REPORT FOR THE VIRGINIA FORESTRY COUNCIL

From a Verbal Report Given at the May 16, 1967 Meeting

Disquieting Findings of the 1966 Virginia Forest Survey - What Can Be Done About Them?

By

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"Virginia's Timber, 1966"[2/], which summarizes data from the 1966 Forest Survey of Virginia, has recently been released. Total timber volume is up 27 percent over 1940 figures, which is certainly gratifying, even if all of the gain is in hardwoods. Other highlights, given by Forest Survey Units (which are delineated on a map in "Virginia Timber, 1966"), are as follows:

1. Southern Mountains - The growing stock shows substantial improvement over the 1957 survey figures; hardwood and pine growing stock are each up 20 percent, and annual cutting does not nearly match annual growth.

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2/ Knight, Herbert A. and Joe P. McClure. 1967. Virginia's Timber, 1966. U. S. Forest Service Resource Bulletin SE-8, 47 pp., illus.

Many friends and colleagues gave welcome suggestions that are incorporated in this report, especially Walton R. Smith, Assistant Director, and Joe P. McClure, Project Leader, both of Forest Economics, Marketing, and Utilization Research, Southeastern Forest Experiment Station.

2. Northern Mountains - This province also seems to be coming along well wood-wise, with both hardwood and pine increased 17 and 11 percent, respectively. And the annual cut is well below annual growth.

3. Northern Piedmont - This area shows moderate gain, with hardwood volume up 8 percent but pine up only 2 percent. However, annual cutting seems to be well below annual growth, except in the case of pine sawtimber.

Having looked at the bright side, with all of us now in a cheerful and optimistic frame of mind, let us examine the more gloomy aspects that are all too clearly brought out by the 1966 Forest Survey.

Here are the problem areas:

4. Southern Piedmont - For this region the outlook is rather poor, with pine growing stock down 7 percent since 1957. About 90 percent of this loss is in the 6 to 8 inch diameter classes, which indicates rather clearly where the wood is going. The most recent year for which volume drain figures are available is 1964, and during that year the cut of pine growing stock was almost 25 percent greater than net growth. It is only mildly encouraging to see that hardwood growing stock has increased 7 percent and that growth exceeds cut, because overcutting is occurring in sawtimber greater than 15 inches in diameter, the scarcest and most valuable portion of the hardwood stocking.

5. Coastal Plain - In many respects the situation in the coastal plain is quite similar to that of the Southern Piedmont. For the sake of brevity (and hopefully clarity) I have chosen the Coastal Plain survey unit for a more detailed problem analysis, instead of discussing both

units. By and large, the general picture given below for the coastal plain also applies to the Southern Piedmont.

I will present under seven headings some of what the 1966 Forest Survey has to tell us about the coastal plain; these are: A) Growing Stock, B) Forest Area, C) Stand Density, D) Forest Land Ownership, E) Forest Conditions by Ownership Class, F) Growth, and G) the Critical Size Class.

A. Growing Stock - Overall stocking has declined 1.3 percent in the last 10 years. This does not look too bad on the face of it until we note that the critical component - pine - is down 8 percent. Hardwood volume shows a modest 3 percent gain. At present the annual cut of growing stock exceeds net growth by 12 percent. Soft hardwoods have shown a 3 percent increase in volume, but how long this will continue is problematical, since the cut in this class of material has increased 23 percent over 1956 levels, with most of this increase utilized as pulpwood.

These dismal trends come as no particular surprise; the 1957 survey showed a tendency toward this direction and was duly noted by the Forest Survey people. Also, many industrial foresters have expressed concern that there may well be some over-cutting within the coastal plain.

B. Forest Area - There has been no real increase of forest area in the coastal plain, losses have nearly balanced gains. Furthermore, judging from past trends, there is no reason to believe that any considerable quantity of old-field land is available for an accelerated planting program, to boost the forest area total.

C. Stand Density - As the following table shows, growing stock levels are rather high--nothing near maximum, mind you, but these values compare favorably with data from other forests of the south. The table below gives values for the average acre, derived by lumping all stocking classes, types, etc. together.

