

Devastating timber damage at Tyndall Air Force Base. Photo courtesy of Tyndall AFB.

PARTNERSHIPS IN ACTION – RESPONDING TO THE “WHEEL OF MISFORTUNE”

RECOVERY AND RESTORATION FOLLOWING HURRICANES FLORENCE AND MICHAEL

By Ad Platt, The Longleaf Alliance

As we make progress in longleaf restoration, it is increasingly unlikely that any storm hitting the southern United States does not impact our progress somewhere. For every hurricane season, a ‘wheel of misfortune’ spins, slows, and someone’s number comes up. Major events in 2018 included Florence’s epic flooding in the Carolinas and Michael striking the Florida panhandle as a Category 4 and carving a catastrophic trail deep into Georgia, continuing across the Carolinas and with continuing impacts in southeastern Virginia. Hurricane Florence primarily brought devastating flooding; Michael’s power was devastating winds. When such events occur, the support of numerous partners makes a vast difference in the recovery.

Michael was the strongest storm to hit Florida in 50 years, the strongest ever recorded to hit the Gulf Coast, and the third-strongest hurricane on record. Michael made landfall between Tyndall Air Force Base and Mexico Beach in Florida as a Category 4 with recorded windspeeds measured from 111 to 156 mph.

This was a catastrophe for people and property. From an

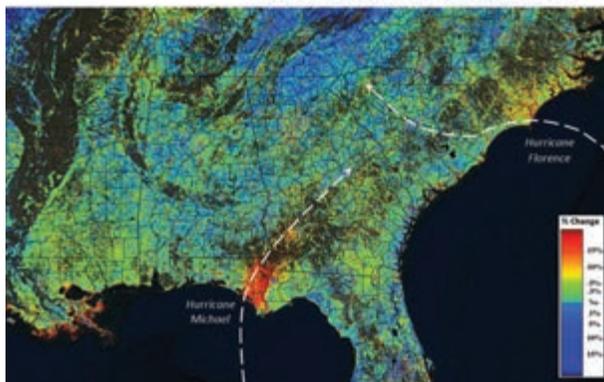
environmental perspective it was an extreme natural disturbance, not the first and certainly not the last, but stronger than the ones healthy ecosystems must routinely absorb. A big hit. Perhaps also an opportunity. We continue to receive questions about the impact of these storms and are partnering to combine the best mapping information we can compile from several platforms to better characterize the impact of these events on the longleaf restoration efforts and to better guide the recovery that follows.

The preliminary estimate of Michael’s impact to timber was estimated to exceed \$2 billion over an area of 5.4 million acres in Florida, Georgia, and Alabama. Damage surveys attempted to evaluate impact according to damage classes of catastrophic (95% damaged), severe (75%), moderate (25%), or light damage (10% does

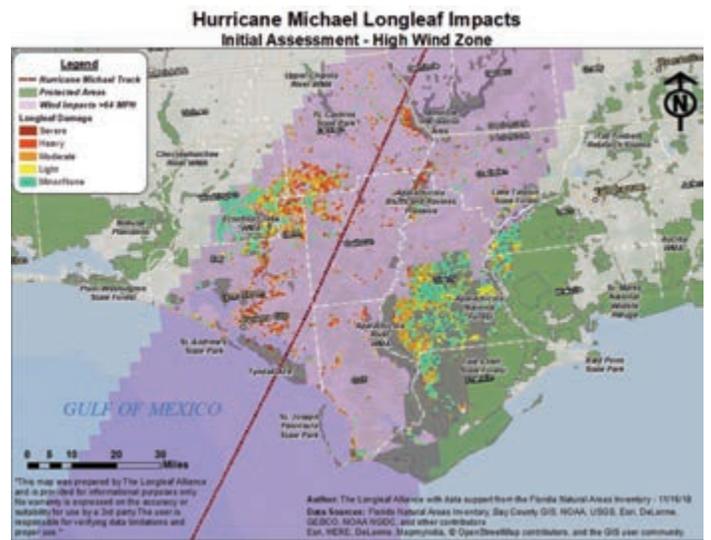
not warrant salvage) classes. Stands with moderate damage will need further assessment to determine whether partial or complete harvesting is warranted, and landowners are urged to utilize the services of a professional forester to determine the

ForWarn II Early Detect for the period ending Oct. 15, 2018

From a regional perspective, the impacts of the Southeast’s two back-to-back hurricanes are evident in the early October vegetation change products showing an exceptional ‘smear’ of vegetation-derived biomass. Hurricane Florence struck southeastern North Carolina as a Category 1 storm, while Michael went through Florida’s panhandle after landing as a Category 4 with peak windspeeds in excess of 156 mph. Landowners in these areas have submitted 100+ acres of requests for recovery assistance.



