

Computing Reservoir Pond Size Required for Waterfall/ Stream

Water Drops in Reservoir Pond with Stream System

Note: Assume 3-inch depth of water in stream courseway and 3-foot width of stream

Drops in inches when stream is designated by feet in length:

Reservoir Pond	In feet	10'	15'	20'	25'	30'	40'	50'	75'	100'
4x4		3.9	5.6	7.8	9.8	11.7	15.63	19.53	29	39.06
4x5		3.13	4.69	6.25	7.8	9.38	12.5	15.63	23.44	37.5
4x6		2.6	3.9	5.21	6.5	7.8	10.42	13.02	19.532	6.04
4x7		2.23	3.35	4.46	5.6	6.7	8.93	11.16	16.74	22.32
4x8		1.95	2.93	3.9	4.89	5.90	7.81	9.77	14.65	22.06
5x5		2.5	3.75	5	6.25	7.5	10	12.5	18.75	30
5x6		2.08	3.13	4.17	5.2	6.25	8.33	10.42	15.63	20.83
5x7		1.79	2.68	3.55	4.46	5.35	7.14	8.93	13.39	17.86
5x8		1.56	2.34	3.13	3.9	4.7	6.25	7.81	11.72	15.63
5x9		1.39	2.08	2.78	3.47	4.17	5.56	6.94	10.42	13.89
5x10		1.25	1.88	2.5	3.12	3.75	5	6.25	9.38	12.5
6x6		1.74	2.6	3.46	4.3	5.2	6.94	8.68	13.02	17.36
6x7		1.49	2.23	2.98	3.72	4.5	5.95	7.44	11.16	14.89
6x8		1.3	1.95	2.6	3.3	3.9	5.21	6.51	9.77	13.02
6x9		1.16	1.74	2.3	2.9	3.5	4.63	5.79	8.68	11.57
6x10		1.04	1.56	2.08	2.6	3.1	4.12	5.21	7.81	10.42
7x7		1.28	1.91	2.55	3.18	3.8	5.1	6.38	9.57	12.76
7x8		1.12	1.67	2.23	2.79	3.35	4.46	5.58	8.37	11.16
7x9		.99	1.49	1.98	2.48	2.97	3.97	4.96	7.44	9.92
7x10		.89	1.34	1.79	2.23	2.67	3.57	4.46	6.7	8.93
7x12		.74	1.12	1.49	1.86	2.23	2.98	3.73	5.58	7.44
7x14		.64	.96	1.28	1.59	1.91	2.55	3.19	4.78	6.38
8x8		.98	1.46	1.95	2.44	2.9	3.9	4.89	7.32	9.77
8x10		.78	1.17	1.56	1.95	2.34	3.13	3.91	5.86	7.81
8x12		.65	.98	1.3	1.63	1.95	2.6	3.26	4.88	6.51
8x14		.56	.84	1.12	1.39	1.67	2.23	2.79	4.19	5.58
8x16		.49	.73	.98	1.22	1.46	1.95	2.44	3.3	4.88
9x10		.69	1.04	1.39	1.74	2.08	2.78	3.47	5.21	6.94
9x12		.58	.87	1.16	1.45	1.74	2.31	2.89	4.34	5.79
9x14		.496	.74	.99	1.24	1.48	1.98	2.48	3.72	4.96
9x16		.43	.65	.87	1.09	1.17	1.74	2.17	3.26	4.34
9x18		.39	.58	.77	.96	1.16	1.54	1.93	2.89	3.86
10x10		.63	.94	1.25	1.56	1.88	2.5	3.13	4.69	6.25
10x12		.52	.78	1.04	1.3	1.56	2.08	2.6	3.9	5.36
10x14		.45	.67	.89	1.12	1.34	1.92	2.23	3.35	4.46
10x16		.39	.59	.78	.98	1.17	1.56	1.95	2.93	3.9
10x18		.35	.52	.69	.87	1.04	1.39	1.94	2.6	3.47
10x20		.31	.47	.63	.78	.94	1.25	1.56	2.34	3.13
12x15		.35	.52	.69	.87	1.04	1.39	1.74	2.6	3.47
12x24		.22	.33	.43	.54	.65	.87	1.04	1.65	2.17
15x20		.21	.31	.42	.52	.63	.83	1.04	1.56	2.08
15x25		.17	.23	.33	.42	.5	.67	.83	1.25	1.67
15x30		.14	.19	.28	.35	.42	.56	.69	1.04	1.39
20x25		.13	.17	.25	.31	.38	.45	.63	.94	1.25
20x30		.10	.14	.21	.26	.31	.42	.52	.78	1.04
20x40		.08	.11	.16	.195	.23	.31	.39	.59	.78

