State Game Land 311 Prescribed Fire

Benezette Township, Elk County, Pennsylvania

March 23, 2016

Incident Resulting in Injury

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INCIDENT INVESTIGATION REPORT

Incident: State Game Land 311 Prescribed Burn Injury to Game Lands Maintenance Supervisor

Location: Lat: 41.355480; Long: -78.372211, Sate Game Land 311, Benezette Township, Elk County, Pennsylvania

Date: March 23, 2016

Incident Investigation Team

Benjamin C. Jones

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Investigation process

The injury was reported to The PA Game Commission's (PGC) Bureau of Wildlife Habitat Management (BWHM) the evening of Wednesday, March 23. The PGC Fire Program was put on safety stand down until initial findings and lessons learned could be briefed to agency burn bosses. An on-site field visit was conducted by the investigation team within 24 hours of the incident (March 24). Interviews with personnel (in-person and phone) were conducted over the ensuing five days. Burn bosses were briefed at a mandatory meeting on Tuesday March 29. The safety stand down was ended at the conclusion of this meeting. The final interview (the injured firefighter) occurred on April 7, a week after he was released from the hospital.

SUMMARY

On March 23, 2016, a Pennsylvania Game Commission Game Lands Maintenance Supervisor was injured while serving as an FFT2 on a prescribed fire. The incident took place on State Game Lands 311, near Benezette, Elk County. The day's plan was to safely conduct a prescribed burn on approximately 30 acres of grass openings to improve wildlife habitat.

At approximately 13:35 the burn crew noted and communicated a shift in fire spread direction, unexpectedly pushing down a steep (40-45%) slope. The fire crossed fire lines into several areas of wooded leaf litter causing crews to employ suppression tactics. The crew member was injured when the leaf litter fuels he was working in flared up, caused by a strong downslope wind gust. Flame lengths quickly increased from <1 foot to 3-5 feet within seconds. The firefighter was engaged in direct attack from unburned fuels at the time of the flare up. He was burned as he passed through the "knee high" flame front in route to his safety zone (the black).

He was transported via medical helicopter to a burn unit in Pittsburgh, PA. Injuries included first degree burns to the face, first degree burns to the elbows, and first, second, and third degree burns to the knees and lower legs. He was released on Wednesday, March 30, 2016 after seven days in a hospital burn unit.

This report provides a timeline of events as well as findings and lessons learned to improve fireline safety.

Location: State Game Land 311, Benezette Twp., Elk County

Burn Plan Number: PA-RX-13-2015-01

Description: Burn Units 311-6C, D, E (9, 16, and 11 acres, respectively).

Fuels: Dormant cool-season grass (FM 1) within units. Mixed hardwood leaf litter (FM 9) outside and adjacent to units.

Staffing: 14 total crew (1 Burn Boss, 1 FFT1, 1 FFT1(T), 11 crew members)

Equipment: Two Type 7 UTVs, one water tender with ~1,500 gallons, one F-150 with 100 gallon sprayer.

Weather:

Spot Weather Forecast (see complete spot forecast in Appendix)

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SKY/WEATHER.........MOSTLY CLOUDY. A SLIGHT CHANCE OF SHOWERS EARLY
                    IN THE AFTERNOON.
MAX TEMPERATURE.....AROUND 59.
MIN HUMIDITY........43 PERCENT.
WIND (20 FT)........SOUTHWEST WINDS 8 TO 13 MPH.
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TIMELINE OF EVENTS

Tuesday 3/22/16

On Tuesday, 3/22/16 two crews successfully completed prescribed burns in the PA Game Commission's (PGC) Northcentral Region. A PGC Bureau of Wildlife Habitat Management (BWHM) burn boss led a crew on SGL 176, Centre County burning approximately 110 acres of forest, grass, and mowed/un-mowed shrubs. A northcentral region burn boss simultaneously led a smaller crew burning grass fields, also in Centre County on SGL 333.

Following Tuesday's operations, discussions focused on potential burns in the northcentral region the next day. Due to other obligations, the BWHM burn boss was returning to the Harrisburg area. On Tuesday, March 22, several spot weather forecast requests were submitted by PGC to the National Weather Service, State College for conditions on Wednesday March 23. Areas included in spot forecasts were SGL 176, and SGL 255 (Centre County). Potential burning on SGL 311 (Elk County) was also considered.

Wednesday 3/23/16

7:01 With un-favorable forecasts for SGL 176 and 255, a spot forecast was submitted for SGL 311 at 7:01 on Wednesday 3/23.

07:32 Spot forecast completed for SGL 311. Forecast conditions were favorable for burning several grass fields in the area of Winslow Hill.

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SKY/WEATHER.........MOSTLY CLOUDY. A SLIGHT CHANCE OF SHOWERS EARLY IN THE
AFTERNOON.

MAX TEMPERATURE.....AROUND 59.
MIN HUMIDITY........43 PERCENT.
WIND (20 FT)........SOUTHWEST WINDS 8 TO 13 MPH (3-5 MPH midflame).
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Crew were notified and a staging time set at 10:00 at the new elk viewing parking lot at the intersection of Winslow Hill Road and Dewey Road.

10:20 Burn Boss and Squad Boss from Northcentral Region Office arrive at staging area.

10:30 Squad Boss spun weather with sling psychrometer. Weather: Exposed, ridgetop site at elk viewing lot. This location was approximately 1.5 miles from the burn unit objective for the day. Winds SW 7-9 (15), WB 44, DB 60, RH 24%, FFM 8%, PIG 40%.

11:10 Burn Boss and Squad Boss drove to burn unit for inspection. They noted significantly reduced winds of <4 mph on the actual burn unit. Discussed firebreaks, tactics for the day, and which parts of the field complex were within burn units in the 311 burn plan.

11:45 Briefing.

Communications on VHF TAC 1.

Only one crew member without a radio. He was paired on UTV with a crew member who did have a radio.

Burn boss exuded high confidence in operating in this fuel type and this confidence was shared by the Squad Boss and others on the crew.

