CENTRAL HARDWOOD NOTES

How To Assess Oak Regeneration Potential In The Missouri Ozarks

The values in tables 1 and 2 apply specifically to oak stands in the Missouri Ozarks and may or may not apply outside this area. Unfortunately, similar values for oak do not exist for other geographic areas. Use the procedures and values cautiously in other areas. Consider them as approximations and compare them to values based on local experience and guidelines.

Table 1 .--*Stocking values for oak advance reproduction in the Missouri Ozarks*

Size of tallest tree per plot		Aspect and slope position of plot								
Height class (feet)	Ground diameter class	Southwest			Southeast and Northwest			Northeast		
		Upper	Middle	Lower	Upper	Middle	Lower	Upper	Middle	Lower
	Inches	*Plot Stocking Value (SV)*[1]								
cl	All	1	1	0	1	2	0	1	1	0
	0.5(0.3-0.7)[2]	5	6	1	8	9	2	4	5	1
(1.123.0)	1.0(0.8+)	14	17	3	22	26	6	13	15	3
4	0.5(0.3-0.7)	10	11	2	15	18	4	8	10	2
(3.1-5.0)	1.0(0.8-1.2)	22	25	6	32	37	9	19	22	5
	1.5(1.3+)	37	42	11	51	56	18	34	38	10
	0.5(0.3-0.7)	19	22	5	28	32	8	16	19	4
(5.167.0)	1.0(0.8-1.2)	32	36	9	45	50	14	29	33	8
	1.5(1.3+)	45	50	15	59	65	23	41	46	13
	1.0(0.8-1.2)	44	49	14	59	64	22	40	45	12
(7189.0)	1.5(1.3-1.7)	54	59	19	68	73	28	49	54	17
	2.0(1.8+)	62	67	24	76	80	35	57	62	21
10+	1.0(0.8-1.2)	58	63	22	72	77	32	54	59	14
(9.1+)	1.5(1.3-1.7)	62	67	24	76	81	35	58	63	16
	2.0(1.8-2.2)	66	71	27	79	84	38	61	66	19
	2.5(2.3+)	69	74	29	82	86	41	64	69	21

Narrow ridge tops
Level areas (<15 percent slopes other than ridge tops and bottoms);
Bottoms

[1] Stocking Value (SV) is the contribution of a single stem to stand stocking at age 20.

[2] Ranges in parantheses.

Table Z.--Expected proportion of stumps that will produce at /east one codominant or larger stem at age 20

Species	Site index	D.b.h. class	Age of parent tree (years) 40	60	80	100	All ages
		Inches					
Black oak	50	2-5	0.36	0.34	0.32	0.30	—
		6-l 1	.13	.11	.10	.08	—
		12-16	.06	.05	.04	.03	—
		17+	—	.02	.02	.01	—
	60	2-5	.47	.45	.42	.40	—
		6-l 1	.16	.15	.13	.12	—
		12-16	.07	.06	.05	.04	—
		17+	—	.03	.02	.02	—
	70	2-5	.61	**.59**	.56	.54	—
		6-l 1	.21	.19	.17	.16	—
		12-16	.19	.08	.07	.06	—
		17+	—	.06	.04	.03	—
White oak	50	2-5	.47	.25	.12	.05	—
		6-l 1	.18	.10	.06	.03	—
		12-16	.06	.04	.03	.02	—
		17+	—	.02	.01	.01	—
	60	2-5	.63	.38	.19	.08	—
		6-l 1	.26	.16	.09	**.05**	—
		12-16	.09	.07	.05	.03	—
		17+	—	.03	.02	.02	—
	70	2-5	.81	**.55**	.31	.15	—
		6-l 1	.36	.25	.16	**.09**	—
		12-16	.15	.11	.08	.06	—
		17+	—	.05	.04	.04	—
Northern red oak	60+	2-5	.86	.86	**.49**	**.49**	—
		6-l 1	.86	.86	.46	.46	—
		12-16	.86	.86	.38	.38	—
		17+	—	.86	.24	.24	—
Scarlet oak[1]		2-5	—	—	—	—	0.46
		6-l 1	—	—	—	—	**.96**
		12-16	—	—	—	—	.46
		17+	—	—	—	—	.10

[1] Values by parent tree age are not available. Values given are means for sawtimber-size stands of various but unknown ages.

