

Fuels Management on the National Forests in Mississippi after Hurricane Katrina

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Abstract—On August 29, 2005, Hurricane Katrina made landfall in southern Mississippi. As the storm passed through Mississippi, it maintained hurricane force winds through the northern part of the State affecting all of the Forests. The eye of the storm passed within a few miles of the De Soto Ranger District, the Forest's southern-most district. Much of the District received moderate to heavy damage to timber and facilities. The De Soto Ranger District had historically prescribed burned 60,000 acres per year. In the 5 years prior to hurricane Katrina, the District had increased its prescribed fire program to an average of 94,000 acres per year. While Hurricane Katrina created a serious large fuel loading, the fact that most of the District has been regularly prescribed burned, prevented the problem from being exacerbated by having the new fuels being piled atop the new growth of volatile brush, which is common in the lower coastal plains. The National Forests in Mississippi developed an aggressive three-pronged strategy to deal with the sudden increase in fuel loading and the subsequent potential for catastrophic wildfire: (1) remove the large, downed material as quickly as possible, through conventional salvage operations; (2) establish fuel breaks in critical Wildland Urban Interface (WUI) areas; and (3) reestablish landscape scale prescribed fire treatments immediately.

Introduction

The National Forests in Mississippi (MNF) consist of 1.2 million acres of public lands located in six Forests across Mississippi. These Forests are diverse ranging from coastal plain pine to upland hardwood stands. Within these lands there are over 2,000 acres of lakes and ponds and 600 miles of streams that are open to the public for fishing.

We have 14 wildlife management areas that are operated by Mississippi Department of Wildlife, Fisheries and Parks. In these areas, emphasis is placed on intensive management of games species such as white-tailed deer, wild turkey, and bobwhite quail.

On some of the forested lands, as we manage for healthy tree stands, we are also able to provide a sustainable harvest to meet the demands of you, our constituents, for lumber, paper, and other wood products. Forested areas are also managed to provide unique habitats for wildlife and opportunities for people to experience primitive natural surroundings.

The Supervisor's office, which is located in Jackson, MS, supports the activities on all the Districts.

The MNF has a very aggressive prescribed burning program. For the last 5 years, with the exception of 2006, MNF Districts have accomplished over 235,000 acres per year. As far back as our burn data goes (1963) Mississippi has consistently averaged over 100,000 acres per year. With the approximate number of "burnable" acres around 1,000,000 we are on a consistent 3 to 5 year rotation.

In: Butler, Bret W.; Cook, Wayne, comps. 2007. The fire environment—innovations, management, and policy; conference proceedings. 26-30 March 2007; Destin, FL. Proceedings RMRS-P-46CD. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 662 p. CD-ROM.

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The MNF has a fulltime fire organization in the Supervisor's office as well as on all the Districts including fire managers, air and fire specialists, fuel technicians, engine crews, tractor plow crews, and firefighters. During the prescribed burning season, generally from January through May, we use personnel from other resource areas within the Districts and pull in detailers from all over the country. We usually have two to four helicopters on the Forest also.

Leading the way in this accomplishment is the De Soto Ranger District, MNF's southern-most ownership. The De Soto contains 378,538 acres including Camp Shelby military base, several communities and municipalities, and many wildland-urban interface issues. In spite of these challenges, the De Soto averages 94,000 acres of prescribed burning each year, which is by far, the largest program on the MNF. Just to the northeast of the De Soto lies the Chickasawhay Ranger District. The "Chick" consists of 122,153 acres and burns an average of 35,000 annually. On August 29, 2005, these two areas took the brunt of Hurricane Katrina's force.

Hurricane Katrina Impacts to the De Soto Ranger District

On August 29, 2005, the De Soto Ranger District was in the unfortunate position of being in the northeastern quadrant of Hurricane Katrina. Although the southern portion of the District lies within 8 miles of the Gulf, the western side of the District suffered the most damage. The eye of the storm passed within 5 miles of the western boundary of the Forest. Winds on the District were estimated between 100 and 140 mph and were sustained for several hours. Damage to homes, facilities, and timber ranged from moderate to near catastrophic.

Impacts to Employees

The De Soto Ranger District is a large complex District with more than 55 employees. Most employees rode out the storm at home. Fortunately there were no injuries. Those that evacuated had trouble returning due to roads being blocked. Every District employee had damage to homes, vehicles, or property. Three employees lost their homes. One employee lost every possession. Even 18 months after the storm, employees were still doing repair work and dealing with insurance companies.

