101-1 Fire Heat Related Illness

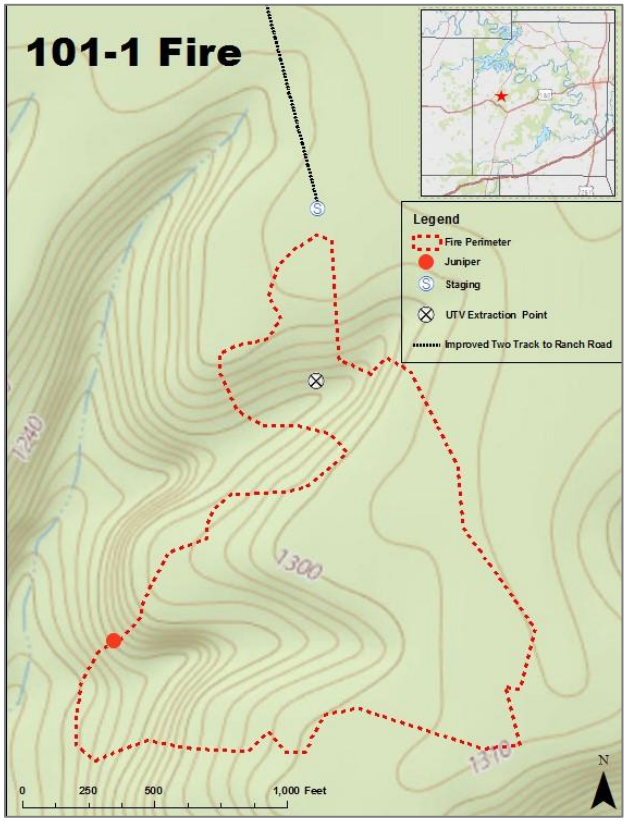
Lessons Shared

"It was just a normal fire. I thought we would be done by noon."

-Firefighter from Module A

Date:	7/24/2017	*Temperature:*	96°
Location:	Palo Pinto County, Texas	*Relative Humidity:*	40%
Fuel Type:	Closed-Canopy Brush/Grass	*Heat Index:*	103°
Topography:	Steep & Rocky; Broken Terrain	*Wind:*	ESE 5-7 mph
Size:	20.5 Acres	*Fire Behavior:*	Smoldering

Narrative



On July 23, 2017 state resources were requested to assist with the 101-1 Fire in Palo Pinto County. Local TFS resources (Module A) were staffing the Walking Cane Fire in Stephens County so Initial Attack (IA) resources were dispatched from the next closest unit. IA resources arrived and engaged the 101-1 Fire at 1900. During this time, Mod A was released from the Walking Cane Fire and requested to stage near the 101-1 to wait for further instruction. It was determined that Mod A would be released for the evening and would staff the fire the following morning at 0700. IA resources constructed dozer line that evening and reported minimal fire activity with light precipitation. IA resources were released at 2300.

On July 24, 2017 Mod A arrived on the 101-1 Fire at 0700. Resources consisted of 2 Type II dozers, 1 Type VI engine, 2 support trucks and 7 personnel. The IC requested 1 dozer to unload, improve existing line and push new line. The IC also asked two personnel (FF #1 & FF #2) to hike the perimeter of the fire to GPS the acreage and secure the line. Afterwards, the IC began scouting, noticed a small spot fire and lined it by hand. At 0800, the IC recognized that environmental conditions required more resources and ordered 2 sawyers and 3 swampers. The agency administrator (AA) received the request and forwarded to dispatch. At 0945 the AA realized the request wouldn't be filled and mobilized Mod B from a nearby unit, which consisted of another Type II dozer and 4 personnel. FF #1 & #2 hiked the perimeter of the fire, worked hot spots on the line and identified areas of concern. At approximately 1100 all resources returned to the trucks for lunch.

