Forest Research Group

Forest Research Notes

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Hardwoods: The Other Timberland Type

A majority of institutional timberland investments in the US are focused on softwoods. But hardwoods make up a significant portion of the US forest, in terms of both forest type by area and standing timber volume. Most "softwood" investments—especially in the East—include some hardwood lands and volumes. Hardwoods provide market diversification as many of them are less dependent on housing construction than are softwoods.

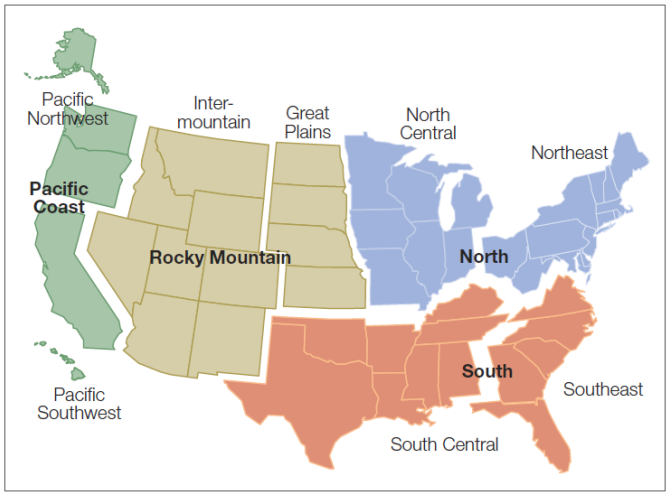
The Resources Planning Act (RPA) of 1974 calls for the USDA Forest Service to prepare reports every decade on the state of the forests and the challenges they face in the US. These RPA reports are multi-year efforts and require a lot of numbers to be combined or averaged or otherwise smashed together (a technical term!) to present a reasonably concise summary of forest resources across a large and diverse landscape.

Figure 1 is taken from a technical document supporting the 2020 RPA assessment (Oswalt et al, 2019) and shows the regions and subregions used in the assessment.

Forest Types

Table 1 shows forest types by area across the United States. The orange/tan color identifies forest types that are over 50% softwoods, the green color shows types that are over 50% hardwoods, the purple/pink shows other forest types and the gray shows timberland that does not currently have trees on it. As is clear from the column headings in the table, western forests are very different than eastern forests.

Figure 1. RPA Regions and Subregions in the United States



Source: Figure I-1, Oswalt et al, 2019

Table 1. Western and Eastern Forest Types (mm Acres)

	Douglas-fir	Ponderosa Pine	Western White Pine	Fir-Spruce	Hemlock-Sitka Spruce	Larch	Lodgepole Pine	Redwood	Other Softwood	Western Hardwoods	Pinyon-Juniper	Non-Stocked	Total Timberland
Rocky Mountain	17.8	13.5	0.1	22.0	1.4	1.2	11.0	0.0	5.4	17.9	31.1	9.4	130.6
Pacific Coast	21.1	9.5	0.2	52.3	18.0	0.5	4.1	0.8	72.9	27.0	1.2	6.0	213.5
	White-Red-Jack Pine	Spruce-Fir	Longleaf-Slash Pine	Loblolly-Shortleaf Pine	Oak-Pine	Oak-Hickory	Oak-Gum-Cypress	Elm-Ash-Cottonwood	Maple-Beech-Birch	Aspen-Birch	Other Forest Types	Non-Stocked	Total Timberland
North	9.7	15.9	0.0	2.4	5.6	56.5	0.8	16.0	49.8	15.6	2.2	1.3	175.8
South	0.5	0.0	13.0	63.9	22.3	84.1	24.7	15.1	4.4	0.0	11.0	6.6	245.5
	Douglas-fir	Ponderosa Pine	Western White Pine	Fir-Spruce	Hemlock-Sitka Spruce	Larch	Lodgepole Pine	Redwood	Other Softwood	Western Hardwoods	Pinyon-Juniper	Non-Stocked	Total Timberland
% Rocky Mountain	14%	10%	0%	17%	1%	1%	8%	0%	4%	14%	24%	7%	100%
% Pacific Coast	10%	4%	0%	24%	8%	0%	2%	0%	34%	13%	1%	3%	100%
	White-Red-Jack Pine	Spruce-Fir	Longleaf-Slash Pine	Loblolly-Shortleaf Pine	Oak-Pine	Oak-Hickory	Oak-Gum-Cypress	Elm-Ash-Cottonwood	Maple-Beech-Birch	Aspen-Birch	Other Forest Types	Non-Stocked	Total Timberland
% North	6%	9%	0%	1%	3%	32%	0%	9%	28%	9%	1%	1%	100%
% South	0%	0%	5%	26%	9%	34%	10%	6%	2%	0%	4%	3%	100%