Decided to take the whole "horseshoe" area (Units 311-6C, D, and E) as one single unit.

ICS and Squad assignments

Burn Boss:

One, RXB2 qualified

Squad 1:

One FFT1, One FFT1 (T)

Five FFT2

Equipment: Two Type 7 engines (UTV 373, UTV 371)

Squad 2:

Six FFT2 (overseen directly by Burn Boss)

Equipment: F-150 with sprayer unit (100 gal) and half inch hose line

Contingency:

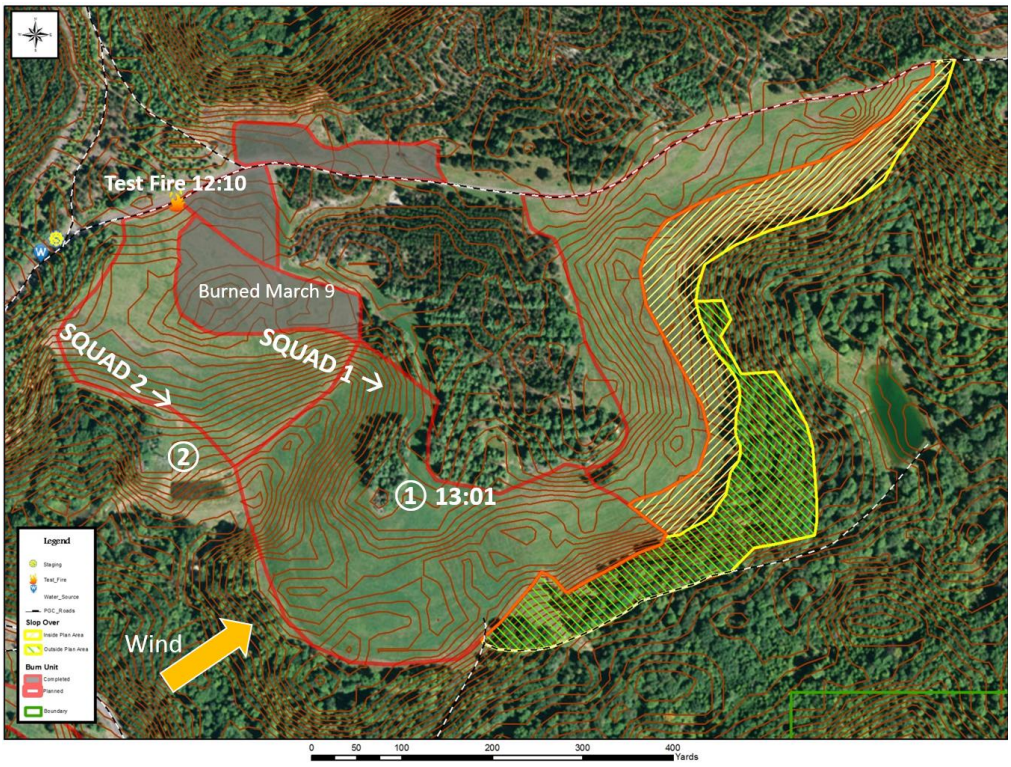
Rollback tender with ~1,500 gallons of water

It was decided that Squad 1 would oversee ignition and holding along the northern, upslope firebreak. Squad 2 would handle ignition and holding along the southern, downslope line. The burn boss would oversee Squad2 operations.

12:00 Weather: On site at burn units 311-6C, D, E. Winds SW 2-4, RH 33%. Burn Boss noted that wind was considerable lower on the burn units, compared to the exposed lookout area where initial staging was held.

12:10 Test fire location was determined by burn boss, anchored into an area that had been burned 14 days earlier. No discussion from crew on location of test fire. Prior to main test fire did a small test in pine needle litter to determine potential behavior outside the unit, noting pine woods in the center of the complex and northeast across the gravel road as the most likely areas for slop-overs and/or spotting on a SW wind.

Figure 1.



12:10-13:00 Squad 1 blacklining along upslope line with pine plantation upslope and behind them.

12:30-13:01 Squad 2 holding along south line waiting for upslope black to be created by Squad 1.

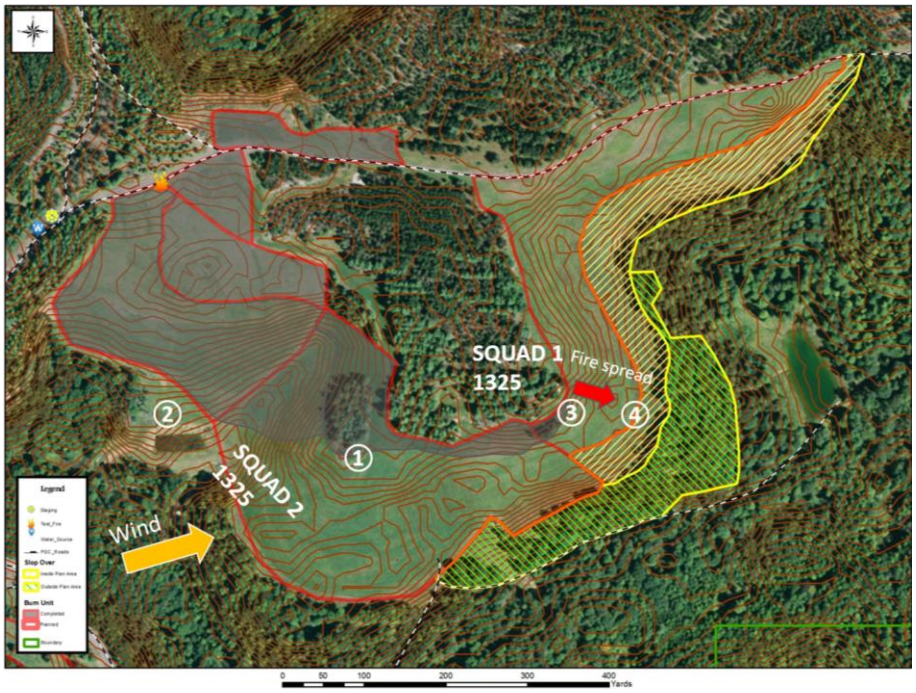
13:01 Squad 1 progressed to point of horseshoe and log pile (**Figure 1**, **Point 1**).

