Indiana Department of Natural Resources

2018 Stump Audit Report

Indiana DNR Division of Forestry

Executive Summary

In March 2018, the DNR Division of Forestry (DoF) conducted stump audits on four areas on state forest properties that had completed harvests in 2017. Combined, the four areas covered 416 acres. The audits took place on Ferdinand compartment 6 - tract 11; Harrison-Crawford compartment 28 - tract 7; Martin compartment 4 - tract 7; and Morgan-Monroe compartment 13 – tract 4. These four sites represented more than 10% of all sites that had a timber harvest that was completed in calendar year 2017. The audit sites were randomly selected.

In this audit, we were able to account for 5,516 out of a total of 5,933 trees that were marked for harvest in these sites, which is 92.97% accountability. There were 89 (1.6%) of the 5,516 trees and stumps accounted for that fell into the category of "Cut Stump/Unmarked," some of these stumps were in trails or had moss growing on them.

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 to ensure that only trees that were marked to be sold and harvested were indeed harvested and that unmarked trees were left in the forest. In the late 1990s this type of audit was stopped while emphasis was given to auditing Best Management Practices (BMPs). Stump audits were discontinued because both audit types require large amounts of personnel and time. Over time, BMP audits evolved and became more efficient, and new GPS equipment made stump audits easier. These advances allowed the DoF to do both types of audits beginning in 2011. In 2012, the DoF could not conduct annual stump audits because a tornado tore through hundreds of acres in Clark State Forest. Resources were transferred to helping conduct salvage efforts in 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 2018, the DoF listed all the timber harvest areas that were completed and closed out in 2017. From that list, the DoF chose four sites, 10% of the 2017 harvest areas, at random, for audit. Once the audit areas are chosen, the head Resource Specialist assembles teams of four to 20 DoF personnel to do the audit.

The goal of a stump audit is to find every tree that was marked for harvest, mark its position with GPS, and record its condition (cut or left standing) and how it was marked (marked, unmarked, saw timber, or poles). In a perfect audit, 100% of trees that were marked and tallied for the sale would be accounted for and there would be no discrepancies. However, in the real world, conducting a stump audit is hard work. It involves looking under fallen tops that are usually filled with dead leaves and debris. 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 2018 we were able to meet that expectation.

Each person on the auditing team is given a GPS unit containing a map of the audit area, 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. They look for harvested trees by looking for stumps and tops. They record where the stump is, the tree species, and whether they can find a "stump mark." Each person also will check standing trees to see if they were marked for harvest 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 and should not exceed the number marked for harvest. If the number of trees harvested and trees found left add up to exceed the number marked for harvest, then an investigation begins.

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 will be unable to differentiate between an "x" and a dot. However, if they find no stump mark, then they will record "unmarked." This initial designation does not automatically mean that it was an unmarked tree. Often, the mark was above the cut line, or the stump's bark rubbed off during the moving of timber, or was 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, remaining in sight of each other so that no stumps or marked standing trees missed. Each recorded tree is painted with an assigned number, 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, even 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 5,933 trees, poles and culls were marked for harvest, and 5,516 were accounted for in the audits, for 92.97% accountability. There were 3,374 stumps that were marked, which is 61.1% of the 5,516. Eighty-nine (1.6%) stumps did not have marks on them that could be found; 28 (0.5%) stumps had no bark on them; 1,310 (23.7%) were standing marked poles; 383 (6.9%) were standing trees marked as saw timber; 332 (6.0%) were standing trees marked as culls; and 13 (0.2%) stumps were marked as culls.

