



# Forest Health Monitoring Program Report January 12, 2022

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.

Chandler Barton, Forest Health Specialist – (501) 297-1581, [chandler.barton@arkansas.gov](mailto:chandler.barton@arkansas.gov)

---

## Interim Report: Effects of Anhydrous Ammonia Leak on Forests

Chandler Barton received reports of pine mortality on January 3<sup>rd</sup>, 2022. He visited properties within the affected area on Jan. 5<sup>th</sup> and 7<sup>th</sup>. As indicated in previous reports, Chandler is focusing his efforts on identifying secondary issues that contribute to tree mortality. Note that any observations of pine bark beetle infestations could increase the urgency for initiating salvage operations. The direct effects of anhydrous ammonia on trees are mostly unknown, but we can expect that the ammonia gas is a damage agent that weakens trees, thereby, making them more susceptible to other issues like bark beetles.



**Left: Drone image of mature loblolly pine taken Jan. 7, 2022. This tract is adjacent to the property where the leak occurred. Trees are mostly defoliated with brown leaves, but most have small green growth (1 to 2 inch shoots) that grew during the fall months.**

## Observations on Jan. 5 and 7, 2022:

### Defoliation

The most visible change over the past several months is the defoliation of damaged leaves. Pine trees have continually shed damaged leaves, giving them a thin and brown appearance. This would typically indicate a dead tree, **however, upon closer inspection, these trees are indeed alive.** Bark is firmly attached to healthy phloem, and there is no indication of decay fungi.

### New Green Growth

Using binoculars, another indicator of health can be observed. On most damaged trees, tiny shoots of green leaves are seen on branch tips. These formed in October and November and have persisted through the winter. Additionally, terminal buds appear healthy and will serve to produce new shoots of leaves in spring. These are clear indications that the ammonia gas did not immediately kill pine trees, however, the ammonia damage could incite other issues like Ips beetles.



**Above: Comparison of the same location after two months. The trees on the left are noticeably thinner.**

### Deodar Weevil

On Jan. 5<sup>th</sup> and 7<sup>th</sup>, Chandler discovered loblolly pine trees infested with deodar weevil, *Pissodes nemorensis*, on two properties. Deodar weevil is a beetle that infests damaged or stressed pine trees. These beetles can infest a single tree in high densities in the fall and winter months, and the infested tree is easily identified when bark falls off the tree. The bark is usually pulled off by woodpeckers that consume the larvae. Another characteristic sign of this beetle is the “chip cocoons” that they create in the sapwood. Fortunately, **deodar weevil alone is not an issue that warrants salvage operations**, as the scale of a deodar weevil infestation rarely exceeds losses of 5% of standing trees.

### Ips Bark Beetles

In Calhoun County, Ips beetles are not presently considered abundant. These beetles are considered secondary damage agents that contribute to tree death. Normally, a tree must be damaged considerably to attract Ips beetles. Drought, mechanical damage, and root dieback often precede Ips attacks. Chandler was able to identify a small number of trees with fresh attacks of Ips beetles on Jan 5<sup>th</sup>. All three species of Ips were identified. This was only observed on a tract adjacent to the gravel facility. There is potential for these infested trees to locally increase the population of Ips beetles, thereby increasing risk for additional mortality.

## Conclusions:

The observations of defoliation, green growth, and deodar weevil do not provide enough indication that the affected stands will or will not suffer catastrophic losses. However, the most concerning observation is the occurrence of Ips beetle infested trees.

As of the writing of this report, we do not believe the population of Ips in the affected area is large enough to have significant damaging effects. We have not observed more than a few infested trees and there were no attacks on trees that were girdled in October. Additionally, there are no other observations of Ips infestations in Calhoun County.

Despite the lack of immediate risks, there are several reasons to believe that Ips will increase in the affected area. Firstly, there is an ongoing drought in south Arkansas. On Jan.6<sup>th</sup>, the U.S. Drought Monitor showed that Calhoun County is categorized under “abnormally dry” and “moderate drought” (Appendix A). Drought conditions are known to increase Ips beetle abundance. Second, the pine trees in this area fit the description of a stressed host for Ips beetles.