Note: Extensive waterfall systems and streams can result in disaster if they are not sized appropriately to the reservoir pond. Whatever water that runs through the system is drawn from the reservoir at its base. Enough water to fill the courseway must be pumped into the system before it can return to the pond. An improper size courseway can leave the pond lowered by several unsightly inches. Topping off the pond to make up for the removed water works only until the pump is turned off and the courseway waters drain back into the pond and flood the surrounding area. Use this chart to determine the size reservoir or bottom pond needed to service the length courseway that you envision.

Pump Size Chart for Pumps by Lifts in Feet

<u>Lifts</u>	<u>1'</u>	<u>3'</u>	<u>5'</u>	<u>10'</u>	<u>15'</u>	<u>20'</u>
Gallons Per Hour						
	120	70				
	170	140	100			
	205	168	120			
	300	255	205	70		
	325	300	270	130		
	500	435	337	210	65	
	600	580	517	414	230	90
	710	690	670	580	380	150
	810	790	745	613	415	173
	1200	1170	1100	1000	840	520
1/6 hp				900	690	480
0.3 hp				2750	1750	750
0.4hp				3250	2500	1550

Recommended Tubing Diameter for Pumps to Waterfalls

½ Inch diameter	for flows up to	120 GPH
¾ Inch diameter	for flows up to	350 GPH
1 Inch diameter	for flows up to	1000 GPH
1 ¼ Inch diameter	for flows up to	1500 GPH
1 ½ Inch diameter	for flows up to	3000 GPH

Converting to Metric

<u>To Convert</u>	<u>Multiply by</u>	<u>To Obtain</u>
Inches	2.54	Centimeters
Inches	25.4	Millimeters
feet	30	Centimeters
Pounds	0.45	Kilograms
U.S. Gallons	3.8	Liters