Coastal Plain Stocking on a Per Acre Basis

Survey Date	Total[1/] Basal Area	Percent Pine	Pine Basal Area
1940	85	44	37
1956	89	40	36
1966	93	35	33

It is evident that although the total stocking has steadily increased, the pine component has been reduced. It is important to emphasize that the pine stocking figures given above are for the average forest acre, not just pine types. At present the pine types occupy 28 percent of the forest area, and the average acre in these types has a basal area of 74 in pine growing stock 5 inches d.b.h. and larger, not at all bad. The trouble is, the acreage in pine types is not sufficient and has been shrinking over the years.

1/ There is a joker in these basal area figures, in that they are not summaries of merchantable volume, but rather include all growing stock greater than 1 inch d.b.h. I doubt whether this factor throws as much fog into the picture as it would first appear. We have a considerable backlog of knowledge that shows that a given site will only support a given maximum of basal area, pretty much regardless of what the size class distribution may be.

Well, these stocking levels do not look so bad but the point is they are not high enough to meet the heavy demand. Can they be improved upon very much? I do not see why not. We know for a fact that these basal area levels are considerably below the biological potential.

As a preliminary in our thinking toward devising remedies, let us ask what is happening forest-wise in the coastal plain. Are we seeing the results of natural succession toward hardwood, due to better fire protection? Have there been too many diameter limit or so-called "economic" clear-cuts without adequate management provisions? Perhaps too many marked "partial cuts" (often euphemistically called selection management) whenever there is a sufficient accumulation of pulpwood present--many landowners may discount future returns heavily when they need a few dollars now.

There are some foresters who like to raise hell over the seed tree law. As for me, I cannot get excited over this controversy, either one way or another. The seed tree law is no doubt imperfect, but we may seriously question if it has done more harm than good. Also, there is much hind-sight over prescribed burning. The whole south was slow in adopting this program, but we have not done so badly of late.

D. Forest Land Ownership - There are 4.1 million acres involved, and who owns this land? It is well for us to inquire, so that we may see where the needs lie and possibly some ripe opportunities, too.

Forest Land Ownership in the Virginia Coastal Plain

	M Acres		Percent of Total	
Farmers	1,864		45	
Misc. Private	1,337		33	
Sub-total:		3,201		78
Pulp and Paper	507		12	
Other Forest Industries	252		7	
Industry sub-total		759		19
Public (no National Forest)	131		3	
Grand Total	4,091		100	

Our profession since its inception has wondered how to motivate farmers to more and better forest management. I have no suggestions specific to them, nor have I ever heard anything really new in this regard. It seems to me that the "Miscellaneous Private" landowners present a much more promising opportunity. They are more often in a favorable position--financially, culturally, and otherwise--to show interest and action in forest management. Moreover, this class of ownership, which already controls one-third of the forest land, is increasing.

E. Forest Conditions by Ownership Class - Here we are attempting to pinpoint problems and opportunities again. We would especially like to know who has the pine types, the pine growing stock, and what condition they are in. The following table shows how the major forest types of the coastal plain are divided percentage-wise among ownership categories.

	Yellow Pine	Oak-Pine	Oak-Hickory	All Other Types
		-----Percent----		
Misc. Private	31	31	35	31
Farmers	37	49	50	43
Forest Industries	28	17	12	24
Public	4	3	3	2
Totals:	100	100	100	100
Acres Involved (M)	1140.1	885.7	1,784.0	275.7
Percent of Forest Total	28	22	43	7

Obviously the "Farmer" and "Miscellaneous Private" ownership groups control a lion's share of the critical pine and oak-pine types, and these two types dominate only half of the total commercial forest land.

Next, let us examine the stocking status of the average acre of each ownership group, as it is presented in the next table:

Volume in Cords Per Acre

	Softwood		Hardwood		Totals			
	Stock	Culls	Stock	Culls	Stock	Culls	All Timber	Percent Cull
Misc. Private	6.4	0.4	8.8	2.8	15.2	3.2	18.4	17
Farmers	5.8	0.4	8.7	3.0	14.5	3.4	17.9	19
Forest Ind.	9.0	0.6	6.9	2.2	15.9	2.8	18.7	15
Pulp & paper	9.3	0.6	7.4	2.4	16.7	3.0	19.7	15
Others	8.3	0.7	5.9	1.7	14.2	2.4	16.6	14
Public	7.7	0.4	10.1	2.4	17.8	2.8	20.6	14
All Forest Land	6.7	0.4	8.4	2.8	15.1	3.2	18.3	17

