

Relation between Net Annual Growth and Annual Allowable Cut for Maine Public Lands

Note from Five Former Maine DOC Commissioners as Requested by the
Public Reserve Lands Funding Commission on Sept 29, 2015
October 22, 2015

Brief Answer to your Question on ACC:

We believe the estimate of 180,000 cords net annual growth presented recently to the Commission is plausible. It is supported by plot data and it amounts to about 2% of inventory. It is not sound, however, to assume out-of-hand that BPL can cut its measured annual growth every year, except under certain conditions:

- Managers must understand the relationship between current measured growth and long-term sustained yield;
- Annual growth may only be cut if the age class distribution is balanced;
- Annual Allowable Cut (AAC) must be consistent with long-term condition goals;
- Net growth measures must ensure that *quality renewal* as being achieved in addition to *volume* renewal.

As these conditions are a bit complex, we offer amplifying explanations below. Based on these factors we consider prudent a 10-year period with AAC at 141,500 cords.

We are not in principle opposed to an increase in the level of harvest; but **the land has never sustained a harvest at 141,500 cords for a decade, and we strongly believe it should have a chance to do so before the AAC is increased further.** We emphasize that we believe the Legislature ought to continue its past practice of setting broad guidance and reviewing progress, and not set specific AAC levels.

Given the conditions cited above, we recommend that the Commission empanel an independent group of several specialists to examine these matters and report their views. This might be a recommendation of the Commission, as there may not be time to complete this task in time for the Commission's report.

In reaching our conclusions, we have reviewed materials submitted By MFS Director Doug Denico and also have relied on the attached short paper by Lloyd C. Irland, a former BPL Director; we ask that this paper be formally entered into the Commission's record.

Attachment: Why BPL Should Not Plan to Harvest at the Level of Measured Growth

Measurement of current net annual growth (hereafter, “growth”) is but one component in setting an annual allowable cut for a forest property. It is also a useful way to compare actual cutting levels with estimated productivity. But the relationship between current measured growth and AAC is not an accounting identity.

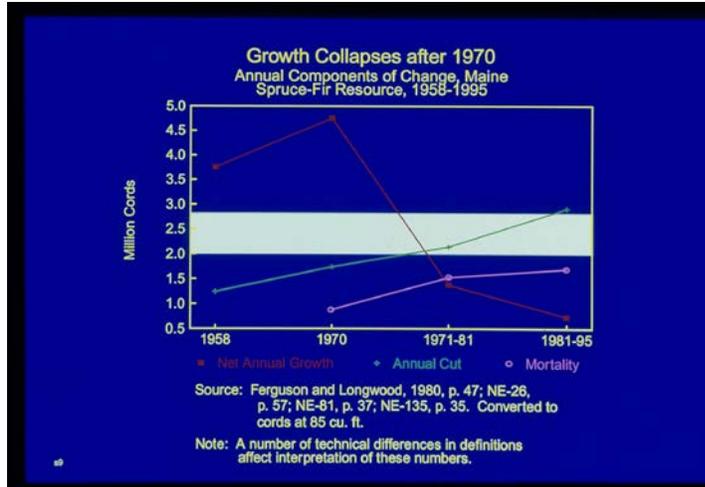
Current Growth May Not Equal Long-Term Sustained Yield (LTSY). Net growth measures *current* growth rates between measurement periods. Often these represent averages over a recent time period. Forest managers are cautious when using net annual growth, as it is a measure derived from measures of inventory change, mortality, and other factors, all of which are measured with sampling error. The decision rule for using growth to determining AAC should be:

Limit harvesting to no more than the annual growth estimated to be sustainable in the longrun (LTSY), given current forest structure, condition goals, knowledge of growth, merchantability factors, and management practices that will be applied in the future.

There is no certainty that current measured growth would be identical to LTSY. Further, current measured growth can fluctuate, as it has in the spruce/fir resource. The chart below shows two things:

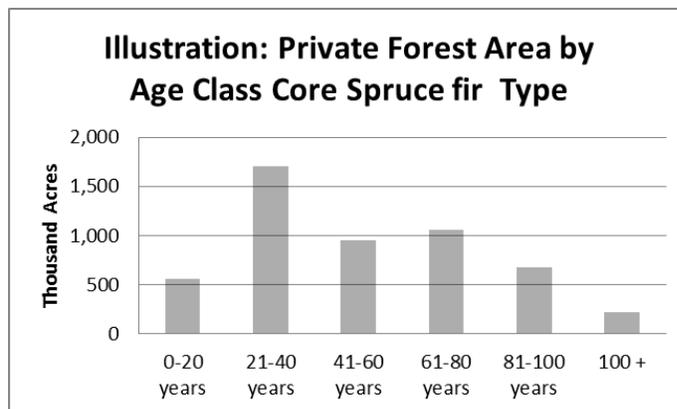
- (a) A band indicating two independent estimates of what LTSY would be for the spruce fir resource.
- (b) Lines indicating the movements of net annual growth, showing the impact of budworm; of the annual cut; and of the estimated mortality up to 1981-95.

