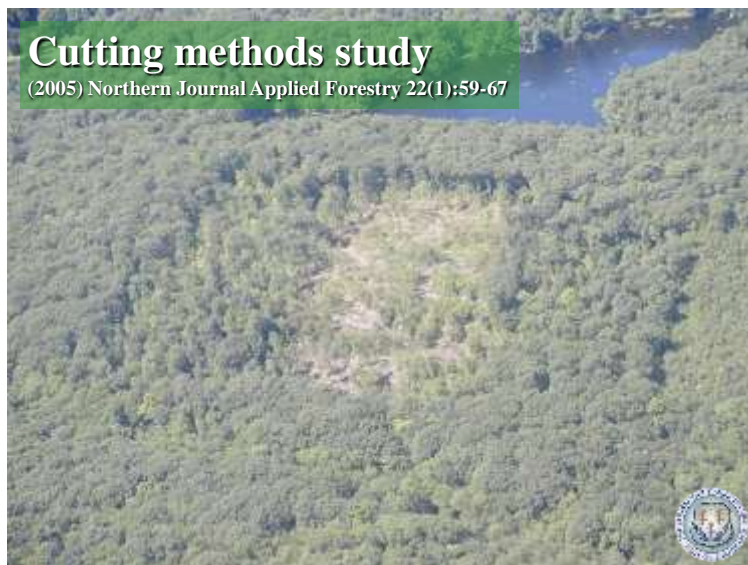


Crop circles: Rethinking Stand Management

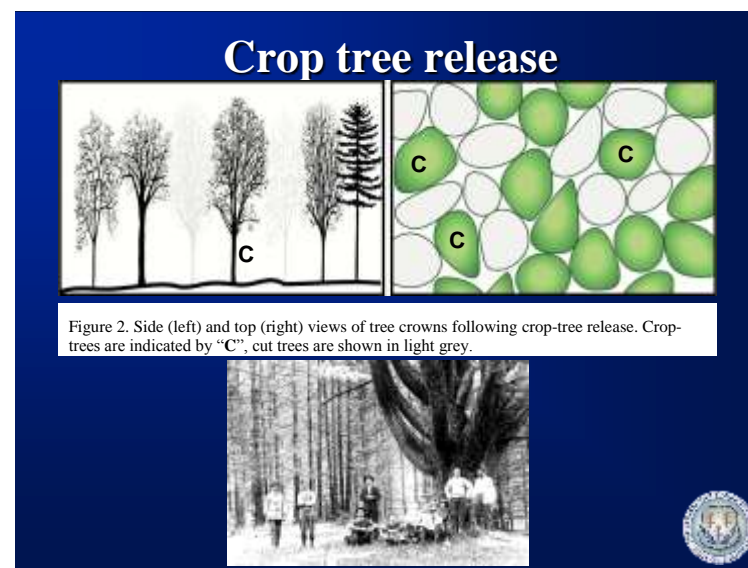
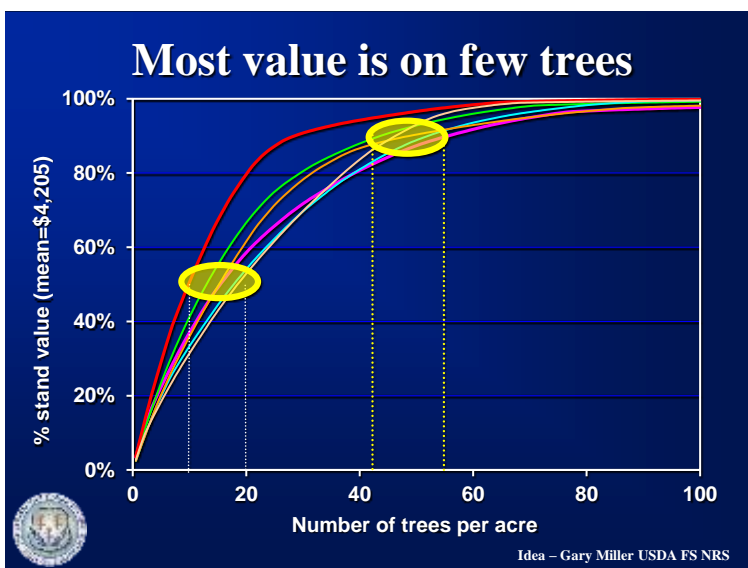
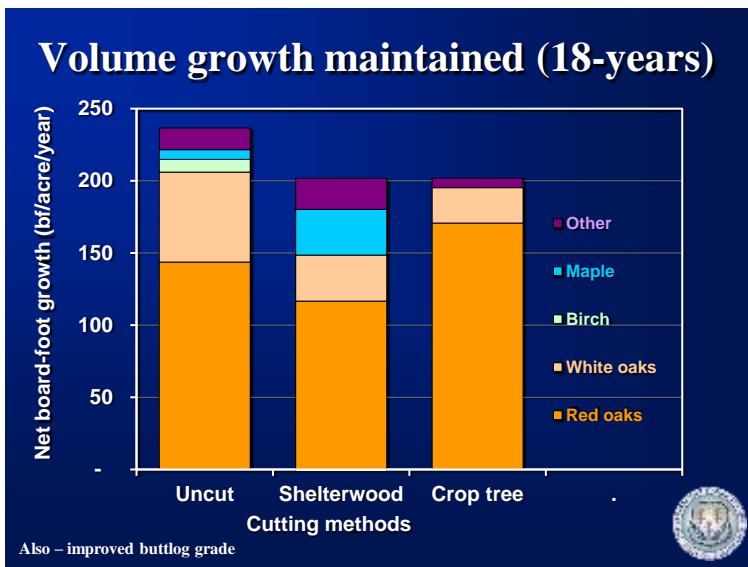
Jeffrey S. Ward, Chief Scientist
Department of Forestry & Horticulture
CT Agricultural Experiment Station



