minimum number of personnel and equipment for the given weather and fuel moisture parameters within the prescription. We are looking at changes that would better identify minimum resource needs at several different levels of predicted fire activity, for example a larger number of resources would be required when burning at the critical extremes of weather and fuel moisture allowable in the prescription.

> "The focus was on 'will we meet resource objectives' not 'what will we do if it escapes'"

Equipment

Fire equipped UTV's are extremely effective for patrolling and catching small spots on Rx burns. They have limitations when suppressing a growing escaped fire.

Use of twin-tipped nozzles are effective for efficient use of water on prescribed burns, but don't provide the volume of water needed to deal with a growing escaped fire.

The national standard configured Type 6 engines don't effectively meet our needs on the National Grasslands. We should consider getting authorization for engine modifications and look at other types of equipment/tools to be more efficient and effective.

As ignition operations progress on a prescribed burn we need to strategically move equipment where it can be best utilized.

Escaped Wildfire

Grassland maps and 911 maps didn't match up, making it difficult to determine where local, state and federal firefighters were at and where they needed to go.

Local fire departments provided much of the contingency and wildfire suppression support. Need to determine the most effective way to dispatch and track local responding resources.

OBSERVATIONS BY THE FLA TEAM

In addition to the lessons learned, the FLA team found additional observations in relation to the Pasture 3B escape.

Weather

1. **Weather Service Forecast improvements** - Prescribed fire unit Pasture 3B and the District are on the fringe of three weather service office forecasting areas (Rapid City, SD, Bismarck, ND and Aberdeen, SD). Forecasts are inconsistent and do not always agree. Additional weather service products (i.e. Rangeland Fire Danger Forecast on April 3) are available on the NWS website but the information is not automatically included in Spot Weather Forecasts requested for prescribed fires.

   The burn boss had spoken to the National Weather Service office in Rapid City on three different occasions on April 2nd and April 3rd. Discussions centered on winds, strength and timing of the cold front passage and moisture predicted. These conversations increased the confidence in the weather forecast from this office for the day of the burn.

   The escape happened during the passage of a dry cold front. The Bismarck spot forecast (outside of the forecast area) forecasted the winds more accurately than Rapid City but overestimated the relative humidity values by about 10%. The relative humidity, from nearby Hettinger airport and the research weather station, bottomed out at 23% for the day at the time the prescribed burn began to escape.

   The wind direction and forecast from Bismarck (including gusts) was almost exact. During the period in which the burn escaped, 30 foot winds were blowing out of the WNW at about 20 mph gusting to 32 mph recorded at Hettinger Airport. Eye level winds (30 minute averages recorded at the research weather station) showed an increase from 12.3 mph to 18.41 mph at the time of escape. No measureable precipitation was recorded anywhere nearby with the passage of this front. While typically we don't see this type of fire behavior, from somewhat gusty winds and RH's in the mid-twenties alone, it can be cumulative when adding in the effects of drought and very high fire danger for the day.

   The Rapid City spot forecast (weather forecast area for the burn) called for minimum relative humidity at 31% with 20 foot winds out of the SW at 8-16 mph shifting to the NW at 17-20 mph in the afternoon.

   > "I thought I identified what could be the biggest area of concern."

   Observation: Continue to develop relationships with meteorologists from all three offices and provide feedback on their forecasts to help fine tune accuracy and coordination of forecasts for this area.

2. **Effects of Drought** – Although conventional wisdom is that one hour fuels are influenced by relative humidity and little effected by long term drought, firefighters reported experiencing increased difficulty extinguishing dead grass and increased rekindling of grass after it was thought to be extinguished. Drought effects soil moisture, winter snow pack, and organic material on the ground and effects fire behavior in grass fuel models.

   Observation: Consider additional research on methods to predict effects of drought on fire behavior in grass fuel models. Consider using other tools to predict effects of drought on grass fuel models.

3. **NFDRS/Grassland Fire Danger Index (GFDI) inconsistencies** – These two indices along with an additional Rangeland Fire Danger Index provide different and inconsistent outputs. This can cause confusion with multiple index outputs and a lack of common understanding by all firefighters

   Observation: The DPG is moving towards a plan to resolve this issue by refining NFDRS inputs and using NFDRS as the index of choice.

4. **RAWS stations** – All existing RAWS stations are over 90 miles from the District and this prescribed fire unit. There is no RAWS station on the Grand River District.

   Observation: Consider additional new RAWS station located on the District to augment existing BLM RAWS stations and improve NFDRS output.

5. **Fine tuning of Prescribed Fire Plans** – The Pasture 3B prescribed fire plan included 6 weather parameter inputs with prescribed minimums and maximums. On April 3 three of those parameters (RH, Eye Level, and Twenty Foot Wind Speeds) were predicted to be at or near their critical limits. The plan states that these parameters are guidelines and not absolutes and it is permissible to burn at a higher temperature if RH is high.

   Observation: Burning when weather is forecasted to be at the critical edge of the burn prescription (high wind speed and low end of RH and fine dead fuel moisture) – Consider adjustments, a sliding scale, prediction of a frontal passage, coordinated weather forecast products and consider adequacy of contingency forces.

6. **Ensure the accuracy of the values in the Burn Plan Prescription** – The Contain runs in the appendix of the Burn Plan indicated that the on-site holding resources would be unable to contain an escape at the lowest fine dead fuel moisture of 4% above a mid-flame wind speed of 9 miles per hour (mph). However, the prescription allowed for a maximum mid-flame wind speed of 15 mph and did not limit the fine dead fuel moisture at the higher wind speeds. The maximum rate of spread in the prescription was 170 chains per hour, but this did not correlate to the maximum rate of spread shown in the Contain run.

Observation: Ensure the values in the prescription section of the burn plan are supported by outputs from BEHAVE. It is important to show that it is out of prescription at the lowest fine dead fuel moisture and the higher wind speeds.

7. **Wildfire declaration:** The Burn Plan stated the Burn Boss would declare the wildfire. Wildfire declaration was made by the Forest Fire Management Officer with concurrence from the Forest Supervisor.

   Observation: Understand when an escaped prescribed fire should be converted to a wildfire, who has the authority to make that determination, and follow as outlined in the burn plan. Clarify with the line officer ahead of time the conditions when an escape fire will be converted to a wildfire. Discuss different scenarios and timeframes for wildfire conversion. Ensure everyone on the incident is informed when the prescribed fire has been converted to a wildfire and who is the Incident Commander.

Human Factors

1. **Continuous Improvement** - Firefighters did an excellent job of planning, organizing and executing this prescribed fire and adhering to the prescribed fire plan. Following the control of the escaped fire some firefighters had difficulty thinking of anything they would do differently next time. While it is true that we work in a dangerous environment with unexpected changes in weather, we strive to be a learning culture and continuously improve our ability to make decisions that evaluate risk and get work done on the ground.

