Forest Health Monitoring Program Report November 22, 2021

This report is intended to share information to forest land managers about forest health damages observed by the Arkansas Department of Agriculture, Forestry Division – Forest Health Monitoring Program. Chandler Barton, Forest Health Specialist, conducts aerial survey annually to detect or monitor forest threats. The areas selected in this report may or may not have been ground-checked; please use this information to aid your forest management operations. Please contact me if you require more information or need my assistance.

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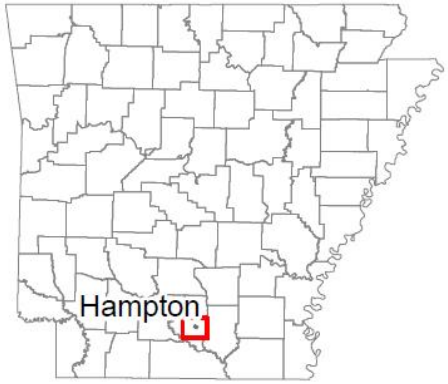
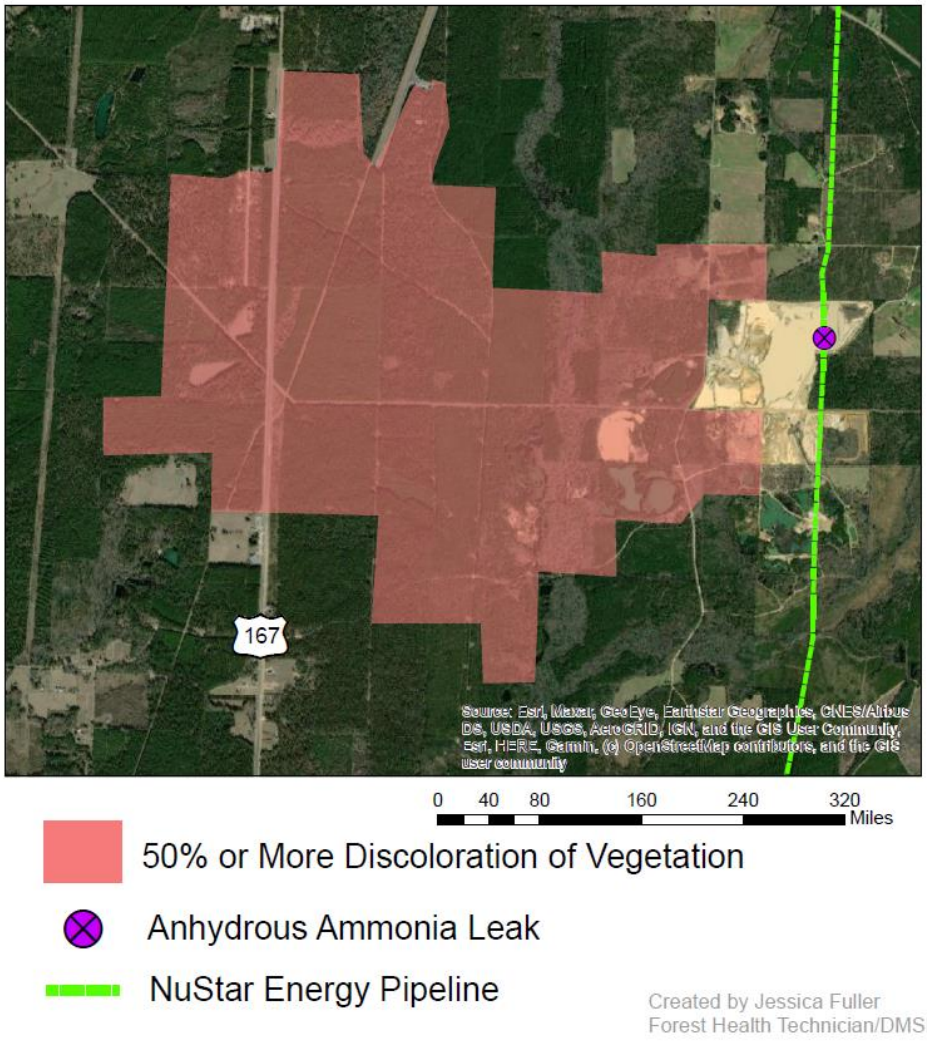
Interim Report: Effects of Anhydrous Ammonia Leak on Forests

Chandler Barton is monitoring the condition of the forests affected by the anhydrous ammonia leak that took place on Thursday September 23rd, 2021. The Arkansas Forestry Division flew a detection flight on October 5th to get an initial "size-up" of the affected area. During the first ground assessment on October 21st, the damage to the vegetation appeared substantial, and the chemical caused the affected trees to turn brown. Many trees defoliated their damaged leaves. Of note, no observed trees were considered dead at the time of that initial ground assessment. There is not much precedent for this type of forest damage, therefore, scientific articles that describe the effects are very limited. The next step is monitoring and documenting the effects. We will continue to monitor the area to determine if any secondary issues occur that may kill trees. He will be looking for pine bark beetles, diseases, or any other indications of declining tree health. Soil samples are also being collected within and outside of the affected area to learn more about the soil health characteristics.

Sentinel II satellite imagery from October 20th clearly shows the extent of the discoloration. Using this imagery shown below, we determine the severely affected area was 3,941 acres. The map on the following page shows that area. Over half of this affected area includes loblolly pine forests.

Anhydrous Ammonia Survey in Calhoun County





Created by Jessica Fuller
Forest Health Technician/DMSM

Effects on Vegetation

We are uncertain at this time how long it will take for vegetation to recover. Both pine and hardwood timber may be sensitive to this level of chemical damage, but the timeline for when mortality will occur is not known. During the first ground assessment on October 21st, we confirmed healthy trunks by making small hatchet cuts; resin pressure appeared normal on pine trees. With binoculars, it was possible to see fresh green shoots on hardwood trees. The fresh new growth could also be seen on pine saplings (see photo to right). On October 29th, a mature pine tree was felled and new growth was observed again. Also of note, terminal buds on defoliated branches appeared healthy. These buds will be important for growing new pine needles in April. Also on October 29th, two pine trees were girdled to serve as "trap trees" for pine-infesting insects in the area.

On November 18th, the site was revisited to document any new changes. Zero trees were discovered with bark beetles. The girdled trap trees (including the felled tree) experienced no bark beetle attacks. The area is anticipated to have negligible bark beetle activity in the foreseeable future, thus giving these trees an opportunity to recover. Furthermore, the seasonal weather change makes it unlikely that a bark beetle issue will occur.

At this time there is not reason to believe the discolored and defoliated pine trees will die. However, the true results of the damage may only be visible during the spring months. It is possible that pines will continue to appear unhealthy for several years as indicated in the description of a similar event in 1971.

On October 29th and November 18th, a small UAS was used to capture imagery on an 80-acre loblolly plantation. The imagery will be periodically recollected to show its recovery over time. An example of this imagery can be seen at the end of this report.

Photo taken October 29th

Girdled Trap Trees, Photo Taken October 29th

Drone Image of Loblolly Stand, Photo Taken October 21st

Understory Vegetation with New Growth, Photo Taken October 29th

Imagery of Loblolly Pine Plantation, Photo Taken November 18th