GEORGIA SHRIMP FIRE
BURN INJURY REPORT
McIntosh County, Georgia

-FOR OFFICIAL USE ONLY-

March 13, 2011

A Board of Review has not approved this Summary Report. It is intended as a safety and training tool, an aid to prevent future occurrences, and to inform interested parties. Because it is published on a short time frame, the information contained herein is subject to revision as further investigation is conducted and additional information is developed.

Submitted by:

__/s/ J. Mark Munns_____ ___03/17/2011_____

Signature Date

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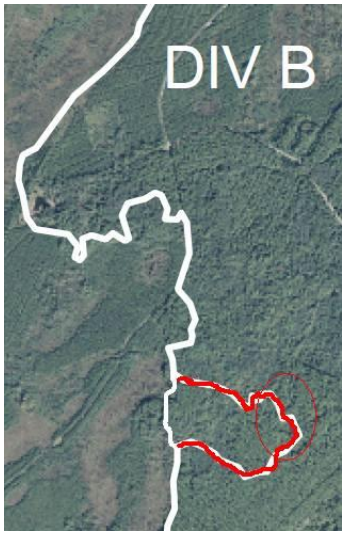
Narrative

Mission and Timeline

The Fire Detection and Suppression Log indicate the first dispatches to the Georgia Shrimp Fire occurred at 1251 hours on March 13, 2011. The McIntosh County Unit committed all tractors and requested additional counties shortly after. During the initial attack, one tractor went out of service due to a wiring harness fire which caused the tractor to shut down (See other findings). Additional tractor plow units from Long, Liberty, Glynn, Wayne, Bulloch, Candler and Tattnall Counties responded to assist with the initial attack efforts. Initial control lines were established around the fire and resources were released by 0031 hours (03/14/11).

The Incident Commander (District Ranger) and Operations Chief –OPS (Local Chief Ranger) met with fresh resources the next morning approximately 09:45 hours to brief on the plan for the day. The operator that would later receive the burn injuries was part of a three tractor plow strike team consisting of two JD 650s and Cat D4H . The initial briefing included a review of the previous days/nights activities, command structure, predicted weather for the day, review of map, and discussion of local fuels and brief history of Blount's Pasture Fire. The overall strategy discussed was to widen firebreaks all the way around the fire perimeter. OPS placed emphasis on the east flank (DIV B) during the briefing because of the heavy fuels across the control lines and observed winds in the area seemed to vary from the South to the West and would be met with Sea Breezes in the afternoon. The initial tactics of this strike team consisted of pushing out a three tractor blade break from initial plowed break. Anchoring into the dirt road on the north of the fire, the strike team worked south along the east flank of the fire.

The lead tractor started experiencing radio trouble with his tractor (mobile) radio (Jumping channels) around 1230 hours. The tractors took a break; the operator looked at the mobile radio, and received an update from Strike Team Leader (STL) that about 4 smokes were starting to pick up around the fire. The strike team reorganized after some conversation in order to have a tractor in front with a mobile radio. The operator did have his handheld but they felt more comfortable with a good mobile radio to communicate with the plane if needed. By 1330 hours, the strike team was into constructing new control lines around the spot over. The initial area, just across last night's control line, was mostly burned out in hardwood litter. As they progressed, open burning was observed to be about 2-3" flames and creeping along slowly. The new lead tractor plowed a line (Toward the East) as the two tractors following pushed the break outward to establish a wide control line. The tractors were able to maintain an area of black as their Safety Zone approximately 100 yards behind them as they remained approximately one half chain (33 feet) from the fires edge. The team started to get past the longest point of the fire and was about to turn south to wrap around the spot over at approximately 1400 hours. The STL reported that smoke was picking up and reminded the strike team to keep a heads up and stick together. Within a minute or two of this time, the fire reached a heavier fuel bed consisting of palmetto, gallberry, pines, and honey suckle. Flame lengths rapidly increased to 20 - 40 feet. The fire ran toward the general area of the strike



team (between the lead tractor and the second tractor). The lead tractor was within eye sight (approximately 100 foot) of the second tractor and had just made the turn south. The second and third tractor had more fire between them and the lead tractor and had to turn around to avoid a burnover. In the short time it took the second tractor to turn around (estimated 45 seconds) the operator received flash burns to the eyes and some 1st degree burns to the eye lids. The operator's neck shroud and other PPE likely prevented other burns. The operator made a radio call for assistance on his handheld and the two tractors escaped into the black (Safety Zone) a hundred yards away. The lead tractor was able to turn around and meet back up with the two tractors as the flames settled back down. The fire did not cross the break and the fire behavior settled as fuel availability diminished. The operator was met by the Chief Ranger (OPS) and taken to immediate care.

