

# CFRU - NHRI'S TREE CLASSIFICATION SYSTEM

The right tool to predict sawlog potential?



## Can NHRI's form and risk assessment be used to predict sawlog potential in hardwood forests in Maine?

CFRU members represent a combined management area of 3.5 million hectares of forestland in Maine. Both economically and ecologically speaking, it is to our member's advantage to know what products are available in their inventories, such as high-value sugar maple sawlogs and veneer products. Ever-changing mill demands make having robust product estimates all the more vital to adapting and planning for short-term harvests and long-term G&Y projections. Yet estimating product ratios in hardwood forests can be complex due to the highly variable stem forms and growth and regeneration strategies found in hardwood species across the Wabanaki-Acadian Forest.

Ryan Smith, a recent graduate of the School of Forest Resources at the University of Maine, utilized NHRI's form and risk classification system for his thesis work to determine its effect on estimated product ratios across common commercial species in Maine.

Smith's work had two primary objectives, the first being to further develop predictive models for sawlog potential utilizing a stem form and risk framework that can be easily added to existing field inventory protocols. The second was to compare commonly used field merchandising techniques and a commonly used regional growth model with the form and risk approach to understanding how each method affects plot-level predictions of sawlog volume, stand value, and the variability of sawlog volume compared to merchantable volume in forest inventories.

The study area was spread across northern and western Maine (figure 1) and consisted of 1,794 plots, representing 18,003 hardwood and softwood trees. Roughly 20% of the trees in the study were measured for sawlog volume and this sub-sample was utilized for predictive models for identifying the presence or absence of sawlog material. A total of 8,674 hardwood stems were utilized to predict stem form and risk, and 2,798 of those trees were merchandized. Amongst the hardwood species sampled, red maple and sugar maple had the largest sample size. Of the 2,798 merchandized hardwoods, almost 30% had at least one saw log present and sugar maple was the most common species in this sample. The stem form and risk assessment proved to be

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an effective predictor for sawlog presence and volume when accompanied by other tree, site, and stand-level characteristics for all tested hardwood species. Smith's models were proficient at predicting sawlog presence for hardwoods in the sample data 86% of the time. Due to varying species preferences for site characteristics, flood/drought tolerances, and growth and regeneration strategies, a larger sample size may be necessary for predicting species-specific models for form and risk classes and merchantable volume of sawlog quality material.

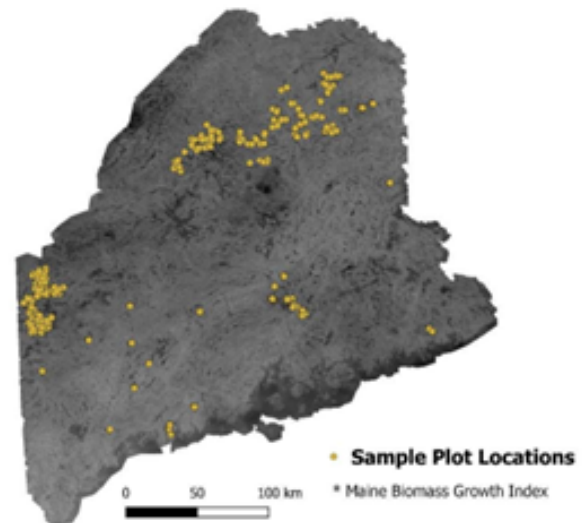


Figure 1. Sample plot locations. Maine, USA.

You can read Ryan Smith's full thesis and learn more about the models, results, limitations, and suggestions for future research areas on this topic [here](#). Smith now works as an inventory analyst for Seven Islands Land Company, a valuable member of the CFRU.



*Ryan Smith graduated from the School of Forest Resources, University of Maine Orono, in the summer of 2022 with dual graduate degrees: Master of Science in Forest Resources and Master of Forestry degrees. Smith's research objectives centered around utilizing NHRI's form and risk classification system to determine its effect on estimated product ratios across common commercial species in Maine.*

Selected related readings to Smith's thesis work:

- Castle, M., Weiskittel, A., Wagner, R., Ducey, M., Frank, J., & Pelletier, G. (2018). Evaluating the influence of stem form and damage on individual-tree diameter increment and survival in the Acadian Region: Implications for predicting future value of northern commercial hardwood stands. [Canadian Journal of Forest Research](#), 48(9), 1007–1019.
- Castle, M., Weiskittel, A., Wagner, R., Ducey, M., Frank, J., & Pelletier, G. (2017). Variation in stem form and risk of four commercially important hardwood species in the Acadian Forest: Implications for potential sawlog volume and tree classification systems. [Canadian Journal of Forest Research](#), 47(11), 1457–1467.

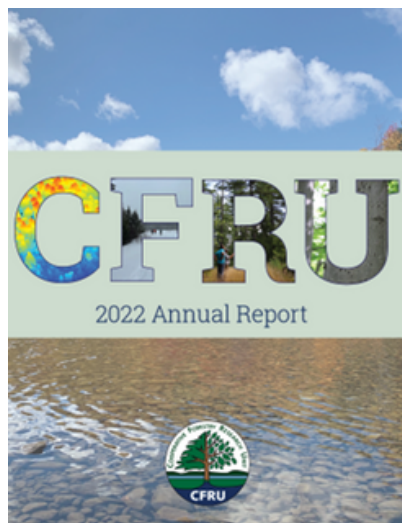


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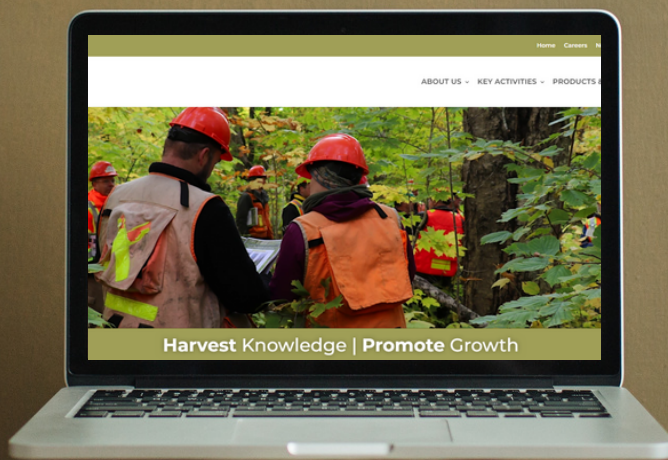
## COOPERATIVE FORESTRY RESEARCH UNIT

### CFRU Releases 2022 Annual Report



We're proud to release the [2022 Annual Report](#) for the Cooperative Forestry Research Unit. This report details 10 projects currently being funded by the CFRU and we feel they span all aspects of forest research that our members are interested in - from budworm, to birds, to better workflows for enhanced forest inventories (EFI). We especially enjoy working on the annual report to reflect on what all our researchers have accomplished in a year and the coordination it requires when working closely with so many CFRU members with varying objectives for their lands. Do you have questions related to a project report or want to connect with CFRU-funded researchers? Contact [regina.smith@maine.edu](mailto:regina.smith@maine.edu).

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