All personnel took a 30-minute break before returning to their assignments. During the break, all individuals ate lunch, drank water, and rested in the shade. Before the break, FF #1 & #2 noticed a juniper with heat in it that was threatening the line. Due to rough terrain, the dozer and engine could not access the tree so they recruited an additional firefighter and returned to the tree to dry-mop it. After working on the tree, the firefighters realized that they needed water and contacted the engine. Around 1400, 3 personnel from Mod A noticed they were feeling overheated. At the same time, Mod B was arriving on scene. With the arrival of Mod B, there were a total of 11 TFS personnel on scene. 3 firefighters from Mod B grabbed backpack pumps from the engine and hiked them to the juniper. After arriving at the tree, the firefighters from Mod B noticed that FF #1 & #2 appeared to be sluggish.

Water from the pumps wasn't enough and firefighters requested a chainsaw from the engine. At 1430, a firefighter (FF #3) began hiking the saw to the tree. After beginning the cut, FF #3 realized the saw was dull and the job would require additional effort. During the saw work, FF #1 & #2 were feeling ill and decided to get in the shade and drink water. Around the same time, the IC was scouting the line and began experiencing muscle cramps and feeling overheated. The dozer operator encouraged the IC to get in the cab of the dozer to cool off. The IC agreed and spent a few minutes in the cab, cooling off. While cutting the tree, FF #3 began feeling ill and took a break. Firefighters from Mod B finished the saw work. At this point, all firefighters at the tree agreed that they should begin hiking out due to deteriorating conditions of personnel. At 1630 the IC was informed of the situation and the firefighters began a 200 yard hike to a UTV.

During the hike out, EMT's evaluated FF #1, #2, & #3 and determined that they should be transported to the hospital. While the firefighters were hiking out, a spot fire (2.5 acres) was detected and an additional dozer was unloaded to line the spot. The firefighters took breaks while hiking out but conditions continued to worsen. Once they arrived to the UTV, some noticed they had stopped sweating and were beginning to feel nauseas and dizzy. One of the firefighters also began dry-heaving. After being shuttled to the trucks, FF #1, #2, & #3 were loaded and transported 1.5 miles to the highway to meet an ambulance.

Side-slope, rocky terrain, and brush fuel model of 101-1

At 1645, the AA was notified of the first injury. At 1705 the AA was notified of two more injuries. The AA ordered work to stop. Prior to this the IC had personnel stop and focus on the extraction process and dozer operations. The AA sent 1 dozer and 2 personnel from a nearby unit to assist. At 1700, FF #1, #2, & #3 were loaded in the ambulance and evaluated by county EMS. The ambulance departed for the hospital at 1729 and arrived at 1753. FF #3 was treated and released the same day (24th). FF #2 was kept overnight and released on the 25th. FF #1 was kept for two nights and released on the 26th.

Timeline

Date	Time	Weather Observation	Key Events
7/23/17	**1038**	*Temperature: 94°F* *Humidity: 40%* *Heat Index: 97°F*	Mod A arrives and begins working Walking Cane Fire.
	1517	*Temperature: 104°F* *Humidity: 28%* *Heat Index: 108°F*	Dispatch received for 101-1 Fire. Mod A already engaged at Walking Cane Fire.
	1850	*Temperature: 92°F* *Humidity: 45%* *Heat Index: 96°F*	Mod A released from Walking Cane and staged to assist with 101-1 Fire.
	2100	*Temperature: 86°F* *Humidity: 56%* *Heat Index: 90°F*	Mod A released from staging and return to home unit. Plan to staff 101-1 Fire at 0700 on 7/24.
7/24/17	**0700**	*Temperature: 74°F* *Humidity: 81%* *Heat Index: 75°F*	Mod A arrives at 101-1 Fire and begin scouting. FF #1 & #2 work hot spots and GPS perimeter.
	0800	*Temperature: 78°F* *Humidity: 79%* *Heat Index: 77°F*	IC requests 2 sawyers and 3 swampers through the AA.
	0945	*Temperature: 87°F* *Humidity: 57%* *Heat Index: 93°F*	Mod A continues to work hot spots with hand tools in rough terrain, Mod B dispatched to 101-1.
	1100	*Temperature: 87°F* *Humidity: 57%* *Heat Index: 93°F*	Mod A takes 30 minutes for lunch and rest. No issues reported.
	1400-1430	*Temperature: 94°F* *Humidity: 47%* *Heat Index: 101°F*	Mod B arrives on scene, FF #1 & #2 working heavy and begin feeling overheated.
	1430-1530	*Temperature: 96°F* *Humidity: 43%* *Heat Index: 103°F*	FF #3 is requested to work heavy with saw; FF #1 & #2 continue to feel poorly. IC cramps up.
	1600-1630	*Temperature: 95°F* *Humidity: 40%* *Heat Index: 99°F*	FF #3 begins feeling poor, #1 & #2 conditions worsen. Decision made to stop work and return to trucks.
	1700-1730	*Temperature: 95°F* *Humidity: 43%* *Heat Index: 101°F*	EMT determines FF #1, #2, & #3 need treatment. All are transported via ambulance to hospital.