13:05 Weather taken by Squad 2 along southern firebreak. DB=69^{o}, RH=27%, Wind WSW at 4 MPH, Gust to 9. Fine Fuel Moisture and PIG were not calculated or reported to crew.

13:07 Burn boss drove up to discuss with Squad 1 current observations. All comfortable with progressing. Fire spread consistent to NE pushed by SW, upslope wind.

13:17 Burn Boss decided to burn out triangle along pond while waiting for upslope black to develop, using 4 of 6 members of Squad 2 (**Figure 1, Point 2**).

Figure 2.



~13:25 Squad 1 noted and communicated to Burn Boss a shift in fire spread ("wind shift") direction pushing downslope across the unit (**Figure 2, Point 3**). Gusts pushed the fire hard downslope. Between wind gusts fire was flanking to the northeast.

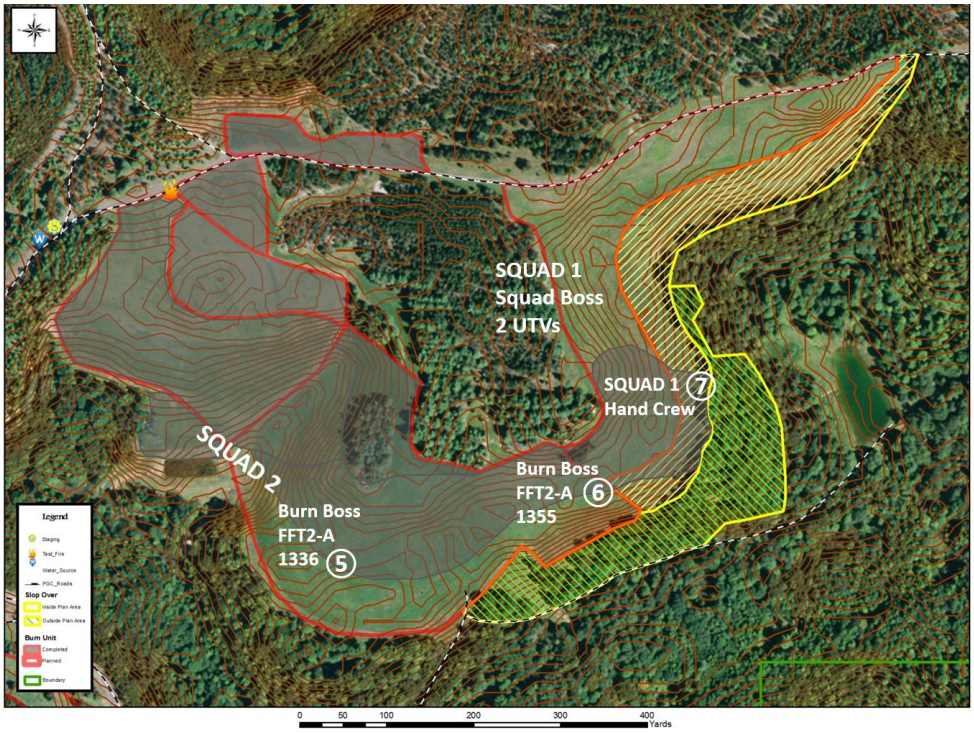
~13:25 Squad 1 Squad Boss pulled crew together for briefing near Point 3. Discussed that fire would not likely run quickly downhill against the steep 40-45% slope. Assigned an FFT1 (T) to monitor downhill fire movement. FFT1 (T) noted 4-6' flame lengths spreading downhill near Point 3.

~13:35 FFT1 (T) reported that fire had crossed the lower, downslope burn unit line but was still within the grass field (**Figure 2, Point 4**).

Burn Boss copied this communication direct.

Figure 3. Slope steepness and fire spread direction at Point 3. Photo taken from northeast of point 3, looking southwest.

Figure 4.



13:36 Burn Boss and FFT2-A (the crew member that would be injured) proceed quickly wet lining and igniting along the south line, moving east, attempting to head off fire spreading downhill from Figure 2-Point 3. Burn Boss was driving the F-150 while running half inch sprayer hose out driver's side window, FFT2-A was igniting with a drip torch behind the F-150, along the wet line. (**Figure 4, Point 5**). The rest of Squad 2 was working to finish burning out the triangle they had begun igniting at 13:17.

~13:50 Burn Boss and FFT2-A make contact with fire spreading downhill and switch from ignition/blacklining to suppressing the flaming front from the black using the F-150 sprayer. Burn Boss driving the F-150, FFT2-A running half inch sprayer hose (**Figure 4, Point 6**).

~13:52 the Squad 1 FFT1 (T) reported fire had made it into the woods line leaf litter, outside the grass field perimeter (**Figure 4, Point 7**).

Reported <1 foot (4-6 inch) flame lengths in the leaf litter.

Reported that it was too steep to engage the UTVs.

