



2016 Stump Audit Report

Indiana DNR Division of Forestry

Executive Summary

In March 2016, the DNR Division of Forestry (DoF), using DoF personnel, conducted stump audits on four harvest areas in state forest properties covering 200 acres, on harvests completed in 2015. The 2016 audits were carried out on Greene-Sullivan compartment 3 - tract 1, Jackson-Washington compartments 5 and 6, Martin compartment 1 - tracts 1 and 11, and Yellowwood compartment 14 - tract 4. These four sites represented over 10% of all the sites that had a timber harvest that was completed in calendar year 2015. The sites were randomly selected for the audit.

In this audit we were able to account for 1,903 out of a total of 2,077 marked sawtimber, poles, and culls that were marked for harvest in these sites, which is 91.62% accountability. There were 94 (4.9%) of the 1,903 trees and stumps accounted for that fell into the category of “Cut Stump/Unmarked,” and many of these stumps were in trails or on landings where all the bark had been removed by equipment and logs running over them. These four sites were common state forest timber harvests.

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 1990's 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, and so 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 got back to completing stump audits and will continue doing so in perpetuity.

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 2016, the DoF listed all the timber harvest areas that were completed and closed out in 2015. From that list the DoF chose 10% of those harvest areas, at random, for audit. In 2016 that 10% made up four timber-sale areas on four different state forest properties. Once the audit areas are chosen, the head Resource Specialist assembles teams of anywhere from four to 20 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 (cut and marked, cut, marked and left, or left standing). 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 in places that only a rabbit was designed to crawl through. 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 can 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 order to conduct an audit, each person on the auditing team will be given a GPS unit containing a map of the area to be audited and each team member will be 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, then 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 us 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, then they will record “unmarked,” which 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 moving of the timber, covered with mud, or any 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.

The 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 that 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 assigned 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. 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.

Results

In the four tracts that totaled 2,077 trees, poles and culls were marked for harvest and 1,903 were accounted for in the audits, for 91.62% accountability. There were 1,274 stumps that were marked, which is 66.9% of the 1,903, 228 (12.0%) standing marked poles, 227 (11.9%) standing trees marked as sawtimber , 52 (2.7%) standing trees marked as culls, 94 (4.9%) stumps that did not have marks on them that could be found, 14 (0.7%) stumps were marked as culls, and 14 (0.7%) stumps that had no bark on them, so no mark could be found on them.

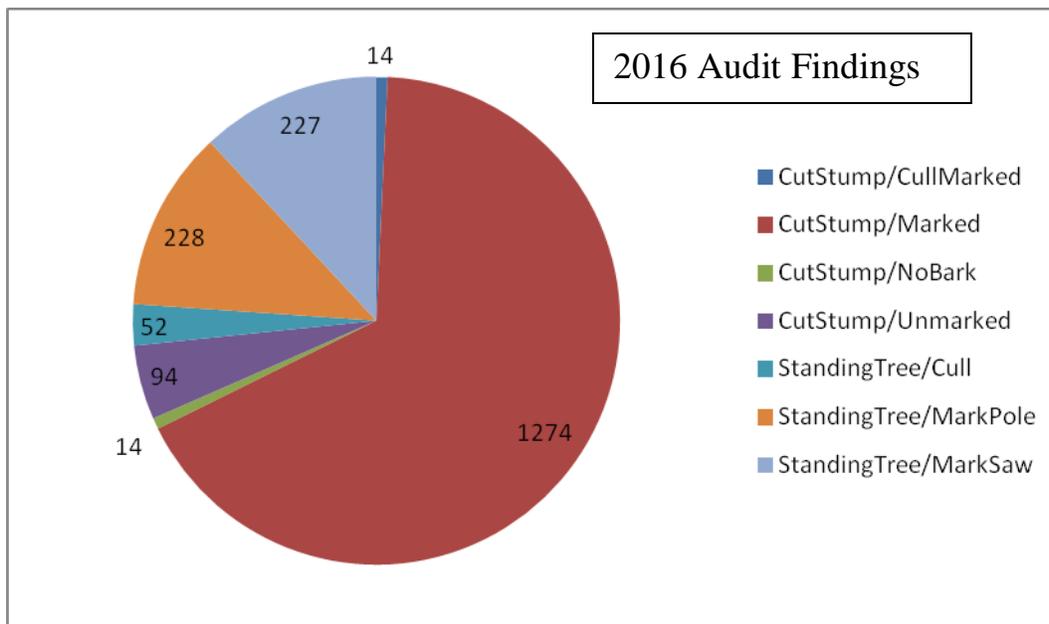


Figure 1. Number of trees audited in each category.