Shelterwood



Multi-aged
crop tree



Crop tree management

- Most economic (and often ecosystem service) value is concentrated on few trees.
- Crop tree management focuses limited management \$\$\$ on high value trees
 - Especially important when premium paid for grade or species.
- Stand rotations may be shortened.



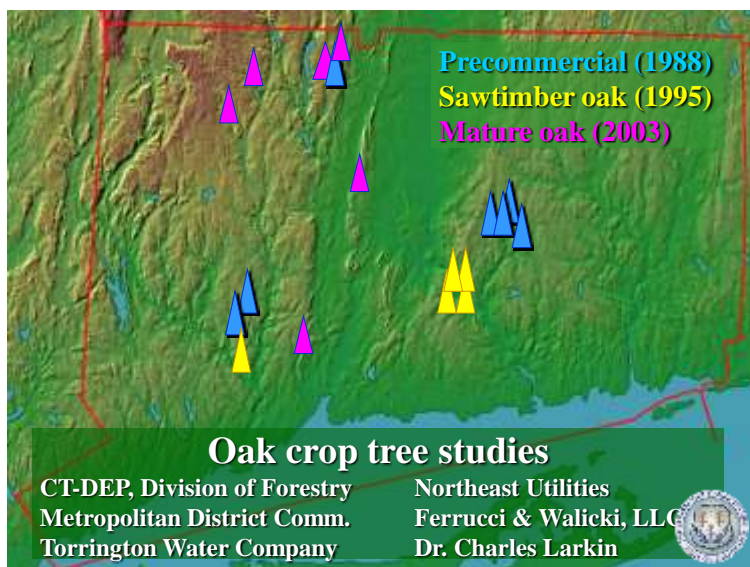
Crop circles - Overview

Crop tree release - oaks

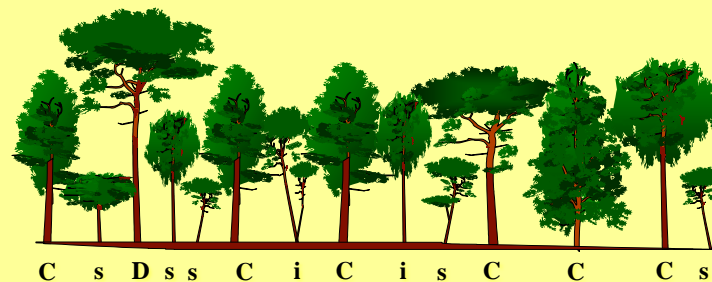
- Precommercial (tree)
- Pole/sawtimber (tree)
- Mature sawtimber (tree and stand)

