

SER-UW Nursery Wet Beds and Their Use



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Introduction: What Is a Wet Bed?

The ultimate goal of most native plant nurseries is to produce plants that will successfully survive once purchased and outplanted in their native ecosystem. To achieve this goal, conditioning plants to accustom them to their future outplanting site can optimize success. This is especially true for wetland plant species, which will need to withstand intense wet-dry hydrologic cycling and long periods of submersion.

Wet beds are an excellent way to control how nursery-grown riparian species are introduced to root immersion. They are a low-walled in-ground bed lined with waterproof material and are filled with water instead of typical nursery media. Plants can either be submerged while growing in traditional media-filled pots (more typical of emergent wetland plants) or grown free-floating in the water (aquatic plants). Wet beds have simple operational systems: a toilet float valve controls the water level so that the system self-regulates.¹ As such, they can be relatively inexpensive to create and maintain.

Constructing a Wet Bed: SER-UW Nursery Wet Bed Specifications

The SER-UW nursery has four individual wet beds, each of which has dimensions 30 ft long by 4 ft wide by 8 inches tall. Each consists of a plastic-lined wood frame over a thin sandy bed; the 6-inch water level in each is regulated by a float valve. A large aerator helps to circulate oxygen throughout the water, which allows for root growth and reduction of algal growth.¹ Unfortunately, the irrigation system of the wet beds is currently broken with burst pipes, but once fixed they should be fully operational. See Figures 1 and 2 below for details on how the wet beds were constructed.

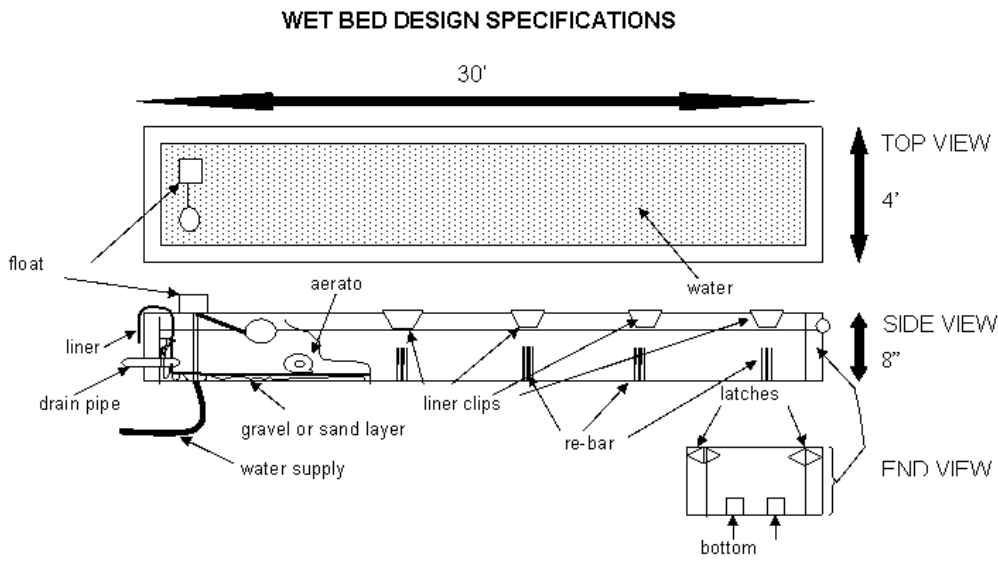


Figure 1. Diagram showing the construction plans of the SER-UW nursery wet beds.¹



Figure 2. Float valve similar to the one installed in the SER-UW nursery wet beds.¹

Maintenance concerns are few. In freezing conditions the water should be drained out of an abundance of caution so as not to freeze and burst irrigation pipes. The SER-UW nursery beds have a hinged opening on one end of the bed for easy cleaning access and a drain pipe at the other end for winter draining. The plastic liner of the wet beds can break down over time due to UV exposure and rodents, so using thick liners is advisable (the nursery has three layers of 6 mm plastic). Should the nursery require supplemental wet bed space on short notice, old plastic 55-gallon drums can be cut in half lengthwise and manually filled with water and plants.¹