Individual Sale Findings:

Greene-Sullivan Compartment 3 Tract 1

G-S C3T1 was audited on March 14, 2016, and found 747 trees out of 828 (90.22%) that were originally marked. Of the 747 audited trees and stumps, 15 (2.0%) were cut stumps with no visible mark, and no cut stumps were completely missing any bark, 321 (43.0%) were stumps that were marked for sawtimber, and 208 (27.8%) that were marked for sawtimber were found still standing. No stumps were found that were marked as culls, and 30 (4.0%) marked as culls were found still standing, and 173 (23.2%) marked poles were found still standing.

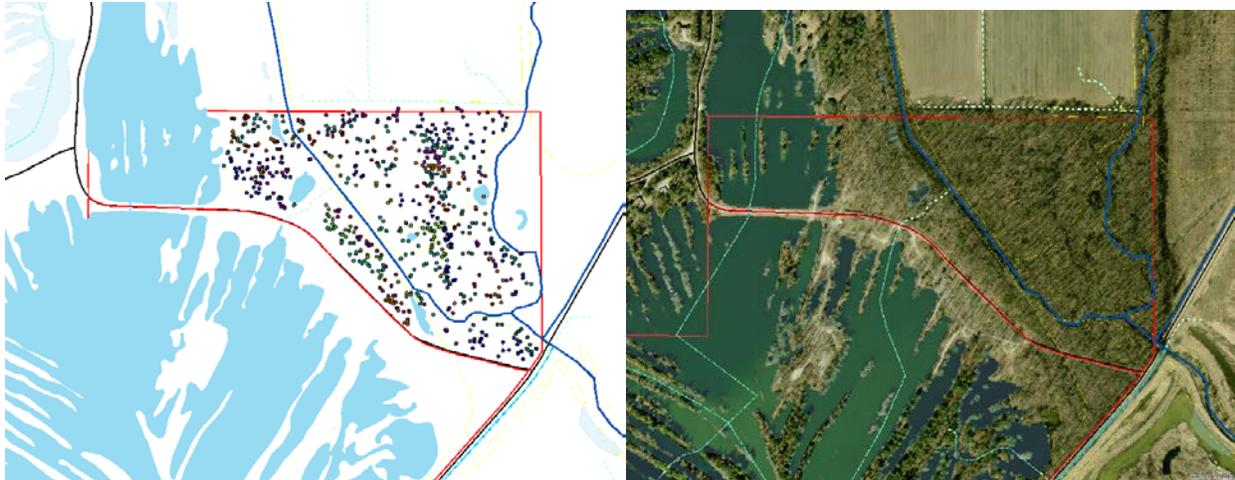


Figure 2. Map of GPS'd stumps and trees and aerial map of G-S C3T1.

Jackson-Washington Compartments 5 and 6

J-W C5T4, 7, 8, 10, 11, 13, 14, and 15 and C6T1 is an area of 44 acres marked within an area of 559 acres. This area was audited on March 7, and June 29, 2016, and found 569 (88.77%) trees out of the marked 641. Of the 569 audited trees and stumps, 10 (1.8%) were cut stumps that had no visible mark, and another 5 (0.9%) cut stumps had no bark on them, 501 (88.0%) were stumps that were marked for sawtimber, and 6 (1.1%) that were marked for sawtimber were found still standing, 10 (1.8%) stumps found were marked as culls, 11 (1.9%) marked as culls were found still standing, and 26 (4.6%) marked poles were found still standing. This audit had many problems. The harvest was spread across several ridges. There was a tremendous amount of Japanese stilt grass in the openings that covered the stumps and made them difficult to find. Despite a good audit in March, two people went back in June and found another 19 trees, but not enough to make 90%. With multiple visits, many man hours and a thick matt of vegetation in several openings, the audit was stopped even though we were 1.23% short of 90%. The conclusion was reached that further time and effort would not result in additional findings. We surpassed our due diligence test and the audit was concluded.

