

# 2020 Stump Audit Report

## Indiana DNR Division of Forestry



## **Executive Summary**

In March of 2020, the DNR Division of Forestry (DoF), using DoF personnel, conducted stump audits on two areas harvested in 2019 on state forest properties covering 185 acres. The 2020 audits were carried out on Jackson-Washington compartment 3 tract 15, and Morgan-Monroe compartment 5 tracts 13 and 18. These two sites represented more than 10% of all the sites that had a timber harvest that was completed in calendar year 2019. The sites were randomly selected for the audit.

In this audit we were able to account for 2,379 out of a total of 2,513 marked saw timber, poles, and culls that were marked for harvest in these sites, which is 94.67% accountability. There were 27 (1.1%) of the 2,379 trees and stumps accounted for that fell into the category of “Cut Stump/Unmarked.” Some of these stumps were covered with soil, cut very low for trails, or had moss growing on them, or were small trees cut out of the way of larger trees but were left onsite.

## **Background**

In the early 1980s through the late 1990s the DoF audited, at random, 10% of its completed timber harvests each year. This stump audit process is a check to be sure that only the trees that were marked to be sold and harvested were indeed harvested, and those that were not marked were left in the woods. In the late 1990s this type of audit was stopped while emphasis was given to auditing Best Management Practices (BMPs), because both audit types require large amounts of resources in personnel and time. As the BMP audits evolved over time and became more efficient and GPS equipment became available to make the stump audits more efficient, the DoF was able to do both types of audits. As a result, the stump audits began anew in 2011. In 2012, the DoF was prevented from completing the stump audits for that year by a tornado that tore through hundreds of acres in Clark State Forest. The resources that the DoF would have used for the audits were transferred to helping conduct the salvage efforts in the tornado-damaged areas. In 2013, the DoF resumed stump audits.

## **Methods**

At the beginning of each calendar year the DoF identifies all timber harvests that were closed out in the prior year. For instance, in early January of 2019, the DoF listed all the timber harvest areas that were completed and closed out in 2018. From that list the DoF chose three sites, at least 10% of the 2018 harvest areas, at random, for audit. Once the audit areas are chosen, the head resource specialist assembles teams of anywhere from four to twenty DoF personnel to do the audit.

The ultimate goal of a stump audit is to find every tree that was marked for the harvest, GPS its position, and record its condition (i.e., cut or left standing) and how it was marked (i.e., marked, unmarked, saw timber, or poles). In a perfect stump audit, 100% of the trees that were marked and tallied for the sale would be found, and there would be no discrepancies. However, in the real world, conducting a stump audit is hard work that involves looking under fallen tops that are

usually filled with dead leaves and debris. These places are difficult for a person to crawl into to see if there is a stump underneath. Hence, there are stumps and even standing marked trees that may be unaccounted for in a stump audit. Our goal is to account for at least 90% of the marked timber in the harvested tract and to be fairly certain that all the trees that were harvested were marked to be harvested. In 2020, we met that expectation.

In order to conduct an audit, each person on the auditing team is given a GPS unit containing a map of the area to be audited, and each team member is assigned a set of numbers. Each team member, working in coordination with the others will work through small areas of the harvested tract looking for harvested trees by looking for stumps and tops, and will record where the stump is, the tree species, and whether they can find a “stump mark.” While doing this task, each person will also check standing trees to see if they were marked to be harvested but were left. If any marked, standing trees are found, they are recorded in the GPS unit. The total of recorded trees should be within 5-10% of the number of trees marked for the harvest without having more trees audited than what was tallied to be sold. If more trees are found harvested or left than were marked for the harvest, an investigation would be started.