The values in tables 1 and 2 are based on a goal of having at least 30 percent stocking (approximately C-level, see Note 5.02 Stocking *Chart for Upland Central Hardwoods)* in dominant and codominant oaks when the new stand is about 20 years old.

Inventories of (a) the oak advance reproduction and (b) the overstory are required. Both inventories should be made at the same time (see example tally form). If the oak advance reproduction inventory shows insufficient oaks to replace the stand, the overstory inventory is used to determine whether or not stump sprouts from overstory oaks are numerous enough to make up for deficiencies in advance reproduction.

Here are the steps to make the assessment.

1. Tally all oaks 1.6 inches d.b.h. and larger by species and size classes on 10 or more l/20-acre overstory plots.
2. Determine the average age of dominant and codominant oaks and the site index; record this on the tally form. Also determine and record the average age of intermediate and suppressed oaks (lower story) that are 1.6 inches d.b.h. and larger. If intermediate and suppressed oaks are younger than the dominant and codominant trees, they will have a higher sprouting frequency.
3. Select the number of 1/735-acre plots (4.3 feet in radius) to use in the oak advance reproduction inventory from the following tabulation by stand size. Distribute them uniformly throughout the stand.

For stand size (Acres)	**Use this number of l/735-acre plots**
<10	25
10 to 30	40
30 to 50	60

4. Measure the tallest stem of advance oak reproduction on each 1/735-acre plot and record on the form. Tally these stems by the 2-foot height classes and l/2-inch ground diameter classes used in table 1. A 6-inch caliper graduated in either tenth or quarter inches can be used to measure ground diameters. Measure only trees 1.5 inches d.b.h. or less; larger stems should be tallied as part of the overstory, even if below the main canopy. If no oak advance reproduction is present, record zero for height and ground diameter on the tally form.
5. Record on the oak tally form the aspect of each plot by quadrant (NE, SE, SW, or NW) and its slope position (upper, middle, or lower thirds). For slope position on level topography, use LE for slopes less than 15 percent, RI for ridge tops, and BO for bottoms, and use the stocking values for southeast/ northwest aspects (table 1).

6. Determine the stocking value (SV) for each plot from table 1 and record on the tally form. Then calculate the average SV and round off to the nearest whole number. If average SV is 30 or greater, oak advance reproduction is adequate; no further calculations are necessary and the stand can be harvested.
7. If the average SV is less than 30, oak advance reproduction is inadequate to reproduce the stand if it is cut. But the stand can still be regenerated if enough stumps of the overstory oak trees will sprout after they are cut to make up for the advance reproduction deficiency.

   To compute the contribution to reproduction stocking from expected stump sprouts:

   a. Assume that the overstory inventory provides the data on the example form for an 80-year-old stand on site index 60.
   b. Note that there are 26 black oaks 2 to 5 inches in diameter per acre. Multiply 26 by 0.42 (from table 2) to estimate how many of the 26 stumps are expected to produce codominant or dominant trees at age 20: 26 x 0.42 = 11 (rounded off), the expected number of stump sprouts per acre for 2- to 5-inch black oaks. Enter 11 at the bottom of the tally form.
   c. Similarly, estimate the expected number of stump sprouts for the other black oak size classes (one for the 6- to 11 -inch class, one for the 12- to 16-inch class, and zero for the 17+ inch class). All these classes sum to 13. Do the same for all oak species.
   d. Summing all oak species and all size classes gives a total of 45 expected stump sprouts per acre.

