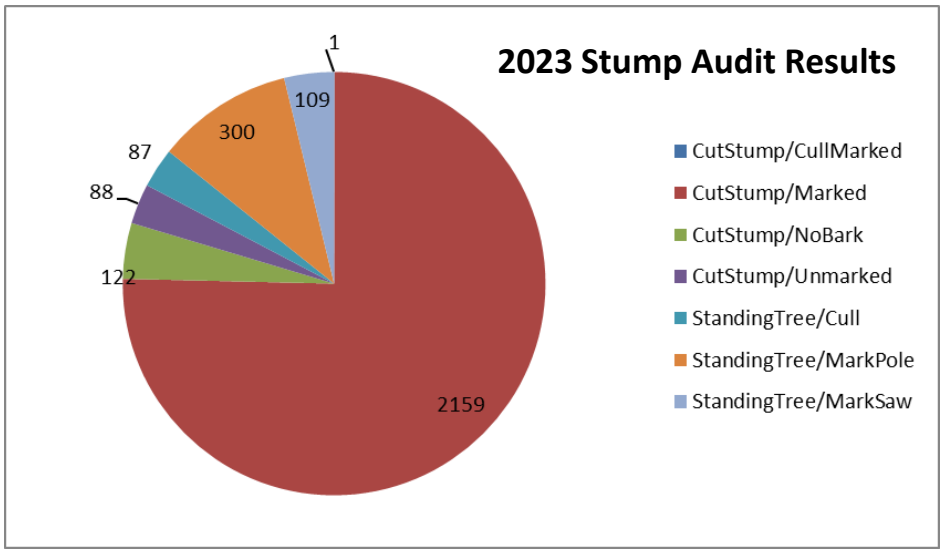
2023 Stump Audit Report

DNR
Indiana Department of Natural Resources
Forestry

Executive Summary

In 2023, the DNR Division of Forestry (DoF), using its personnel, conducted stump audits on two state forest property tracts covering 141 acres harvested in 2022. The 2023 audits were carried out on Greene-Sullivan State Forest compartment 8 tracts 3 and 4, and Harrison-Crawford State Forest compartment 11 tracts 4 and 6. These sites represented 10% or more of all the sites that had a timber harvest completed in 2022 and were randomly selected from the 20 harvests completed.

In this audit, the DoF was able to account for 2,866 out of a total of 3,125 marked saw timber, poles, and culls that were marked for harvest in these sites, which is 91.71% accountability. There were 88 (3.1%) of the 2,866 trees and stumps accounted for that fell into the category of Cut Stump/Unmarked. Some of these stumps were covered with soil, missing bark or part of the stump, were hard to see because they were covered with debris, or were small trees cut out of the way of larger trees but were left onsite.



The total number of trees and stumps found in the 2023 stump audit.

Background

From 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 make 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 place. 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, 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 help 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 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 harvest areas completed in 2018, at random, for audit. 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 (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, 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 in to see if there is a stump underneath. For these reasons, 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 2023, we met that expectation overall, but were one tree short at one site.

To conduct an audit, each auditing team member is given a GPS unit containing a map of the area to be audited and assigned a set of numbers. Then, in coordination with the others, each team member works through small areas of the harvested tract seeking harvested trees by looking for stumps and tops, and records where the stump is, the tree species, and whether they can find a "stump mark." Each person also checks standing trees to see if they were marked to be harvested but were left. If any stumps or 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 is started.

Auditors, when recording a tree, 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 fits into in the DoF protocol (Appendix). If the tree is cut, the auditor looks for a mark, but often the cut line of the stump is 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 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

A standing tree marked as a cull
(photographer unknown)

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.

Members of the audit team form a type of picket line to cross a hill or area but try not to lose sight of each other so they know there are no stumps or marked standing trees missed. Each recorded tree is assigned a number from the set of numbers each team member was given, and they 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 moves 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.