Source: Oswalt et al, 2019

Table 2. Summary of US Forest Types (mm Acres)

	Softwood	Hardwood	Other	Non-Stocked	Total Timberland
Rocky Mountain	72	18	31	9	131
Pacific Coast	179	27	1	6	214
North	28	144	2	1	176
South	77	151	11	7	246
US	357	340	45	23	765
% of Rocky Mountain	55%	14%	24%	7%	100%
% of Pacific Coast	84%	13%	1%	3%	100%
% of North	16%	82%	1%	1%	100%
% of South	32%	61%	4%	3%	100%
% of US	47%	44%	6%	3%	100%

Table 2 summarizes the forest types from Table 1. The western forests are over 70% softwood types while hardwood types make up 70% of the eastern forests and the two types are evenly balanced when looking at the entire country.

Timber Volumes

Table 3 shows a similar picture for growing stock volumes (growing stock refers to trees that are in good condition and expected to grow and does not include cull or dead trees). Softwoods make up almost 60% of the growing stock, but that varies from 90% in the western forests to just over 22% in the forests in the north subregion. Hardwoods are very important in the northern forests and make up over half the volume in the southern forests.

Table 3. Growing Stock Volumes by Major Species Group (MMBF)

MMBF	Total	Softwoods	Hardwoods
Rocky Mountain	55,087	50,467	4,620
Pacific Coast	112,756	101,489	11,267
North	114,424	25,678	88,746
South	135,207	59,876	75,331
US	417,474	237,511	179,963
% of Total	Total	Softwoods	Hardwoods
Rocky Mountain	100%	92%	8%
Pacific Coast	100%	90%	10%
North	100%	22%	78%
South	100%	44%	56%
US	100%	57%	43%

Source: Oswalt et al, 2019

Here is where the smashed-together data needs to be looked at carefully. For example, in the South, the Appalachian Mountains are heavy to hardwoods and the coastal plain is heavy to softwoods. But there are hardwoods in the coastal pine belt, especially in the bottomlands along the rivers. There are pines in the Appalachian Mountains, but not the large pine plantations found along the coast.

Table 4 shows the distribution of sawlog volumes for hardwoods in 23 eastern states. (This does not include the timber-growing regions of Texas and Oklahoma, which are included in the South in Table 3.)

Table 4. Sawlog Portion of Sawtimber Trees in 23 Eastern States (MMBF)

Species	% of Standing Timber	% of Annual Growth	% of Annual Harvest
Red Oak	21.2%	22.9%	17.3%
Yellow Poplar	14.6%	15.2%	11.4%
Hard Maple	7.8%	7.1%	10.4%
Soft Maple	7.0%	6.7%	9.7%
Top 4	50.7%	51.9%	48.9%
Other Hardwoods	49.3%	48.1%	51.1%
Total Hardwoods	100.0%	100.0%	100.0%
Top 4 Hardwoods	% of Standing Timber	% of Annual Growth	% of Annual Harvest
Red Oak	41.8%	44.1%	35.4%
Yellow Poplar	28.9%	29.4%	23.3%
Hard Maple	15.5%	13.6%	21.4%
Soft Maple	13.8%	12.8%	19.9%
Top 4	100.0%	100.0%	100.0%

Source: US Forest Service Forest Inventory & Analysis

There are several different red oak species that get rolled into the red oak group when looking at prices for stumpage and lumber.

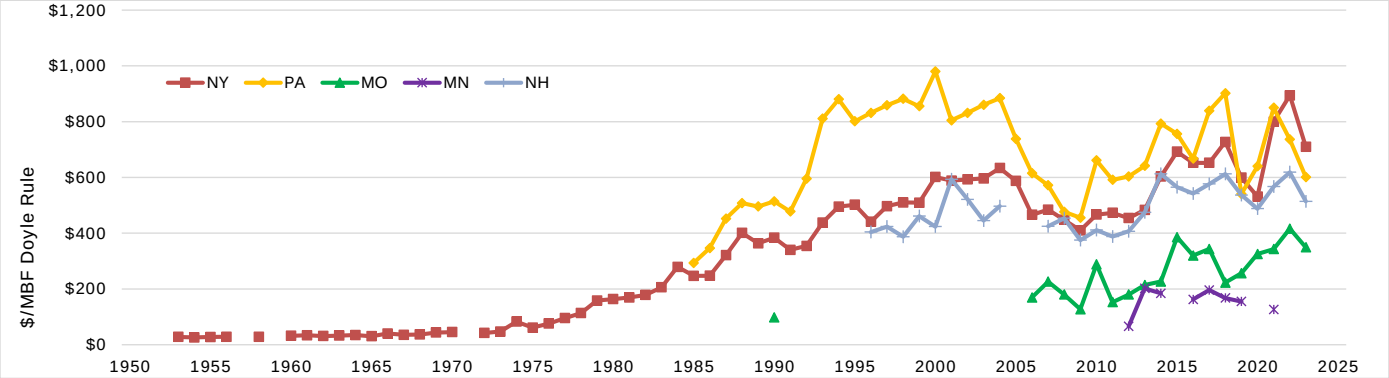
Yellow-poplar (*Liriodendron tulipifera*) is the second most common species in the eastern forest. [Not to be confused with the ***poplars*** (*Populus spp.*) or *aspens*. The confusion is not helped by the fact that yellow-