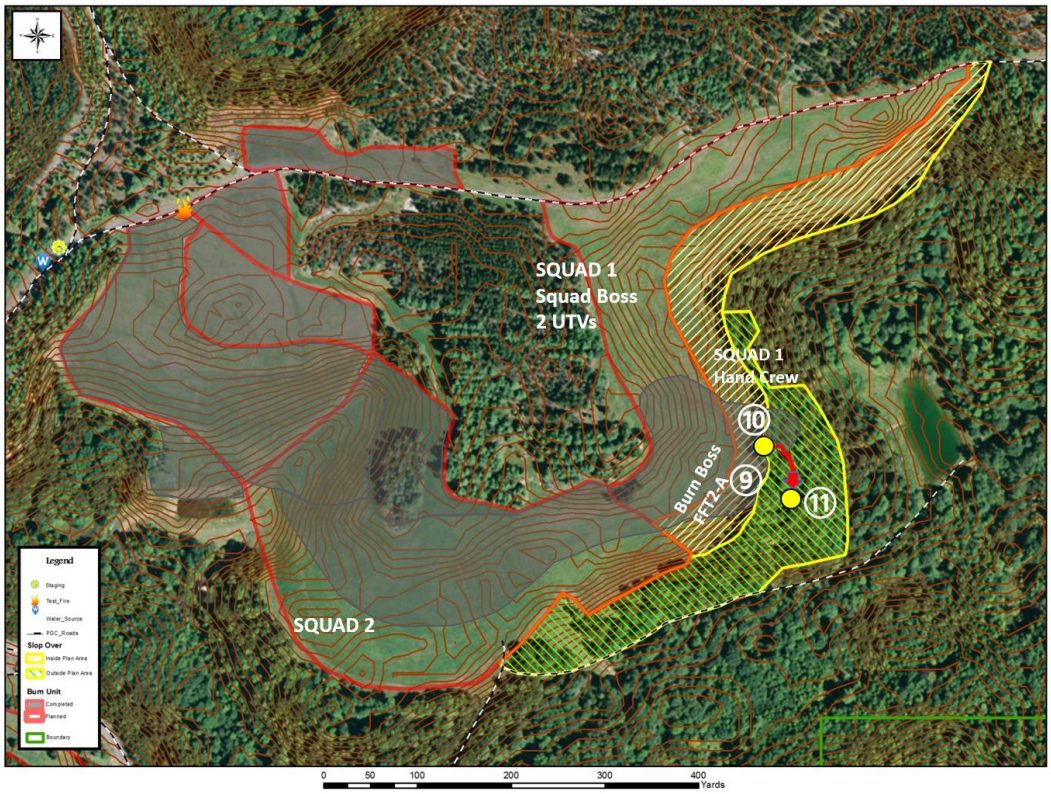
Burn Boss copied this communication direct.

Squad 1 not overly concerned because of low fire behavior in leaf litter and forthcoming arrival of Squad 2 along the bottom (south) line.

Squad 1 Squad Boss sent 4 crew members, 2 with hand tools, 2 with bladder bags to work with the FFT1 (T) to begin suppressing the fire that had crossed the grass burn unit into the woods line. They used anchor and flank from the black to begin containing the slop over on its northeastern flank (near Point 7). UTVs were not sent due to slope steepness.

At that point (approximately 14:00) Two FFT2s and two UTVs remained along the north, upslope line with the Squad 1 Squad Boss.

Figure 5.



~14:00 Burn Boss and FFT2-A working from the black field edge to suppress fire that had spread downhill 10-15 feet inside the woods line (**Figure 5, Point 9**).

Flame lengths were <1 foot with low spread rates.

Progressing along the woods line from the black, Burn Boss noticed an opening through the woods (in unburned fuels) to go direct on <1' flame lengths in leaf litter (**Figure 5, Point 10**).

Burn boss and FFT2-A entered the woods using a pump and roll variation with Burn Boss driving the F-150 and the FFT2-A spraying low flames behind and to the passenger side of the truck (using ~50' of hose).

As they engaged, tactics were a combination of direct (on the fire to their north) and indirect (fire coming from their west, and unknown to them, fire coming from their southwest).

Figure 6. Fuel conditions in the woods, just outside the grass burn unit boundary.

~14:02 Sprayer hose gets "V" hooked on trees causing Burn Boss to park truck, exit, and come to rear of truck to assist with hose (**Figure 5, Point 11**).

> As the hose is nearly reeled in, fire behavior picks up threatening the vehicle (3-4 foot flame length, rate of spread ~22-23 chains/hour).
>
> Burn Boss gets back in the driver's seat.
>
> FFT2-A throws remaining hose in truck bed, slams the tailgate and yells Go-Go-Go!

~14:04 Wanting to get into the black where he "knew from training that it was safe," FFT2-A looked for an escape route and noted the area where he had entered the woods had re-ignited with active flame behind and below him (Point 10-11) as well as in front of him (Point 9). Still wanting to get to the black, he ran forward through the flaming front, heading west from Point 11, toward the blackened field. He observed that the flame front he chose to run through was "about knee high" at the time. However, as he passed through the flame front he noted a whirl of ash and debris. This whirl suggested increased fire intensity caused by two flaming fronts converging at the very moment he passed into the black (the severity of his injuries support this contention). He did not believe he could outrun the approaching flame front by moving downhill to the east of Point 11 citing that, "from training I knew I couldn't outrun the fire."

~14:04 Simultaneously, the Burn Boss drove the F-150 south 50-100', then west 50' to exit the woods the woods near Point 9 and re-enter the black field.

> [Fire behavior could have been as high as 4-5 feet flame lengths and 22-23 ch/hr rate of spread at that point based on 13:05 weather conditions recorded on site (see Appendix Fire Characteristics Chart)]

14:05 Upon entering the black, the FFT2-A communicated on the radio that he had been, "burned on the face and legs".

> Burn Boss noticed redness in the victim's face and directed him to the burn kit in the F-150 and instructed him to begin application and remain at the truck while he checked on fireline status.
>
> The victim then communicated via VHF radio that he was in pain, felt nauseated and might throw up.

14:09 Burn Boss used 800 mhz radio to make contact with AVIS (Northcentral Region Office dispatch) to begin dispatching EMS to the site. Burn Boss could not find the Elk County Talk group on the radio channels to go direct with Elk County dispatch. [See Appendix for c communication record from Elk County Emergency Management.]

14:10 On-site, the Burn Boss requested a UTV (Unit 3-7-3) from Squad 1 to evacuate the victim to a staging area where several trucks and one crew member were stationed.

> The UTV operator (a daily crew mate of the injured firefighter) did not follow the instruction and took FFT2-A all the way to the medevac location, tying up a UTV that was needed for further suppression of the fire.
>
> With active fire still both inside and outside the unit, Squad 1 started suppression of remaining fire within the burn unit by working the remaining UTV (Unit 3-7-1) from the black.