Fahrenheit to Celsius: Subtract 32, Multiply by 5, Divide by 9

Plants for the Stream Garden

The following plants are suitable for planting right in the flowing water of the side of a stream. Select a variety of plants according to their texture, color, growth habit, flowering time, hardiness for your area, and general appeal.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Height / Zone</u>	<u>Blooms</u>	<u>Aspect</u>
<i>Acorus calamus</i>	Sweetflag	1-4'	4 Summer	Sun
<i>Acorus gramineus</i> 'Variegata'	Variegated dwarf sweetflag	9"	7 Spring-Summer	Sun
<i>Butomus umbellatus</i>	Flowering rush	3'	6 Spring-Summer	Sun
<i>Calla palustris</i>	Bog arum	1'	5 Spring-Summer	Shade
<i>Caltha palustris</i>	Yellow marsh marigold	1'	5 Spring-Summer	Shade
<i>Caltha palustris</i> 'Flora plena'	Double yellow marsh marigold	18"	5 Spring-Summer	Shade
<i>Cardamine cordifolia</i>	Heartleaved bittercress	4-32"	5 Early Summer	Shade to Sun
<i>Carex obnupta</i>	Slough sedge	2'	4 Summer	Sun
<i>Cyperus alternifolius</i>	Umbrella palm	3'	8 Summer	Sun
<i>Echinodorus cordifolia</i>	Radican sword	2'	6 Summer	Partial Shade
<i>Eleocharis palustris</i>	Common spike rush	1'	3 Spring	Sun
<i>Eriophorum angustifolium</i>	Cotton grass	Creeper	4 Summer	Sun
<i>Houttuynia cordata</i>	Houttuynia	18"	5 Summer	Partial Shade
<i>Houttuynia cordata</i> 'Variegata'	Chameleon plant	18"	5 Summer	Partial Shade
<i>Hydrocotyle umbellata</i>	Pennywort	1'	5 Summer	Sun
<i>Iris</i> 'Black Gamecock'	Black gamecock iris	18"	5 Spring	Partial Shade
<i>Iris fulva</i>	Red iris	1'	5 Spring	Partial Shade
<i>Iris pseudacorus</i>	Yellow flag iris	3'	5 Spring	Sun
<i>Iris versicolor</i>	Blue flag iris	18"	6	Partial Shade
<i>Juncus effuses</i>	Soft rush	2'	3 Summer	Sun
<i>Juncus ensifolius</i>	Dagger leaf rush	1'	3 Summer	Sun
<i>Juncus patens</i>	Blue Spreading rush	18"	3 Summer	Sun
<i>Lysimachia nummularia</i>	Creeping jenny	Creeper	4 Summer	Partial Shade
<i>Lysimachia nummularia</i> 'Aurea'	Yellow-leafed creeping jenny	Creeper	4 Summer	Sun
<i>Menyanthes</i>	Bog bean	1'	5 Summer	Partial Shade
<i>Mimulus guttatus</i>	Yellow monkey flower	1'	4 Summer	Sun
<i>Nasturtium officinale</i>	Watercress	Creeper	6 Spring-Summer	Partial Shade
<i>Peltandra virginica</i>	Spoon flower	2'	5 Summer	Partial Shade
<i>Pontederia cordata</i>	Purple pickerel weed	20"	3 Summer-Fall	Sun
<i>Pontederia cordata</i> 'Alba'	White pickerel weed	2'	3 Summer-Fall	Sun
<i>Ranunculus flammula</i>	Small creeping spearwort	6"	3 Spring-Summer	Sun
<i>Sagittaria latifolia</i>	Arrowhead	2'	3 Summer	Sun
<i>Sagittaria montevidensis</i>	Aztec arrowhead	2'	3 Summer	Sun
<i>Saururus cernuus</i>	Lizard tail	4'	4 Summer	Sun
<i>Scirpus zebrinus</i>	Zebra rush	5'	3 Summer	Partial Shade
<i>Typha laxmanii</i>	Graceful cattail	4'	Summer	Sun
<i>Typha minima</i>	Minature cattail	2'	3 Summer	Sun

Computing Quantities of Building Supplies

Crushed Limestone or Hardcore also called #53: one ton fill approx. 20 cubic feet

Mulch in the form of shredded bark sold by the yard with one yard covering 100 square feet at a depth of 3 inches

Topsoil: pulverized, is sold by the ton/yard with one ton equal to about 1 yard that covers 27 cubic feet

Flagstone, Slate, and Flat Granite: sold by the ton. Lighter weights of the stone up to 1.5 inches in thickness cover from 100-150 square feet, while heavier weights cover 70-80 square feet.

Ground cover aggregates and Pea gravel: sold by the ton. Pebbles, nuggets, and chips are usually figured at 100 square feet of coverage at a depth of 2-inches or 150 square feet of coverage at a depth of 1.5-inches

Feather block boulders: weigh approx. 65 pounds per cubic foot

Granite boulders weigh approx. 200 pounds per cubic foot

Sand sold by the ton. One ton is approx. 20 cubic feet

Stone bark and crater rock ground cover aggregates: Cover approx. 225 square feet at a 2-inch depth

Marble boulders weigh approx. 150 pounds per cubic foot

Brick is figured at 4.5 bricks per square foot laid flat

Cement and mortar: 80-pound bag, premixed, fills 2 square feet at a depth of 2-inches

Cobbles or round stones that fit within two open hands are available at about 30-35 per ton.

Pond Liner Size Formula: Pull a tape measure tight across the pond at its widest point, repeat this for the length as well, and note these measurements. Now measure the pond at its greatest depth, enter all of these into the following formula:

Total Length + (2 x Greatest Depth) + 2' for overlap = total length of the liner

Total Width + (2 x Greatest Depth) + 2' for overlap = total width of the liner

Total Length of Liner x Total Width of Liner = Total square feet of liner needed