Impacts to District Facilities

Practically all Forest Service facilities were damaged. The District Office sustained major roof damage, causing leaks throughout the building. Temporary offices were utilized during the repair. Work centers had only minor damage. Some of the fleet vehicles were not so lucky. All of the District's 18 recreation areas were heavily damaged. Over 170 miles of trails were made impassable or nearly obliterated. Every recreational or administrative facility became unsafe for use due to leaning trees and trees with broken tops and limbs. All roads (Forest Service, county, and State) were blocked by fallen trees. No form of communication was functional after the storm, including telephones, cellular phones, radios, and e-mail.

Impacts to Timber

The De Soto Ranger District's annual timber target was around 15 million board feet prior to Hurricane Katrina. The storm changed the timber program for the foreseeable future. Approximately 30 percent of sawtimber sized trees were blown over or broke off. Virtually all the young plantations are permanently bent over. The District estimates that 3 to 5 years of regular rotation timber sales will have to be suspended. Through salvage sales, hazardous fuel removal was completed on 99,000 acres. Final salvage volume (218 MMBF) harvested during 12 months represents 14.5 years of annual average De Soto Ranger District timber offered target.

Impacts to Threatened and Endangered Species

There were more than 150 Red-Cockaded Woodpecker (RCW) cavity trees on the De Soto. Around half of these cavity trees were blown over or snapped in-two by the hurricane. At least two RCWs died in the storm.

The Federally threatened gopher tortoise fared well because they burrow under ground. However, the amount of timber blown down could have restricted gopher tortoise movements for foraging and reproduction.

On a positive note, in preparation for salvage sales, approximately 48,200 acres of Threatened and Endangered Species surveys were completed. Close to 4,000 new gopher tortoise burrows were located and flagged to protect.

Impacts to Fuels

Since Hurricane Katrina, dead fuel loadings are obviously a great concern. The 1hr, 10hr, 100hr, and 1000hr fuel loadings have all increased dramatically, especially the 1000hr. The forest could be considered "jack-strawed" in many areas. Prior to the storm, no fuel models 11, 12, and 13 existed. Now these models are present in large areas. The open canopy has drastically increased the amount of solar radiation to the fuel bed. This has caused dead fuels to dry out more rapidly. This has also caused an increase in the mid flame windspeeds. The increase in available fuel has increased the source for spotting and therefore increased the spotting potential. In addition, the more open canopy will enhance the growth of common volatile understory brush species such as ti ti, gallberry, and yaupon. This combination of dense, volatile live fuels and the dramatically increased dead fuel loadings will be a concern for several years.

Another critical issue that has impacted mainly the area closest to the coast is salt damage to vegetation. Most of the needles have remained on the trees, so torching or crowning is an increased possibility. Areas with a heavy combination of brush and dead needles will most likely prove to be the most dangerous. These fuel types will have a heavy dead component to the understory and allow fire to move rapidly into the crowns.

The rate of fire spread has slightly increased due to more open canopies. The added fuel loading has increased the flame length and intensity in all areas. Spotting due to accumulations of debris and numerous snags has increased.

Prescribe burning has proven to be difficult and hazardous due to the volatile nature of the fuels. Prescribe burning has also produced higher concentrations of smoke and large particulate matter due to the above normal amount of dead and live fuel.

Fire Occurrence and Severity

The increased fuel loading caused by the hurricane, combined with a moderate to severe drought in the months after the hurricane has greatly increased southern Mississippi's fire danger. The combination of drought and fuel loading resulted in the following suppression figures for the De Soto Ranger District in the 18 months following the hurricane:

- 244 – fires suppressed
- 29 – fires over 100 acres
- 20,800 – acres burned
- 4 – Type 3 fires
- 11 – lightning caused fires

Forest Response

After Katrina made landfall, the first and foremost concern of the Forest and District staff was the wellbeing of District employees. Locating our employees and confirming that they (and their families) were safe were difficult tasks. Phone lines (including cell phones) were down all across the southern end of the State. Some employees had moved inland with family or friends. But eventually all employees either were contacted by or made contact with their supervisors.

The next concern of the Forest was to reopen Forest roads for emergency and essential travel. Over 1,300 miles of Forest roads were totally or partially blocked due to fallen trees and other debris. The Forest brought in two Type 2 Incident Management Teams to accomplish this task. Over the next 2 weeks, using chainsaws and mechanized equipment, personnel opened more than 1,000 miles of roads. It was only then that we realized the magnitude of Katrina's fury.

The fuel loading on the two Districts had gone from around 1 ton per acre to upwards of 60 tons per acre. We knew this new fuel had to be removed quickly due to the rapid rate of decay for wood products in the South. If this fuel was not salvaged, it would become available to burn within 1 or 2 years.