Auditors, when recording a tree, must record what they have found as CutStump/Marked, StandingTree/MarkSaw, StandingTree/MarkPole, StandingTree/Cull, and CutStump/Unmarked. The first part of each designation tells whether the recorded tree was standing or felled. The second part tells if the tree was marked, marked cull or had no bark, and in the case of standing trees, tells the product class the tree fit into per DoF protocol (Appendix). If the tree is cut, the auditor will look for a mark, but often the cut line of the stump will be level with part of the stump mark; therefore, the auditor will see the stump mark but not be able to differentiate between an “x” and a dot. However, if they find no stump mark, they will record “unmarked.” Doing so does not necessarily mean that it was an unmarked tree, but that the mark was above the cut line, the bark was rubbed off during the removal of the timber, covered with mud, or any other number of things. Should there prove to be many unmarked stumps and more trees harvested and marked than what was tallied, an investigation will be conducted to be sure no trees were harvested that were not supposed to be.



Picture 1. Yellow marking identifies trees marked for poles.

Members of the audit team will form a type of picket line to cross a hill or area, but not lose sight of each other so that they know there are no stumps or marked standing trees missed. Each recorded tree will be assigned a number from the set of numbers that each individual team member was given, and they will also paint that number on the tree or stump they found so that no trees are counted more than once. As each area of the harvest is covered, the team will move to a new area until the entire harvest area is completed. In smaller areas with just a few trees, a small number of people can accomplish this task in less than an hour. Completing bigger areas with thousands of trees can take more than a day with a large team.

Once the team members complete the audit on-site, they download what they recorded on the GPS unit into the computer of the LTB forester, who then will analyze the data and make sure they are within 90% of the number of trees that were to be harvested. Once that is confirmed, the team is released to go home, and the data are analyzed at a later date to be sure the team did not find more trees than were supposed to be harvested.



Picture 2. Marked sawtimber tree that was felled.

## **Results**

In the two tracts 2,513 trees, poles and culls were marked for harvest and 2,379 were accounted for in the audits, for 94.67% accountability. There were 1,744 stumps that were marked, which is 73.3%. A total of 539 (22.7%) were standing marked poles; 25 (1.1%) were standing trees marked as saw timber; 15 (0.6%) were stumps that had no bark on them; 27 (1.1%) were stumps that did not have marks on them that could be found; 28 (1.2%) were standing trees marked as culls; and one (0.0%) stump was found marked as cull.

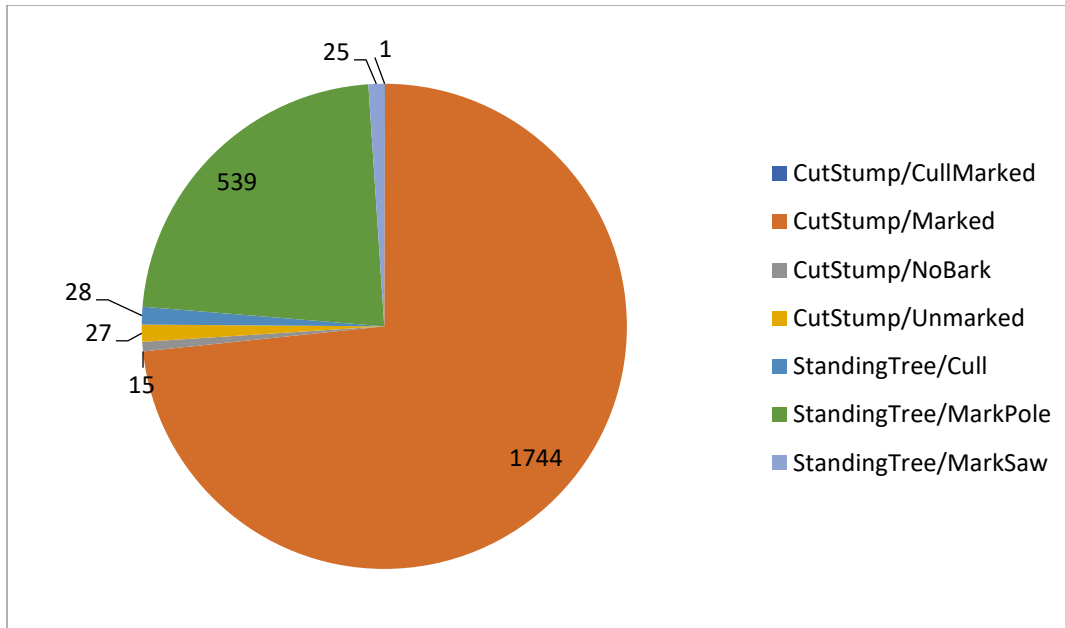


Figure 1. Number of trees audited in each category.