   "If I was burning the unit, I'd have done it the exact same way"

   Observation: Continue to look for opportunities to adapt new ideas into routine practices. Example: Effects of drought, prescription parameters, contingency resources.

2. **Worst Case Scenario planning** - If stars align, where is the worst case scenario likely to take place? What will that look like? Fire organizations frequently use sand table exercises to play the "What-If" game related to fire suppression. More recently, we have become more involved in these exercises as we look to manage fire. As we implement we need to do more "game playing" with all parties involved—or with those who may be affected.

   Observation: Consider gaming out worst case scenario "what if" during burn planning process, and discussing with participants during the on-site briefing. Take time to step back and look at the big picture when everyone is "in the chute and not looking at the arena"; plan for potential, not for current conditions.

   "This is the way we always do it"

Communications

The following two lessons learned were brought to our attention during the FLA. Neither one of these lessons learned contributed to the events leading up to the escaped prescribed fire.

1. **Interagency Radio Communication** - Communication challenges among interagency resources during initial and extended attack was a concern during suppression efforts and is a continuing problem on the DPG and other rural areas. The Grand River District and partners (especially Lemmon VFD) have excellent relationships and are skilled at "workarounds" using multiple radios. Many rural VFD departments lack the capability to communicate on the same radio frequency causing missed communications, less than optimal coordination and compromised safety.

   Observation: Consider system-wide changes to improve communication and safety. While mutual-aid channels exist, some cooperating partners are unable to access these channels making critical communication difficult and threatening the safety of all firefighters.

2. **Forest Service Motorcycle Helmet use with ATV policy.** This policy requires use of motorcycle helmets while riding ATV/UTVs during prescribed fires and wildland fire suppression. Radio communication is poor to non-existent while using this style helmet.

   Observation: Consider use of helmets with earpieces, other communications capabilities, or other options. Consider requesting assistance from MTDC to help with this problem.

COMMENDATIONS

The personnel involved in all levels of the Pasture 3B prescribed fire were motivated, worked well as a team, were adequately trained, and appropriately briefed. They had a keen awareness that this was the first burn of the year, and took numerous precautions to ensure successful completion of the prescribed fire.

Coordination with partners proved invaluable to the operations of both the burn and the escape. The local leaders exemplify true coordination and confidence in each other's programs, capabilities, and personnel.

Training and cooperation with the local Volunteer Fire Department led to very successful integration of VFD resources into both the prescribed fire implementation and the subsequent Pautre escape response.

Initial attack dispatching from the centralized North Dakota Dispatch Center proved to be valuable in the dispatching of additional resources for wildfire incident.

The Dakota Prairie Grasslands is working with researchers, meteorologists, and wildland fire professionals to move towards using the National Fire Danger Rating System (NFDRS) to improve fire danger prediction and communication.

Although this burn was the first for the District Ranger and the first role as RXB2 on the grasslands for the Zone FMO, this was not found to be a factor in any actions leading to the escape. To the contrary, the team felt the individuals were aware of this factor and performed well.

The IA response should be commended in that no residences were lost or injuries sustained, especially given the rapid rate of spread and size of the escape.

FLA SUMMARY

Our goal during this learning review is to share local observations and learning across a wider audience. With hindsight, it is easy to pass judgment over a project with an unintended outcome. The goal instead is for you to consider the story as it is written, be thoughtful of the conditions and ask yourself these questions:

- Could you find yourself in similar positions along the continuum of events here?
- Would you have acted in a similar fashion? If not, why not?
- How would your coworkers have responded to key action points along this story?
- Could you use this story as a virtual staff-ride discussion in your organization as you prepare for your prescribed burn?

The FLA team along with the participants of the Pasture 3B prescribed fire found, while no one condition contributed to the escape, the combination of several conditions played a role in the outcome of this prescribed burn. Some conditions that contributed to this cumulative result are:

- the passage of the dry cold front before the burn was completed
- the inability to control the escape due to the very high fire danger, winds, and topography
- the effects of drought on fine dead fuel moisture, surface litter and organic matter,
- forecasting inconsistencies between differing NWS offices
- lack of fire danger rating index information included in Spot weather forecasts from NWS
- use of UTV's for quick, maneuverable and effective patrolling were not as effective as an engine once the escape was established
- twin tipped (Forester) nozzles help conserve water but are not as effective as barrel nozzles when needed to knock down grass fires
- better maps (with 911 road nomenclature) assist in communication with mutual aid resources during suppression

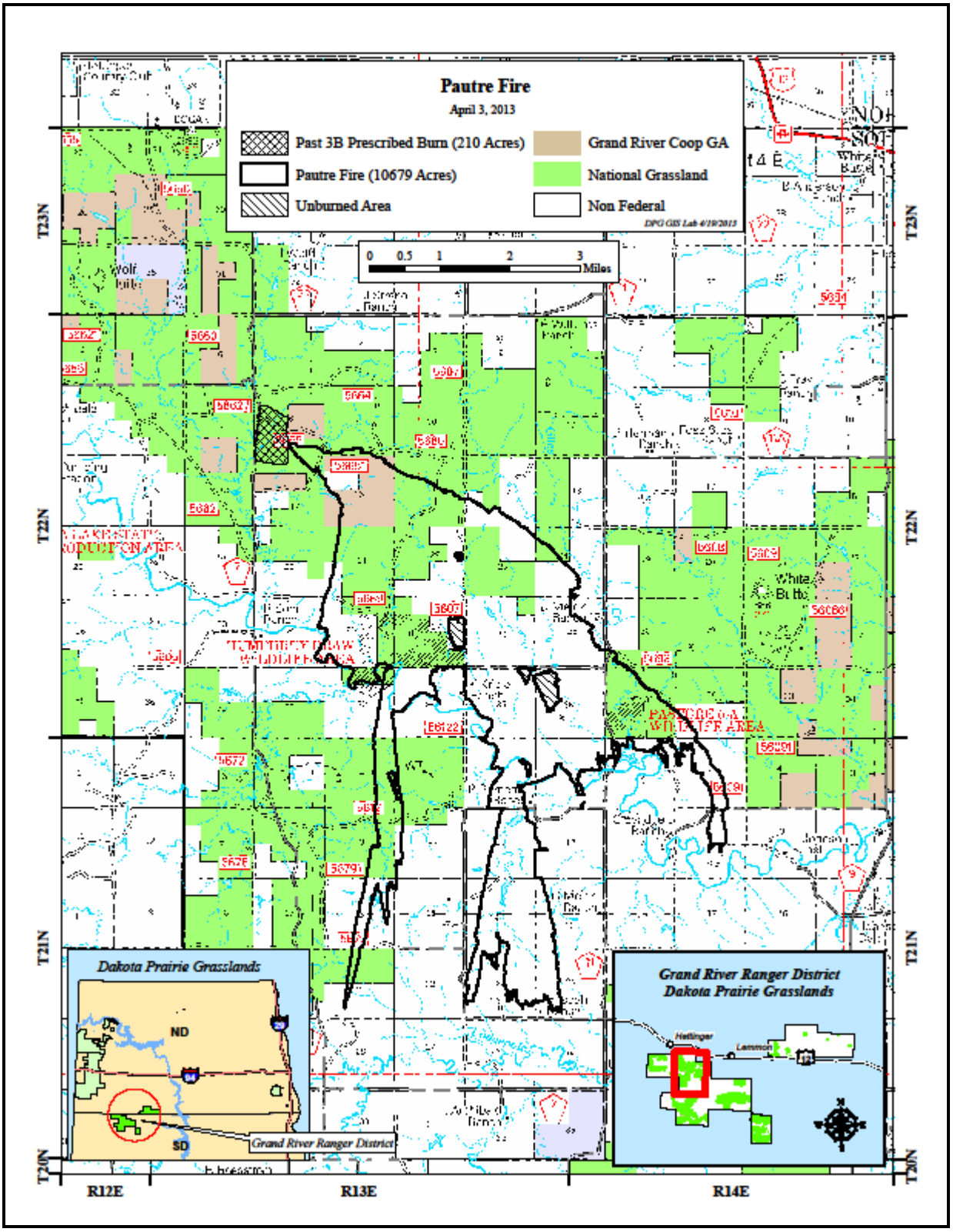
- prescribed fire plans require the same minimum number of personnel regardless of whether fuel moisture and weather inputs indicate potential for a low, moderate or high intensity burn
- burning at the upper end of the prescription
- the required holding resources were on the burn, but two of the engines were not staffed at the time of the escape. Personnel for these two engines were utilizing UTV's to hold