Species Recommendations

Only species that prefer living in continuously wet soil conditions once established should be grown in wet beds. Note that species susceptible to root rot should not be used.¹ Some relatively common wetland and aquatic species that could be tried in wet beds (based upon their ecology and tolerance to perpetually-wet soil) are included below.² This is by no means a complete list, and some experimentation may be necessary to determine whether these species actually do well in these conditions or if they develop root rot or other stress indicators easily.

Trees

- *Fraxinus latifolia* (Oregon ash)
- *Malus fusca* (Pacific crabapple)
- *Populus tremuloides* (quaking aspen)
- *Rhamnus purshiana* (cascara)
- *Salix lucida ssp. lasiandra* (Pacific willow)
- *Populus trichocarpa* (black cottonwood)
- *Salix sitchensis* (Sitka willow)
- *Thuja plicata* (western red cedar)

Shrubs, ferns and vines

- *Athyrium filix-femina* (lady fern)
- *Cornus stolonifera* (red-osier dogwood)
- *Lonicera involucrata* (black twinberry)
- *Spiraea douglasii* (western spiraea)
- *Viburnum edule* (high-bush cranberry)
- *Andromeda polifolia* (bog rosemary)
- *Kalmia microphylla* (bog laurel)
- *Ledum groenlandicum* (Labrador tea)
- *Vaccinium oxycoccos* (bog cranberry)

Herbaceous plants*

- *Scirpus cespitosus* (tufted clubrush)
- *Angelica genuflexa* (kneeling angelica)
- *Carex obnupta* (slough sedge)
- *Carex rostrata* (beaked sedge)
- *Carex densa* (dense sedge)
- *Carex nebrascensis* (Nebraska sedge)
- *Carex stipata* (awl-fruited sedge)
- *Juncus effusus* (soft rush)
- *Lysichiton americanus* (skunk cabbage)
- *Nuphar polysepalum* (spatterdock)
- *Oenanthe sarmentosa* (water parsley)
- *Platanthera dilatata* (white bog orchid)
- *Sagittaria latifolia* (wapato)
- *Scirpus microcarpus* (small-fruited bulrush)
- *Typha latifolia* (cattail)

*Note: there are many aquatic and semi-aquatic species not included on this list which the nursery has not traditionally propagated but which the wet beds could enable us to grow and sell.³

How to Protect Plants From Herbivory

Currently, the SER-UW nursery's wet beds have no protection from herbivory or interference by birds. Once back in use, there are many pests that may try to eat or disturb easily accessible nursery plants. Below is an examination of some common pests and ways to minimize their effects.

Rabbits

There are two native species of rabbits in the Pacific Northwest, and two nonnative invasive species have been introduced to the area. Especially as plants begin their seasonal die-off, these mammals eat less discriminately, making it increasingly important to keep these nursery plants protected. Though many control mechanisms are available, the most preventative and long-term measure is to use fences. These should be at least 3 feet tall, constructed of 1 inch

chicken wire since rabbits cannot chew through it, and have stakes or fence posts supporting it every 4-6 feet. Because rabbits are more likely to go under a fence than over it, the bottom of the fence should be secured. There are three methods to do this: 1) dig the fence down 6 inches into the ground; 2) stake the fence down along the ground; or 3) create a 1 foot wide “apron” of continuing wire that has been staked down along the exterior of the fence (See Figure 3).⁵