Judging from the above table, the "Farmers" and "Miscellaneous Private" land owners appear in a rather poor light as regards pine

stocking in their woodlands. However, this is only a half-truth because we must remember that these owner classes have a preponderance of hardwood types, and on the basis of total growing stock levels, they are about on a par with everyone else. Also, if we examine stocking on pine types alone, we find that:

Cords Per Acre Volume, Pine Types Only

	Pine		Hardwoods		Totals			
	Stock	Cull	Stock	Cull	Stock	Cull	All Trees	Percent Cull
Misc. Private	15.7	1.0	3.1	1.0	18.8	2.0	20.8	10
Farmers	14.7	0.9	3.1	1.1	17.8	2.0	19.8	10
Forest Ind.	15.0	0.9	2.2	1.0	17.2	1.9	19.1	10
Public	17.9	1.5	1.8	0.7	19.7	2.2	21.9	10

Plainly there is little difference between ownership groups in the amounts of stocking and cull percent (the public agencies have a slight edge but they have a very minor fraction of the coastal plain timberland). But the "Farmers" have only 23 percent and the "Miscellaneous Private" owners 26 percent of their total forest holdings in the pine type, as compared to 43 percent for "Forest Industries." This is the important difference between ownerships. Very likely hardwoods have been replacing pine at a more rapid rate on "Farmer" and "Miscellaneous Private" holdings, and it would be most beneficial to stem this ominous trend.

F. Growth - As near as I can figure from data presented in the preliminary survey report for the coastal plain, in 1965 the growth of pine

alone on the predominantly pine types averaged 0.65 cords per acre per year. Including the hardwood that exists on these lands, growth is probably slightly greater than 7/10 of a cord per acre.

There is no biological reason why this land should not grow loblolly pine, on the average, at a rate of 1.5 cords per acre per year[1/]. And that would be more like it!

For all the commercial forest land in the coastal plain, average growth for pine and hardwood combined is about 6/10 of a cord per acre per year.

G. The Critical Size Class - There is a dearth of small size-class pine growing stock--the 5 inch through 13 inch d.b.h. size classes--and they have been declining from both the 1940 and 1956 stocking levels. This segment of pine volume, some of it in the small sawlog class, is no doubt being over-cut for pulpwood.

1/ You doubt this, do you? Will you allow that coastal plain pine land will average roughly 85 in site index, and 100 basal area is not extreme? Then, according to T. C. Nelson, et al. 1961, "Merchantable Cubic-Foot Volume Growth in Natural Loblolly Pine Stands," S. E. Forest Experiment Station Paper No. 127, one can expect annual growth of about 175 cubic feet (outside bark) per acre per year in a 30 year rotation. This works out to 1.94 cords per acre per year ($\frac{175}{90}$). However, we all know that due to road openings, stocking variations, disease losses, etc. we cannot expect this much growth. If we accept 80 percent of 1.94 cords as a reasonable estimate, our answer is 1.55 cords per acre per year.

DISCUSSION

When over-cutting occurs, I am certain we all realize there is no panacea, we are going to be burdened awhile with the unwelcome results. In our business there unfortunately is not a great deal of opportunity for economy either in time or space.

However, the present problem points out how much forestry has progressed. What I mean is, a few years ago we would have been reasonably satisfied with the stocking and growth situation down on the coastal plain. But forest industry has concentrated there, and with the increasing drain we now need to grow more wood and utilize it better. We know that it is possible to do this, and I think it can be done.

Through the help of numerous foresters, I have for your consideration some suggestions as to how the pine growing stock situation, in the coastal plain and southern Piedmont, could be put back in the black.

Silvicultural and Managerial Actions

1. My co-workers in Asheville who are concerned with the Forest Survey tell me that if 85 thousand acres a year were planted, direct seeded, or otherwise stocked, we would be back on schedule in 15 or 20 years. They may be a little pessimistic; I hope so.

   a. We need to get old fields stocked, also the cut-over pine land that has not regenerated for some reason.

   b. More type conversion is indicated, low quality hardwoods to pine.

c. We must reverse this trend of more hardwood forest at the expense of pine woodland, using a. and b. above complemented by prescribed burning.