**Individual Sale Findings:**

**Jackson-Washington Compartment 3 Tract 15**

Jackson-Washington C3T15 had a harvest area of 54 acres in a 54-acre tract, and was audited on March 3, 2020, finding 1,244 trees out of 1,376 (90.41%) that were originally marked. Of the 1,244 audited trees and stumps in C3T15, a total of 884 (71.18%) were stumps that were marked; 286 (23.0%) were standing marked pole trees, there were 26 (2.10%) standing marked cull trees, 19 (1.50%) were cut stumps with no visible mark; 14 (1.10%) cut stumps were completely missing bark; 14 (1.10%) were standing marked saw trees, and there was one cut stump marked as a cull. This harvest had six openings.

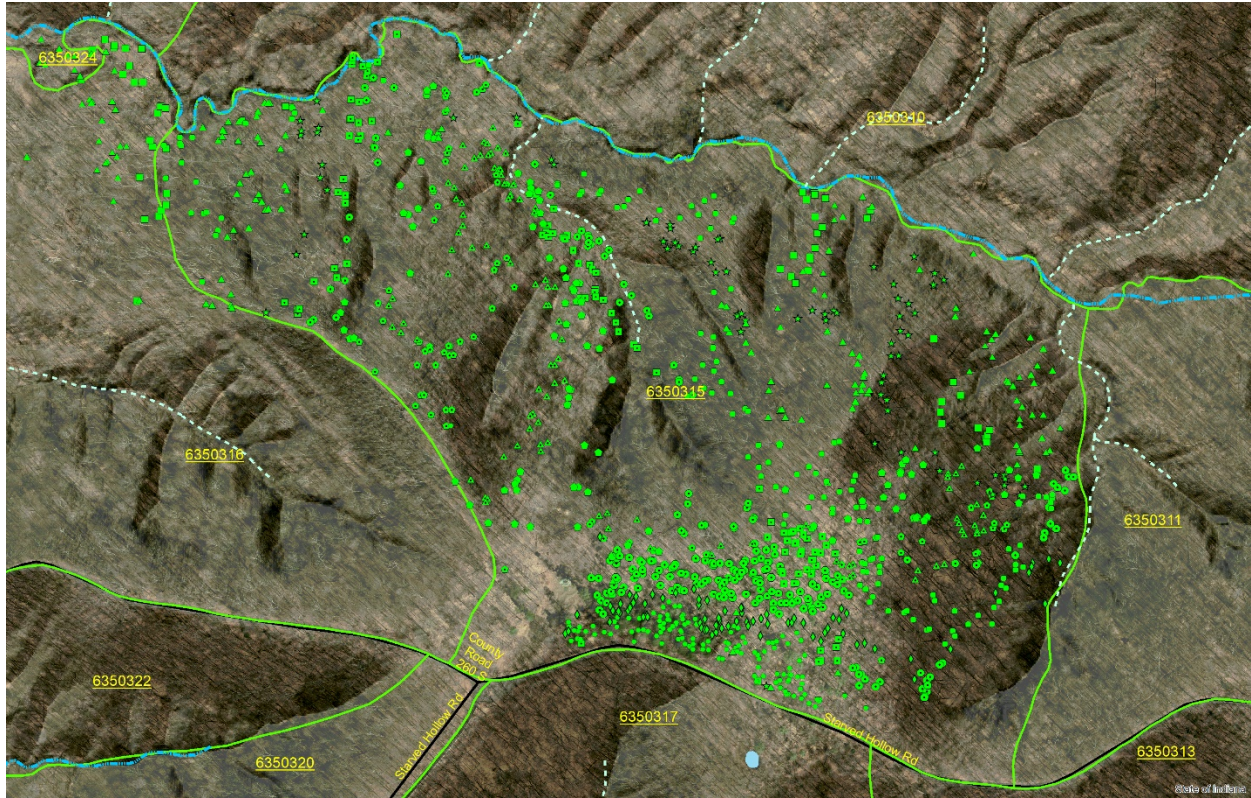


Figure 2. Map of GPSed stumps and trees and aerial map of Jackson-Washington C3T15.

