REHABILITATING CUTOVER STANDS

... some ideas to ponder

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Background reading:


Sources cited:


Some background about the situation ...

NYS Society of American Foresters

A SURVEY OF TIMBER HARVESTING
IN NEW YORK STATE

We looked at seven factors:

-- residual stocking (basal area/acre)
-- variability of residual stocking
-- retention of desirable species
-- change in average tree diameter
-- change in sawtimber potential
-- area in skid trails
-- design and condition of skid trails
Rating each stands as …

**GOOD** - Score 0.0 through 1.5
**MIXED** - Score 1.6 through 2.2
**POOR** - Score 2.3 through 3.0

This …

Nyland 2000
GOOD …

… silviculture or similar

… high potential for the future

… likely sustainable

38%

GOOD … sustainable with common silviculture
Composite stand condition

Nyland 2000

MIXED …

… modified and mediocre

… potentially fixable

… some opportunities lost or minimized

…… silvicultural purgatory

49%
MEDIOCRE

... sometimes with a bit of hope (the purgatory stands)

Mostly due to **diameter-limit cutting** ....

... *removing the large and valuable trees*

... *extracting the value for short-term gain*

... *disregarding the future*
Composite stand condition

Or worse …

POOR …

... ravaged and ruff  
... degraded and dismal  
... few options for the future

13%
RAVAGED  ... with little future potential (the bad 13%)

... like closing the door after the goats got out
Generally …

… the mediocre and poor

… missing the best
… left with the rest

Even-aged stand at 65- to 75 years of age …

Watch the change in stand conditions …
Residual stand after first diameter-limit cutting …

It leaves trees with the poorest growth potential …

… missing the best

… left with the rest
### 15-year post-thinning diameter growth of sugar maple trees in different initial crown positions

<table>
<thead>
<tr>
<th>Crown position</th>
<th>15-year total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominant</td>
<td>2.98</td>
</tr>
<tr>
<td>Codominant</td>
<td>1.95</td>
</tr>
<tr>
<td>Intermediate</td>
<td>1.36</td>
</tr>
<tr>
<td>Overtopped</td>
<td>0.69</td>
</tr>
</tbody>
</table>

**Nylander et al. 1993**

**THESE GONE!**

**But the ones left behind will slowly get larger …**
And a second diameter-limit cut again removes the best …

… patchy and poor
And those low-vigor trees usually have poor quality boles …

… and often develop epicormic branches that make them worse
Further, the remaining trees may lack adequate vigor for good seed production …

… so regeneration may remain sparse for long periods

… and interfering plants may fill the ecologic void
... leaving few options

What about uneven-aged stands ...

... diameter-limit cutting removes age classes

... leaving acceptable trees of small size
First diameter-limit cutting …

… removing the older age classes

… with this result
Second diameter-limit cutting …

... one more time, with less to take

... highly patchy, with only small trees
So for both even- and uneven-aged stands ask …

- *what might salvage the future*

- *what will cost the least, or have the best payoff*

- *what will satisfy the landowner*

First make an inventory …

… assessing the regeneration potential as well as the residuals
Looking for acceptable growing stock …

• At least a lower codominant …
  \( \ldots \text{or the equivalent within a cohort} \)

• At least 20-25% of height in live branches

• No epicormic branches on lower bole

• No holes or fruiting bodies on main stem

• Fewer than 25% of major branches dead or dying

• Not leaning more than 10°

After Nyland 2006

Low density and open stands …

… not always the best

… but the best available

… with some promise
... and check for advance seedlings and interfering plants

... to plan ahead for a new age class
Consider two cases …

A. Stands with **SOME** good residuals

B. Stands with more limited promise

**NOT** including stands to manage with variations of traditional silviculture …
CASE A: STANDS WITH SOME GOOD RESIDUALS

WHERE …

… when insufficient trees for full site utilization
… when still have a component worth keeping

... recalling this concept for even-aged stands

Recommended minimum for continued management
And this as a residual condition for 2-ages silviculture …

Based on spacing for 50% canopy cover at maturity …

<table>
<thead>
<tr>
<th>Dbh² (In)</th>
<th>Crown radial (Ft)</th>
<th>50% crown cover (No/ac)</th>
<th>Spacing (Ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>11.0</td>
<td>57</td>
<td>28</td>
</tr>
<tr>
<td>14</td>
<td>12.5</td>
<td>44</td>
<td>31</td>
</tr>
<tr>
<td>16</td>
<td>14.5</td>
<td>33</td>
<td>36</td>
</tr>
<tr>
<td>18</td>
<td>16.5</td>
<td>25</td>
<td>42</td>
</tr>
<tr>
<td>20</td>
<td>17.5</td>
<td>23</td>
<td>44</td>
</tr>
</tbody>
</table>

²Intended mature tree

... wide spacing

… a better way to control the cutting

Cases like these …

Uneven-aged …

Even-aged …
Option #A
Clearcut …
… any stand

… given sufficient volume for an operable cut

… but with one important constraint

In stands lacking well-developed advance seedlings …

… the risk of failure high
Clearcutting reasonable here …

… good advance regeneration makes success likely

… stored and blown-in seed adds species of low shade tolerance

11 years after clearcutting …

… if abundant and well-developed advance regeneration
CASE B: STANDS WITH SOME GOOD RESIDUALS

WHERE …

… when insufficient trees for full site utilization
… when still have a component worth keeping

OBJECTIVE …

… retain the best trees for future development
… create a new age class beneath them

What to do …

1. reduce the residuals to wider spacing
2. concentrate the growth on the best trees
3. release any desirable regeneration
4. establish a uniform distribution of new trees
Consider even-aged stands …

Leave widely spaced trees …

… uniformly distributed (hopefully)