Additional research is needed to determine if the effects of drought may play a role in increasing fire behavior in grass fuels.

Several notable communication considerations were identified by participants that are worthy of further research but none of those conditions played a causal role in the escape.

The participants of the Pasture 3B prescribed fire acted professionally in preparing for and executing the prescribed fire. Their efforts along with those of responding firefighting forces successfully controlled the Pautre Fire, saving multiple structures with no loss of life or injuries. In addition, the participants were very willing to candidly discuss the events of the prescribed fire escape with the FLA team. They were focused on getting the facts correct and also discovering lessons learned for future prescribed fire practitioners.

APPENDIX 1 – PAUTRE FIRE PERIMETER



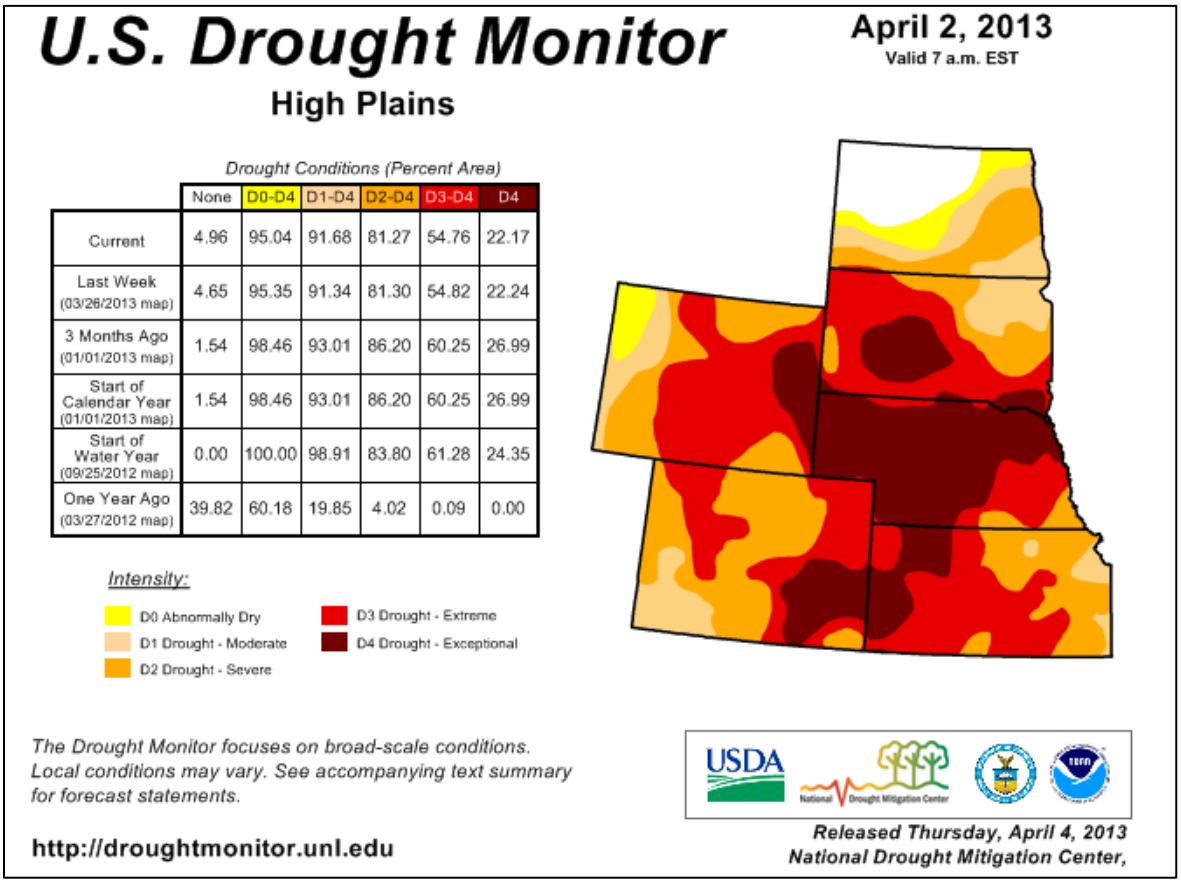
APPENDIX 2 – PASTURE 3B / PAUTRE FIRE TIMELINE OVERVIEW

TIME	EVENT	DESCRIPTION
0830	Weather	Early weather observations, called into NDC
0930	Resources	Initial resources at location. Pre-planning briefing with operational leadership. Drove the lines of the unit.
1000	Briefing	Briefed all personnel, did JHAs, read spot weather, lined out equipment.
	Weather	Small rain cell passed early – this was consistent with the spot weather forecast. Weather observations taken, checked soil moisture.
1200	Test Fire	Decided to conduct test fire. Called dispatch to confirm ignition.
1210	RX Ops	Called dispatch to notify that the burn was meeting objectives and they were continuing.
1215	Fire behavior	Paused ignitions due to fire in a patch of blue stem (to see how it behaved). No issues identified.
1230	RX Ops	East side fire reached the road; ignitions paused to wait for other flank to even out.
1307	Slop-over	Three slop-overs (creep) through the wet line on east flank. Adjusted wet line tactics
1312	RX Ops	Ignitions on east flank reached the corner. They strengthened the black line and checked the water tanks of the engines.
1330	RX Ops	Continued around the corner to the south side of the burn area.
1330-1340	RX Ops	Fire from east and west and interior all sucked together. West flank held up at phone pedestal.
1340	Slop-over	Two small spots on the south line. Interior ignitions noted a column shift and announced this over the radio.
1352	Escape	“SPOT” was announced over the radio
	Escape	Resources converged at the escape
~1400	RX Ops	RX command transferred to an ignitions person. RXB2 switched to IA IC
1406	Escape	IC orders contingency resources through NDC
~1415-1430	RX Ops	Completed ignition on RX
~1450	Escape	Paged all fire departments in the area to respond
~1600	Declaration	Official declaration occurs from Grasslands FMO and Line Officer