Note how measured net annual growth changed over this period. Up until 1970 it was very high. This was because roughly half of the measured growth was “ingrowth”—trees just becoming large enough to be harvested (usually 5” dbh). If you have a balanced age class distribution, you may cut your ingrowth; but if you don’t you must be careful. Not until the 70’s did harvesting catch up with net growth. Because of the inventory surplus and large amount of dying spruce and fir, it was not a problem to cut above growth during the years when growth was so low.



Today, however, BPL may have an inventory surplus in its spruce/fir, but we do not know how large it is. **We are now facing an AAC proposal that leaves no margin for error** either in the growth estimates or in the effects of age class distribution.

Age Class Distribution – Is It Balanced? Traditionally, a key management goal is to improve the distribution of age classes in the forest. In the past, the goal was a uniform (balanced) distribution of age classes. It was assumed that for a commercial property, age classes beyond planned rotation age would virtually disappear. This approach is *not* followed on public lands. To illustrate, the chart below shows 20-year age classes for all spruce fir in the Northern Forest States (NY, VT, NH, ME); Maine accounts for the bulk of this. The 21-40 year bar is the wood that will become merchantable in the coming 20 years. It will appear in net growth as “ingrowth”. If we cut that ingrowth, the next 20 years will have a shortage, as the area aged 0-20 years is far smaller.



We do not have a similar chart for the Maine Public Lands. If we did, we could see to what degree the age class distribution is balanced or lopsided. **Only if the age class distribution is balanced is it sound to base the AAC on cutting all of the current measured growth.**

Goals for Future Forest Condition. Forest planners often talk of a Desired Future Condition, or DFC. This may include many variables, including allocations to different management regimes, goals for retention of deeryards or late-successional area, or areas to be devoted to multi-aged silviculture for habitat, aesthetic, or other reasons. Ideally AAC would fall out from a determination of the DFC and what path of management, including harvesting, would efficiently move the forest toward that long-term condition. Computer models are necessary for making these estimates. It may be that the inventory and stand characterizations now available would not support highly sophisticated analysis of this kind.

Quality Renewal – Not Measured by Growth in Cords. It is natural to use a summary measure such as cords to bring together all products that are measured and sold in different units. The goal of management, however, is not only to sustain *volume* yields, but to sustain and improve *quality* yields. While we believe that BPL silviculture is now doing this, it is clear that the higher one pushes yields in cords, the more important it becomes to ensure that *quality renewal* is being achieved. We do not want to merely sustain quality but to improve it. **Net growth measured in cords cannot tell us whether we are doing this or not.**

Some Related Issues

How Many Separate AAC's Does BPL Need? This is subject to discussion. Given the size of the land-base and the inevitable uncertainty in measuring growth, not more than 3 would be reasonable on a geographic basis; perhaps 2 would do. We see no management need for a multiplicity of separate geographic AAC's. Also, the sample size in the inventory would probably not support any degree of accuracy. Perhaps more importantly, there might be more merit in setting separate AAC's for pine, spruce-fir, and northern hardwoods. The Denico testimony to the Commission shows that the Bureau considers this.

Merchantability Limits. As timber supply has grown tighter, mills have reduced minimum sizes of wood they will accept, and lowered quality standards. The changing energy situation and public policies have incentivized the use of biomass for energy. These factors have enabled the removal of more biomass tonnage from every acre. This cannot be confused with improved productivity -- the basic productivity has not changed, only the amount that is used. Further, the additional volumes have generally been those of the lowest unit values. Nor can higher sawlog yields that result from lower minimum log sizes be considered actual productivity gains.

Should Measured Growth be Discounted to reach AAC? We believe it should, for several reasons. First, growth is an estimate with an unavoidable range of statistical uncertainty. Second, on a property-wide basis, *growth surprises* are often negative ones. Finally, with a looming budworm outbreak, it is likely that spruce-fir growth will be depressed for a period of time, though we do not know when or by how much.

Is a New Inventory Needed? We don't know. This cannot be answered until a careful look is taken at what is now known in light of the above questions. The Bureau is acquiring Woodstock, a forest simulation model, and will be developing the skills needed to use it. We think a brief review by a small panel of outside experts should review the Bureau's current data and GIS capabilities. They would see to what extent these compare with best-practice private owner capabilities for properties of similar size. The group could then offer a judgment as to whether a new inventory is needed. There may be better uses for the funds. It would cost little to wait until 2020/2021 for new inventory. Inventory technology is changing rapidly. New LIDAR technology is very promising and will only get better by 2020. Tentatively, we would be comfortable deferring an inventory if the Department were to adopt our suggestion that the AAC be maintained at 141.5.

Meaning of High Removal Rate per Acre Harvested? We are concerned that the removal rates per harvested acre previously reported by the Bureau look very high to us, and we do not understand why. We hope the Commission will probe this question with DOC officials and learn what the answer is.

Is Allowing Spruce/Fir Salvage or Pre-salvage in Anticipation of a Budworm Outbreak as "Unregulated Cut" a Loophole? In our previous note, we suggested this. Some may feel that this is questionable. We don't think so, as it is a customary practice in forest management. Our suggestion is tied to our recommended retention of the 141,500 cord AAC. At higher levels, this idea does become more problematic. We assume that such harvests would be cost-effective, would be conducted in an orderly manner with sound silviculture, and would be reported to the Legislature in its annual reviews. By "unregulated" we do not mean unplanned, unreported, or undisclosed. We just mean "not charged against the annual allowable cut".