The Future of the Maple Sugar Industry in the United States: Assessing the Growth Potential Based on Ecologic, Economic, Demographic, and Public Policy Factors

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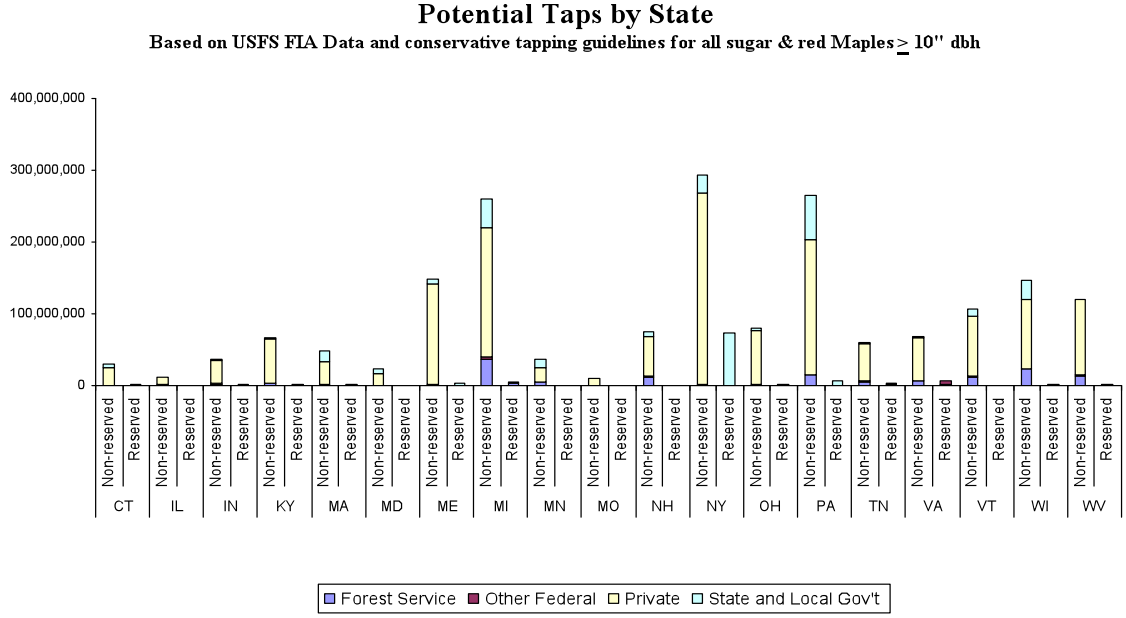
Introduction

Maple sugaring represents a traditional, economically important, and sustainable use of northeastern forests. Sugar production maintains ecosystem services, provides jobs for rural communities, and supports tourism through its direct and indirect benefits. Current worldwide demand for maple products is steadily rising with demand outpacing supply. With bulk syrup prices at an all time high, many sugarmakers are planning on expanding their production to fill the growing markets. In order to determine the growth potential of the maple industry, this poster discusses the current potential for tapping in the United States, future projections for sugar maple distribution, and historical trends in maple syrup production since the 1850s. Although there are concerns about the impact of climate change on syrup production in the northeast, socioeconomic factors and public policy decisions in the United States and Canada are likely to have the greatest impact on the future of the maple industry.

Assessing the Tapping Potential in the United States

In order to determine the growth potential of the maple industry, it is important to first determine the full extent of the maple resource.

