

## Section 6

### Guidelines for Determining Acceptable Stocking Levels

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These guidelines may be used with **Chapter 222-34 WAC** to determine acceptable stocking levels of harvested areas. See **WAC 222-34-010** for Western Washington or **WAC 222-34-020** for Eastern Washington.

#### **PART 1. PROCEDURES**

1. Sample entire harvested area at two plots per acre. For seedlings use a plot radius of 9.6' in Western Washington and 10.8' in Eastern Washington. For larger trees, use plot radius of 10.2' in Western and Eastern Washington. Establish plot centers one chain (66') apart along lines spaced five chains (330') apart. Begin plot line 2.5 chains (165') from harvest unit boundary. Sample the range of elevations and conditions on the site. Shift plot lines if necessary to get representative sampling.
2. Shift or delete plots on areas unsuitable for commercial timber production such as: roads, stumps, logs, rocks, slides, water bodies and other areas that will not support reasonable tree growth.
3. Count up to two established seedlings, or count one advanced reproduction, sapling or merchantable tree per plot. Record and total separately for *one seedling/plot* or *one tree/plot*, for *two seedlings/plot* and for *plots not stocked*. Do not count seedlings or trees less than half the height of the dominant seedling or tree in the plot. Also note whether conifer or hardwood, or indicate actual species.
4. Seedlings, advanced reproductions, saplings and merchantable trees must be vigorous, without damage to roots and stem that would cause mortality or reduce merchantability, free from competing vegetation, and must have survived at least one growing season on the site.
5. Acceptable stocking with seedlings means at least 55% of all the plots have two or more established seedlings/plot while 20% of all the stocked plots have at least one established seedlings/plot.
6. Acceptable stocking with advanced reproductions, saplings, or merchantable trees means 75% or more of all the plots are stocked with one or more trees/plot.
7. Calculation of seedlings/plot data.

Seedlings Plots	Plot Radius in Feet	Seedlings/Acre at 100% Stocking
Western Washington (190 seedlings/acre)	9.6	
Plots w/at least 2 or more seedlings		300
Plots w/only 1 seedling		150
Eastern Washington (150 seedlings/acre)	10.8	
Plots with at least 2 or more seedlings		240
Plots with only 1 seedling		120

Calculate the average number of well-distributed seedlings or trees per acre using procedures 1, 2, 3, and 4 and the arithmetic steps described in A or B.

- A **Western Washington** - 190 well-distributed seedlings per acre are required. Multiply 150 by the number of plots with only 1 seedling. Next, multiply 300 by the number of plots with 2 or more seedlings. Add the answers and divide by the **total** number of plots taken. If the answer is less than 190, the area may be under stocked.
- B **Eastern Washington** - 150 well-distributed seedlings per acre are required. Multiply 120 by the number of plots with only 1 seedling. Next, multiply 240 by the number of plots with 2 or more seedlings. Add the answers and divide by the **total** number of plots taken. If the answer is less than 150, the area may be under stocked.

The average number of established, well-distributed seedlings/acre is calculated by using the following formula:

<b>Western Washington</b>		
Multiply 150 x _____ # of plots with only 1 seedling		= _____ Total 1
Multiply 300 x _____ # of plots with 2 or more seedlings		= _____ Total 2
Add Total 1 and Total 2		= _____ TOTAL 3
Divide TOTAL 3 by the total number of plots taken (Including the total number of plots with NO seedlings.)		
This answer is the average number of well-distributed seedlings/acre.		= _____

<b>Eastern Washington</b>		
Multiply 120 x _____ # of plots with only 1 seedling	=	_____ Total 1
Multiply 240 x _____ # of plots with 2 or more seedlings	=	_____ Total 2
Add Total 1 and Total 2	=	_____ TOTAL 3
Divide TOTAL 3 by the total number of plots taken (Including the total number of plots with NO seedlings.)		
This answer is the average number of well-distributed seedlings/acre.		
	=	_____

8. Calculations of plot data for larger trees.

Statewide (100 Trees/Acre)	Plot Radius in Feet	Trees/Area At 100% Stocking
Plots with 1 or more advanced reproduction, sapling, and merchantable tree	10.2	133

Calculate the average number of established, well-distributed trees/acre using this formula:

**Both Western and Eastern Washington:** 100 well distributed merchantable trees, saplings or advanced reproductions per acre are required. Multiply 133 by the number of plots with 1 or more trees. Divide the answer by the **total** number of plots taken. If the answer is less than 100, the area may be under stocked.

<b>Plot Data for Larger Trees</b>		
Multiply 133 x _____ # of plots with 1 or more trees	=	_____ Total 1
Divide Total 1 by the total number of plots taken		
(The answer is the average number of well-distributed trees/acre.)		

The department may approve lower stocking levels that reasonably utilize the timber growing capacity of the site.

**Note:** Plot size and sampling procedures allow for some variation in distribution and stocking. Further adjustments are not needed.

## PART 2. REFORESTATION PLANS

1. Adequate site preparation, vegetation control, and proper handling and planting of seedlings is required. When planting or seeding, a reasonable allowance must be made for expected mortality.

2. With favorable conditions, good planting stock, and skilled people, 80% - 90% seedling survival, after two full growing seasons, is possible. More typically, 70% - 80% survival may be expected after the second full growing season. Adverse conditions, delays in planting, and inexperienced planters may result in a second growing season survival of 60% or less.
3. Where natural seeding is reasonably reliable, natural reforestation can be considered and planting reduced, EXCEPT where mixed hardwood and conifer areas have been harvested. Reforestation of the mixed stands requires pure conifer plantations proportional in area to the percentage of conifer trees to hardwoods in the area prior to the harvest. Conifer plantations can be managed to control hardwoods and maintain growth.
4. Landowners may follow approved alternate reforestation plans or approved supplemental reforestation plans in lieu of specific rule requirements.
5. Lower stocking levels may be approved where the timber growing capacity of the site is reasonably utilized with less trees per acre than the minimum stated in the rules.

**Table 6.1 Stocking and spacing guide**

Target Trees Per Acre	DBT*	At 80% Survival Trees Needed	DBT*	At 70% Survival Trees Needed	DBT*	At 60% Survival Trees Needed	DBT*
100	20.9	125	18.7	143	17.4	166	16.2
120	19.0	150	17.0	171	16.0	200	14.8
150	17.0	187	15.3	214	14.3	250	13.2
190	15.1	237	13.6	271	12.7	317	11.7
240	13.5	300	12.0	343	11.3	400	10.4
300	12.0	375	10.8	429	10.1	500	9.3

*\*DBT=Distance Between Trees in feet.*