Weather

Forestry Weather & Smoke Management Forecast
From Georgia Forestry Commission
Issued at: 630 AM EDT Mon 14 Mar 2011
District 6 (Ogeechee)-Coast

CAUTION ITEMS
Taylor Creek, Ga ; is forecast to have a Class 4 day today!
Wind shift occurs in 4TH period

	Today	Tonight	Tuesday	Tuesday Night	Wednesday
Sky Condition	Mostly Cloudy	Mostly Cloudy	Mostly Cloudy	Mostly Cloudy	Partly Sunny
Temperature	75 To 79	49 To 53	76 To 80	54 To 58	73 To 77
Relative Humidity	32 To 37	95 To 100	35 To 40	95 To 100	36 To 41
Probability of Precipitation	None	None	30	20	None
Shower Coverage	None	None	Isolated	Isolated	None
Precipitation Type	None	None	Showers	Rain & Few ThunderShowers	None
Precipitation Amount	None	None	Trace	1/4 Inch Or Less	None
Precipitation Duration	None	None	1 To 2 Hours	Around 5 Hours	None
Surface Wind (Open)	South 8- 12mph	Southeast 5- 8mph	South 10- 14mph	South 8- 12mph	West 10- 14mph
Wind Direction Shift Within Period	None	None	None	Clockwise from Southeast to Southwest	None
Canopy Wind	South 5- 8mph	Variable 3- 6mph	South 6- 10mph	South 5- 8mph	West 6- 10mph
Smoke Dispersion Index	46(Generally Good)	10(Poor)	49(Generally Good)	17(Generally Poor)	52(Generally Good)
Fog Potential	None	Slight	None	None	None
Low Visibility Occurrence Risk Index	1(Low)	8(High)	1(Low)	6(Medium)	1(Low)
Mixing Height	1964m 6442ft	10m 33ft	1371m 4497ft	10m 33ft	1761m 5776ft
Transport Wind Speed	7m/s 16mph	5m/s 11mph	8m/s 18mph	8m/s 18mph	8m/s 18mph
Turner & Atmosphere Tendency	4(Normal)	4(Normal)	4(Normal)	4(Normal)	4(Normal)
Plume Trajectory	North	Northwest	North	North	East
Drying Potential	High	Low	High	Low	High
Available Sunshine	Around 5 Hours	None	Around 5 Hours	None	Around 8 Hours

Injuries

The operator received thermal burns to the eyes and some 1st degree burns to the eye lids. The thermal burns made it difficult to see while retreating to the Safety Zone. He was met by the Chief Ranger and immediately taken for medical care. No other injuries have been reported at this time.

Training and Qualifications

The training and qualifications of the Strike Team were within jurisdictional requirements of the Georgia Forestry Commission. Having served as a Ranger I (Tractor/Plow Operator) for approximately 10 years the TPOP has responded to a number of initial attack fires in the past. He also had approximately 6 additional years of experience as a tractor operator with private company in the forest industry.

Attitudes and Performance

The general attitude of the Strike Team was described as positive and ready to get the job done. Fatigue, morale and/or team performance was not an issue. Various communications throughout the day with overhead, STL and team members indicate that efforts were made by all to consider and communicate Safety concerns. Changing the order (layout) of the strike team (due to communication concerns) and anchoring into cold line are examples of that

Causal and Contributing Factors

The following matrix was used to determine the degree to which various elements contributed to the burn over. The current fuel conditions, weather, tactics, communications, Incident Command Structure and training/qualifications for wildland fires were the significant contributing elements. Further discussion relating to the conclusions may be found in the narrative following the matrix.

