Calculating Plant Quantities for Restoration Projects

First, calculate the area that needs to be planted with each plant type and convert to square footage (1 acre = 43,560 ft^2).

Second, determine what kind of spacing is required for successful establish ment—average, dense, or sparse. Take into consideration probable survival rates, competition from undesirable species, amount of on-going maintenance (especially watering), possible recruitment from adjacent native vegetation, cost of the project, and other factors. Our average spacing for dense, average, and sparse plantings are provided in the table on the next page.

Finally, use the spacing table to find the square footage required by each plant type at your chosen spacing (these numbers are simply the square of the spacing number). Then start with the plant types that will be most widely spaced – usually trees – and divide its required square footage into your planting area square footage to produce the number of plants needed. For the second most widely spaced plant type – probably shrubs – use the same method, but then subtract the number of plants already occupying space (determined in the first calculation). Continue the process for any other plant types appropriate to your project.

Click on the following link to access the Plant Quantity Calculator worksheet through our website. Enter the square footage of the planting area and select the appropriate planting density and this worksheet will calculate the necessary quantities of different strata of vegetation.

Example

Plant quantities for a 1 .3 acre forested riparian area:
1 .3 acre x 43,560 ft^2 / acre = **56,628 ft^2**

Assuming that you want to plant the entire area with trees, shrubs, and herbaceous plants:
Trees: 14 ft o.c. (average spacing) 56,628÷196 ft^2 = **289 trees**

Shrubs: 6 ft o.c. (average spacing) 56,628 ÷ 36 ft^2 = 1,573 shrubs – 289 (space occupied by trees) = **1,284 shrubs**

Herbaceous/groundcovers: 1.5 ft o.c. (average spacing) 56,628 ÷ 2.25 ft^2 = 25,168 – 289 (occupied by trees) – 1,284 (occupied by shrubs) = **23,595 herbaceous/groundcovers**

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Generalized container plant spacing guidelines

PLANT TYPE	GOAL FOR SPACING	SPACING	DIVIDE YOUR SQUARE FOOTAGE BY
Trees	Dense	10 ft on center (o.c.)	100 ft^2
	Average	12-15 ft o.c.	144-225 ft^2
	Sparse	18 ft o.c.	324 ft^2
Shrubs	Dense	4 ft o.c.	16 ft^2
	Average	6 ft o.c.	36 ft^2
	Sparse	8 ft o.c.	64 ft^2
Live stakes	Dense	1 ft o.c.	1 ft^2
	Average	2 ft o.c.	4 ft^2
	Sparse	3 ft o.c.	9 ft^2
Emergents (plant in clumps of 4*)	Dense	clumps 1 ft o.c.	1 ft^2
	Average	clumps 2 ft o.c.	4 ft^2
	Sparse	clumps 3 ft o.c.	9 ft^2
* multiply the final number by 4			
Herbaceous/ground cover – 4" pot	Dense	1 ft o.c.	1 ft^2
	Average	1.5 ft o.c.	2.25 ft^2
	Sparse	2 ft o.c.	4 ft^2
Herbaceous/ground cover – 1 gallon pot	Dense	2 ft o.c.	4 ft^2
	Average	3 ft o.c.	9 ft^2
	Sparse	4 ft o.c.	16 ft^2

If bare root plants are specified for your project, we recommend adding 25-50% to the plant numbers to compensate for mortality rates potentially higher than with container-grown plants. The same is true for B&B material if it will not be receiving frequent irrigation for the first two summers.

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