14:24 When UTV 3-7-1 needed to refill, Squad 1 Squad Boss lit along the SGL Road to tie off the unit along the northeastern fire break. By this time, fire had already burned uphill from the slop over, blackening the northeastern finger of the unit.

> Squad 1 firefighters continued working to suppress fire along the southern line, using anchor and flank tactics.
>
> Squad 2 employed similar tactics along the slop over's southern extent.

15:30 Active fire was suppressed.

15:30-17:00 Crew mopped up, mostly in heavy downed woody material along the field/woods edge.

17:30 After Action Review.

Figure 7. Photo taken looking southeast from the burn unit into the wooded location where the injury occurred. Point 10 is where the F-150 entered the woods. Point 11 was the truck's location at the time of flare up. The injury occurred as the firefighter moved from the woods near Point 11 toward the field, crossing an active flame front. The red symbol indicates approximate location where injury occurred.

Figure 8. Photo taken at Point 10 where F-150 entered the woods. Note char heights of 1-2 feet.

Figure 9. Photo taken at Point 11 where F-150 was located at the time of flare up. Note char heights of 5-6 feet. The red symbol indicates approximate location where injury occurred.

FINDINGS AND LESSONS LEARNED

ICS and Span of Control

While there were sufficient crew numbers to carry out the burn (Burn Boss and 12 staff), there was a lack of overhead leadership for appropriate span of control (only one FFT-1 Squad Boss). Without a second Squad Boss, the Burn Boss directly oversaw firing and holding operations for Squad 2 in addition to managing the overall fire. As such, he engaged in tactics along the southern line (bottom of the slope) instead of overseeing the operation from a high vantage point. This action limited his ability to observe the whole fire, coordinate resources, and adjust tactics. This became especially critical as the fire made downhill runs and spread outside the burn unit boundary.

Maintaining span of control at 3 – 5 firefighters per leadership position should be the goal on every fire, regardless of complexity. If local leadership is not available, resources should be requested from neighboring areas. Additionally, while a Firing Boss is not required on Complexity 3 grass units, the additional oversight can prove helpful, especially on units with complex topography, limited visibility across the entire operation, and flashy fuels.

Escape Routes and Safety Zones:

The injured firefighter "knew from training" that the black, or burned out areas, are excellent safety zones. This concept is normally covered in crew briefings. However, a safety zone cannot be established without an escape route to get there. At the moment the fire flared up, the injured firefighter's escape route into the black was compromised. Although a potential escape route was available downhill to a wetland/pond, he did not believe he could outrun the fire in unburned fuels. Faced with this scenario and focused on getting in the black, he opted to go through the flaming front, which caused his injuries. An assessment of fuel condition and probable rates of spread suggest the downhill route "in the green" may have been a viable option.

Escape routes and safety zones are part of every briefing, with fire leadership attempting to specifically define safe areas for the day. Some burn plans even state they will be clearly marked. In reality, escape routes and safety zones change continually as events unfold. Fire leadership must maintain situational awareness, communicating escape routes and safety zones to crew continually as their location and circumstances change throughout the operational period. Firefighters share the responsibility to maintain situational awareness relative to the fire, their location, and potential escape routes and safety zones.

Secondary Control Lines and Contingency Plans

Near the slopover location, a secondary control line was available south of the burn unit, tying into the pond to the east. The line was a leaf covered skid trail accessible by Type 7, and perhaps Type 6, engine. A specified plan to use this secondary line could have precluded the direct/indirect attack undertaken at Points 10 and 11 where the injury occurred. Ultimately, crews did utilize this skid trail to stop fire spread outside the burn unit boundary.

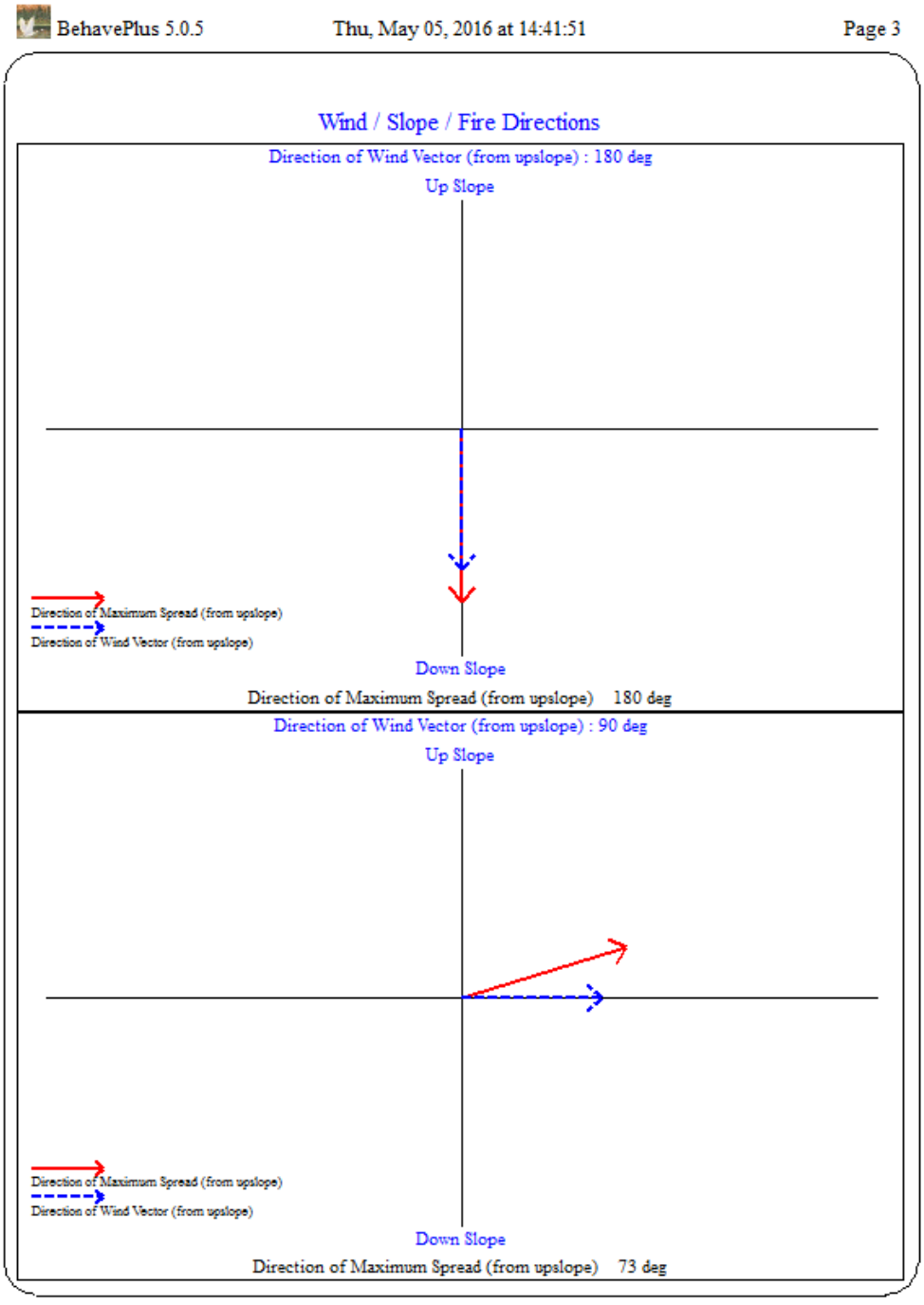
Secondary control lines and contingency plans are part of every burn plan. Determining which secondary lines are relevant and how to use them are operational decisions that must be detailed in the Incident Action Plan. These secondary areas and contingency actions should be briefed in detail to the crew at morning briefing and updated throughout the operational period; "If the fire crosses the line at X, we'll tie into the line at Y working toward point Z." Be specific regarding contingency actions in the briefing.