See Entrapment Elements on following page…

Entrapment Elements

	Did not contribute	Influenced	Significant contribution
Fire Behavior			
Fuels			X
Weather			X
Topography	X		
Predicted *vs.* observed		X	
Other (drought)	X		
Environmental Factors			
Smoke, temperature, embers	X		
Slope	X		
Temperature	X		
Visibility	X		
Incident Management			
Incident Command	X		
Strategy	X		
Tactics		X	
Safety briefings/major concerns	X		
Instructions given	X		
Control Mechanisms			
Span of control	X		
Communications		X	
Ongoing evaluations		X	
Ten Std Fire Orders/18 Watch-out Situations, LCES		See Attached	Matrix
Personnel Profiles of Those Involved			
Training/qualifications/physical fitness	X		
Length of operational period/fatigue	X		
Attitudes	X		
Leadership	X		
Experience levels	X		
Equipment			
Availability		X	
Performance/non-performance		X	
Used for intended purpose		X	
Other			

Fire Behavior

The initial fire started on the March 13th (The day before the injuries) and made significant runs from about 1400 hours and on into the evening. The fire continuously crowned and dropped back to the ground over and over through the pine stands. Surface winds were observed to be light and variable (from South to West) for most of the period. The sea breeze reaches the area around 1400 hours. The fire's intensity increased on both days around this time, as the sea breeze brought increased upper level winds. The one or two percent change in humidity and changes in wind direction & speed may not have been noticeable from a tractor seat or on foot under the thick canopy. Reviewing the area where the injuries occurred, it is believed the sudden change and intensity of the fire behavior is due to a combination of variable surface winds combined with an increase of fuel loading and fuel arrangement.

Fuels

The approximately 20 acre spot over occurred in an area with an interface of fuel types and loading.

In the area where the strike team anchored into the existing firebreak, light ground liter with hardwoods two to six inch diameter. This area had been intensely burned through in 2001 as part of the Blount's Pasture Fire.

As the break progressed, and crossed out of the old Blount's Pasture Fire print, the hardwood stems slowed progress with 650 sized tractors, but fire intensity remained low in the hardwood liter.

It appeared that as the line progressed, fingers of the old Blount's Pasture Fire aided progress to some degree as the 650 class tractors had smaller trees to punch through with the break.

Fuels Cont…

Approaching the first bend to the southeast. It is between this bend and the next where the fire's intensity picked up as the strike team was working the area.

Across firebreak

Inside of firebreak

Fuels Cont…

Around the bend a transition from the pine hill back into hardwoods occur. The areas where (Pine or hardwood) the old Blount's Pasture Fire did not burn have heavy fuel loading. These areas, similar to the Bay/Pine transitional area during the 2007 burn over in Brantley County can feed and promote intense fire behavior with little to no wind.

Environmental Factors

- **Smoke, temperature:** Smoke was not determined to be a factor in the incident. Dust from the lead tractor was present (two of the three tractors were not environmental cabs) as well as the normal dust from continuous pushing and backing while building line.

- **Terrain:** The land in this area consists of around 2% slope or less.

- **Visibility**: Fuel density is some areas restricted visibility to some degree but did not contribute to the injuries from a visibility stand point. As the fire activity increased the thermal burns to the operator's eyes restricted his visibility while escaping; fortunately, the Safety Zone was close by and OPS met him there in a timely manner.

Incident Management

- **Incident Command:** Command was established as the initial resources arrived on the fire. As additional tractor/plow units were requested, additional overhead was dispatched to integrate within command structure. The Strike Team reported to the fire on March 14th with a Strike Team Leader (30 years of experience). Briefings and communication checks were properly conducted and held prior to engaging fireline.

- **Strategy:** The strategy on the day of the injuries was to utilize Tractor/Plow Strike Teams (4 Strike Teams - A total of 13 tractor plows) to widen the containment lines established the day/night before. The overall strategy was communicated during initial briefing with the Strike Team.

- **Tactics:** The initial tactics of the strike teams was to push out the previously plowed lines with blades, working three tractors in a team with a leader. The tactics utilized to establish a fire break around the spot over was to allow the lead tractor to plow an initial break while picking a path through dense timber and allowing the two following tractors to push the break outward to widen it.