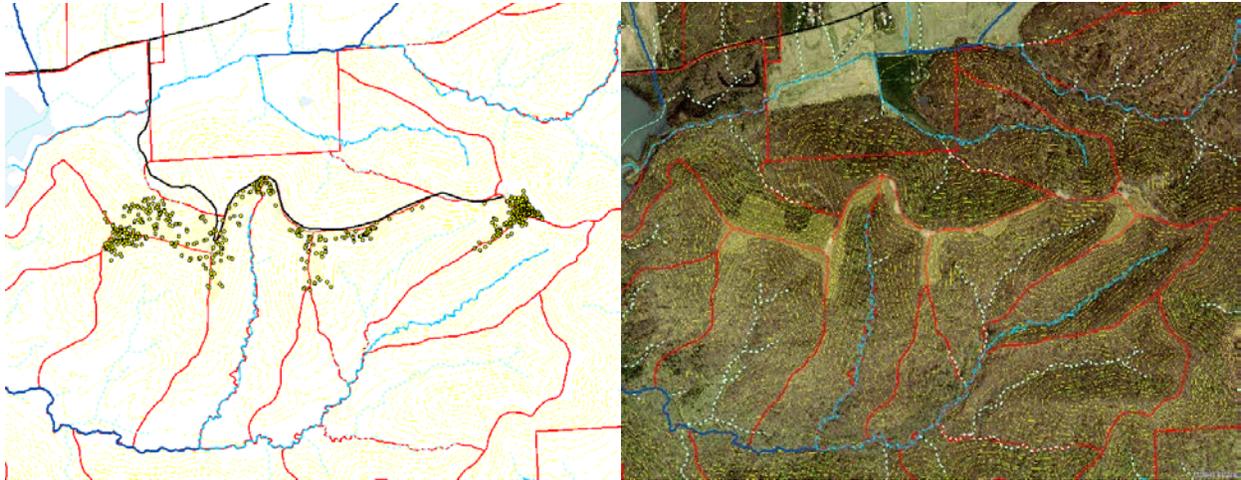


Figure 3. Map of GPS'd stumps and trees and aerial map of J-W C5+6.

Martin Compartment 1 Tract 1 and 11

Martin C1T1+11 are two tracts with a combined 190 acres out of which 70 acres were marked. These tracts were audited on March 11, 2016, and found 45 (85.54%) trees out of the marked 52. Of the 45 audited trees and stumps, 18 (40.0%) were cut stumps had no visible mark, 19 (42.2%) were stumps that were marked for sawtimber, and 2 (4.4%) that were marked for sawtimber were found still standing. There were no stumps found that were marked as culls, four (8.9%) marked as culls were found still standing, and 2 (4.4%) marked poles were found still standing. This harvest had a low percentage found due to the length of time between marking, harvest and audit complicated by the dying ash in this area. There were many standing, dead ash in that area and sloughing their bark, which means the paint would have been lost. Nine ash were marked in the selective harvest, and five were found. In contrast, we found 21 of 23 black oak that were marked. During this audit, we walked through this tract twice on March 11, revisited the site later, and found no more than what we found originally. Even though we were 4.46% short of our goal, the missing ash was an obstacle that we felt we could not overcome and stopped the audit having surpassed due diligence in this audit as well.

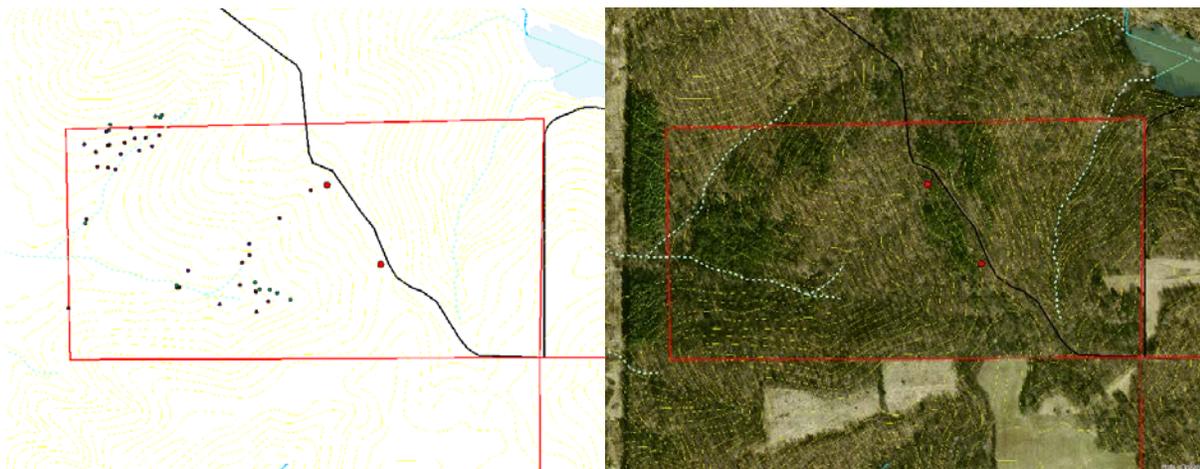


Figure 4. Map of GPS'd stumps and trees and aerial map of Martin C1T1+11.