poplar lumber is referred to as *poplar* while aspen/poplar lumber is referred to as *aspen*.]

The maples make up a slightly larger percentage of the forest than yellow-poplar, but they are usually reported separately for both stumpage and lumber. Hard maple is primarily sugar maple and soft maple is primarily red maple, but there are other less common species in each group.

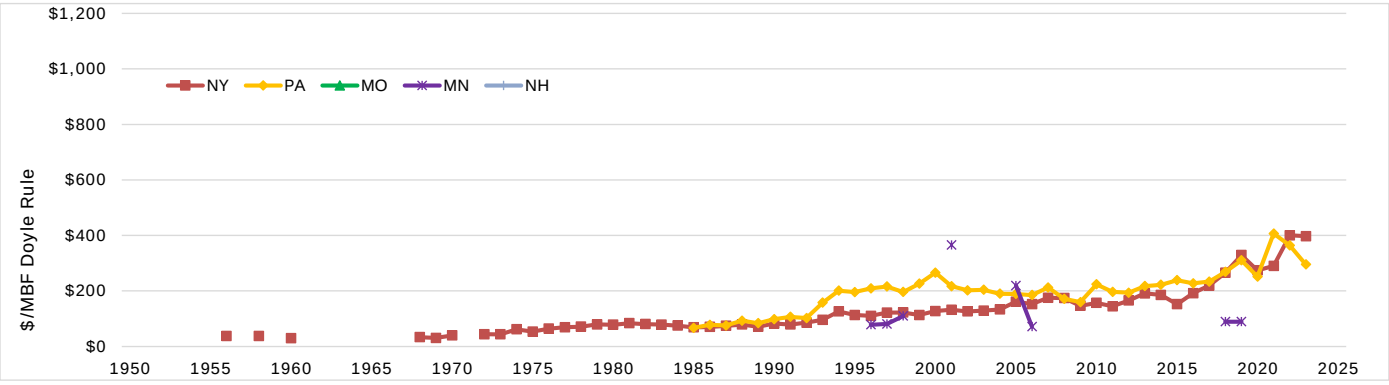
The next four charts show stumpage prices for the top four species/species groups for five states:

Figure 2. Red Oak Stumpage Prices



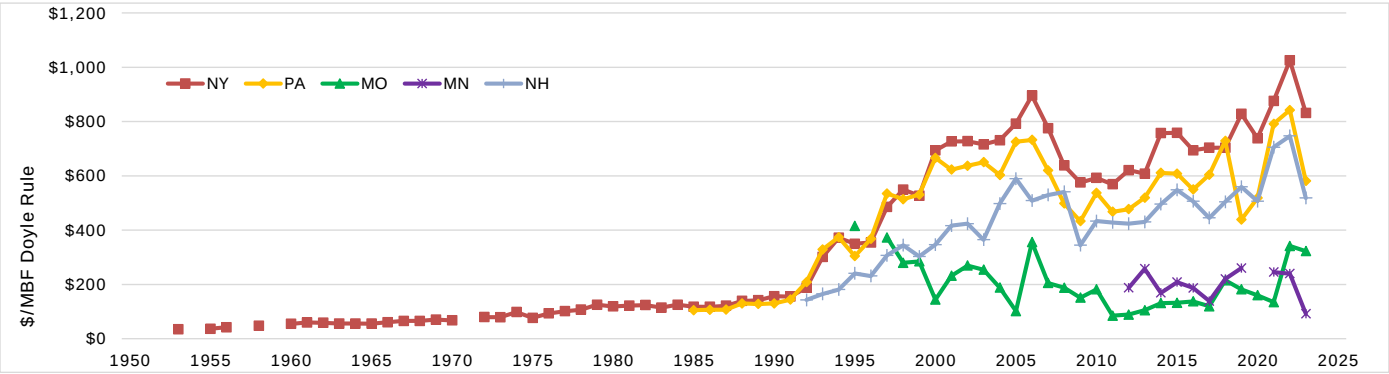
Sources: NY Division of Forests and Lands, PennState Extension, MO Department of Conservation, Timber Mart North, NH Timberland Owners Association

