Critical Market Tipping Points for High-Grade White Oak Inventory Decline in the Central Hardwood Region of the United States

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Overview

Study Context
Project Objective
Research Approach
Results
Way Forward
White oak growing region

Inventory levels of white oak

Source: Luppold, 2017 USFS.

Factors influencing changes in hardwood timber base

Ecological factors

- Mesophication
  Fire suppression policies, selective harvesting, herbivore population

- Emerging threats – climate change & pathogens

Socio-economic factors

- High-grading
- Lack of active management
Study Context

- **Top wood-related exports ($134 MM)**
- **$8.6 billion of economic output**

**Inventory of Bourbon Barrels**
(Source: 2019 KDA Report)

- 66,321 (2011)
- 300,607 (2013)
- 549,737 (2014)
- 942,990 (2015)
- 1,176,216 (2016)
- 1,371,965 (2017)
- 1,483,969 (2018)

Delivered stave logs prices in Kentucky 2008-2019 by annual average ($/MBF)
Specific Project Objective

1. To expand the spatial scope of the SRTS model to the Central Hardwood Region to quantity critical market tipping points in time for high-grade white oak inventory
SRTS Modeling Framework

A. Economic Framework

\[ \sum_{i}^{57} Q_{ijt}^{S} (p_{jt}, l_{ijt}, \gamma_{j}, \tau_{j}) = Q_{jt}^{D} (p_{jt}, c_{jt}, \epsilon_{j}) \]

\[ \text{Market Module} \]

B. Biological Framework

\[ l_{ij,t+1} = l_{ijt} + \Delta l_{ijt} - H_{ijt}^{*} \]

\[ \text{Inventory Module} \]

Demand scenarios
- Constant demand (base)
- 12 rising demand scenarios for high grade white oak sawtimber
Figure. High-grade select white oak growing stock inventory inflection points under alternative price elasticities of supply ($\gamma_{HGWO}$) and demand ($\epsilon_{HGWO}$) for high-grade white oak.
Figure. High-grade white oak growing stock inflection points across states in the CHR
Future directions of research

- Hardwood forest dynamics under mesophication
- Evaluating potential management interventions
Thank you!