Of note, deodar weevil could be seen in younger, small-diameter pine as well as mature trees. This beetle typically favors a smaller diameter tree and “chip cocoons” will be seen in the entire length of the trunk, but interestingly, many of the infested mature trees had chip cocoons in the middle to upper crown. From the ground, these mature trees appeared healthy, but binoculars could be used to find sections of bark falling off in the crown where deodar infested. We could speculate that these mature trees could be the perfect brood trees for Ips to increase their local abundance.



**Above: Drone image of the upper crowns of pine (at ~50ft). These trees were not infested at the base of the tree, but patches of bark were falling off the upper crown where deodar weevil had attacked (indicated by red circles).**



**Above: The finger is pointing to fresh Ips egg laying galleries found on Jan 5<sup>th</sup>.**



**Above: This tree was infested with deodar weevil in the fall months as indicated by the “chip cocoons.”**

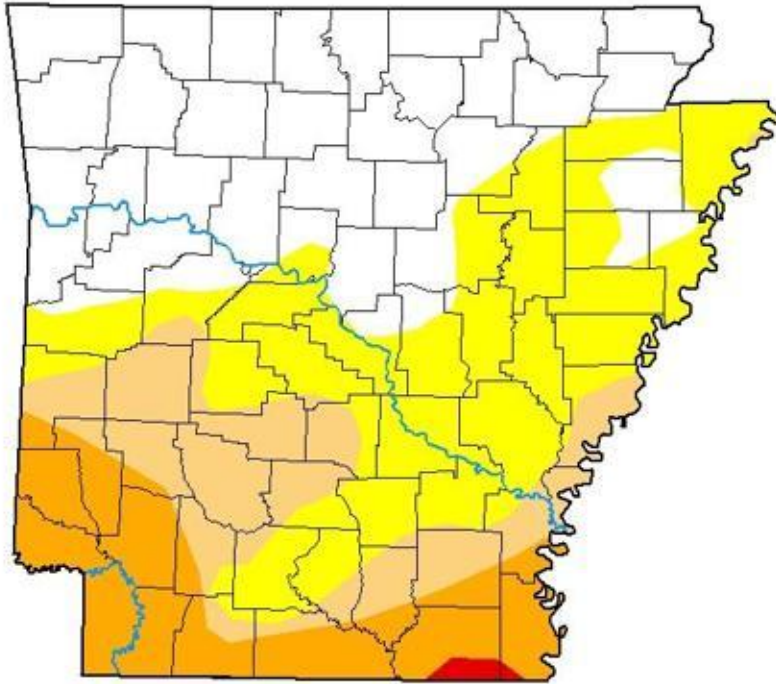
## **Recommendations:**

The Forest Health Specialist recommends salvage operations if Ips infested trees are found. Thinning these stands with Ips infested trees is not recommended. The trees damaged by ammonia gas are greatly stressed and the residual trees may be further susceptible to death after a thinning. The Forest Health Specialist and local Forestry Division foresters are available to conduct assessments to locate infested trees.

Evaluations should be made on a stand-by-stand basis. Pine stands that are significantly impacted by the leak and show presence of Ips infested trees should receive salvage harvests. Pine stands that do not have Ips presence should be monitored closely through the growing season, with an action plan developed in case salvage is warranted. Hardwoods will need to be evaluated once green up begins in late March through April of 2022.

# U.S. Drought Monitor Arkansas

**January 4, 2022**  
(Released Thursday, Jan. 6, 2022)  
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	39.91	60.09	28.99	14.24	0.41	0.00
<b>Last Week</b> 12-28-2021	23.76	76.24	29.83	2.67	0.00	0.00
<b>3 Months Ago</b> 10-05-2021	57.52	42.48	4.56	0.00	0.00	0.00
<b>Start of Calendar Year</b> 01-04-2022	39.91	60.09	28.99	14.24	0.41	0.00
<b>Start of Water Year</b> 09-28-2021	51.41	48.59	5.17	0.00	0.00	0.00
<b>One Year Ago</b> 01-05-2021	83.35	16.65	0.00	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Richard Tinker  
CPC/NOAA/NWS/NCEP



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)