Wind vs. Slope

Many crew members recalled being surprised by the downslope rates of spread and flame lengths they observed. Wind is the primary factor determining ROS and FL, especially for fine fuels. The graphics below depict the influence of wind over slope.

In the top figure, despite a steep slope of 45%, the maximum rate of fire spread is down slope if the wind is blowing downslope. In other words, rate of spread is the same for an upslope or downslope wind. The lower graphic shows a west wind blowing perpendicular to a south facing slope. At only 5 mph blowing across slope, wind is still the primary driver of fire spread direction and spread rate.

Inputs: FM1, Fine Fuel Moisture 6%, Midflame wind 5 mph, slope 45%.



First Aid

Within minutes after the injury, burn care was administered. Each vehicle on the fire had an assortment of Water Jel® burn care pads. These pads are a gelatinized water mix designed to cool and protect burns. They do not contain an ointment or cream.

Immediate first aid using a Water Jel® 12x16 face shield may have mitigated burn severity on the injured firefighter's face. However, because he didn't have significant pain in his legs, the lower extremity burns were not addressed for some time. In fact, he did not notice pain in his legs until approximately 20-30 minutes after the injury (while in route to the medevac location). At that time, he requested the UTV driver to stop and hose his legs down in an attempt to relieve severe pain. During the incident interview, the injured firefighter lamented not removing his pants to begin the cooling process soon after the burn occurred. As he put it, "…don't be modest."

It is not advisable to cool burns with water from engines or snap tanks that was likely drawn from a pond or other non-sterile source. Burn infections are of major concern and these water sources could introduce infection. Instead, sterile water or drinking water is preferred. Medical staff would not commit to whether more immediate first aid to his legs would have helped prevent the most severe burns.

There are several important steps in burn first aid that wildland firefighters should be aware of (Source: UPMC Mercy Burn Center)

- Cool the Burn: Cool the burned areas immediately with cool water. This has three benefits:
  - It reduces skin temperature and stops the burning process.
  - It numbs the pain.
  - It prevents or reduces swelling.
- Remove Burned Clothing: Lay the person flat: Remove non-sticking clothing. Loosen or remove tight clothing, jewelry, or boots before swelling occurs.
- Cover the Burn: After cooling the burn with water, apply a clean dry dressing to the burned area. Cover the person to keep him or her warm.
- Get Medical Help: Get the person to a hospital. Do not underestimate the seriousness of the burn!
- Don't Use Ointments: Do not use ointments, sprays, first aid creams or butter.

Personal Protective Equipment (PPE)

The injured firefighter's PPE performed to standards. Medical staff noted his burns were the result of radiant heat, not contact with flame or burning material. Inspection of Nomex pants revealed a few light patches of discoloration, but no indication that the material was burned or compromised in any manner. Medical staff also noted that his eyes could have been burned if he had not been wearing safety glasses.

Appropriate helmet, safety glasses, leather gloves, leather boots, and Nomex pants and shirt are, and will continue to be, required attire for PGC personnel engaging in wildland fire.