- **Safety briefings:** Having recognized the previous day's fire activities and previous experience with the large fire 10 years ago in this same area, the local Chief Ranger (OPS) stressed a concern for safety during briefings. OPS, The Strike Team Leader and Strike Team members all discussed LCES, variable winds and concerns with the heavier fuels, areas of dense timber and potential for the fire to blow up and go, as the previous day activities demonstrated.

- **Instructions given:** Instructions provided seem to be consistent with a normal command structure. Communications within the Strike Team appeared to remain clear (everyone was on the same page).

Control Mechanisms

- **Span of Control:** Number of resources was manageable (3 to 1).

- **Communications:** The radio frequency to be used was communicated during the briefing and radio checks were performed prior to getting on the fire line. Operators were equipped with a mobile radio installed on their tractor/plow units and had a handheld portable radio for use when off the tractor or as a backup. The radio on the D4H starting jumping channels just prior to the strike team taking action on the spotover. The Operator indicated the radio was just put back in service about 3 weeks earlier from being repaired for another issue (But it had been working okay up to this point). The Strike Team ensured they had a working mobile radio in the lead to communicate with airplane if needed, by placing one of the 650s in the lead. The Strike Team Leader communicated that smokes were starting to pickup and lift, the Strike Team was able to acknowledge the communications.

- **Ten Standard Fire Orders/18 Watch-out Situations and LCES:** (Reference analysis of Fire Orders and Watch outs on following pages.)

Personnel Profiles of Those Involved

- **Training/qualifications/physical fitness:** Training & Qualifications for each of these strike team members met agency standards. It was discussed by some members of this strike team and other personnel assigned to this fire that more specific training related to various fuel types in Georgia would have been helpful (See Findings)

- **Length of operational period/fatigue:** The previous day's fire activity ran for about 12 hours and was within standard work/rest ratio guidelines. The strike team reported to the fire the following morning and had been working the fire for less than 5 hours when the incident occurred. A degree of general fatigue was present in all employees due to the time of year (Wildfires & Prescribe Burning) and increased workload due to personnel reductions over time.

- **Attitudes:** The attitude of the Strike Team, overhead and other resources assigned to the fire were positive.

- **Leadership:** Leadership roles on this fire were filled with personnel having the appropriate experience for their positions on this incident. The burned operator expressed an appreciation (During interview) of the briefing and details they received prior to working on the fire.

- **Experience levels**: The Strike Team consisted of a STL with 30 years of experience, an operator with about 11 years of experience, an operator with 3 years of experience and the injured operator had 10 years of GFC experience and an additional 6 years of experience with a private forest industry company.

Equipment

- **Availability:** The availability of resources/equipment has declined over time (Last several years) due to budget reductions. To utilize the number of tractors needed to safely contain a fire with intense fire behavior requires the dispatching of equipment from several other counties. This process (Mainly travel time) prolongs the response of needed resources. While it cannot be determined with certainty that if more tractors would have been engaged sooner on the first day, it is a factor that will continue to effect the size of fires to come. Individual response times of equipment dispatched for this fire was within GFC guidelines

- **Performance/Non Performance**: The equipment performed well and met expected progress earlier in the day while working the break along pine plantations. When the Strike Team started establishing fire breaks in the hardwood liter and areas where the density of fuel and big timber had been reduced from a previous fire, the equipment performed well. As the need to establish breaks in the heavier fuel and timber, the fuels outsized the tractors and made ability to establish desired break size difficult (See Findings).

- **Used for Intended Purpose:** The type and size tractors used within this Strike Team are ideal for typical fuel types and loading in middle Georgia (Most Upper Coastal Plain and Piedmont areas). The Coastal areas often require a larger tractor to adequately push through dense areas (tie tie, bays, and mixed southern rough) and remove surface fuels. With fewer resources (Tractors available within each county), an additional concern for closest resource dispatching to certain areas will have to be tractor type/size when available.

- **Evaluation of 10 Standard Fire Orders and 18 Watch-Out Situations**

The 10 Standard Fire Orders were evaluated to determine both their application and any violations.