… setting the stage to regenerate a second age class
... like this

... or this
And how many trees …

… all you can

But if …

… want half of crown canopy in each age class

… will grow trees to 16-18 in (40-45 cm) dbh with a crown radius of 15 ft (~5 m)

Then …

… keep a tree at 40-ft spacing

(12-m interval)

… 30 trees/ac (75/ha)
… just under 20 ft²/ac (4 m²/ha)
And if regulations require more to avoid a permit …

… then keep extra trees between the crop trees

… *keep stocking just above the jurisdictional threshold*

… *return to remove the extras when the new age class grows to adequate size*

… or something like this

… with some marginal trees to keep stocking higher

… *for a “short” period*
... or this (but ideally more uniformly distributed)

... likely facilitated by access to biomass markets
And don’t ignore interfering plants beneath even-aged stands…

… like where ferns cover >30% of the ground

… this will happen

Or an understory of interfering woody plants …

… like striped maple
Requiring site preparation to improve the situation …

AND FOR UNEVEN-AGED STANDS …
If NO sawtimber left …

… reduce stocking among poles

… adjust the proportion of poles and smaller trees

Try this …

… leave 2/3 of basal area in poles (≥ 6 in, or 15 cm) … to improve age class distribution

… uniformly space the residuals … to provide good light for all trees

… keep many large poles (>8 in, or 20 cm) … to promote movement into sawtimber

… to promote regeneration, enhance growth, and balance the age classes
If some sawtimber remains …

... adjust the spacing
  ... across all size classes
  ... keeping widely-spaced large trees

... begin balancing the age classes
  ... keeping the best of all size classes
  ... regulating stocking of small, medium, and large trees

... start a new age class
  ... release advance seedlings
  ... establish new trees to fill the voids

Try this …

... leave at least 55 ft\(^2\)/ac \( (12-13 \text{ m}^2/\text{ac} ) \)

... with 20% <6 in \(<15 \text{ cm} \)
35% 6-11 in \((15-30 \text{ cm} \)
50% >11 in \(>30 \text{ cm} \)

... plan for another cutting in 25 years

... or 5 years sooner or each additional 10 ft\(^3\)/ac \( (1 \text{ m}^3/\text{ha} ) \) of growing stock
... work toward uniform stocking and an intermixing of age classes

... also made possible by markets for small and low-value trees
And what about the new age class …

… not an issue if have desirable advance regeneration to release

… or a good seed source

… but for stands with an interfering understory
Removing it … helps to promote desirable regeneration

Site preparation needed …

Above all … … for stands with some promising trees

Even-aged …

Control spacing and stocking !
CASE C: STANDS WITH LIMITED PROMISE

WHERE …

… too few acceptable trees
… mostly poor residuals remain
… they have low vigor and produce little seed

... like this
CASE C: STANDS WITH LIMITED PROMISE

WHERE …

… too few acceptable trees
… mostly poor residuals remain
… they have low vigor and produce little seed

OBJECTIVE …

… remove the low-grade remnants
… create a new age class

Often complicated by …

… few acceptable trees left

… little volume for a regular timber sale
… few seedlings
… interference to new regeneration
… often after two or more diameter-limit cuts

Here you must …

… clean off the dregs
   … to open space for regeneration

… leave any suitable trees
   … as a seed source
   … to grow larger

… do site preparation
   … to reduce the interference

… plant the voids
   … to reclaim the site
... often as an investment in cull removal

... including the small dregs
…creating some order out of the chaos

… even though imperfect

… mechanized harvesting
and a biomass market
may make the cutting a
cost neutral operation
COST NEUTRAL means ...

... sufficient revenues to just pay the costs

... e.g., give the wood away to get the cutting done

... e.g., reinvest sale value in site preparation and other non-commercial treatments

... like this
… taking advantage of what already present

… hoping to get sufficient regeneration to replace the old stand
IF no or too little advance regeneration …

… and no reliable seed source

… you must invest in tree planting
   … to get the new cohort started

… and often in site preparation
   … to keep the trees alive and growing

… often you must deal with interference after a second diameter-limit cutting
Then site preparation must precede other efforts …

… followed by planting, and likely with a conifer
... resulting in a species conversion

... at a real COST

... to salvage the future
... better to look for a cost-neutral way to accomplish the task

Note this …

... conditions vary widely in cutover stands

-- patches of remaining trees

-- open areas lacking tree cover

-- areas with widely scattered trees
... Chaotique ...

... requiring more than one approach in many stands

SO THE PAST EXPLOITATION ROBBED US ...

... of a chance to do it profitably now
... and even to break even in some cases
In really bad cases you may be …

A. TEMPTED TO PAUSE

… waiting for growth to add more volume
  … if it will

… ignore the problem
  … even selling the land for other uses

In really bad cases you likely will be …

B. BETTER TO BEGIN REHABILITATION

… particularly where regeneration exists
  … removing the dregs
  … regulating the spacing

… adding the rest as funds permit
  … but not letting things to get worse
... much depends upon a commitment to fix the problem

But ignoring the problem …

... just passes it to the next person
By contrast, rehabilitation leads to restoration …

... reviving the vitality of forested ecosystems
... insuring appropriate biologic diversity
... reducing the spread of invasive plants
... reversing chaotic ecologic change
... and reclaiming the capacity for wood volume production
SO do something ...

Like …

… look for trees with good crowns and boles

… keep the best and cut the rest

… cut for the minimum operable sale

… leave trees at uniform spacing

… start a new age class

… do the site preparation

… make the rehabilitation \textit{co$\text{st} \text{ neutral}}

So \textit{DO SOMETHING} …
If you have not, don’t

If you do, stop

If you did, rehabilitate the stands
... and sometimes good things come together

SUNRISE OR SUNSET?