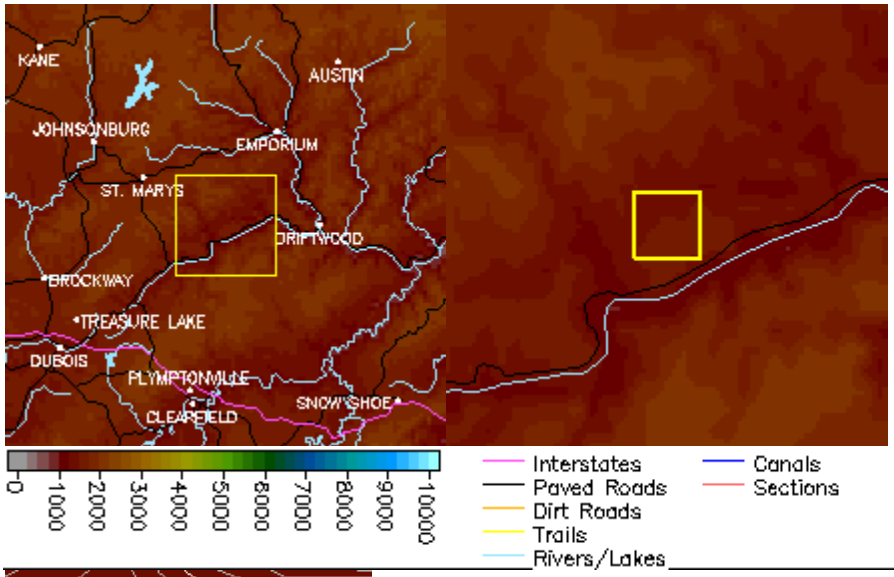
Appendix

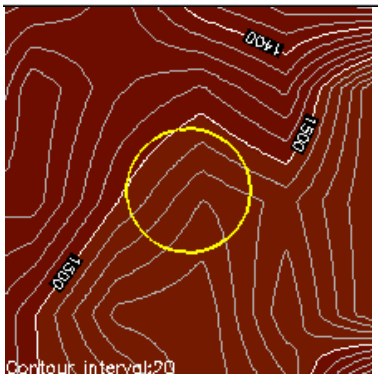
Spot Weather Forecast

SGL 311 (Proposed ignition time: 1000 EDT 3/23/16) (Requested: 701 EDT 3/23/16)

Forecast complete at 732 EDT 3/23/16

Requested by: PGC





Location: Legal: Lat/Lon:41.34247/78.35964 Quad:Dents Run PA
Calculated: (41°20'32"N 78°21'34"W) (DENTS RUN PA)

Elevation:1400-1700 Drainage:unknown Aspect:south Size:200

Fuel Type:1, 3 Grass (Unsheltered)

Observations:

Place Elev Time Wind Temp Wetbulb RH Dewpt Remarks

Requested Parameters	Remarks
XXX Sky / Weather	Need ASAP
XXX Temperature	
XXX Relative Humidity	
XXX 20 Foot Wind	

FORECAST:

IF CONDITIONS BECOME UNREPRESENTATIVE,
CONTACT THE NATIONAL WEATHER SERVICE.

SPOT FORECAST FOR SGL 311...PGC
NATIONAL WEATHER SERVICE STATE COLLEGE PA
732 AM EDT WED MAR 23 2016

FORECAST IS BASED ON IGNITION TIME OF 1000 EDT ON MARCH 23.
IF CONDITIONS BECOME UNREPRESENTATIVE...CONTACT THE
NATIONAL WEATHER SERVICE IN STATE COLLEGE.

.DISCUSSION...

THIS AFTERNOON AND THURSDAY AFTERNOON WILL BE BREEZY AND MILD
ACROSS MUCH OF CENTRAL PA. DEWPOINTS AND RH VALUES WILL GRADUALLY
INCREASE DURING THIS PERIOD. MIN RH WILL BOTTOM OUT IN THE LOWER 40S
THIS AFTERNOON OVER THE PRESCRIBED BURN AREA.

THE NEXT CHANCE FOR WIDESPREAD RAIN /0.25 TO 0.50 INCH/ FROM
SHOWERS...
AND PERHAPS A THUNDERSTORM...WILL BE LATE IN THE DAY THURSDAY INTO
EARLY FRIDAY MORNING.

FRIDAY WILL BE QUITE WINDY AND COLD WITH RAIN SHOWERS ENDING IN
THE MORNING ACROSS THE EASTERN HALF OF THE STATE...FOLLOWED BY
SCATTERED SNOW SHOWERS ACROSS THE WESTERN MOUNTAINS.

&&

.TODAY...

SKY/WEATHER.....MOSTLY CLOUDY. A SLIGHT CHANCE OF SHOWERS EARLY
IN THE AFTERNOON.
MAX TEMPERATURE.....AROUND 59.
MIN HUMIDITY.....43 PERCENT.
WIND (20 FT).....SOUTHWEST WINDS 8 TO 13 MPH.

TIME (EDT)	10A	11A	12P	1PM	2PM	3PM	4PM	5PM
SKY (%)	77	77	76	75	73	73	72	71
WEATHER COV					SCH	SCH	SCH	SCH
WEATHER TYPE					RW	RW	RW	RW
TSTM COV								
TEMP	46	48	50	52	54	56	58	57
RH	51	49	48	46	45	43	44	47
20 FT WIND DIR	SW	SW	SW	SW	SW	SW	SW	SW
20 FT WIND SPD	9	12	12	13	12	12	12	10
20 FT WIND GUST	15	20	20	20	20	20	20	15

.TONIGHT...

SKY/WEATHER.....MOSTLY CLOUDY. A SLIGHT CHANCE OF SHOWERS EARLY
IN THE EVENING...THEN A SLIGHT CHANCE OF RAIN
EARLY IN THE EVENING.
MIN TEMPERATURE.....AROUND 45.
MAX HUMIDITY.....83 PERCENT.
WIND (20 FT).....SOUTH WINDS 6 TO 9 MPH.

TIME (EDT)	6PM	7PM	8PM	9PM	10P	11P	MID	1AM	2AM	3AM	4AM	5AM
SKY (%)	69	65	67	67	68	68	69	69	69	69	67	66
WEATHER COV	SCH	SCH	SCH	SCH	SCH	SCH	SCH	SCH	SCH	SCH	SCH	SCH
WEATHER TYPE	RW	RW	RN	RN	RN	RN	RN	RN	RN	RN	RN	RN
TSTM COV												
TEMP	55	54	51	51	50	49	48	48	47	47	47	47
RH	53	57	66	66	68	74	77	77	79	79	79	83
20 FT WIND DIR	SW	SW	SW	SW	SW	SW	SW	SW	S	S	S	S
20 FT WIND SPD	9	6	6	6	6	6	6	6	6	6	7	7
20 FT WIND GUST	15	10							10	10	10	10