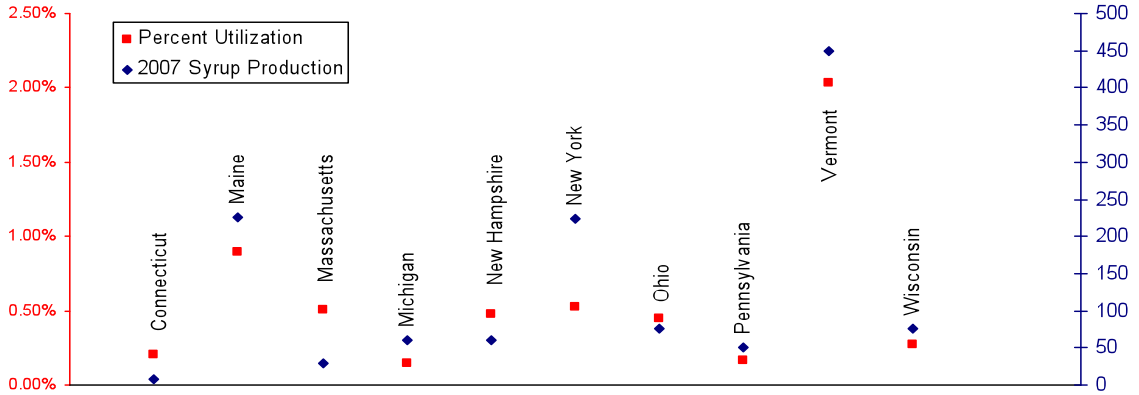


This graph displays the total potential taps in the US by ownership category- Private, US Forest Service, Other Federal Land, State and Local Government. It is also divided between Reserved and Non-Reserved, as many of our forestlands are restricted from

commercial tapping. These graphs were created with the most recent US Forest Service FIA (Forest Inventory & Analysis) data for each state. The number of potential taps were estimated by summing all of the sugar maple (*Acer saccharum*) and red maples *(Acer rubrum*) greater than 10" dbh and applying conservative tapping guidelines- 1 tap for a 10-17" tree and 2 taps for trees 18" and greater. Since these data do not take into account density or accessibility factors, it overestimates the actual potential based on attributes of a viable sugarbush. We are conducting further analyses to account for the distance of the potential taps to roads as well as the basal area of maples in the FIA plots.

Utilization of the Resource for Syrup Production

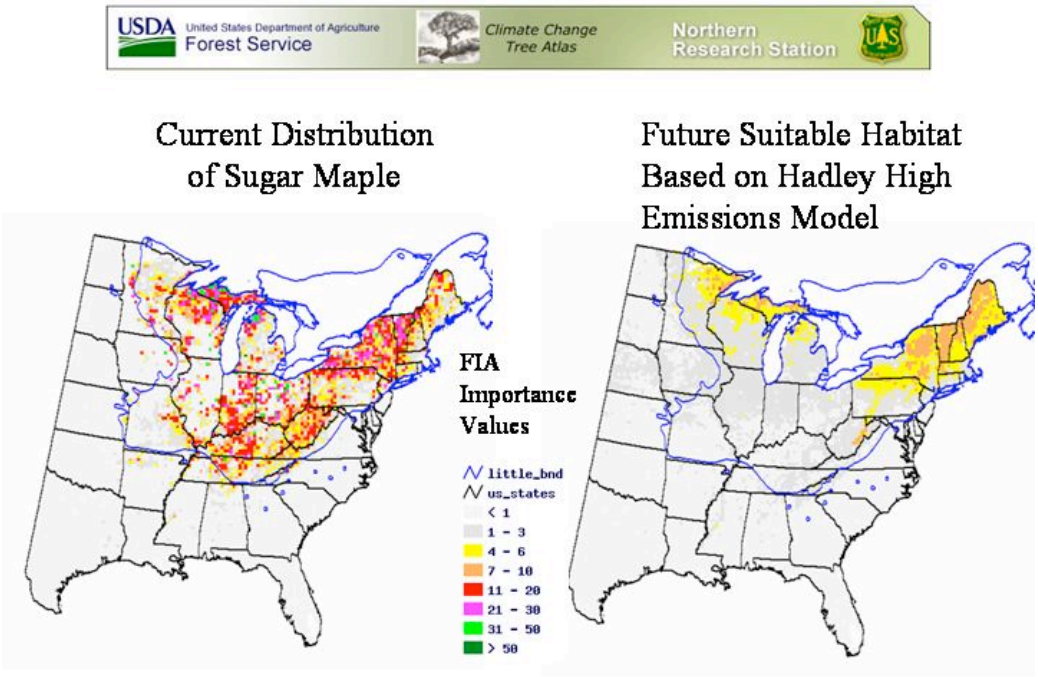
The following graph displays the percentage of all possible taps utilized for syrup production, based on 2007 National Agricultural Statistics Service reporting and FIA data for sugar and red maples.



Significant differences exist in the extent of maple syrup production throughout the United States (and Canada). Vermont clearly dominates the industry due to its relatively high utilization rate while states such as Michigan and Pennsylvania have tremendous potential for expansion. Preliminary analysis indicates a much greater utilization in Canada, with Quebec far and away the leader in syrup production.