Tying it all together

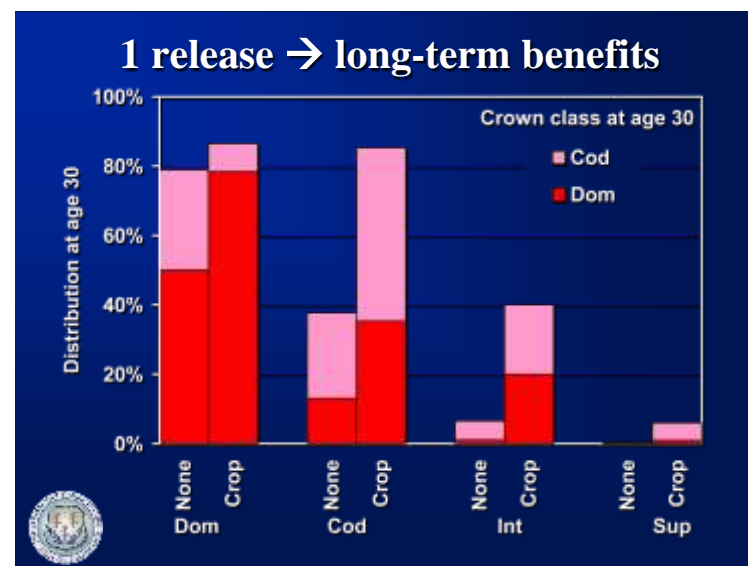
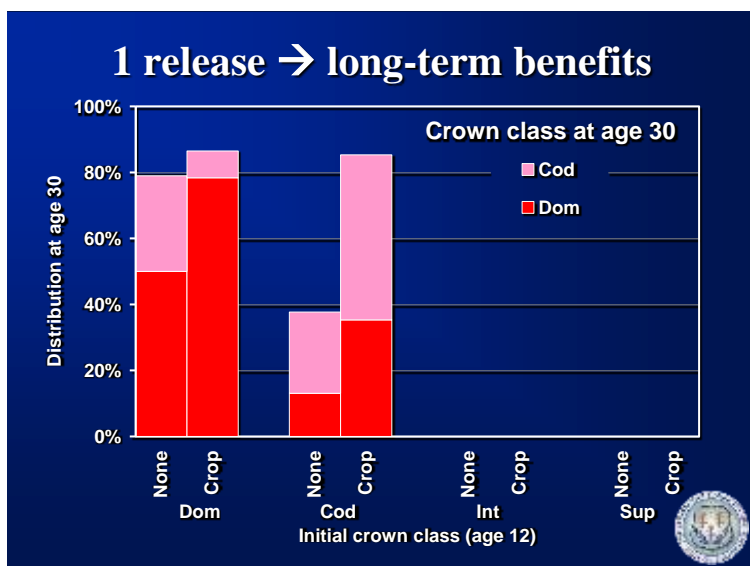
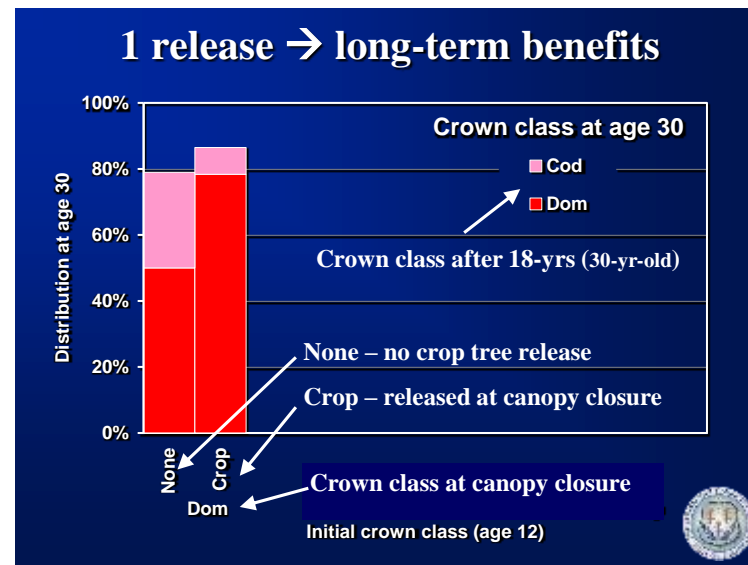
Brief look at black birch