How can this be done?

a. More and bigger family tree farms, promoted and sponsored by the wood using industries. They could help in accomplishing required site preparation and the necessary planting, seeding or whatever.

b. Yet more extension work is desirable. We need to get the word out, especially to the "Miscellaneous Private" landowner group that controls a goodly share of the forest and is rapidly acquiring more. Many of these people have sufficient acreage and wherewithal to do some forest management, and perhaps they are not fully aware of the profit opportunities.

c. I am told that obtaining labor for planting is a major problem. I wonder if the way could be cleared so that state convicts and/or county prisoners could be employed for this. Prisoners are presently being used for forestry work in at least one other southeastern state.

2. Virginia needs accelerated programs for genetically superior seedlings, to obtain greater quantities more rapidly. This is a state and federal obligation, but industry could also expand their endeavors.

3. Concerning existing stands:

a. More timber stand improvement work will be needed, to get rid of those culls, for instance, that presently hog 17 percent of the

coastal plain timber volume. To help make this work economical and, indeed, possible to many landowners, federal assistance is available through cost sharing agreements. Unfortunately, many county agricultural groups budget rather meager sums for forestry cost sharing. We might look into ways and means of breaking more of this money loose.

The wood-using industries could be strong in T.S.I. assistance programs too, and as ever, we need vigorous extension efforts to get the pertinent information disseminated where it counts.

b. <u>There is presently too much cutting of small, young trees barely merchantable</u>. Apparently many owners have little appreciation of optimum rotations and financial maturity, or desirable levels of stocking. And the much maligned farmer and small landowner is not alone in this, either. An individual or company certainly has the right to run their own affairs largely as they see fit, but it may be that the forestry profession has been less than successful in formulating, selling, and implementing sound economics advice.

<u>Possibilities Through Better Utilization</u>

The more of the cut wood that is utilized, the less the pressure will be on developing young growing stock.

1. Considerable amounts of sawmill residues are still going abegging. The pulp and paper industries could do more to curb this loss of fiber.

2. A lot of useful pine fiber is still left in the woods. Logging utilization could be much closer, with more whole tree logging a step the

right way. The logging methods of most operators are a long way short of maximum efficiency. Guidance would help, but what is particularly needed is a way to finance the more sophisticated logging machinery that many could use to advantage but cannot get.

Mr. Joseph J. Wiley of the West Virginia Pulp and Paper Company recently made a speech in which he presented a strong case for proprietary logging, where the company runs the show and woods workers are company employees. There have been many unsatisfactory ventures into this, but Joe has made it work. Mr. Wiley makes the telling point that the time is rapidly passing wherein we can accept as woods workers men who cannot find a job anywhere else; logging is going to have to mechanize, a higher grade of man will be needed to run these machines, and he must be compensated accordingly. Better logging efficiency will almost certainly improve utilization.

3. If more hardwoods could be used in pulping it would help considerably. I mean change the mix ratio of hardwood to pine. Lately most of the increased use of hardwood for pulp has been accompanied by an increased intake of pine fiber also.

4. We lose a lot of volume each year in mortality of one sort or another. Prompt, aggressive salvage can be profitable on occasion. Considerable ice-damaged timber is now being salvaged on the coastal plain. In 1965, 200 thousand cords of pine in the coastal plain were lost through mortality. This amounted to 15 percent of the gross pine growth for that year.

Other Ideas

1. We have heard that stopping the export of Virginia wood might be a good idea. I am against such an idea on principle, but more than that it might not work out at all as intended. Quite possibly Virginia is on the heavy side of the ledger now, and an embargo might boomerang.

2. Should we try to accelerate the cutting of sawtimber stands, so that these woodlands may be more rapidly converted to fast growing young stands with plenty of pulpwood potential, if only from thinnings? Perhaps this is robbing Peter to pay Paul, and this sort of program is not likely to be popular with the sawmill and veneer industries.

3. Are there alternative sources of pine timber in Virginia, to take the pressure off the southern Piedmont and coastal plain areas? The northern Piedmont is just about holding its own, and that leaves the mountains. They are a long way from the big coastal plain pulp mills and only have about 16 percent of the state's coniferous growing stock, anyway.

4. Perhaps the Virginia Forestry Council could sponsor a symposium on these growing stock problems the Forest Survey has brought to light. Two days worth might not be too long, with committees formed to take a hard, aggressive look at the various phases and possibilities.

Walton Smith and his group in Asheville (Forest Economics, Marketing, and Utilization Research which includes the Forest Survey) have assured me that they would be glad to cooperate in such a meeting in any way they can.