

Forest Inventory of Property Program Lands
Indiana Division of Forestry
Annual Update October 2009

There are approximately 149,445 acres of forest managed by the Properties Program Section of the Indiana DNR – Division of Forestry. In an effort to better understand the forest resources on these lands, different inventory systems over time have been implemented and are briefly described below.

FIA is a federal inventory system across the entire nation and across all ownerships and land uses. The properties program lands contain approximately 50 FIA plots. These fixed-radius permanent plots are measured on a continuous basis, with 1 panel or one-fifth of the plots measured each year. Available data from FIA plots in Indiana were most recently measured during the 2003 – 2007 period.

In addition to FIA, the Division of Forestry had a system-wide inventory (SWI) conducted in 2005. An outside entity was contracted to collect data on approximately 1,020 plots. These plots were variable-radius plots and data was measured during 2004 and 2005. Data collected was entered into available software (TwoDog Inventory Software) and results analyzed.

Beginning in 2008, the Division of Forestry began a continuous forest inventory (CFI) system. This system was designed heavily from the FIA system, but at a much higher intensity. Like FIA, 1 panel or one-fifth of the plots will be measured each year. There are a total of approximately 3,825+ plots that will be established over the course of the initial 5 year period. To date, the first panel (764 plots) was completed on time and currently we are on schedule with the second panel of annual plots. Preliminary results from approximately 1200 (30%) panel 1 and panel 2 plots were analyzed mainly to test the functionality of the new program.

The Division of Forestry forwarded a shapefile outlining the property lands to the USFS FIA unit. The USFS produced a list of FIA plots to be included in the analysis. The 50 plots provide excellent information on volume and growth across the system. For attributes such as total acreage and gross volume, all 50 plots were used. For change data, such as growth, mortality, removals, etc, only the plots visited during the current cycle (4 panels, 2004-2007) were used, resulting in approximately 30 plots.

We used the USFS EVALIDator tool to interpret the data from the 50 FIA plots. We used the custom-built Access database (modeled from the USFS EVALIDator tool) to interpret the preliminary data from the CFI plots. Two Dog Inventory Software was used to interpret the data from the 2005 SWI. Some interesting information:

Total acres of forest land: According to FIA, 163,199 acres plus or minus 12.22 percent. FIA expansion of plots would indicate total acreage involved in this query to be between 143,256 and 183,142 acres, a range within which the GIS acreage would fall. The shapefile contained a total of 149,445 acres, a figure that is within the error range of

the FIA expansion. In comparison, the preliminary CFI data shows 144,587 acres plus or minus 11.2 percent, or a range from 128,393 to 160,780 acres. This preliminary data is also within an acceptable error range. DoF staff will continue to update the properties' shapefile; we will send an updated shape file to the USFS for a new plot list as it becomes available and future comparisons between inventory systems is desired.

Total volume of sawtimber on property system lands from FIA data is 1,549,640,331 board feet, Int. $\frac{1}{4}$ scale, $\pm 15.75\%$. When converted to Doyle using USFS conversion factors by dbh class, the Doyle volume is 1,028,926,682 board feet with a range of 866.9 MMBF to 1,191.0 MMBF, Doyle. For comparison, the 2005 SWI data showed 1,171,353,450 board feet, Doyle. The preliminary CFI data computed volume using two different methods to assess and evaluate the differences of these two methods. One computed volume from the CFI plot data using the FIA volume equation and the other uses a volume table currently used by DoF staff. Using the FIA volume equation, the CFI data shows 1,105,974,546 board feet when converted to Doyle using USFS conversion factors by DBH class plus or minus 13.36 percent, or a range from 958.2 MMBF to 1,253.7 MMBF, Doyle. Using the lookup table, the CFI data shows 1,484,182,524 board feet Doyle plus or minus 13.67 percent, or a range from 1,281.3 MMBF to 1,687.1 MMBF, Doyle. Both of these methods are within the error range of the FIA expansion.

Net growth of sawtimber on forestland (property system lands from FIA data) is 65,674,053 board feet per year, Int. $\frac{1}{4}\pm 21.37\%$, resulting in a range of 51,639,508 to 79,708,598 bd. ft/yr. Net growth is that growth above mortality but includes removals. Converted to Doyle scale, the total annual net growth is 40,439,257 board feet per year, Doyle and a range of 31,797,388 to 49,081,126 bd. ft/yr. For comparison, the 2005 SWI data showed 24,788,950 bd. ft/yr Doyle. At this time, preliminary growth estimates from the CFI data is unavailable. If removals equal net growth, a reasonable interpretation would be that we are harvesting (or removing) 100% of growth. Net growth is a positive number for all species groups.

Saw timber mortality is 3,705,599 bd. ft per year, Int. $\frac{1}{4}$ scale or 1,980,603 daft. per year, Doyle, $\pm 54.22\%$ on property system lands from FIA data. No mortality data is available from either the CFI data or the 2005 SWI data. Saw timber mortality is 0.32% of total standing volume.

Removals of sawtimber averaged 5,932,200 board feet Doyle per year during the 5 year span from 2003-2007 (total volume was 29,661,000 bd. ft Doyle) according to the FIA estimation. This would be merchantable saw log volume. To directly compare this with the total and/or growth volumes, one would need to add in the estimated volume of wood fiber not considered merchantable (volume in such things as butt ends and tops left in the woods). From the latest Timber Product Output Survey and help from FIA, utilization ratios were calculated for the different species groups and applied to the removal figures to "add in" this volume left in the woods, bringing a total estimated removal of 6,889,092 board feet Doyle per year. By comparison, using the DoF's advertised sale volumes for this same time period the removals averaged 7,254,983 board feet Doyle per year.

It should be noted that the time period for DoF's advertised sale volume data is newer than that of the growth data. Using the most recent 5 year period of 2004-2008, DoF's advertised sale volumes (removals) averaged 9,001,326 board feet Doyle per year.

Comparing any of these estimated annual removal volumes (6.9 MMBF Doyle using FIA or 7.3 MMBF Doyle using DoF sale estimates for the same time period or 9.0 MMBF Doyle for the most recent 5 year average) to the lower end of the range of net annual growth (31.8 MMBF Doyle) it should be a safe interpretation that sawtimber growth well exceeds harvest.

Conclusion

Average annual net growth of lands managed by the Properties Program Section of the Indiana DNR – Division of Forestry is estimated to be 40.4 MMBF Doyle scale. This growth exceeds the estimated annual removal volume using any method of 6.9 MMBF Doyle (FIA 2003-2007), 7.3 MMBF Doyle (DoF 2003-2007), or 9.0 MMBF Doyle (DoF 2004-2008). Another conclusion that should be made is that our newly developed continuous forest inventory (CFI) system is on schedule for implementation and we continue to evaluate the differing methods for computing total volumes, growth, and removal estimates.