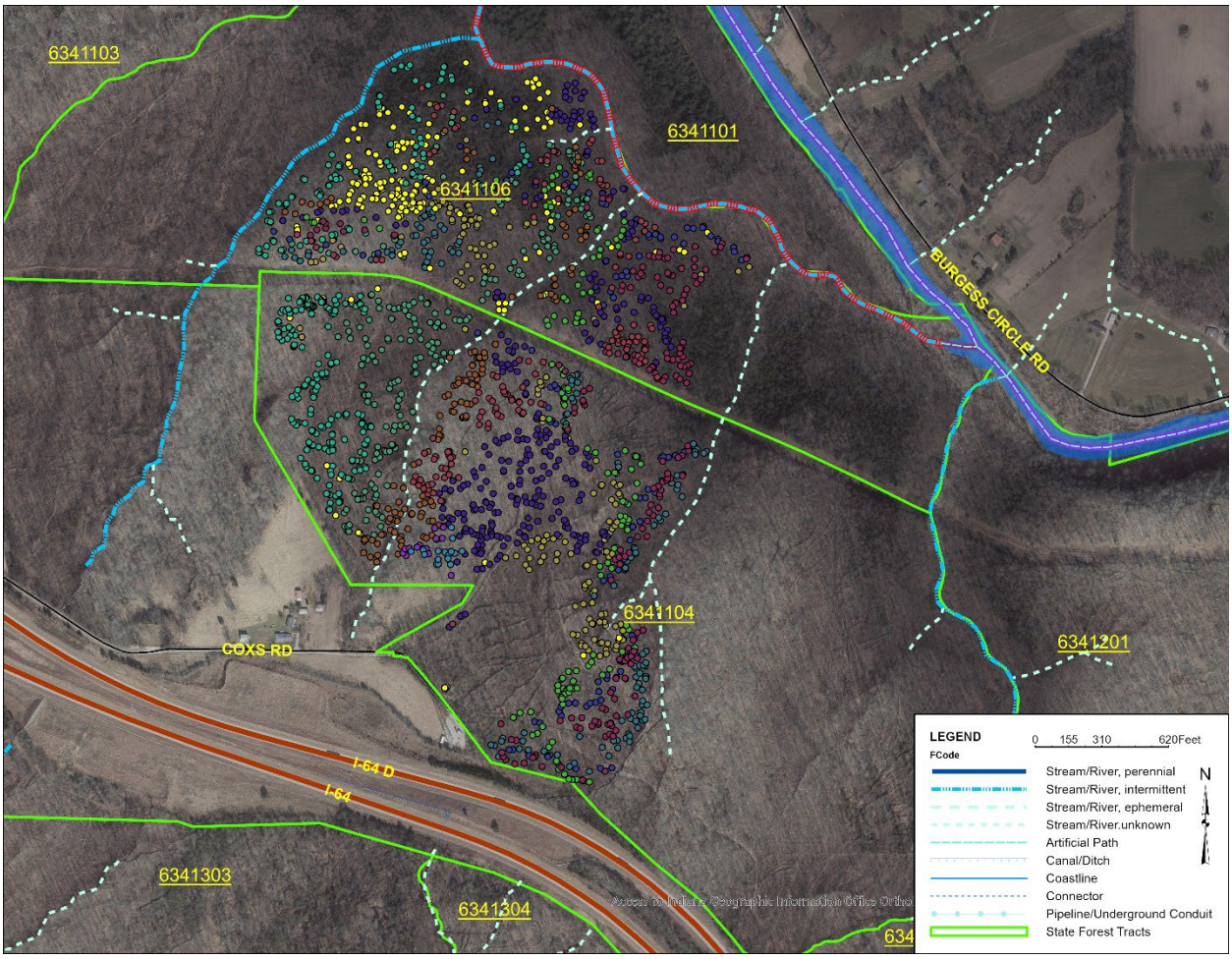
Once the team members have completed the audit on site, they download what they recorded on the GPS unit into the computer of the LTB forester, who then analyzes the data and makes sure it is within 90% of the number of trees that were scheduled to be harvested. Once that is confirmed, the team is released to go home, and the data is analyzed again at a later date to be sure the team did not find more trees than were supposed to be harvested.

An auditor taking information and GPS points on a found stump (Picture by Bradley Schneck)

Results

Harrison-Crawford Compartment 11 Tracts 4 and 6

This site was a total of 276 acres with 97 marked for the harvest. In the harvest area we audited for 2,362 trees, poles, and culls were marked for harvest and 2,125 were accounted for in the audit, for 89.97% accountability. A total of 116 of the 2,125 (5.5%) were standing marked poles, 70 (3.3%) were standing trees marked as saw timber, 83 (3.9%) were stumps that did not have marks on them, 115 (5.4%) were stumps that had no bark on them, 3 (0.1%) were standing trees marked as culls, 1 (0.0%) stump was found marked as cull and 1,737 (81.7%) were marked stumps.