Figure 3. Yellow-Poplar Stumpage Prices



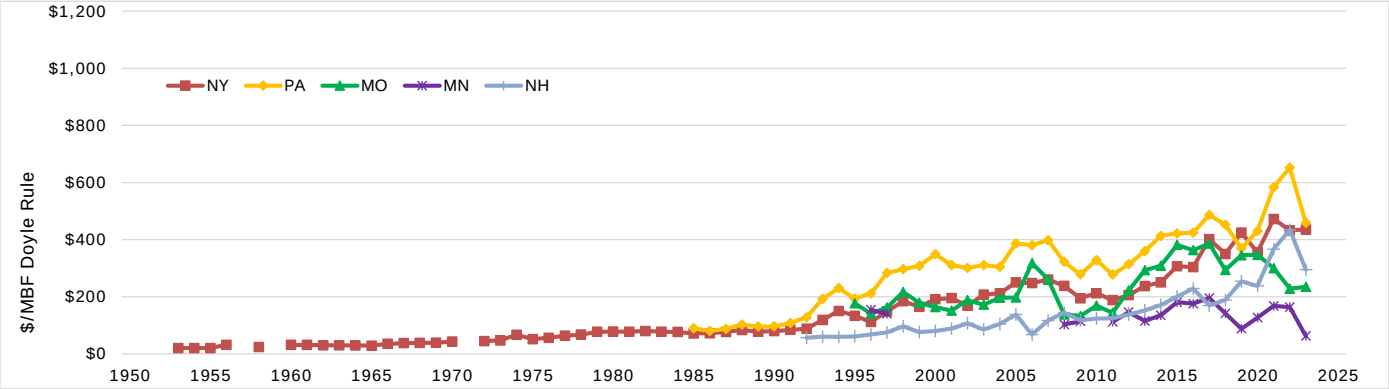
Sources: NY Division of Forests and Lands, PennState Extension, MO Department of Conservation, Timber Mart North, NH Timberland Owners Association

Figure 4. Hard Maple Stumpage Prices



Sources: NY Division of Forests and Lands, PennState Extension, MO Department of Conservation, Timber Mart North, NH Timberland Owners Association

Figure 5. Soft Maple Stumpage Prices



Sources: NY Division of Forests and Lands, PennState Extension, MO Department of Conservation, Timber Mart North, NH Timberland Owners Association

Table 5 shows the correlation coefficients for hardwood species stumpage prices among the five states. Prices in the three northeastern states are very strongly correlated with each other. Red oak and soft maple prices in MO are also strongly correlated with the northeast states. MN is less correlated with the other states and MO is negatively correlated in some cases.

Table 5. Correlation Coefficients for Hardwood Species Stumpage Prices Among States

Red Oak	NY	PA	MO	MN	NH
NY	1.0000	0.6435	0.8225	0.1553	0.8057
PA		1.0000	0.5709	0.2833	0.2493
MO			1.0000	0.2489	0.6509
MN				1.0000	0.5760
NH					1.0000
Yellow-Poplar	NY	PA	MO	MN	NH
NY	1.0000	0.8280		-0.2244	
PA		1.0000		-0.1940	
MO					
MN				1.0000	
NH					
Hard Maple	NY	PA	MO	MN	NH
NY	1.0000	0.9492	-0.0933	0.1331	0.9199
PA		1.0000	0.0073	0.1541	0.7872
MO			1.0000	-0.1771	-0.2450
MN				1.0000	0.3884
NH					1.0000
Soft Maple	NY	PA	MO	MN	NH
NY	1.0000	0.9288	0.6771	0.0474	0.8970
PA		1.0000	0.6056	0.3340	0.8692
MO			1.0000	0.3991	0.4826
MN				1.0000	0.0755
NH					1.0000

Summary

Hardwood forest types make up almost half of the US timberland by area and hardwoods make up almost half of the sawtimber volume on those timberlands. Over 85% of the hardwood volume is found east of the Great Plains.

Hardwood timberlands provide diversification for portfolios dominated by softwood investments (see for example, Vol 13 No 2). A geographic diversification of hardwood properties further adds diversification benefits because hardwood stumpage prices are not always strongly correlated across the East.

References

Oswalt, Sonja N.; et al, 2018. Forest Resources of the United States, 2017: a technical document supporting the Forest Service 2020 RPA Assessment. General. Technical. Report WO-GTR-97.

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