Satellite imagery reveals a swath of vegetative impact caused by Michael, comparing mid-October data to a 1 yr. baseline. Image depicts ForWarn II, MODIS, 1yr NDVI change product, masked to forest classes only. Credit: Eastern Forest Threat Center, USFS SRS (Forestthreats.org).



Michael's track across Florida and into Georgia, showing approximate wind impacts with reference to protected lands locations. Map showcases areas where severe wind impacts were most likely. Map credit: Lucas Furman, LLA.

Michael's track across Florida, depicting initial damage estimates to known Florida longleaf stands (FNAI-LPEGDB) falling within the 64 mph or greater wind zone. Approximate longleaf damage categories defined by FNAI, based upon methodology used in the USFS hurricane fuels assessment report. Map Credit: Lucas Furman, LLA; Data Credit: Chad Anderson, FNAI.

best action. Stands with severe or catastrophic damage should be salvaged if possible for whatever value can be recovered, with consideration for future reforestation.

Across the impact area, forest landowners and the forest industry now face significant costs and impacts including direct loss of timber investments that typically are not insured, and often cannot be written off as a tax loss. There may also be additional timber lost to pine beetles or reduced value of remaining timber because of poor form and wind sweep. Debris removal costs of wasted timber to restore lands to productive use will be significant, and reforestation costs in these devastated areas significantly higher. Both the wildfire threat and the cost to suppress wildfires has increased in areas with upwards of 100 tons per acre of forest fuels on the ground, often strewn with unknown and hidden hazards. Because these local economies were heavily based on forestry, any potential loss or reduction of jobs in the forest industry could be a storm impact that would last for decades.

We have past evidence that longleaf is a tougher and more resilient pine in moderate damage zones. Once winds reach the catastrophic level, however, all bets are off, and damage to structures or timber are also likely catastrophic. Outside of the catastrophic wind zone of Michael, the pattern of damage from the storm is similar to that of other less severe storms we have experienced, with varying levels of damage correlated to how easily the wind could enter a particular stand. The most severe impacts are observed on field edges or stands open to a long 'fetch,' the distance winds blow unimpeded prior to impact. As is often seen, recently thinned stands with lower densities often had significant damage.

Tyndall Air Force Base was essentially ground zero, experiencing the eye wall passage. Access is still restricted only

to essential personnel as we go to press, with many roads still blocked, but Melanie Kaeser, USFWS Ecologist, gained entry the last week of October to begin initial Threatened & Endangered (T&E) assessments and plan the recovery. Pine tree damage is estimated to be 95%, mostly slash pine, that was snapped. Buildings in these areas suffered a lot of structural damage. The slash pine timber formerly provided the revenue used to fund longleaf restoration on base. Because of the way timber was snapped, salvage operations will be minimal and below market price. Planning is underway with foresters and the wildland fire center at Eglin for restoration of the vast area of damage, which will likely require heavy mechanical treatments of shearing, raking, and burning at specified spacings as restoration funding can be made available. With the loss of an estimated \$14 million dollars in revenue and no remaining timber to harvest to finance restoration, it may necessarily progress very slowly.

Considering the entire area resembles a war zone, people did amazingly well. Melanie and most of her neighbors stayed, though just a few blocks from the bay. Several natural features made a significant difference. The barrier islands absorbed the storm surge, though they suffered extreme erosion. Where dense live oak canopies deflected a lot of wind, neighborhoods fared much better. Where yards had open tree canopies, much more damage is obvious. Cell service was mostly restored within ten days; internet service is taking longer.