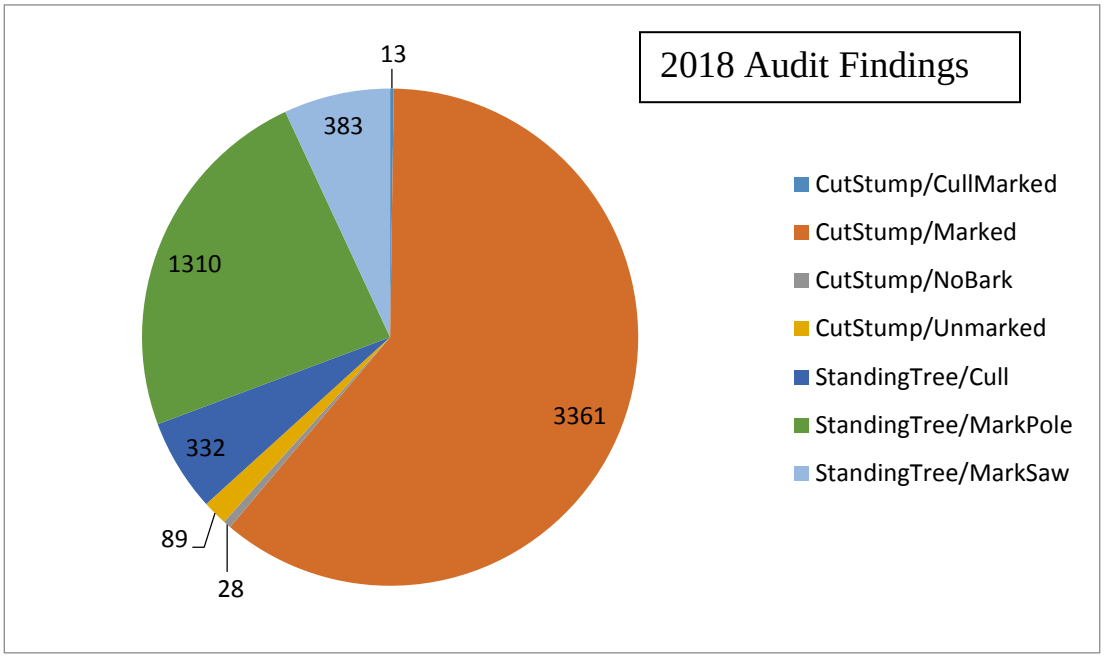

Figure 1. Number of trees audited in each category.

Individual Sale Findings:

Ferdinand Compartment 6 Tract 11

Ferdinand C6T1 has an area of 14 acres and was audited on March 5, 2018. The audit found 372 trees out of 410 (90.73%) that were originally marked. Of the 372 audited trees and stumps in C6T11, 265 (71.2%) were stumps that were marked for saw timber; 74 (19.9%) were marked poles still standing; 12 (3.2%) were cut stumps with no visible mark; 12 (3.2%) cut stumps were completely missing bark; nine (2.4%) were marked saw timber still standing; and there were no trees marked as culls that were found still standing. This harvest consisted of one 14-acre tract adjacent to I-64 and had an acre-and-a-half in two openings.

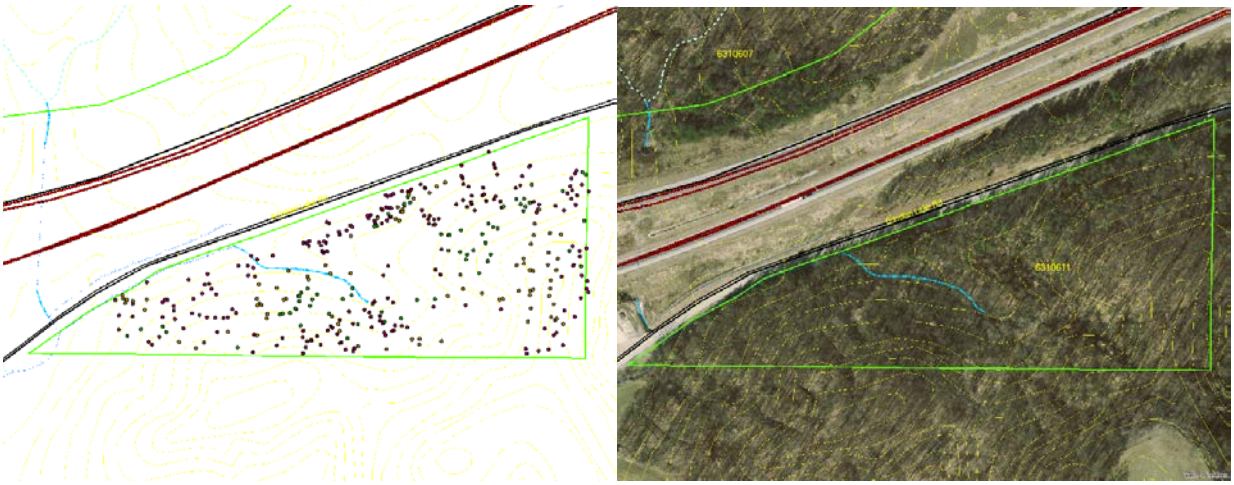

Figure 2. Map of GPS-marked stumps and trees and aerial map of Ferdinand C6T11.