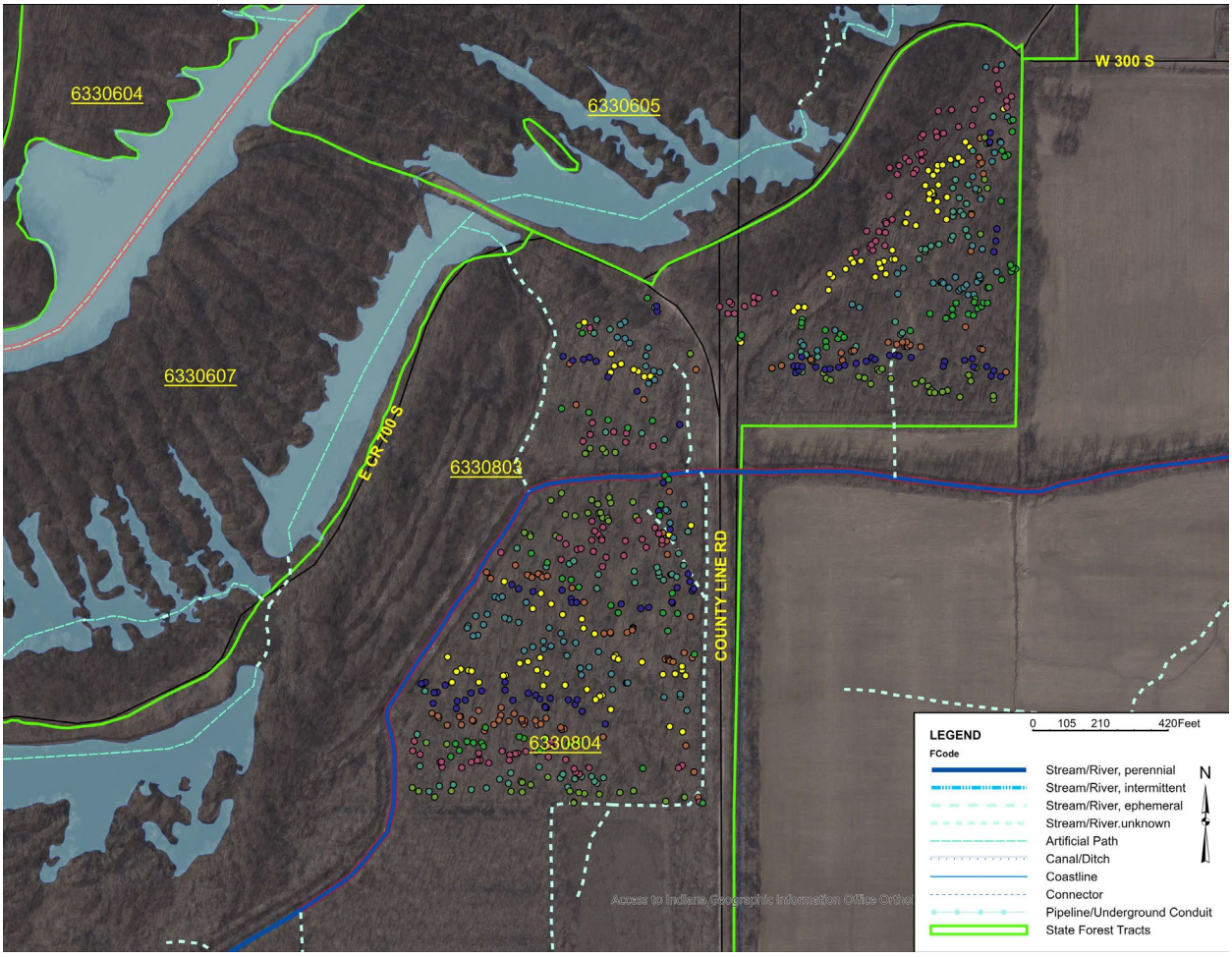
Map of standing marked trees and stumps found during Harrison-Crawford audit.

This site was extremely hard to work as there was a large cedar opening and area next to a big power line corridor which had been covered with brush and stilt grass. These factors made it very hard to find and identify stumps. We had a full team audit on Feb. 3, a small team revisit on Feb. 22, then had one person go back for more visits through the year to gather the data at this site.

An auditor in the cedar opening trying to find stumps (Picture by Bradley Schneck)

Greene-Sullivan Compartment 8 Tracts 3 and 4

This site was a total of 78 acres with 44 of those acres marked for the harvest. In the harvest area we audited for 763 trees, poles, and culls that were marked for harvest, and 741 were accounted for in the audit, for 97.12% accountability. A total of 184 of the 741 (24.8%) were standing marked poles, 39 (5.3%) were standing trees marked as saw timber, five (0.7%) were stumps that did not have marks on them, 7 (0.9%) were stumps that had no bark on them, 84 (11.3%) were standing trees marked as culls, and zero stumps were found marked as cull and 422 (57%) were marked stumps.



Map of standing marked trees and stumps found during Greene-Sullivan audit.

Appendix

The product definitions listed below are designed to classify trees into several useful categories to help determine the existing condition of the forest and future needs. For the product categories, 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. Quality trees cannot have any decay defects in the butt log, though they can have some limited, non-decay minor defects. However, they can't have a major defect. There can be no internal decay in the butt log, which is found through sounding for punky wood or a hollow echo. 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 have prime trees 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, found through sounding for punky wood or a hollow echo. 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 in the 6 to 13-inch diameter class. Volume in poles is calculated in cords. Poles with a 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 to 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. 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 occurs.
- 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 a combination of these.