

Incident Summary Page for the 100 Fires Project

Incident Name: Mack Lake Fire	Incident Date & Time: 05/05/1980 @ 12:45
Incident Location: South of Mio, Michigan on the Huron-Manistee National Forest	Incident Size: 24,000 acres final size Less than 500 acres at the time of the entrapment
Types of resources involved: U.S. Forest Service district personnel	# of Fatalities/injuries: 1 fatality
Reason this fire was selected for the 100 Fires list: ➤ Fire made a notable impact within the wildland fire service	
Conditions leading up to the event:	
<p>On May 5, 1980 employees of the Mio Ranger District, Huron-Manistee National Forests ignited the Crane Lake Prescribed Fire. They intended to burn a 210 acre unit alongside State Highway M-33. The burn project had previously been postponed twice due to unfavorable conditions. The goal was to reduce the slash fuel load to prepare the site for planting Jack pine to create habitat for the endangered Kirtland's Warbler. Fuels on the site included grass, shrubs and scattered discontinuous logging slash. Resources on hand were 11 personnel, a John Deere 450 tractor plow, a light engine (125 gallon tank), and a heavy engine (6x6 with a 1000 gallon tank). Several of the personnel were inexperienced or were not very familiar with the fuel type. The tractor plow operator was also inexperienced and planned to have his final certification on the plow later in the week. The primary operator of the tractor was not available along with several other firefighters due to a training class being held that day. The burn unit was surrounded by tractor plow line. The Burn Boss planned to ignite the fire around 09:00 and complete the burn before 12:00. However, due to wildfires the previous day, they were not ready to ignite the burn until 10:30. The afternoon weather conditions were predicted to have temperatures in the 80s, relative humidity in the 20s, with gusty southwest winds changing to northwest due to the predicted passage of a cold front during the mid-afternoon.</p>	
Brief description of the event:	
<p>During the initial stages of the prescribed burn it spotted four times along the east control line. These spots were quickly suppressed. Soon after, three new spot fires were detected. While trying to access the spot fires the light engine became stuck on a stump and then later broke down. This problem complicated the suppression of these additional spot fires. At approximately 12:06 one of the new spot fires escaped initial control efforts and began to move east towards the highway. This forced the personnel on the fire to use Highway M-33 as the next logical control feature. The Burn Boss requested a Sheriff patrol for M-33 at 12:08 due to heavy smoke. The tractor plow was directed to construct a line along the north side of the spot fire and connected it to M-33, but this line did not hold.</p> <p>During this time, the fire spotted over to the east side of Highway M-33. The heavy engine attacked this spot but was delayed as it tried to climb a steep cut bank off the road. The Burn Boss then directed the tractor plow to contain the spot across the highway. The tractor plow put in two lines around the spot, successfully containing it.</p> <p>At approximately 12:15 a second spot fire was detected on the east side of Highway M-33 just to the north of the first spot. This spot was in grass on the highway shoulder and was pushed by wind. Less than 100 feet from its origin, this spot torched and then crowned into a stand of Jack pine regeneration.</p> <p>The tractor plow and heavy engine quickly attacked this second spot. However, they were not able to contain it as the fire pushed across their line and continued to move east, gaining intensity. At this point, the District Ranger, who also was serving as the tractor plow spotter, conferred with the Burn Boss and decided to leave the scene and serve as an aerial observer. The District Ranger then stopped a passing motorist to get a ride back to the nearby airport as a truck was not available. The tractor plow operator was now without a spotter. Together, the heavy engine and the tractor plow continued a flanking action to the east after failing to contain the spot fire in the dense Jack pine. The heavy engine followed behind the tractor plow spraying at the base of the flames as they progressed. It was now about 12:30.</p> <p>The flame height was forcing both the heavy engine and tractor plow to work some distance from the fire edge. The tractor plow was slower than the heavy engine and was passed by the engine. The tractor plow operator and engine operator did not speak face-to-face and did not have radio communication when this pass was made, but they did make eye contact. From that point on the engine remained in front of the tractor plow. When the fire began to make a push to the north, the heavy engine radioed that they were being forced to disengage from the fire and they moved north to safety. At approximately the same time, the tractor plow operator realized he was in trouble. He raised his plow and began to move north away from the fire. After only 110 feet he abandoned the tractor and ran to the northeast. The fire burned over him 276 feet from his tractor.</p> <p>The fire continued to advance on the Mack Lake Subdivision at a spread rate of almost 3 miles per hour with spotting ¼ of a mile in advance of the head. The fire hit the edge of the subdivision at approximately 13:10 and had burned through the whole subdivision by</p>	

Incident Summary Page for the 100 Fires Project

approximately 13:25 with 44 structures lost. The rapid rate of spread and high intensity did not allow for effective structure protection. However, evacuations were effective and no civilian lives were lost. After the fire passed, firefighters were able to quickly return to the subdivision and prevent further structure loss from residual burning and smoldering.