Harrison-Crawford Compartment 28 Tract 7

H-C C28T7 is an area of 175 acres. This area was audited on March 6, 2018. The audit found 3209 (92.21%) trees out of the marked 3,480. Of the 3,209 audited trees and stumps, 1,913 (59.6%) were stumps that were marked for saw timber; 829 (25.8%) were standing marked poles; 311 (9.7%) were standing marked culls; 82 (2.6%) were standing marked saw timber; 52 (1.6%) were cut stumps with no visible mark; 12 (0.4%) stumps found were marked as culls; and 10 (0.3%) were cut stumps completely missing bark. This harvest had several openings with large quantities of debris.

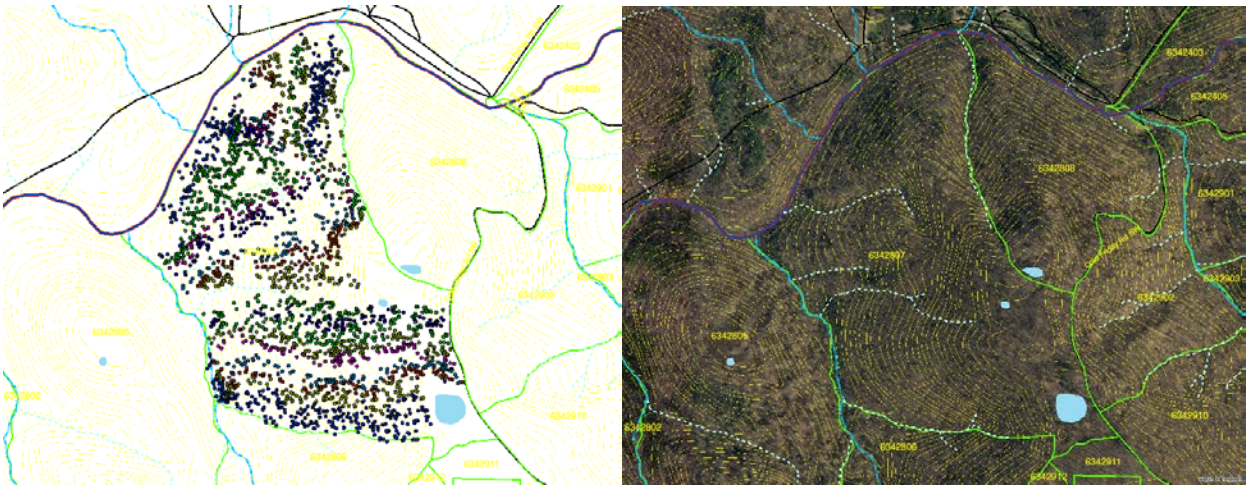

Figure 3. Map of GPS-marked stumps and trees and aerial map of H-C C28T7.

Martin Compartment 4 Tract 7

Martin C4T7 is a tract with 130 acres. This tract was audited on March 7, 2018. The audit found 1,245 (94.18%) trees out of the marked 1,322. Of the 1,245 audited trees and stumps, 615 (49.4%) were cut stumps that were marked for saw timber; 328 (26.3%) were standing trees that were marked as poles; 265 (21.3%) were standing trees marked for saw timber; 21 (1.7%) were

standing trees marked as culls; 10 (0.8%) were cut stumps where no mark was found; and 6 (0.5%) were cut stumps that had little to no bark left on them.