Crown classes



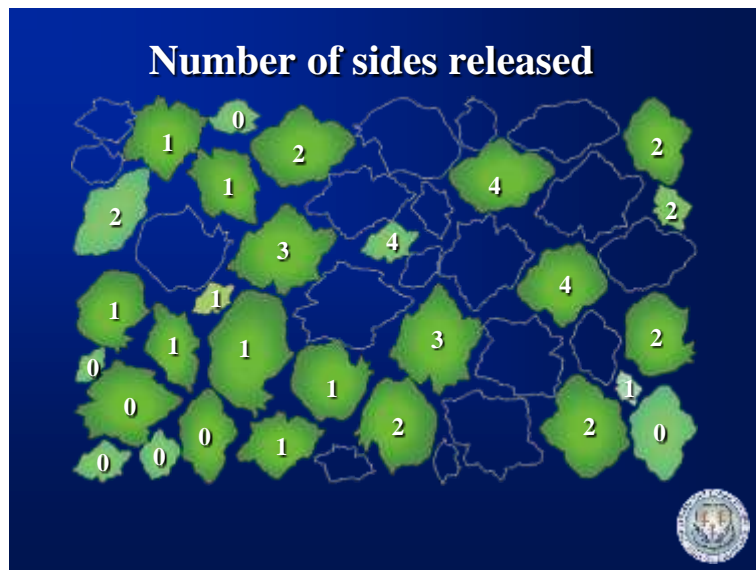
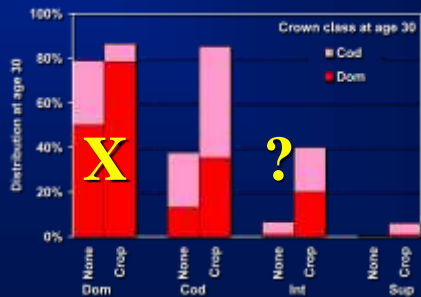
- D – dominant, top and sides in full sun
- C – codominant, top and partial sides in full sun
- i – intermediate, only top in full sun
- s – suppressed, growing in shade of other trees