Species affected at Tyndall are primarily the coastal federally listed T&E species. The barrier islands protected Tyndall from surge impacts, though Crooked Island East and Crooked Island West appear to have suffered a lot of washover and beach erosion. Gopher tortoise burrows are still here and for the most part fine, unless impacted by fallen timber. The plan forward is a full base

assessment of populations. Previous GPS locations, rebar, and flagging, will help ensure machinery in the shearing and raking can see and stay at least 25' from burrows to avoid burrow collapse. The reassessment of two federally listed plants, Godfrey's Butterwort (*Pinguicula ionantha* Godfrey) and Telephus spurge (*Euphorbia telephoides* Chapm) will have to await access. Fortunately, a good baseline exists through previous annual population counts. We will be better able to assess the impact to native understory in the spring, and partners will be a big help in the assessments.

Cavity nesters in trees suffered significant losses. Tyndall did not have any RCWs, but they were all at risk on adjoining partner properties. Some RCW colonies were eliminated, and others had significant loss of cavity trees, but prompt actions by all partner agencies to inspect colonies and replace cavities helped to reduce losses and depredation for suddenly homeless birds near the storm centerline. The USFS alone expects to replace more than five hundred cavities in the Apalachicola National Forest to make up for the losses from this storm.

Much further inland, Michael still dealt a major blow to the Jones Ecological Research Center in Baker County, Georgia. Kevin McIntyre, Education Coordinator at the Jones Center, noted that they considered themselves lucky. Structures still sustained a lot of minor damage, with trees on the corners of some buildings, and a lot of variability in the damage to timber stands, often ranging from ten percent to half the stems downed. One logging crew immediately went to work on the salvage operations, focusing on the more damaged areas, but two others planning to assist have yet to arrive. Slash pine seemed to take it hard, with a lot of the damage seeming to be associated with fetch -- an 'open door' allowed more damage from winds which were still up to Category 3 levels. Their restoration plan includes revisiting the 864 permanent upland management plots to better assess the change and damage. There are some locations where plantations of loblolly, slash, and longleaf can also be compared.

Focus on recovery

Individuals, state and local government agencies, church and civic groups, non-government organizations and partners of all kinds immediately jumped into recovery mode and responded

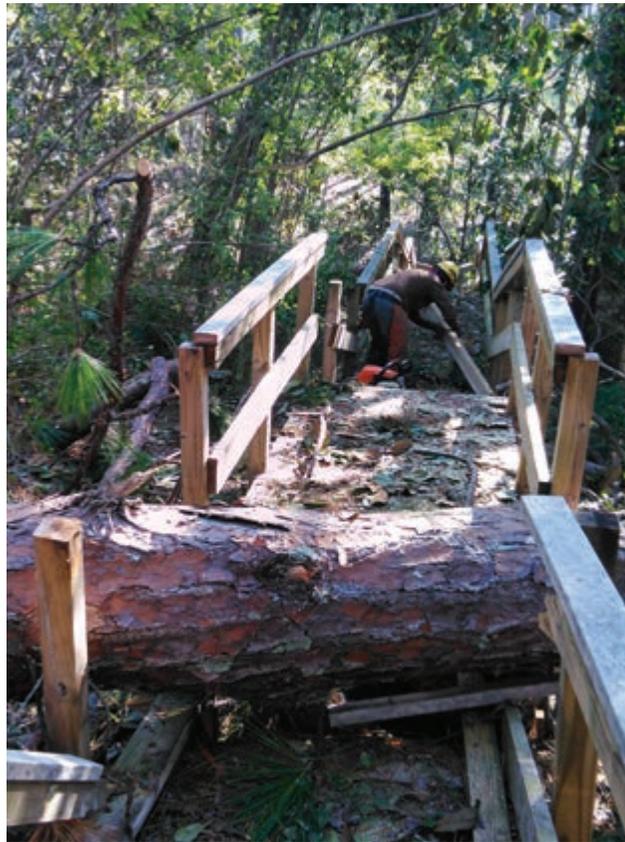
quickly to help restore access, clear the path for reconnecting utilities, and facilitate the search and rescue efforts for friends, family, and neighbors. Governments are getting better at this, having learned from previous major storms.

Information is most critically needed following a crisis, even if it is just sharing what we don't yet have answers to, but where and how we plan to get them. In the absence of information, rumors proliferate. Following Michael, coordinated "Recovery Assistance Meetings" were quickly organized and rapidly held at locations across the impact zone in Florida and Georgia, and the numbers attending were at or exceeded meeting room capacity. At these community meetings, citizens had opportunities to hear from agency leaders of state and federal agricultural and forestry agencies on assistance that was already committed and to begin their applications even as assessments were continuing. Given the magnitude of the losses, additional programs and assistance are being created and assistance is expected.