APPENDIX 3 – ESCAPED PRESCRIBED FIRE REVIEW ELEMENTS

1. An analysis of seasonal severity, weather events, and on-site conditions leading up to the wildfire declaration.

SEASONAL SEVERITY AND DROUGHT



U.S. Drought Monitor

April 2, 2013
Valid 7 a.m. EST

High Plains

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	4.96	95.04	91.68	81.27	54.76	22.17
Last Week (03/26/2013 map)	4.65	95.35	91.34	81.30	54.82	22.24
3 Months Ago (01/01/2013 map)	1.54	98.46	93.01	86.20	60.25	26.99
Start of Calendar Year (01/01/2013 map)	1.54	98.46	93.01	86.20	60.25	26.99
Start of Water Year (09/25/2012 map)	0.00	100.00	98.91	83.80	61.28	24.35
One Year Ago (03/27/2012 map)	39.82	60.18	19.85	4.02	0.09	0.00

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

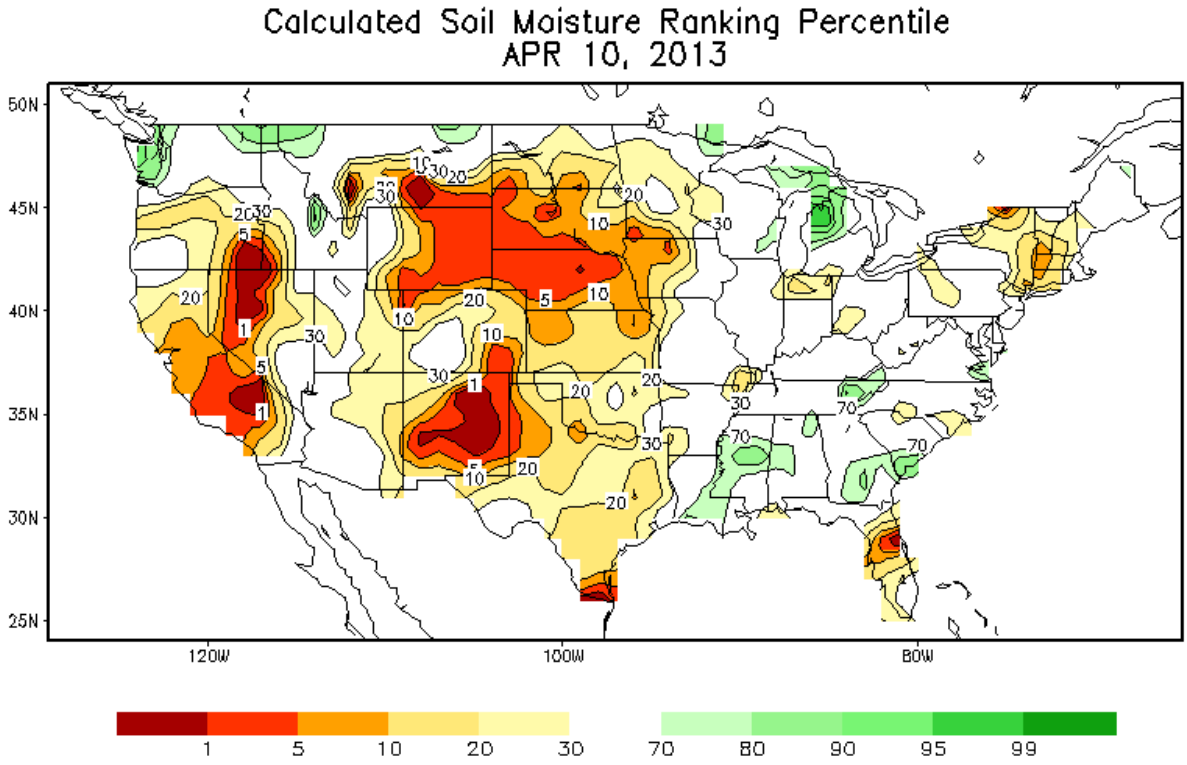
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu

USDA National Drought Mitigation Center

Released Thursday, April 4, 2013
National Drought Mitigation Center,

The U.S. Drought Monitor showed "D3 Extreme Drought" for the area. The U.S. Drought Monitor is abroad-scale analysis tool and does not provide site-specific information.



The 50% values on the Soil Moisture Ranking Percentile Map represent values that are historically average. The prescribed fire site has a value of 10%, which would represent that historically only 10 percent of the years on record have been drier (90% have been wetter).

The prescribed fire is located in an area where the nearest RAWS station is approximately 80 miles away. The Keetch- Byram Drought Index (KBDI) for the Tatanka Prairie RAWS on April 3 was 378. The KBDI is designed specifically for fire potential assessment. It is a number representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers. It is a continuous index, relating to the flammability of organic material in the ground.

- KBDI = 0 - 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of spring dormant season following winter precipitation.
- KBDI = 200 - 400: Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.
- KBDI = 400 - 600: Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.

- KBDI = 600 - 800: Often associated with more severe drought with increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

The average precipitation received January through March at the Hettinger Airport weather station averages 1.2 inches of rainfall or liquid equivalent. Through the end of March this year, they have received .53 inches.

Fire Danger Rating Systems used in North and South Dakota.

National Weather Service offices in South Dakota, North Dakota, and other states in the Great Plains use the Rangeland Fire Danger Index (RFDI) or Grassland Fire Danger Index (GFDI) to determine daily fire danger in non-forested areas. The National Fire Danger Rating System (NFDRS) is not widely used due to lack of remote automated weather stations statewide in the Plains States. Inputs into RFDI and GFDI are not cumulative and track similar to the Burning Index. There have been issues with GFDI and RFDI where at times they tend to over predict or under predict fire danger, particularly during summer months. The differences between GFDI and RFDI is that GFDI tends to more heavily weight the RH and wind speed values, while the RFDI weights fuel conditions more than GFDI. The RFDI was used from 1988 until 2010 in the Dakota's. It was at the prompting of the NWS that the GFDI was looked at and determined it would be an improvement over the RFDI. Part of the effort on the part of the NWS was to standardize a Fire Danger Index for use in the Great Plains states, as some were using RFDI, some GFDI and others NFDRS. In the Dakota's, RFDI has not been used since the 2009 fire season.