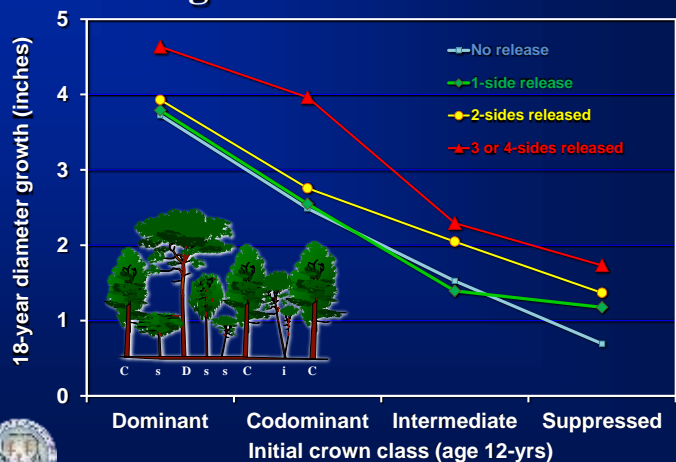
You can choose which trees will remain

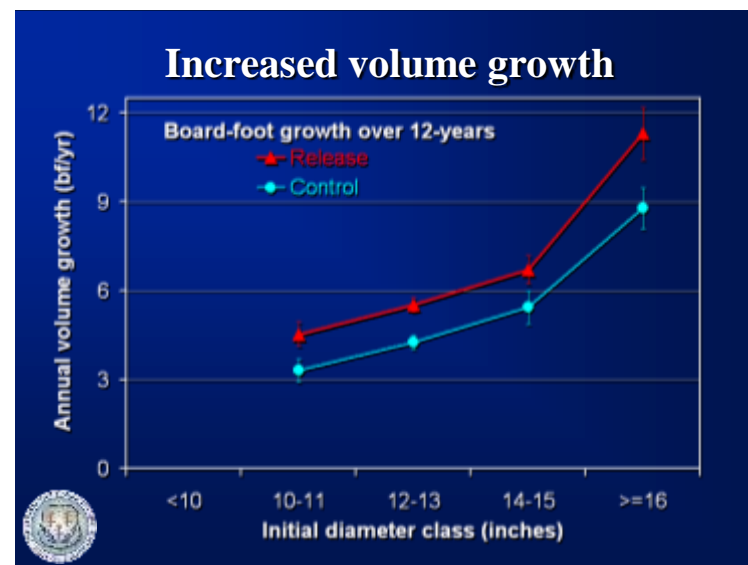
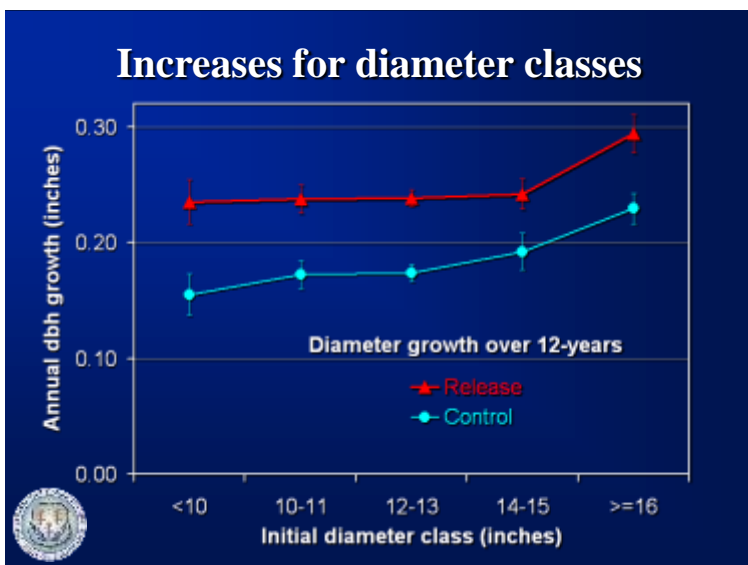
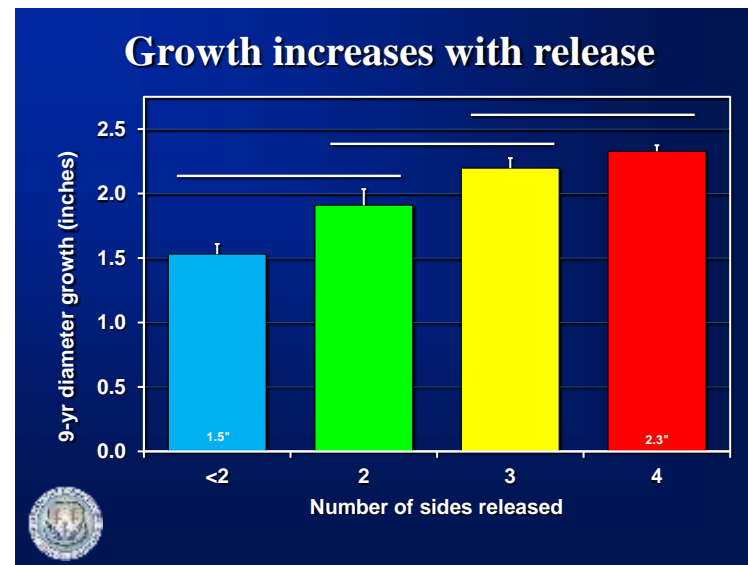
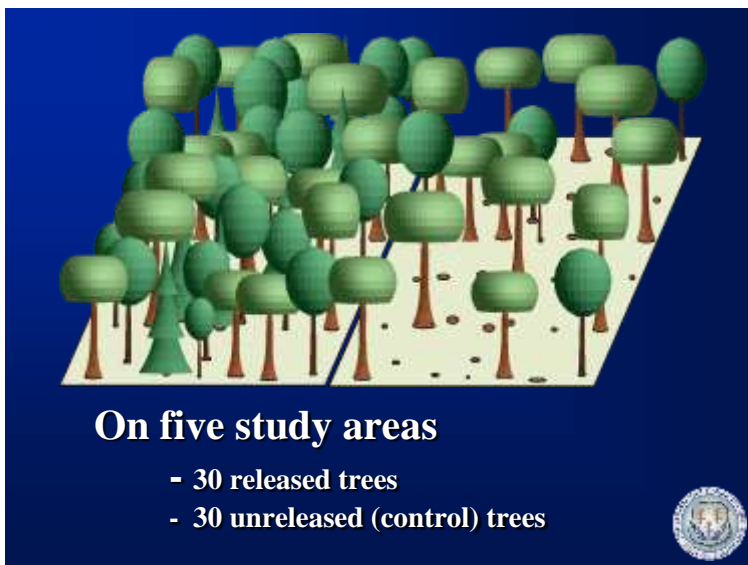
Most codominant oaks, including those with good form, will die without release

One single release doubles odds codominants will thrive

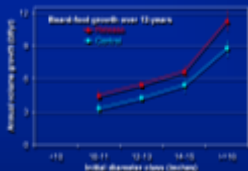


Increased growth → Reduced rotation





Increased volume growth



- If 50 trees/acre released
- ½ 14-15” and ½ ≥ 16”
- Using numbers from this study

Then approximately 1 MBF/acre per decade of increased growth focused on highest value trees!