10 Standard Fire Orders	Did not Contribute (Order was followed)	Influenced	Contributed Significantly (Order was not followed)	Unknown
#1 – Fight fire aggressively but provide for safety first.		X		
#2 – Initiate all action based on current and expected fire behavior.			X	
#3 – Recognize current weather conditions and obtain forecasts.	X			
#4 – Ensure instructions are given and understood.	X			
#5 – Obtain current information on fire status.		X		
#6 – Remain in communication with crewmembers.	X			
#7 – Determine safety zones and escape routes.	X			
#8 – Establish lookouts in potentially hazardous situations.		X		
#9 – Retain control at all times.	X			
10 – Stay alert, keep calm, think clearly, and act decisively.	X			

Evaluation of adherence to the Ten Standard Fire Orders

The fire was fought aggressively; however, the operator did state that waiting for the plane prior to continuing may have helped in providing another lookout. The fire behavior made significant changes with fuel changes. Caution was stressed regarding the potential intensity in these areas. It is also important to note that the fuel arrangement and continuity could have promoted another crown fire with more room to grow. An update of fire status was given just before the incident by the STL. The flare up occurred just after the warning of smokes in the area starting to pick up (Likely promoted by the sea breeze bumping into the area around this time). The STL monitored the main fire & the spotover and reported changes as noted. Due to the density of ground fuels, the only other lookout potential available would have been aircraft. The plane was being used but had a large area and other resources to monitor as well.

The 18 Watch-Out Situations were evaluated in terms of their application and contribution to entrapment that occurred.

18 Watch-Out Situations	Did not Contribute Or N/A	Influenced	Contributed Significantly	Unknown
1 – Fire not scouted and sized up.	X			
2 – In country not seen in daylight.	X			
3 – Safety zones and escape routes not identified.	X			
4 – Unfamiliar with weather and local factors influencing fire behavior.			X	
5 – Uninformed on strategy, tactics, and hazards.	X			
6 – Instructions and assignments not clear.	X			
7 – No communication link with crewmembers or supervisor.	X			
8 – Constructing line without safe anchor point.	X			
9 – Building fire line downhill with fire below.	X			
10 – Attempting frontal assault on fire.		X		
11 – Unburned fuel between you and fire.			X	
12 – Cannot see main fire, not in contact with someone who can.	X			
13 – On a hillside where rolling material can ignite fuel below.	X			
14 – Weather becoming hotter and drier.			X	
15 – Wind increases and/or changes direction.			X	
16 – You are getting frequent spot fires across the line.	X			
17 – Terrain and fuels make escape to safety zones difficult.			X	
18 – Taking nap near fire line.	X			

Evaluation of adherence or consideration of the 18 Watch-Out Situations

The Strike Team was aware of the predicted weather and recognized the variable winds observed on site. They had observed some fire behavior in these type fuels; however, they had not observed the erratic behavior in the excessively heavy fuel areas and did not expect the fire to run as fast or as hot as it did. Most of the break installed up to the flare up was on the flank of the spotover, but as they approached the turn, they were starting to get around the head of the fire. While there was not a great distance of fuel between them and the fire, there was a lot of volume of fuel within the ½ to 1 chain of fuel. The fire shifted directions as it charged the Strike Team, influenced by local winds (Sea Breeze). The escape route was the fire break behind them and an adequate Safety Zone was identified 100 yards away; however, the heavy fuel loading next to the firebreak burned excessively hot and making travel on that portion of the break difficult.