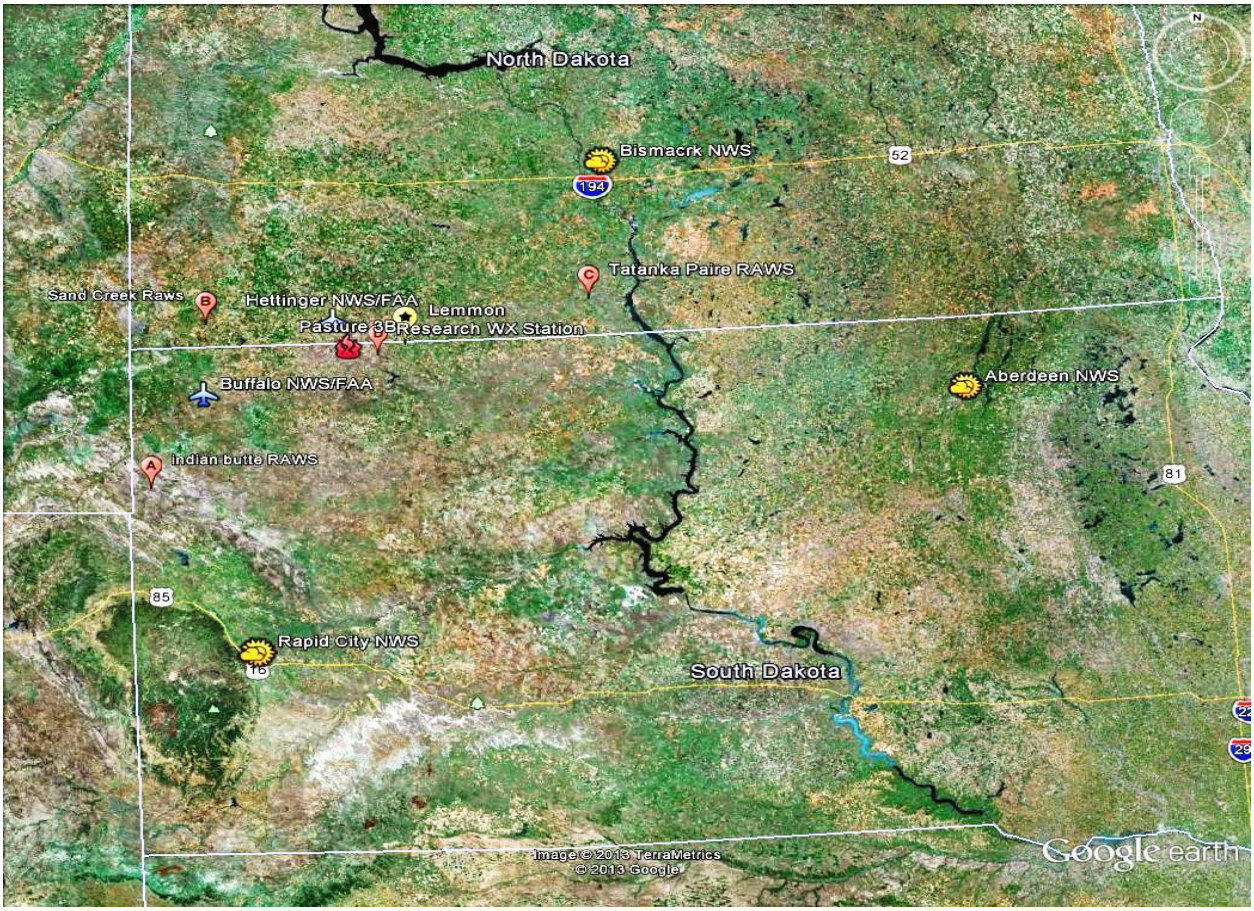
Over the past few months the Dakota Prairie Grasslands, ND National Park Group, USFWS and ND Forest Service have been working with the NWS Office in Bismarck, ND to begin transition from GFDI to NFDRS in North Dakota. Due to concerns the NWS has about replacing the existing GFDI system, Matt Jolly and Bryan Henry have been working with the NWS Office in Bismarck as well as surrounding NWS offices including Glasgow, Rapid City and Aberdeen to develop tools to assist them with the transition to NFDRS. It is expected that by the 2014 fire season, NFDRS will replace the GFDI in North Dakota and possibly South Dakota

The National Fire Danger Rating System (NFDRS) index used to track the combined effects of fuel dryness on fire potential is known as the Burning Index (BI). The BI at the Tatanka RAWS for western perennial grasses was 48 on April 3 with a corresponding adjective rating of Very High for fire danger.

The Rangeland Fire Danger Forecast issued by the NWS in Rapid City South Dakota at 0421 a.m. MDT states that **The Grassland Fire Danger Index** will reach the very high category this afternoon. Very poor weather conditions or a very low moisture content of grasses…and other dry organic material on the ground…indicate that dangerous burning conditions exists. Fires will spread rapidly and show erratic behavior. Outdoor burning is not recommended.

This information is one of the products available on the NWS Rapid City website. However this information is not repeated in the spot forecasts.

WEATHER



This map depicts the location of the Bismarck, Rapid City and Aberdeen National Weather Service offices as well as the two stations located closest to the burn unit. Hettinger Airport station (airplane symbol) is located 10 miles NW of the unit with the Research Weather Station depicted by the balloon 8 miles to the east. The other balloons represent the location of the nearest RAWS sites.

The RXB2 obtained multiple site-specific spot weather forecasts from the National Weather Service for the Pasture 3B (Pautre) Prescribed Fire. A spot weather forecast was obtained the morning of the burn. The dispatch center first submitted the request into The Bismarck Weather Service office then upon the advice of the burn boss, submitted it to the Rapid City Weather Service where the prescribed fire was to take place. The prescribed fire location was 3 ½ miles south of the North Dakota border (North Dakota=Bismarck forecasting area) into South Dakota (Rapid City Forecasting area).

The forecasts for the National Weather Service Offices in Bismarck and Rapid City are summarized in the table below:

	NWS Rapid City	**NWS Bismarck**
Sky weather	Partly Cloudy	Partly Sunny
Max. Temp. (F)	63	66
Min. Rel. Humidity (%)	31	33
20' Winds (mph)	SW 8-16 then NW 17-20 mph	S 5-11mph then SW 14 mph late morning then NW 25 mph with gusts to 30 mph in the afternoon
Mixing height (ft.)	3500-4500 Ft. AGL	

Rapid City discussion…A cold front crossing far western Montana will continue to push into the Dakotas early this afternoon. The winds will gradually shift to the west in the next couple hours…and then continue to shift to the NW by mid-afternoon.

Bismarck discussion…A gradual wind shift will develop today behind a cold front. Maximum NW wind gusts up to 30 mph are expected this afternoon.