Morgan-Monroe Compartment 5 Tract 13 and 18

Morgan-Monroe C5T13&18 was actually a harvest of four tracts (10, 13, 18, and 19), with a total of 353 acres. However, we pulled these two tracts at random out of the four. Tracts 13 and 18 covered 131 acres of the total harvest area. This area was audited on March 4, 2020 and found 1,135 (99.8%) trees out of the marked 1,137. Of the 1,135 audited trees and stumps, 860 (75.8%) were stumps that were marked; 253 (22.3%) were standing marked poles; 11 (1.0%) were standing marked saw timber; 8 (0.7%) were cut stumps with no visible mark; 2 (0.18%) were standing marked culls; and 1 (0.09%) was a cut stump completely missing bark. This harvest had six openings.

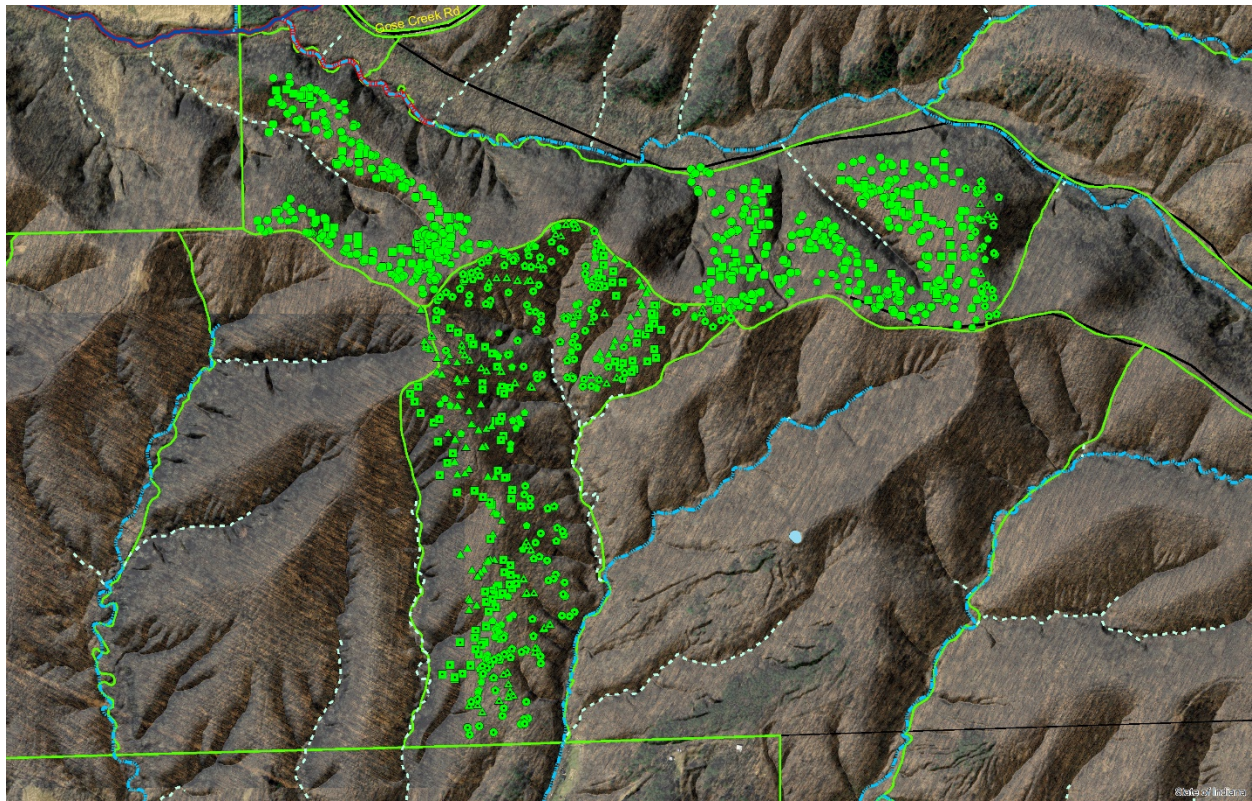


Figure 3. Map of GPSed stumps and trees and aerial map of Morgan-Monroe C5T5.