The fire continued to rapidly advance to the east, consuming a total of almost 24,000 acres. By 18:30, two factors changed; the vegetation and the weather. The fire reached a hardwood forest type and the relative humidity increased significantly, thus reducing fire intensity. By the evening of May 6, over 35 miles of control line was built and there were no further significant runs.

Fire behavior factors that were present during the event:

Low relative humidity
Logging slash fuel bed adjacent to dense Jack pine regeneration stands
Approaching cold front with increasing wind speed and shifting wind direction

Fire foot print showed evidence of surfacing horizontal roll vortices. These vortices would have caused rapid lateral fire spread to occur. This probably played a role in the difficulty the tractor plow operator and the heavy engine crew encountered while trying to escape the fire on its northern flank.

Operational lessons available for learning from this incident:

Required holding forces should be based on fuel conditions outside of the burn unit as well as within the unit.
Pressure from management to complete a burn in a rush or without adequate resources is a watch-out situation.
Confirm the availability of contingency resources prior to ignition of any prescribed burn.
Ensure that all resources are monitoring the assigned incident tactical channel.

Notable impact or historical significance for the wildland fire service from this incident:

The follow-on fire behavior study for the Mack Lake Fire is one of the first scientific efforts that documented horizontal roll vortices as a fire behavior phenomenon. Donald Haines, a U.S. Forest Service Research Meteorologist, was one of the principle authors for the study; he would later go on to develop the Haines Index in 1988.

Links to more information on this incident:

<https://www.nwcg.gov/wfldp/toolbox/staff-ride/library/mack-lake-fire>
<https://lessons.wildfire.gov/index.php/incident/mack-lake-1980>
<https://wlfalwaysremember.net/1980/05/05/james-swiderski-mack-lake/>
https://www.nrs.fs.usda.gov/pubs/gtr/gtr_nc083.pdf
<https://fs-prod-nwcg.s3.us-gov-west-1.amazonaws.com/s3fs-public/2023-06/sr-ml-fire-analysis-report-june1980.pdf>
<https://fs-prod-nwcg.s3.us-gov-west-1.amazonaws.com/s3fs-public/2023-06/sr-ml-american-forests-article-july1981.pdf>

Video:

➤ <https://www.youtube.com/watch?v=gFIA8Y2ngmg>

This summary page was proudly provided by:
Jim Cook & Kurt La Rue

August 2024

Incident Summary Page for the 100 Fires Project



Memorial for Tractor Plow Operator James Lee Swiderski
Located at the National Interagency Fire Center

Tragedy Strikes

Tractor Plow Entrapment of James Swiderski

As the Mack Lake Fire continued its spread east of M-33, the tractor plow—operated by James Swiderski—and 1,000 gallon engine continued to flank the fire indirectly to the east. The engine initially followed behind the plow, spraying water at the base of the flames.

Eventually, the engine passed the slower tractor plow. Eye contact was made between the operators, but no radio communication was made. Shortly after the engine passed by the tractor plow, the fire made a significant run to the north. The engine radioed that they were retreating to the north away from the flames. There was no radio contact from the tractor plow.

Evidence on the ground showed that James attempted to evade the spreading fire and leave the area. He had lifted the plow and began to move away from the flames for about 110 feet. He abandoned the tractor plow and ran another 275 feet before he was overrun by the fire.

The Incident Commander began calling James at approximately 1300 to reposition him to protect the Mack Lake Subdivision, but there was no response. A spotter airplane worked with crews to locate the tractor plow and James's body at approximately 1500.

Firefighting personnel continued to fight the fire until the next day, while knowing their friend and co-worker had been fatally burned.

Timeline
1300: Incident Commander becomes concerned because he cannot contact James.
1310: Mack Lake Fire enters the subdivision.
1325: Fire has burned through the subdivision and continues east.
1500: James is located by spotter aircraft and fatality confirmed by ground personnel.