Weather observations taken on-site can be found in the table below:

On-site obs	**Temp**	**RH**	**Wind(mph) eye level**	**Direction**
0830	42	70	6-8	SSE
1030	59	32	4-7	SW
1220	63	33	2-4 gusts 8	W
1330	71	35	4-6 gusts 8	W

Weather observations taken on site for the day of the burn stop at 1330, approximately 30 minutes prior to the escape. There were no available on site observations taken after the spot (1352) as all personnel were engaged in suppression efforts. Eye level wind measurements taken from a ridge on the western edge of the prescribed fire at 1430 recorded 14-15 mph with gusts to 20 mph. Individuals on the burn mention gusts were strong enough to blow their hardhats off their heads at around the time of the escape and during suppression actions.
A weather station named GRNG_Lemmon, established Dec 3, 2012, by Phillips et al. for research purposes is located approximately 8 miles east of the prescribed fire near White Butte. The data is collected every minute and is used to calculate the 30 minute averages.

Weather observations obtained from this station for the day of the burn are as follows:

TIME STAMP	RH Avg.	Air Temp Avg.	Wind direction	Wind speed mph (measured 8 feet off ground)
4/3/2013 @ 7:30	59.67	37.16 F	S	16.75
8:30	48.67	42.83	S	15.43
9:30	33.86	53.15	SSW	15.94
10:30	27.35	58.6	SW	14.91
11:30	28.26	59.07	SW	14.57
12:30	29.78	60.37	WSW	9.97
13:30	24	67.87	W	12.3
14:00	22.73	69.37	W	18.41
14:30	23.12	68.65	WNW	20.25
15:30	30.97	65.01	NW	25.11
16:30	42.57	55.93	N	25.76
17:30	47.21	49.23	N	24.29
18:30	46.7	44.82	N	17.46
19:30	49.25	43.31	N	15.22
20:30	57.16	40.23	N	9.48
21:30	58.89	36.71	NW	7.912

These observations were not available to the Burn Boss the day of the burn as the researchers were working to get web access to the site. Wind is measured 8 feet off the ground so approximates eye level winds from ground observations. According to these weather observations 8 miles east of the prescribed burn, the wind increased from 12 to 18 mph at time of escape.

Observations were also pulled from the FAA weather station at Hettinger Airport. The highlighted portion shows the observations for 1 hour prior to escape, the escape at approximately 13:52 and for two hours after. The Hettinger airport is located 10 miles NW of the prescribed fire site. Winds at the airport station are measured 30 feet off the ground.

ID = KHEI	TMP ° F	RELH %	Wind Speed mph	GUST mph	DRCT °	Sky Condition	VSBY miles	DWP °F
4-3-2013 23:53 MDT	28	71	8.1		350	clear	10	22.3
4-3-2013 22:53 MDT	34	56	9.2		360	clear	10	23.9
4-3-2013 21:53 MDT	37	54	8.1		350	clear	10	26.1
4-3-2013 20:53 MDT	41	53	12.7		360	partly cloudy	10	29.3
4-3-2013 19:53 MDT	45	45	10.4		10	overcast	10	30.3
4-3-2013 18:53 MDT	46.9	42	23	29.9	10	clear	10	30.7
4-3-2013 17:53 MDT	51.1	42	24.2	36.8	10	clear	10	34.6
4-3-2013 16:53 MDT	57	42	28.8	35.7	360	clear	10	39.6
4-3-2013 15:53 MDT	**68**	**25**	**20.7**	**32.2**	**310**	**partly cloudy**	**10**	**39.4**
4-3-2013 14:53 MDT	**66.9**	**25**	**24.2**	**32.2**	**300**	**partly cloudy**	**10**	**38.6**
4-3-2013 13:53 MDT	**70**	**23**	**18.4**	**31.1**	**290**	**mostly clear**	**10**	**39.1**
4-3-2013 12:53 MDT	**68**	**25**	**16.1**	**21.9**	**290**	**mostly cloudy**	**10**	**39.4**
4-3-2013 11:53 MDT	61	27	12.7		290	overcast	10	35.1
4-3-2013 10:53 MDT	55.9	30	17.3	21.9	250	overcast	10	32.7
4-3-2013 9:53 MDT	51.1	38	16.1		210	mostly clear	10	32.4
4-3-2013 8:53 MDT	42.1	50	10.4		190	clear	10	29.6
4-3-2013 7:53 MDT	35.1	61	8.1		170	mostly clear	10	26.4
4-3-2013 6:53 MDT	32	66	10.4		150	clear	10	24.8
4-3-2013 5:53 MDT	30.9	66	9.2		160	clear	10	23.9
4-3-2013 4:53 MDT	30.9	66	11.5		150	clear	10	23.9
4-3-2013 3:53 MDT	32	63	10.4		140	clear	10	24.2
4-3-2013 2:53 MDT	32	63	12.7		140	clear	10	24.2
4-3-2013 1:53 MDT	32	63	11.5		130	clear	10	24.2
4-3-2013 0:53 MDT	32	66	13.8		150	clear	10	24.8
MesoWest Disclaimer								
Data provided by: National Weather Service								
Contact MesoWest								

TOPOGRAPHY AND ASPECT

The elevation of the project area ranges from approximately 2,500 feet to 2,600 feet. Topography is rolling with slight changes in aspect.

FUELS

The fuels on-site are 100% GR2.GR2 is a moderately continuous grass with an average depth of one foot with a high spread rate and moderate flame length. Fine dead fuel moisture was calculated on site at 6%. The fuels outside the area targeted for ignition are the same as fuels within the burn area. Fuels are uniform throughout the 203 acre burn unit.

2. An analysis of the actions taken leading up to the wildfire declaration for consistency with the Prescribed Fire Plan.

In reviewing the events that occurred prior to and during the implementation of the prescribed burn for consistency with the burn plan and/or policy direction, there were no actions found to be in contradiction of the burn plan. The burn boss reviewed and completed the Go-No Go Checklist the morning of the prescribed burn. Resources started gathering at the site of the burn in plenty of time to conduct the required briefing. A thorough briefing was conducted, including a review on the operation of the engines. There were at least two types of engines present and the operation of both types was done.

The burn boss waited for the first small front to pass prior to conducting the test fire. The test fire was conducted in the farthest down wind corner of the unit. All holding resources were on site during the test fire. The test fire results were satisfactory so ignitions commenced. Black lining off of a wet line along a mowed strip began from the northeast corner going in two directions. Black lining began along the east mowed line and proceeded south as well as along the north mowed line proceeding to the west. Two engines for both black lines were used to lay a wet line in the mowed strip and to help hold. Hand ignition along the wet line occurred on foot. An igniter on an all terrain vehicle was used to fill in between the two black lines.

On site weather was taken that morning and the results were sent to the National Weather Service to produce the spot weather forecast. On site weather was taken every hour up to the point of the escape.

There were six type six engines on site during the burn. Two of these engines were not staffed until the time of the escape, the personnel for these engines were on UTVs with tanks and used in holding actions during the implementation of the burn.