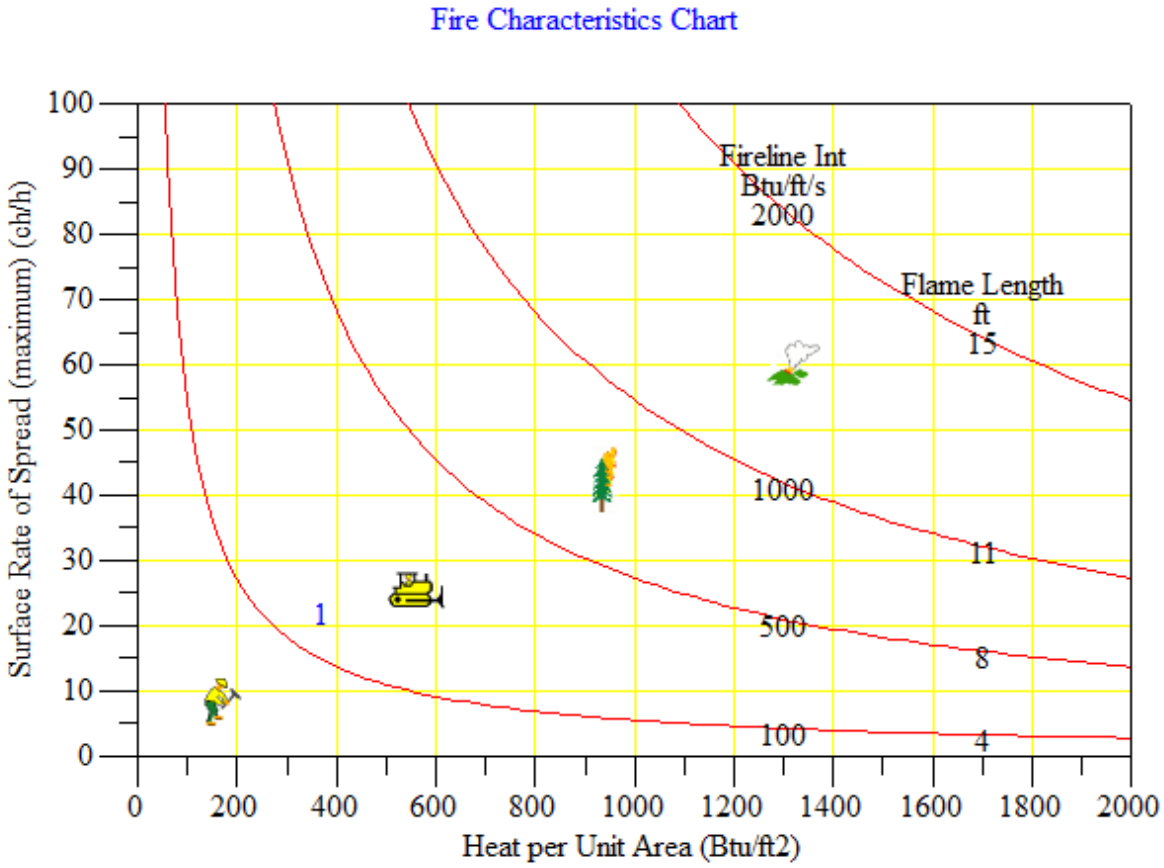
.THURSDAY...

SKY/WEATHER	PARTLY SUNNY...THEN BECOMING CLOUDY. A SLIGHT CHANCE OF RAIN IN THE MORNING...THEN SHOWERS LIKELY AND A CHANCE OF THUNDERSTORMS IN THE AFTERNOON.
MAX TEMPERATURE	AROUND 65.
MIN HUMIDITY	56 PERCENT.
WIND (20 FT)	SOUTH WINDS 8 TO 13 MPH. GUSTY AND ERRATIC WINDS EXPECTED NEAR THUNDERSTORMS LATE.

TIME (EDT)	6AM	7AM	8AM	9AM	10A	11A	12P	1PM	2PM	3PM	4PM	5PM
SKY (%)	64	63	63	63	63	72	72	72	72	72	72	93
WEATHER COV	SCH	SCH	SCH	SCH	SCH	SCH	SCH	SCH	CHC	CHC	LKY	LKY
WEATHER TYPE	RN	RN	RN	RN	RN	RN	RN	RN	RW	RW	RW	RW
TSTM COV												CHC
TEMP	47	47	47	50	53	56	59	61	63	64	64	64
RH	83	83	83	77	71	66	62	60	58	56	56	56
20 FT WIND DIR	S	S	S	S	S	S	S	S	S	S	S	S
20 FT WIND SPD	7	7	7	8	9	10	12	13	13	13	13	12
20 FT WIND GUST	10	10	10	10	15	15	15	20	20	20	20	20

Appendix

Fire Characteristics Chart. Based on 13:05 weather conditions recorded on-site. The “1” represents estimated fireline intensity where the injured firefighter crossed the flaming front.



Appendix

Communications Log with Elk County EMA

From Elk County EMA

1410 – Call Taken at 911 Center from NC Dispatch

1413 – NC Dispatch requested EMS to respond to Winslow Hill Road and Dewey Road for a burn patient

1417 – EMS Dispatched

1419 – EMS Responding

1421 – NC Dispatch provided Elk EMA with an updated location for EMS to respond to the New Parking Lot at Winslow Hill Rd. and Dewey Rd.

1423 – NC Dispatch provided Elk EMA with an update that the patient was at the parking lot in a UTV

1439 – BLS on scene

1441 – BLS requests helicopter for patient with 2nd and 3rd degree burns and pain in legs from flames

1453 – ALS on scene

1539 – Patient in air, heading to Mercy Hospital in Pittsburgh

Basic Life Support Provider – Bennetts Valley Ambulance

Advanced Life Support Provider – Saint Mary's Ambulance

Medical Helicopter – Stat Medevac 9 out of Clearfield. 11 Minute ETA to the LZ.

From Scanner Audio

1500 – Fire Dept. on the scene for the LZ

1505 – Stat 9 on the ground