Landowners are moving quickly to recover whatever value they can through prompt salvage harvests, but both loggers and markets are limited. The use of a registered consulting forester is highly recommended in assessments and can help reduce both hasty judgments and include consideration of all or any options that may be available. But with the continuing warm fall weather, speed is of the essence since blue stain fungus will deteriorate the wood in a few short weeks. With pulp mills damaged and pulp inventories high, the initial focus is on salvaging as much of the higher valued sawtimber as possible.

Following Hurricane Hugo, almost as significant an event, only about 15% of the damaged timber was salvaged in time, most at 20 cents on the dollar. The magnitude of this storm, and the cumulative loss of value so many have experienced, has led to a bipartisan, multi-state proposal for a Forest Recovery Act to help with cleanup efforts, special tax relief for timber casualty losses (usually not applicable under current rules), and funding for reforestation.

Some of the evident improvements include a lower human casualty count, both from the storm and so far through the also dangerous recovery period. Faster response and restoration of essential services and organizations, in spite of damaged office locations, having a presence to assist those in need. Sometimes



Donna Vassallo, GCPEP EST, opening access to Falling Waters State Park to provide staging area for First Responders to Michael. Photo by Kaiden Spurlock, LLA.

folks are frustrated by processes which can seem bureaucratic, but it is evident that agency partners are giving their all and doing all they can, and more smoothly this time around.

Opportunity following this crisis

One thing that we've definitely learned is to be site-specific in the cleanup and restoration efforts, and to ensure that contractors are informed how to avoid accidentally causing more damage to the things that matter as we go about restoring sites. This guidance could include avoiding impacts to animal populations like gopher tortoise, or to minimize damage to healthy native understory, and guarding against spreading noxious invasive species as we restore sites.

Owners are advised to continue to monitor pine stands with moderate or light damage and to be on guard for subsequent pine beetle or disease issues that sometimes follow in the spring. Wind damage from root wrenching also can be expressed in the next growing season. Planning for reforestation closely behind salvage operations should also consider risk from pales weevils in addition to the usual hardwood or invasive challenges.

Resources for landowners and land managers

The Farm Service Agency (FSA) has a cost-share program called Emergency Forest Restoration Program (EFRP) that assists with site preparation and planting costs. They have waived the onsite inspection requirements for this program in the counties impacted by Michael.

The Natural Resources Conservation Service (NRCS) has offered additional signup periods for EQIP incentive programs, and it expects additional funding in the wake of this extraordinary event. NRCS leaders are refining assessments to potentially deliver additional funding for longleaf programs to support the recovery in areas hardest hit. For more information, contact your local NRCS office.

The Longleaf Alliance is also engaged, from helping connect people with specific providers of assistance to technical assistance for questions. More than ever, we are sharing the information and resources we have with those impacted, and by participating in planning and recovery assistance meetings, we are guiding resources to where people and species at risk in the longleaf world are most critically in need. Our staff is directly engaged in assisting partners with specialized chainsaw and burn planning assistance. Living where longleaf grows will provide you a number of experiences both with hurricanes and how people respond in the aftermath; examples both good and bad, and we learn from both.

Was it a catastrophe? Yes. And both people and trees come back following all manner of catastrophes, even relentlessly. Our efforts and choices will guide where the future forests will rise and how resilient and how suitable they will be for people and for the diversity of plants and animals that belong there.

A host of information is gathered at www.usa.gov/hurricane-michael.

DAMAGE STATISTICS BROKEN DOWN BY STATE

Damage Statistics Broken Down by State

State	Acres Timberland Impacted	Financial Impact
Florida	~3 million	\$1.3 billion
Georgia	2,368,227	\$763 million
Alabama	40,000	\$20 million

Florida Timber Loss Statistics

Damage Level	Acres Impacted
Catastrophic (≥95% timber loss)	347,000
Severe (75% damage)	>1 million
Moderate	1.4 million

Counties Suffering the Highest Impacts

State	County
Florida	Bay
Florida	Calhoun
Florida	Franklin
Florida	Gadsden
Florida	Gulf
Florida	Holmes
Florida	Jackson
Florida	Leon
Florida	Liberty
Florida	Wakulla
Florida	Washington
Georgia	Seminole
Georgia	Decatur
Georgia	Miller