Ignitions were adjusted when the wind switched from a south west direction to a westerly direction. Care was taken to adjust ignitions so the ignitions on the west side did not get ahead of the ignitions on the east and south side of the unit. Holders on the UTVs regularly patrolled the line on the east side of the unit and had controlled a few small slop-overs across the line. When the slop-over that eventually resulted in the escape was detected, all efforts were made to contain the escape, but were unsuccessful. The review team noted that although the UTVs get around easier than type six engines, they do not possess the flow or the volume of a type six engine. This reduced capacity may have been a factor in not being able to catch the escape.

When the slop-over occurred that lead to the escape, care was taken to finish tying in the ignitions on the original unit so that additional escapes did not occur, compounding the situation.

Fire behavior on the Pasture 3B prescribed burn, on April 3, 2013, was within prescription and met the burn plan goals and objectives within the burn unit. Fine dead fuel moisture calculated on site was 6%, eye level winds were 4-6 mph with gusts to 8 mph. The burn plan prescription allows 15 mph eye level winds, 20% RH and 4% for fine dead fuel moisture. Eye level winds recorded 8 miles east of the burn site were recorded at 18.41 mph at 1400. These winds would be outside of the prescription, however the winds at this station are 30 minute averages and the location of the weather station site may be more exposed than the burn unit. It would appear however; that the winds prescribed in the burn plan may be too high for the conditions at the low end of fine dead fuel moistures in extreme drought conditions and relative humidity's.

On April 2, the burn boss called Rapid City weather service in the morning to see how confident they were in the weather forecast on Wednesday and information on the cold front. The meteorologist had stated that it was not a strong cold front and indicated times for the wind shifts (morning S-SW, 1200 W, 1500 NW) and that the rain would be widely scattered. The burn boss called Rapid City weather service to get an update on the forecasted weather around the prescribed burn unit. After looking at the models the meteorologist said the predicted forecast which was very similar to the one in the morning.

April 3, the burn boss arrived at work at 0700 and pulled up the weather and called Rapid City, SD weather service. She navigated to the Rapid City NWS website through the Bismarck NWS website and noted that the Fire Danger for Hettinger was Yellow which meant high. At the Rapid City website, she navigated to the graphical forecast and called the Rapid City NWS. She requested from the meteorologist information about the weather forecast for Lemmon, SD. They discussed the cold front coming into the area. He informed her that it was not a strong cold front and gave her the times for the passage. Temperature: 60-63, Minimum RH: 30%, Winds: Morning – S-SW 10-15 gust to 20, 1200-W 10-15, 1500-NW 15 with gust to 20 mph, good smoke dispersal.

The escape rate of spread was calculated by the FLA team to be approximately 160 chains per hour. The "CONTAIN" run on page 35 of the burn plan called for 6 Type 6 engines with four of them having a response time of 6 minutes and the other two having a response time of 18 minutes. There were 6 type six engines available on site, 4 were immediately available and two were available when ATV operators switched to their engines to attack the escape. According to the burn plan, the resources on site should have been able to catch an escape with a rate of spread of up to 170 chains per hour. When re-calculated, this upper limit ROS should have been listed as 192 chains per hour. While this figure (192 chains per hour ROS) is identified correctly on page 35 of the burn plan, it was transposed incorrectly on page 6 of the burn plan where 170 chains per hour is listed as the maximum ROS. This should have been the maximum rate of spread the personnel and equipment could have been expected to catch and contain. The escaped fire was not contained both because wind speeds increased and the fire reached a rocky area, impassable to engines, allowing the fire to gain considerable size and intensity before the engines could navigate a route around the rocks and re-engage the fire.

3. An analysis of the Prescribed Fire Plan for consistency with policy.

In reviewing the burn plan, nothing was contrary to the Interagency Prescribed Fire Planning and Implementation Procedures Guide, July 2008, hereafter referred to as the Implementation Guide. In reviewing the Burn Plan, the following suggestions MAY help improve the Burn Plan for the Burn Boss, resources on the burn, and/or the Line Officer.

Element 1 - There are digital signatures on the burn plan for the preparer and reviewer. Original signatures are not a requirement of the Implementation Guide, but original signatures ensure the review occurred.

No Table of Contents – not a requirement in the guide, but make it easier for the user to find things in the document during implementation.

Element 11 - A listing of the required positions for the implementation of the burn was in the burn plan. It is recommended that an actual organization chart be shown in the burn plan to show the implementation organization. For the briefing, it is suggested to have a blank burn organization that shows positions and fill in the name of the individual filling that position, and brief the entire group of the role of each person or crew on the organization chart.

Collateral duty positions were identified in the burn plan. Positions that could NOT be combined to have collateral duty were not identified in the burn plan. Positions that may not serve collateral duties are to be identified in the organization chart, as stated in the Implementation Guide. Be conscientious when considering the appropriate use of collateral duty positions for each burn.

Element 13 – The Medical Plan is not signed by the safety officer, although this is not a requirement of the Implementation Guide. The Medical Plan states EMT's will be identified on the day of the burn, but was not documented in either the Medical Plan or in the Organization Chart for the day of the burn.

Element 17A- Evaluate the use of absolutes in the burn plan, such as "Stop ignition if a spot fire occurs." Consider the use of terms such as "Consider" or "Pause". During the implementation of the 3B burn, ignitions paused when spots or creep were found outside the line. When the spot or creep that resulted in the eventual escape occurred, ignition was paused, but then resumed to tie off the unit to reduce the risk of additional escapes. These actions were appropriate but absolute language in the burn plan to the contrary could have caused additional problems had the unit not been tied off, monitored and held.

It is good planning to identify both contingency resources and resources that may be called in the event of an escape. There is a fine line between realistic contingency resources to attempt to bring a prescribed fire back into prescription and resources that for all intents and purposes will be used in the event of an escape.

Element 18 – The Burn Plan stated the Burn Boss would declare the wildfire. Wildfire declaration was made by the Forest Fire Management Officer with concurrence from the Forest Supervisor. Understand when an escaped prescribed fire should be converted to a wildfire, who has the authority to make that determination, and follow as outlined in the burn plan. Ensure everyone on the incident is informed when the prescribed fire has been converted to a wildfire and who is the Incident Commander.

Element 20A - Ensure the RAWS station identified in the burn plan is the RAWS used to provide indices.

It is helpful in the development of the burn plan to ask these types of questions:

- "What is the worst case scenario that could occur today?"
- "Where and under what conditions could a low probability high consequence event occur?"
- "Is the worst case scenario not meeting the burn objectives, inability to maintain control of the prescribed burn, or some other undesirable outcome?"

It is also informative to ask the people on the burn during the pre-burn briefing similar questions.