Summary

- The upper age limit at which oaks respond to crop tree release is at least 90-yrs-old.
- Crop tree release increase 12-year diameter growth by 26-52%.
- Crop tree release also increases volume growth (both cubic-foot and board-foot).

Question

What about actual stand level response?



Mature sawtimber crop tree release

(2010) Central Hardwood Forest Conf. (in press)

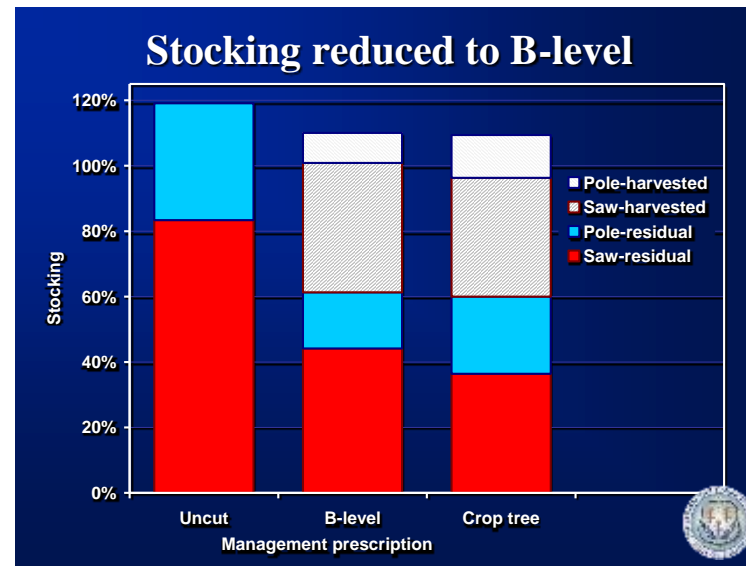
| | DBH (in) | Height (ft) | Sawlog (ft) | Buttlog (grade) |
|---------------------|----------|-------------|-------------|-----------------|
| Crop trees | 20.9 | 85 | 44 | 1.1 |
| Other oak sawtimber | 17.1 | 84 | 39 | 1.7 |
| Non-oak sawtimber | 14.1 | 75 | 28 | 2.9 |

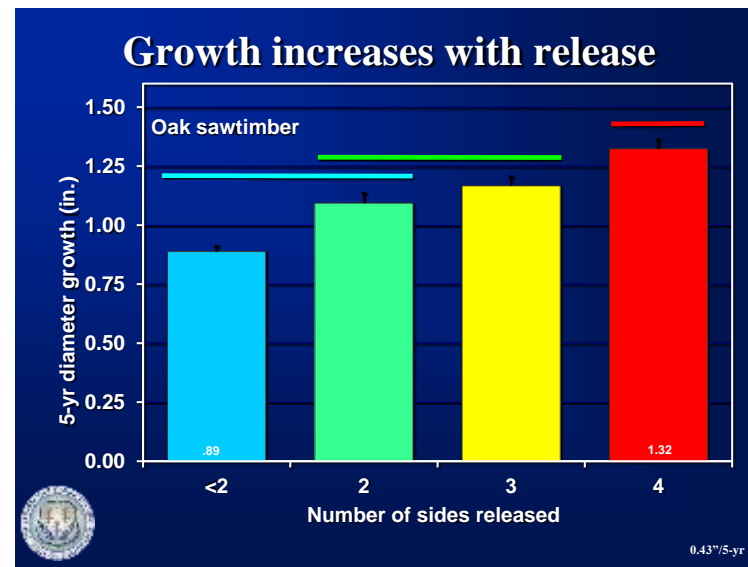
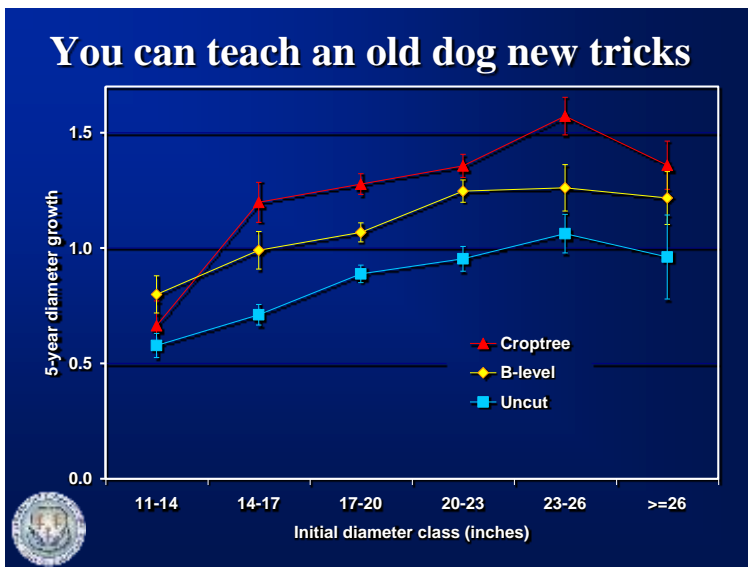
80-112 yrs-old