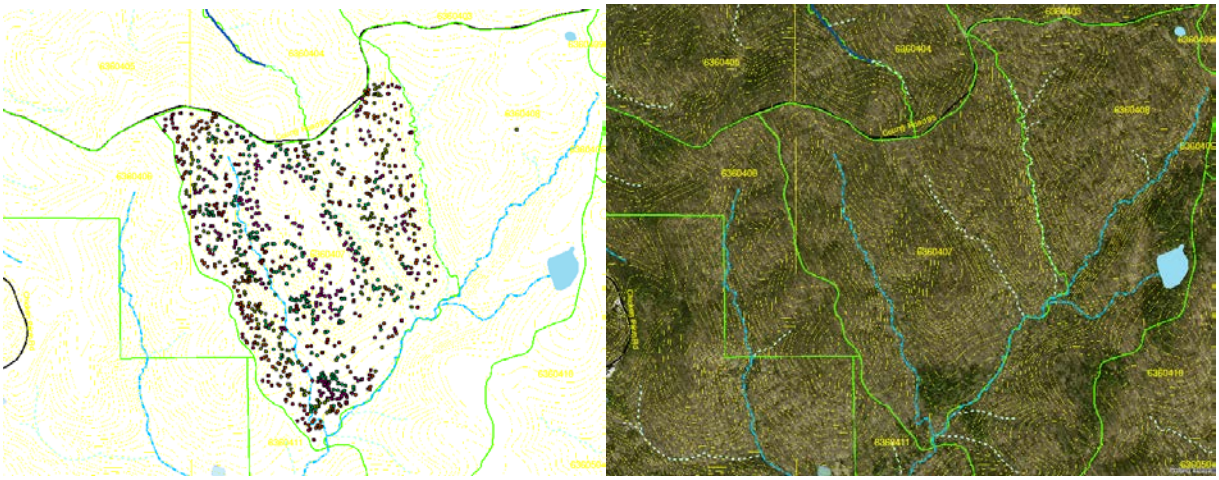

Figure 4. Map of GPS-marked stumps and trees and aerial map of Martin C4T7.

Morgan-Monroe Compartment 13 Tract 4

M-M C13T4 is a 101-acre tract in which 76 acres were marked for harvest. This tract was audited on March 8, 2018. The audit found 690 (95.70%) trees out of the marked 721. Of the 690 audited trees and stumps, 568 (82.3%) were cut stumps marked as saw timber; 79 (11.4%) were standing trees marked as poles; 27 (3.9%) were standing trees marked as saw timber; and 15 (2.2%) were cut stumps with no visible mark.

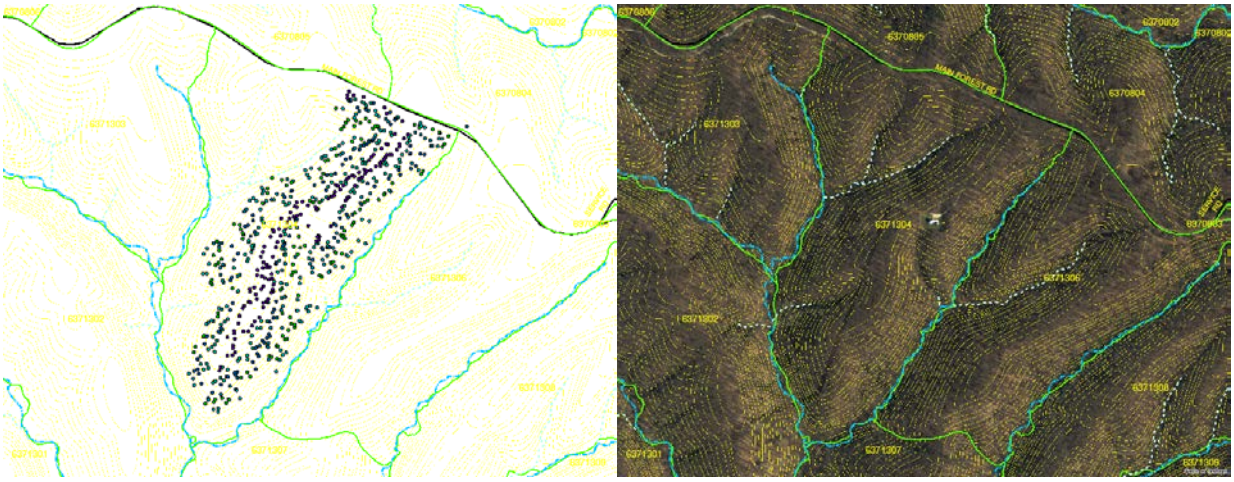

Figure 5. Map of GPS-marked stumps and trees and aerial map of M-M C13T4.

Appendix

Product Definitions

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

S Saw timber trees are in the 14-inch diameter class and larger. They are considered to have merchantable saw timber volume. Saw log 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 bur 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 saw timber volume, and are trees in and smaller than the 13-inch diameter class, down to the 6-inch class. Volume in poles in 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 saw timber 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 — timber stand improvement (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.