4. An analysis of the prescribed fire prescription and associated environmental parameters.

Element 7 – The eye level wind speed maximum in the burn plan is 15 miles per hour (mph) whereas the maximum 20 foot wind speed is 20 mph. The wind reduction factor for an unsheltered grass fuel model is 0.4. To derive the eye level or midflame windspeed from the 20 foot wind speed you need to multiply the 20 foot wind speed of 20 mph by the reduction factor of 0.4, resulting in a maximum midflame or eye level wind speed of 8.0 mph. To get an eye level wind speed of 15 mph with a wind reduction factor of 0.4 would require a 20 foot wind speed of 37.5 mph. The burn plan shows a maximum rate of spread of 170 chains per hour given the weather and fuel parameter inputs of the prescription. On page 35, the maximum ROS is shown as 192 chains per hour. After recalculation, it is confirmed that the maximum ROS for this prescription should be listed as 192 chains per hour.

There is a live fuel moisture value in the prescription. The live fuel in the fuel complex is the presence of grass re-growth. An explanation is needed that the live fuel moisture is the presence of grass re-growth and will not be measured. It is added to the prescription and to the computations to serve as a dampening factor to reduce the over prediction of the BEHAVE model. If there is a correlation to the re-growth height to the live fuel moisture percent level in the calculations, this should be explained in the burn plan.

Explain the tie between the resource objectives and control needs with the prescription parameters in the burn plan. Tie the holding and contingency resources to the expected fire behavior if the fire should become established outside of the control lines. Consider varying levels of control and contingency resources as the prescription goes from the low end, to the desired prescription level, to the upper end of the prescription. A table can be used to display the needed resources at the various levels. Carefully consider the response times of both the holding as well as the contingency resources. There may be value in staggering the response times of the holding resources to reflect realistic times from various parts of the unit.

Be careful of cutting and pasting, especially in the prescription. If you have a prescription that works well in a particular fuel type, as we all do, ensure you make validation runs for your situation to ensure the prescription from past units is valid for this unit. For example, the Pasture 3B burn plan contains maximum spread rates and flame lengths not consistent in the prescription and the contain outputs. Also, Behave runs indicate the minimum fine dead fuel moisture allowed is 4% and the maximum eye level wind speed should be nine mph.

In the Contain runs, the prescription shows that with a fine dead fuel moisture of 4% and eye level wind speeds of up to 15 miles per hour, the six engines identified would not be able to catch the escaped fire. With this information, either the acceptable weather parameters should have been changed (to reduce ROS) or additional resources should have been required. Since the fine dead fuel moisture never reached 4% (it was 6%), this error did not factor into the escaped fire. Contain runs predicted that the six engines would have been able to catch the escaped fire with a fine dead fuel moisture of 6%.

5. A review of the approving line officer's qualifications, experience, and involvement.

The line officer for this prescribed fire met all of the required training and experience to approve the use of prescribed fire as outlined in the 2013 Interagency Standards for Fire

and Aviation Operations. The Line Officer had a current Delegation of Authority Letter from the Dakota Prairie Grassland Supervisor. The Delegation of Authority Letter required the assignment of a shadow Line Officer for the management of Type III incidents, which occurred after declaration of this incident.

6. A review of the qualifications and experience of key personnel involved.

A review of the IQCS qualifications for the personnel on the fire confirmed they were all qualified for the position they occupied.
Use caution in assigning trainees away from close proximity to their trainer. In the event of the escape it may not meet the intent to have the fully qualified person engaged in a different portion of the fire than the trainee.

7. A summary of factors contributing to the wildfire declaration.

Increased wind speed and increased rate of spread in the fuels adjacent the slop-over factored in to the escaped fire. This increased wind was potentially caused by the passage of a dry cold front predicted to cross the area in the early afternoon. It may have also been influenced by topographic features that may have funneled and concentrated the winds from the west. Following the escape, winds were observed at between 14-15 mph eye level winds with gusts to 20 mph. Winds continued at sustained higher speeds further complicating control efforts.

Other factors that may have influenced the cause of the escape are increased fire behavior, rate of spread, resistance to control - possibly influenced by extended drought -, lack of winter snow pack (fuels not compressed), and the low moisture content of the soil and organic material in the ground.

APPENDIX 4 – FLA REVIEW PROCESS AND MEMBERS

The NWCG Interagency Prescribed Fire Planning and Implementation Procedures Guide as well as the Forest Service Manual 5104.42 require a "review initiated by the appropriate level Agency Administrator" to "guide future program actions by minimizing future resource damage and/or preventing future escapes from occurring by gathering knowledge and insight".
The Northern Region Regional Forester convened a team on April 4th to conduct a Declared Wildfire Review utilizing a Facilitated Learning Analysis process "to maximize the potential to learn from this event and the experiences of those involved".

The team was asked to review the seven elements of the Declared Wildfire Review in the 2008 Interagency Prescribed Fire Planning and Implementation Procedures Guide (page 29). These seven elements are valuable items to consider. This demonstrates that policy requirements (as laid out in the guide) and a learning-focused review effort are not mutually exclusive concepts; a dual focus on learning and policy compliance is possible.

This commitment to learning deserves to be recognized and commended. The lessons that emerged out of this escaped prescribed fire are numerous. Without the participants' commitment and support of the learning-focus, these lessons would not be available for others to benefit from.

Based on the scope and focus of the review, the following team was organized:

Steve Lenzo	Team Leader	Deputy Forest and Grasslands Supervisor, Nebraska National Grasslands
Brad McBratney	Subject Matter Expert, RXB1	Forest Fire Staff, Helena and Lewis & Clark National Forests
Diane Hutton	Fire Behavior, RXB1	District Fire Management Officer, Wisdom/Wise River Ranger District, Beaverhead-Deerlodge National Forest
Rob Lehman	Interagency Participation	Training Officer, Division of Wildfire Suppression, South Dakota Department of Agriculture
Lily Huskey	Documentation Specialist, Facilitator	Incident Business Specialist, Helena, Lewis & Clark and Beaverhead-Deerlodge National Forests

Corrections from the original Pasture 3B Escaped Prescribed Fire Review FLA

Paragraph two of page four was corrected from the original report. The word "northwest" was deleted and replaced with the word "northeast" in two sentences to correctly indicate the location of the test fire and the location where the firefighters began ignitions. Those changes are shown below in red on a copy of paragraph two, page four, of the original report.

Unit 3B East was planned for 210 acres in a mostly flat grass fuel model. The test fire in the northeast corner was successful and the decision was made to proceed with burning the unit. From the northeast corner, ignitions proceeded south along the east line and west along the north line. Ignitions continued slowly, with pauses in lighting to allow fuels to consume and to widen the burned area adjacent to the mowed control lines. In total, five small slop-over areas crept through the wet line between 1230 and 1340. These slop-overs were areas that burned into the mowed control line (a recently cut fuel break of 2-3" tall grass stubble) and ranged from roughly six inches to a few feet in diameter. All spots were quickly extinguished by the holding crew using UTVs with 70 gallon tanks and spray nozzles.