FINDINGS

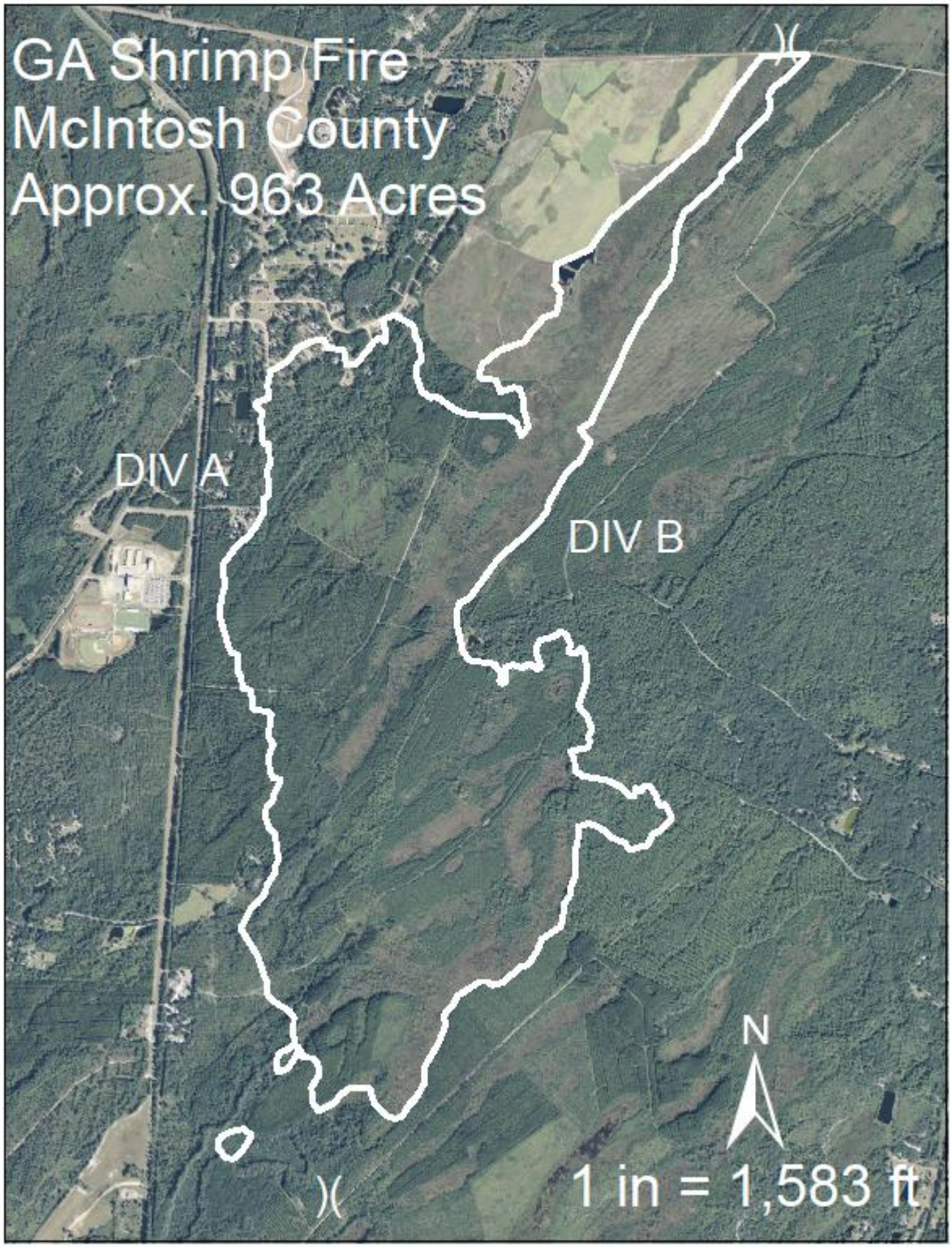
The Strike Team responded to the spotover as they would have any other initial attack fire. They started with a safe anchor point, identified a Safety Zone, maintained communications within crew and with STL and flanked the fire. The combination of excessive fuel with changes in wind direction and speed met as the Strike Team was constructing line 30 to 60 feet away. The break the team was constructing held the fire; therefore, this was not burnover incident. The Thermal Burns to the eyes are in comparison that of which one would get from looking at welding arks. The Strike Team believes that if they had placed more fuel between them and the fire that this may have been a burnover incident. Several elements add to the building of the one or minuets that the flare up occurred. In addition to the elements already covered in this document, some discussion on the following notes should be considered:

Should a "Regional Watchout" training be created within GFC to cover a variety of watchouts that exists within our Coastal Plains, Upper Coastal Plains, Piedmont and Mountain regions?

- Some of the same elements here existed in the 2007 Burnover but not everyone was familiar with the findings on that report.
- The reduction of personnel over time prohibits the ability to put a local person with out of county or out of district Strike Team.
- "Regional Watchout" refreshers should be shared across regions as extended attack fires will promote more out of district responses.

Are all Near Misses, Serious Accident & Injuries and Burnovers investigated and communicated for Lessons Learned purposes?

Would District After Action Reviews held at the end of fire season help share successes, highlight budget considerations/concerns related to Safety, Equipment, Tools, etc?


GA Shrimp Fire
McIntosh County
Approx. 963 Acres
DIV A
DIV B
N
1 in = 1,583 ft