## Appendix

### Product Definitions

The product definitions listed below are designed to classify the tree into several useful categories to help determine the existing condition of the forest, and future needs. For the product categories, the trees are considered alive except for the snag product.

**S** Sawtimber trees are those trees in the 14-inch diameter class and larger that are considered to have merchantable sawtimber volume. Sawlog height is measured using 12-foot logs to a 10-inch diameter inside bark (DIB).

**Q** Quality saw timber trees are saw timber trees that have high quality, i.e., minimal defect, but don't quite reach prime quality. Quality trees must be at the minimum in the 16-inch diameter at breast height (DBH) class. The determination of quality is made in the butt log. Quality trees cannot have any decay defects in the butt log. Quality trees can have some, limited, non-decay minor defect in the butt log, but can have no major defect. There can be no internal decay in the butt log — evidenced through sounding for punky wood or hollow sound. Quality trees can have decay defect in the upper logs as long as it does not produce greater than 20% defect deduction. Saw log height is measured using 12-foot logs.

**V** The V is from veneer, but this really refers to prime trees. The term veneer here designates prime trees, per the stated grading guide. The only species to be considered to have prime are black walnut, northern red oak, white oak, chinkapin oak, swamp chestnut oak, swamp white oak, and burr oak. The determination of prime is made in the butt log. If the butt log cannot make prime, but a higher log can, the tree is still not considered prime. To be considered prime, black walnut must have a minimum 8 feet of clear log length on all four faces and a minimum DBH of 17 inches. The oaks must have a minimum of 8 feet clear length on all four faces and a minimum DBH of 19 inches. To be clear log length, there can be no visible defects such as knots, pin knots, cat faces, seams, scars, etc. on the butt log except close to the ground line on root flares. There can be no open defects such as a dead fork, open hole, or surface decay anywhere on the butt log. There can be no internal decay in the butt log — evidenced through sounding for punky wood or hollow sound. Prime trees can have decay defect in the upper logs as long as it does not produce greater than 10% defect deduction. Saw log height is measured using 12-foot logs.

**P** Poles are considered to have no merchantable sawtimber volume, and are trees in and smaller than the 13-inch diameter class, down to the 6-inch class. Volume in poles is calculated in cords. Poles with defect that destroys their volume can be considered culls. Cordwood height to a 4-inch DIB is measured using 16-foot logs.

**C** Culls are defined as live trees with no merchantable volume. Poles can be considered culls when they are determined to have essentially no sound cord volume. Height to a 4-inch top is measured using 16-foot logs.

**N** Snags are defined as standing, dead trees. These can be sawtimber size or pole size. Height to a 4-inch DIB is measured using 16-foot logs.

**A** Saplings are live trees in the 5-inch class to the 1-inch class. No merchantable height measure is taken.

The leave and remove/harvest designations are used to determine the likely status of a particular tree when management activities occur in the area. This would include trees whose removal is recommended to occur. A tree to be removed could be removed via several operations—timber stand improvement (TSI), logging, or hazard-tree removal in recreation areas. In a typical forest, situation there are several reasons a tree would be chosen for removal/harvest:

- The tree exhibits poor vigor/weak crown and will likely die before the next management activity is likely to occur.
- The tree has a major defect, and its removal would benefit surrounding decent trees by providing release.
- The tree is a decent tree in among many decent trees that are competing against one another. The tree must be removed to provide significant release on residual decent trees to improve vigor and growth and prevent stagnation and eventual mortality.
- The tree is competing against other trees that are preferred to reach the desired future condition of the tract, and its removal would benefit the growth of the preferred trees. Preference may be determined by site conditions, species composition, quality, or combinations of these.