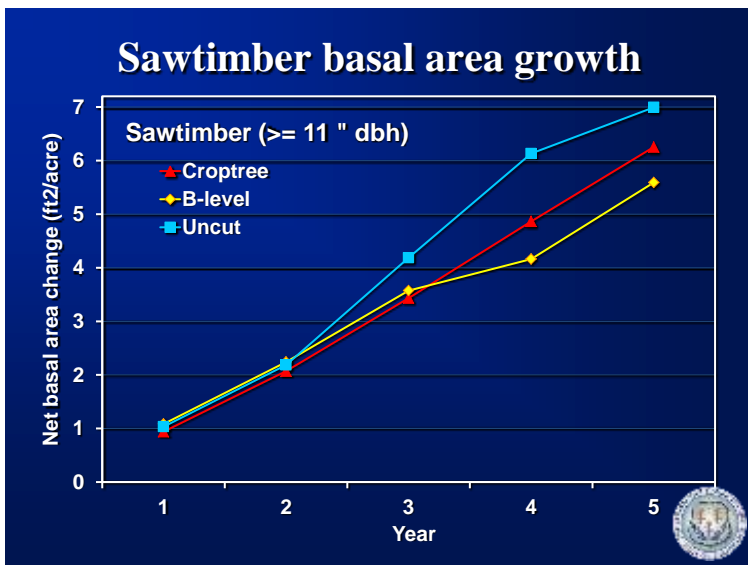


Tunxis Dump Study Area





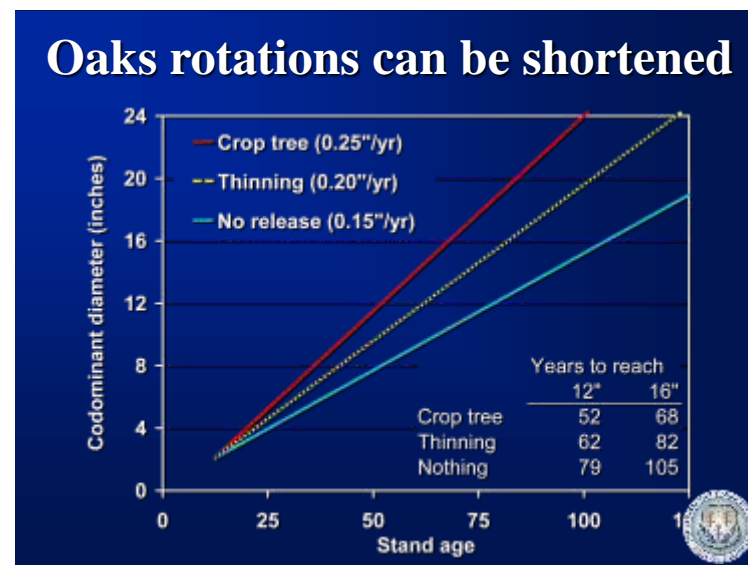


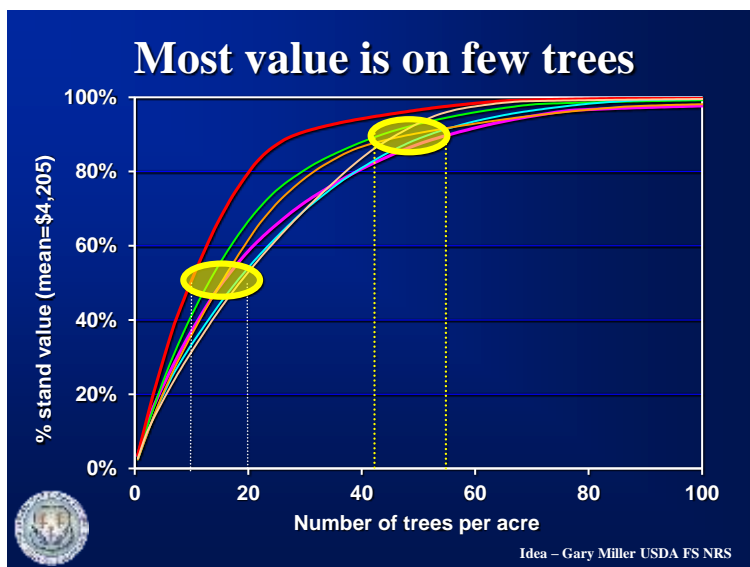


Tying it all together

- Most sapling and poletimber oaks are lost without management.
- Crop tree management allows you to select the winners (do not invest in low quality stems).
- Growth increase is proportional to release. Complete crop tree release maximizes growth.
- Oaks from 2 to 26 inches respond to release.
- Best investment is made on codominant stems with grade potential.

But there is more!



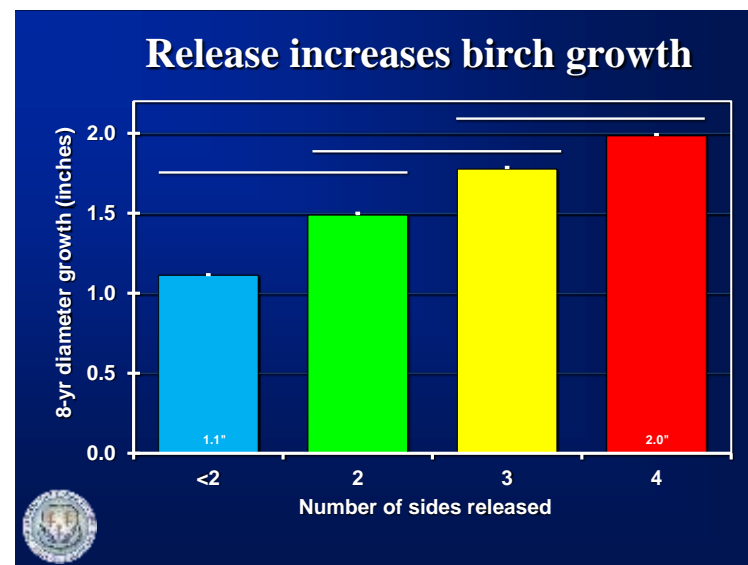


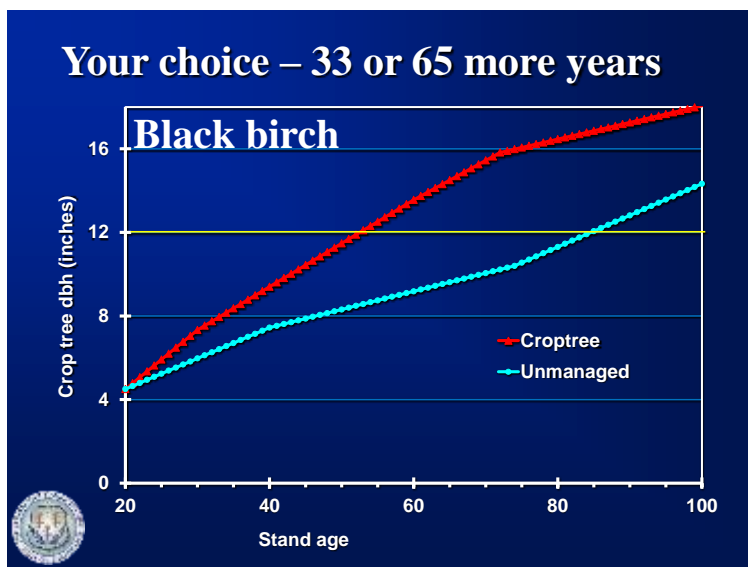
Summary

- Most economic (and often ecosystem service) value is concentrated on few trees.
- Crop tree management focuses limited management \$\$\$ on high value trees.
- Stand rotations can be dramatically shortened.
- Therefore – crop tree management can increase stand and regional productivity

BLACK BIRCH

(2007) Northern Journal of Applied Forestry 24(2): 117-122
 (2010) Northern Journal of Applied Forestry 27(3): 85-91





Once stem diameter reaches ~ 4 inches, it is unlikely to become infected with *Neonectria* (formerly *Nectria*)



Black Birch - summary

- Black birch is increasing in many forests, in part because of a change in disturbance regimes (and too many deer).
- Black birch responds well to release.
- Stems > 4" appear resistant to *Neonectria*.
- Do not despair – there is (probably) a feasible silvicultural system for our new favorite species – black birch.