8. Go to table 3 and find the number of stump sprouts required in combination with advance reproduction stocking to meet minimum stocking requirements. The stocking value for this example is 25. Opposite 25 note that 37 stump sprouts are needed to make up the deficiency in advance reproduction.
9. The computed value 45 exceeds the needed value 37 so oak stump sprouts will make up for the deficiency in advance reproduction. Thus, the oak component of the new stand will be adequate and the old stand can be harvested.
10. If the number of expected stump sprouts does not compensate for advance reproduction deficiencies, harvesting should be delayed until adequate oak advance reproduction is established.

Table 3.--*Number of stump sprouts required to compensate for stocking deficiencies of advance reproduction*

Mean stocking value (SV) for 1/735-acre plots	Stump sprouts required
	Number per acre
> 30	0
29	8
28	15
27	23
26	30
25	37
24	45
23	52
22	59
21	67
20	74
19	81
18	89
17	96
16	103
15	111
14	118
13	125
12	133
11	140
10	148
9	155
8	162
7	170
6	177
5	184
4	192
3	199
2	206
1	214
0	221

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Example Tally Form for Recording Overstory Trees and Advance Reproduction

Date 9/12/83 Compartment 1 Stand 10 Site Index 60

Stand Age (Dominants) 80 Stand Age(Lower story) 80

Overstory (1/20-acre plots)								Advance Reproduction (1/735-acre plots)					
Sample Point Number	D.B.H. Class	Black Oak	White Oak	Scarlet Oak	N. Red Oak	Other spp.		Plot No.	Asp:	Slope Pos.	Ht.	Crnd. Dia.	SV
1	2-5							1	SE	LO	0	0	0
	6-11							2	SE	LO	10	2.0	39
	12-16							3	SE	LO	0	0	0
	17+							4	SE	LO	2	.5	2
2	2-5							5	SE	LO	2	.5	2
	6-11								SE	LO	0	0	0
	12-16							7	SE	LO	6	1.5	23
	17+							8	SE	LO	4	.5	6
3	2-5							9	SE	LO	0	1.5	28
	6-11							10	SE	LO	6	0	0
	12-16							11	SE	LO		.5	8
	17+							12	SE	LO	0	0	0
4	2-5							13	SE	LO	2	.5	2
	6-11							14	SE	MI	4	.5	18
	12-16							15	SE	MT	8	1.5	73
	17+							16	SE	MI	4	.5	18
5	2-5							17	SE	MI	8	1.5	73
	6-11							18	SE	MI	0	0	0
	12-16							19	SE	MI	4	1.0	37
	17+							20	SE	MI	1	—	2
6	2-5							21	SE	MI	8	1.0	64
	6-11							22	SE	NT	0	0	0
	12-16							23	SE	MI	6	1.5	65
	17+							24	SE	MI	6	1.5	56
7	2-5							25	SE	MI	8	1.5	73
	6-11							26	SE	MI	0	0	0
	12-16							27	SE	UP	10	2.0	79
	17+							28	SE	UP	0	0	0
8	2-5							29	SE	UP	0	0	0
	6-11							30	SE	UP	8	1.5	68
	12-16							31	St?	UP	1	—	1
	17+							32	SE	UP	10	a.0	179
9	2-5							33	SC	UP	0	0	c
	6-11							34	SE	UP	0	0	C
	12-16							35	SE	UP	6	1.5	59
	17+							36	SE	UP	0	0	0
10	2-5							37	SC	UP	0	0	c
	6-11							38	SE	UP	8	1.5	68
	12-16							30	SE	UP	6	1.5	59
	17+							40	SE	UP	1	—	1
Total No. Per Acre	2-5	26	60	s-4-	4	26	140	SV Mean					25
	6-11	8	12	2	f-	? %	48						
	12-16	18	8	4	2	14	46						
	17+	2	2	0	2	0	6						
	Total	54	82	30	12	62	240	Advance Reproduction Adequate?					NO
No. of Stump Spts. per Acre	2-5	11	II	II	2								
	6-11	1	1	2	2			Total Per Acre					
	12-16	1	0	a	1			Advance Reproduction + Stump Sprouts Adequate?					Yes
	17+	0	0	0	0								
	Total	13	12	IS	5			45					