Morgan-Monroe Compartment 14 Tract 4

M-M C14T4 is a 44-acre tract that was marked. This tract was audited on March 8, 2016, and found 542 (97.48%) trees out of the marked 556. Of the 542 audited trees and stumps, 51 (9.4%) were cut stumps had no visible mark, and another nine (1.7%) cut stumps had no bark on them, 433 (79.9%) were stumps that were marked for sawtimber, and 11 (2.0%) that were marked for sawtimber were found still standing. Four (0.7%) stumps were found that were marked as culls and seven (1.3%) marked as culls were found still standing, and 27 (5.0%) marked poles were found still standing.

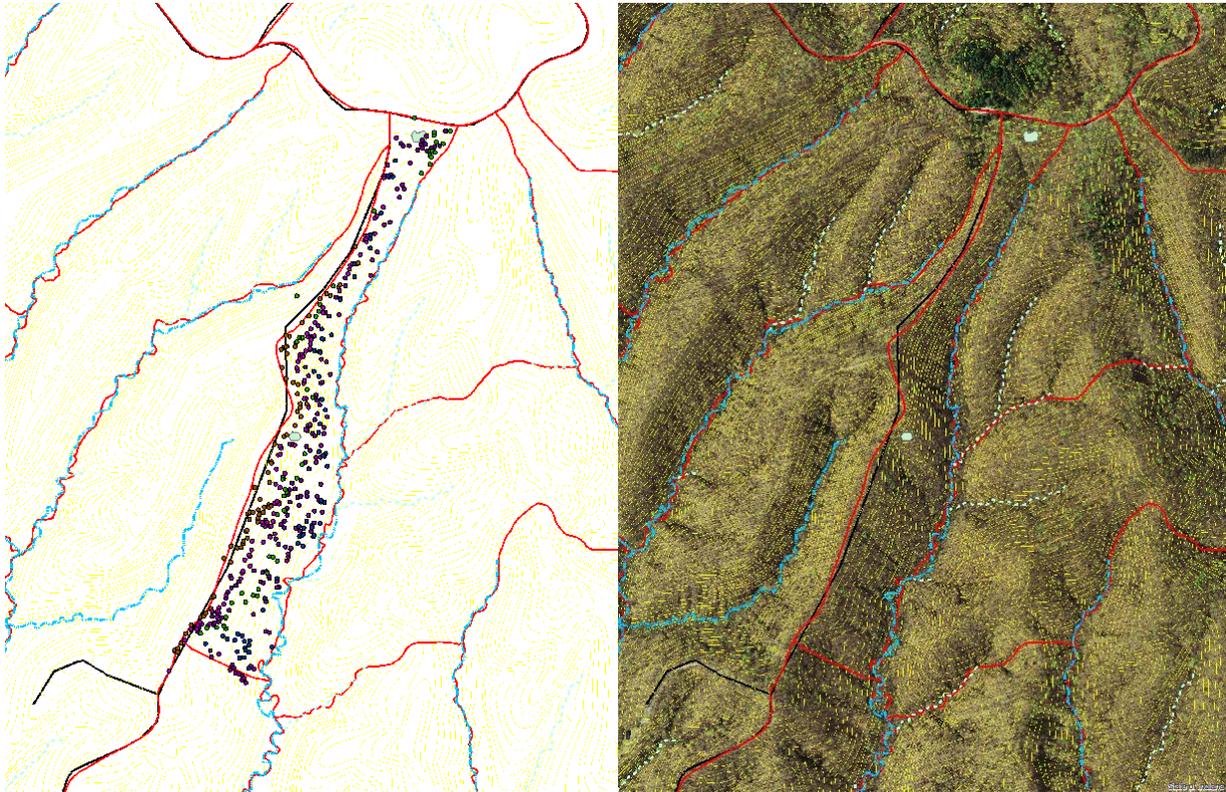


Figure 5. Map of GPS'd stumps and trees and aerial map of M-M C14T4.

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 dib.

Q Quality sawtimber trees are sawtimber 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 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. Sawlog 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, catfaces, 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. Sawlog 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 six-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 on these.

The leave and remove/harvest designations are to determine the likely status of a particular tree should management activities occur in the area. This would be for trees whose removal is recommended to occur. A tree to be removed could be removed via several operations — TSI, logging, 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.