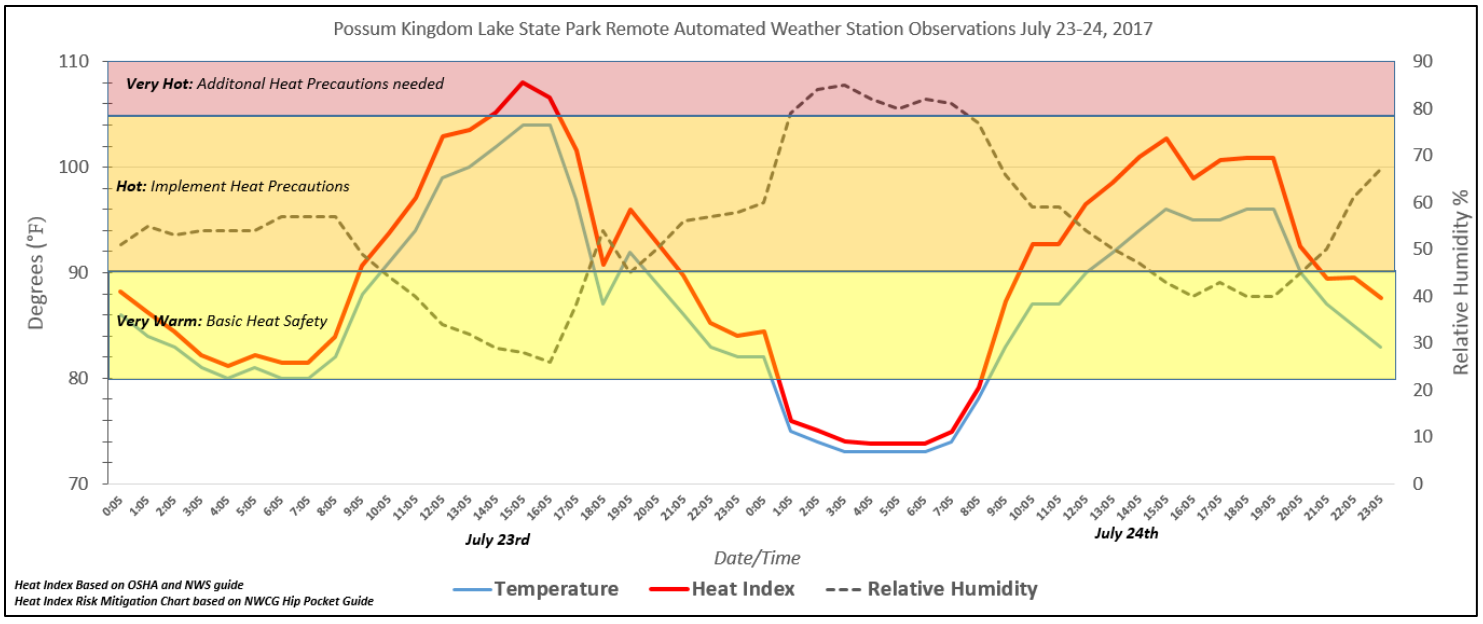
Lessons Learned – Fire line Personnel

"It's not all about the water; we have to supplement it" – From the beginning of the day, firefighters reported that they were feeling fit and ready to do the job. They were excited to be on the fire and were aware of the environmental conditions. They took plenty of breaks throughout the shift, found shade, drank plenty of water, and ate breakfast and lunch. What firefighters took away from the event is that water has to be supplemented and electrolytes have to be replaced.

"Its 08:15 and I'm sucking down water" – Firefighters were aware of the heat and humidity and mitigated the impact to the best of their ability, but the heat issues still seemed to sneak up on them. Firefighters expressed that anyone working in these conditions need to know their bodies, know their limitations and speak up if something is wrong. One firefighter stated "I'm an EMT, I knew what to be looking for, I knew what needed to be done, but it just wasn't registering. My mind was fried."

"PT is important" – FF #1, #2, & #3 were pack tested at the arduous level. The crew has a routine PT program that consists of cardio and weight lifting. If the individuals didn't have a PT program, the outcome could have been much different.

"They just didn't look like they were doing too good" – Firefighters recognized that there was an incident within an incident. They noticed that people weren't feeling well and made early decisions to stop working and get individuals off the line. An early decision was also made to order EMS and transport the patients. FF #1, #2, & #3 realized that the timely decisions made on the line by their peers resulted in a positive outcome.



Weather Observations from the PK RAWS (Approximately 10 miles away)

Lessons Learned – Agency Administrator

"Something just didn't sound right, I should have gone with my gut instinct" – Multiple individuals at the agency administrator (AA) level and the line supervisor level reported that something didn't feel right at certain points in the day. From the fire line standpoint, radio communications during the incident seemed normal, but personnel reported that the tone of individual's voices, at times, didn't seem to match the messages. At the AA level, the environmental conditions and early request for resources triggered an uneasy feeling about operations for the day. The AA stated "I knew that my guys needed help, but the request wasn't going to be filled, so I sent 4 personnel and a dozer from my location."