In loving memory
James L. Swiderski
1950-1980

Interpretive plaque near the location of the accident

Incident Summary Page for the 100 Fires Project

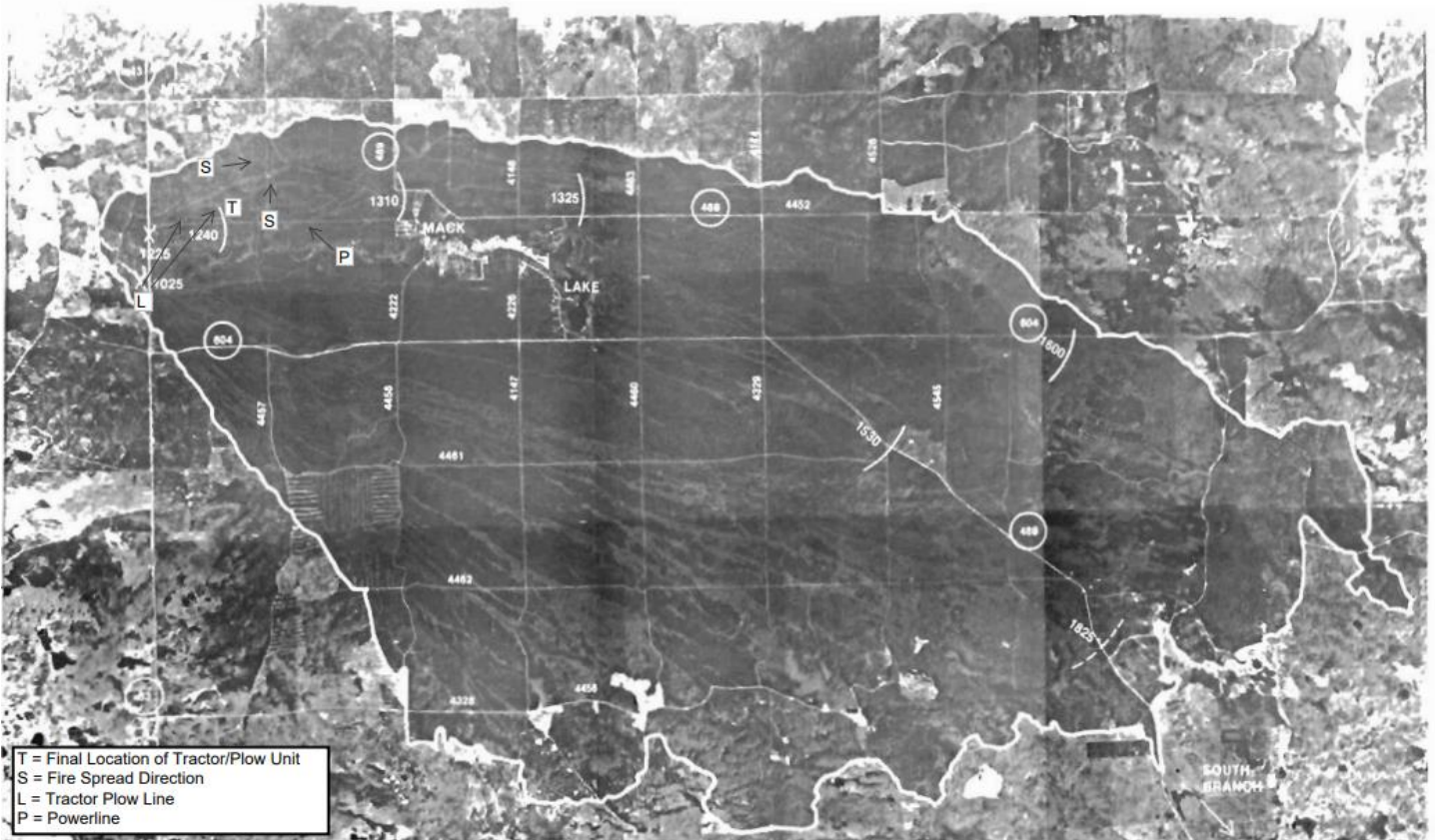


Figure 15.—Area burned by the Mack Lake Fire, including approximate positions of the leading edge of the fire during the afternoon of May 5, 1980. Photo courtesy Huron-Manistee National Forest.

**Orthophoto showing the perimeter of the Mack Lake Fire
The light colored unburned stingers of vegetation are a signature of the horizontal roll vortices**



Photo of the burned over tractor plow taken during the investigation