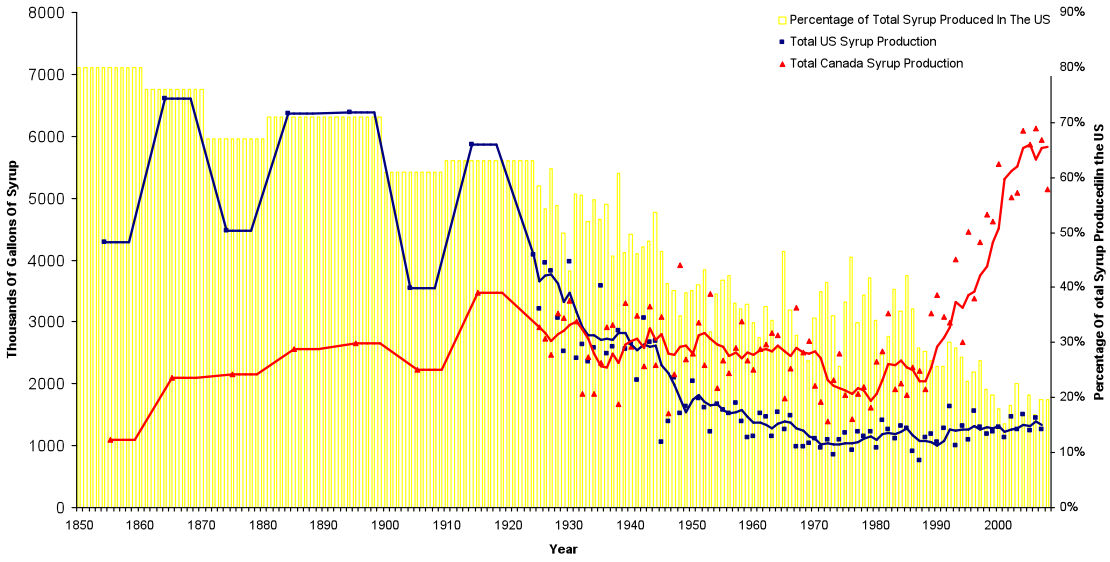
Future Distribution of Sugar Maple in the United States

This figure shows one projection of the areas with suitable climate for sugar maple in 2100 according to the Hadley High Emissions climate model. Sugar maple-dominated forests of the northeast are predicted to be replaced by oaks and hickories. The Climate Change Tree Atlas models developed by the US Forest Service are meant only as a guide, and do not take into account other factors that can influence sugar maple distribution, such as forest management practices, herbivory, acid rain, invasive species, etc. To complicate matters, FIA reports indicate that oak-hickory forests in the Midwestern states are being replaced by the more shade tolerant sugar and red maples. Furthermore, the maple-dominated northern hardwood forests have virtually no oak or hickory seedlings currently established. Thus, further research is needed to make better predictions regarding the future range of sugar and red maple, as well as other tree species.



Historical Trends in Maple Syrup Production

The following graph is based on data gathered from Statistics Canada and the USDA National Agricultural Statistics Service.



As seen above, maple syrup production has shifted greatly over the past century. Production in Canada has increased dramatically in recent years whereas the US has remained stagnant after a sharp decline in the early 1900s. Although some people attribute this trend to global warming, the change in climate has had only limited impact on overall syrup production and sugar maple distribution thus far. The primary reasons behind the northward shift of syrup production into Canada seem to be economic, social, and political

Future Research Priorities

Pictured below is a maple producer teaching his grandson how to tap a tree that was planted by the young boy's father.

The guiding mission of my research is to ensure that the young boy has the same opportunities in maple production as his grandfather has had over the years. To this end, some of the projects I will be doing to evaluate the future potential of the maple industry include:

1) Developing more accurate estimates of the tapping potential in the US by refining the FIA data to account for density of maples in a forest stand and distance of the trees to a road.

2) Utilizing historical FIA data to examine trends in sugar maple growth and distribution over the past 50 years in order to make better predictions on what may happen in the future.

3) Analyzing the factors that result in such large disparities in syrup production between states and provinces, i.e. government policies and resources devoted towards maple production, economic factors such as the US-Canadian exchange rate, land ownership patterns, social capital and demographics, and climatic variables

4) Surveying maple producers and landowners to determine their current and future plans for syrup production and the socioeconomic factors that may influence their decisions

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