"Stop operations and get off the line" – After being informed that 3 firefighters were being transported to the hospital, the AA requested the remaining personnel to stop operations (IC had done this prior to being notified by the AA). Shortly after, AA traveled to the hospital to check on FF #1, #2, & #3. The following day, Mod A was made unavailable and additional resources were ordered from out of the region to backfill. The AA was worried about the condition of the crew and wanted to ensure that they had adequate rest and time to comprehend the incident.

Lessons Learned – FLA Team

Leadership Qualities – There were some key leadership traits that influenced a positive outcome. From the senior firefighter to the IC to the AA, individuals had the foresight and the bias for action to manage the situation. Hazards and risks were identified early and dealt with properly. Teamwork was another important characteristic of the situation. Personnel from Mod A and Mod B worked together to get FF #1, #2, & #3 off the line and to the ambulance.

Risk vs. Reward – What's the risk here? Is the risk the fire behavior or is it the high heat index? If fire behavior is dictating that crews must engage in suppression duties, then crews have to mitigate heat issues, but still work to suppress the fire. If the fire behavior is minimal and the threat is heat, do we attack the fire during cooler conditions and monitor it during the heat of the day? How do we empower our people to make these decisions?

Document, Document, Document… - The documentation of significant events is critical. From the AA to the firefighter level, the FLA team was handed thorough documentation that aided in piecing the event together.

Appendix - Resources for Heat Related Illness

NIFC Heat Related Illness Refresher (2013)

NWCG Heat Illness Prevention Guide

Heat Illness Basics for Wildland Firefighters

The FLA team would like to thank all of the participants for their willingness to share.