Use of the Healthy Forest Restoration Act (HFRA) authority was critical in meeting the time sensitive issue of salvaging these 1000 hr fuels. Proactive collaboration played a critical role in expediting the process. Key collaborators included U.S. Fish and Wildlife Service, The Nature Conservancy, Mississippi Department of Wildlife Fisheries and Parks, and forest industry. Weight scale authority was granted to expedite removal of downed timber. Salvage sale preparation was conducted concurrently with the National Environmental Protection Act process in order to expedite offering of merchantable timber.

All sales prepared were sold. Over 1.2 million tons or 276 MBF on 109,828 acres on the Chickasawhay and De Soto were removed.

Because of all the new fuel on the ground, access through the Forest was difficult if not impossible. We knew it was critical to establish fuel breaks between the Forest and adjoining private lands, especially those in Wildland Urban Interface (WUI) areas. The lines were needed not only to prevent wild fires from spreading onto private land from the Forest, but more often to prevent the spread into the Forest of fires started by the adjoining landowners

as they were cleaning up debris. Using existing District resources, detailers, and contract resources, the Forest constructed more than 600 miles of WUI lines. While we knew that these lines would not stop an approaching wildfire on its own, they would serve as fuel breaks, provide access routes into areas where we needed to position suppression resources, and serve as escape routes if needed. It was not long before we began to see just how valuable the WUI lines were. On the Burnt Dog fire, the WUI line put in between the Forest and some private houses made it possible for our resources to make a stand and save the homes.

With the additional fuel loading, the District was reluctant to try any prescribed burning at first. It was actually after a wildfire or two that they realized they could conduct prescribed fires without doing resource damage, causing excessive smoke issues or creating a situation for extreme fire behavior. It turned out that what we had thought to be the case all along was actually true. Previous years of aggressively burning the Forest had reduced the fuels to such a level that, even with tons of fuel added to the forest floor, it was still manageable. The District successfully burned more than 14,000 acres but then, the Forest made a difficult decision. To concentrate all efforts and resources on assisting with the mechanical removal of fuels that were already sold. While the entire Forest burned only 91,000 acres that year, we were able to count an additional 112,000 acres as mechanical fuel reduction. This year, 2007, the De Soto jumped right back into their normal burning routine. At the time of this writing, they have successfully burned 74,017 acres with no plans to let up. The cost of burning is higher now due to additional preparation and holding resources needed but that will go down as time goes on.

Lessons Learned, and Our Plans

There are several lessons that we can learn from the events surrounding Hurricane Katrina. We know that a quick, organized response was vital to the success of our mission. Using HFRA and other agreements that were already in place, getting the support of our cooperators and other parties, and the aggressive, dedicated attitude of our employees made all of this possible.

At the time, the National Forests in Mississippi's Fire Staff Officer was a Type 1 Incident Commander. His background and experience played an important role in getting much of this started. After his retirement, he came back on contract and helped us put together a hurricane response plan that we can use for future events like this.

The aggressive fuels program that has been in place on the Forest was essential. Having much of the District in a condition class 1 made it possible for our resources to get back on the ground sooner because the new fuel was not piled on top of existing fuels and new growth of volatile brush that is common in the lower coastal plains.

Our plans include using supplemental Katrina funds to bring in additional resources during the burning season and purchase larger equipment that can get through the blow-down. We developed a 3-year plan to use these funds on the De Soto and several other Districts.

The first year or two after Katrina, our main goal has been to reduce the fuel loading as much as possible, but we plan to return to more of a growing season rotation, eventually bringing the De Soto and Chickasawhay back to where they were pre-Katrina.

Acknowledgments and References

This presentation was developed by Danny Bryant, Forest Assistant Fire Management Officer for the National Forests in Mississippi and Jay Boykin, District Fire Management Officer on the De Soto Ranger District.

We thought it would be beneficial to the whole fuels community to see how Mississippi and the entire agency pulled together to address and overcome what could have been a crippling event. Thanks to Katrina Incident Commander David Carter and all the Forest Service employees who were involved with this crucial event.

Most of the data came from weekly reports and updates submitted by the Incident Management Team (IMT) on the incident, David Carter Incident Commander. Reports are posted on the Hurricane Katrina Recovery Internet site, which is linked to the Mississippi National Forests home page: <http://fsweb.ms.r8.ffs.fed.us/>. Contact us at National Forests in Mississippi, 100 West Capitol Street, Suite 1141, Jackson, MS 39269 (601) 965 1600

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