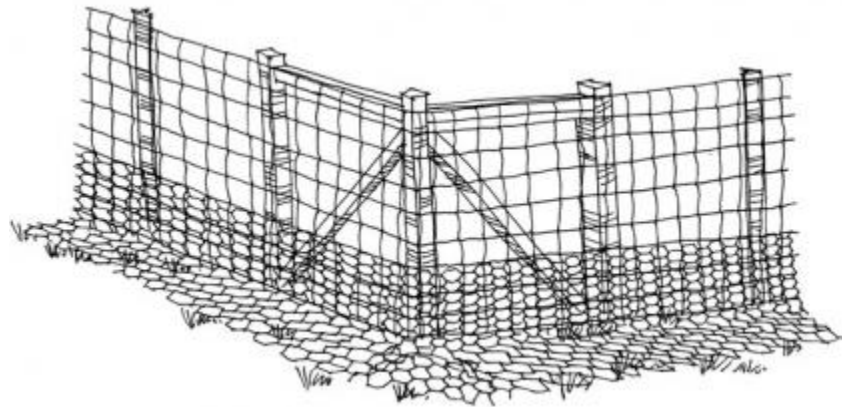


Figure 3. An image of a good rabbit fence, with a wire “apron” staked down along the exterior of the fence.⁵

Deer

Deer are quite common throughout the edges of Seattle, particularly in slightly more natural areas like the SER-UW nursery’s location. Browsing on the growing tips of woody plants is their main food source, which can greatly damage trees and shrubs. Fencing is really the only option to prevent damage; a 6-8 foot high fence made of wire is a good option.⁴ However, the SER-UW nursery grounds are already surrounded by a quite tall (roughly 8 foot) chain link fence, which should keep out the deer.

Construction Options for the SER-UW Native Plant Nursery

Because the main herbivory concern is rabbits, the fence installed around the SER-UW needs to be over 3 feet tall and have a secure bottom to keep out rabbits. Therefore, purchasing 1-inch hole chicken wire that is 4 feet tall and burying 6 inches of its height underground should be sufficient, and will create a 3.5 foot tall fence.



Figure 4. Wet beds embedded in their gravel pad in the foreground and dilapidated sawdust beds in the background, the back left of which is currently in use.

An approximate budget for these materials is as follows in Table 1. The SER-UW nursery has access to tools such as shovels and wire cutters, so these will not need to be purchased. These materials are based on the size of the area we would like to enclose. Currently, in addition to the four wet beds, there are four adjacent sawdust beds which are in varying states of disrepair (only one bed is still in use; see the background of Figure 4). The estimates in Table 1 are based on enclosing the wet beds and their gravel pad only, an area of 56 feet by 17.5 feet, because the sawdust beds are in such poor condition. If enclosing the entire area is desired in the future, calculations for materials should be made for dimensions 56 feet by 31 feet. The process of building the fence is simple: dig a 6 inch deep trench around the wet bed perimeter, insert the posts and chicken wire into the trench, then fill in the trench and zip tie the chicken wire to the posts. A 3 foot wide wood-and-chicken-wire door that hinges on and latches to two strong 4x4" wood posts should be constructed, and scrap chicken wire should be buried in the trench that runs under the door frame so no rabbits dig under the door.

Table 1. Approximate supplies budget for creating wet bed fencing, 56 ft x 17.5 ft area, with a 7x3ft door crafted out of 2x4" boards and latched and hinged to two sturdy 4x4" posts. Home Depot product links are embedded in the materials descriptions.

Materials	Quantity	Cost per Item	Total Cost
Chicken wire (1 inch holes; 4 feet tall)	1	\$113.54	\$113.54

T-posts (5 foot posts, which stand 3.5 feet tall aboveground)	29	\$5.84	\$169.36
T-post pounder	1	\$47.73	\$47.73
Zip ties (100-pack)	87 individuals (3 per T-post)	\$8.97 for one 100-pack	\$8.97
Wood (2x4") for creating a 3.5 ft x 3 ft door with single diagonal crosspiece	16.5 ft length (Purchase: 1 3-pack of 4-ft boards , and 1 6 ft board)	\$26.37 and \$7.98	\$34.35
Wood (4x4") for two sturdy 3.5 ft posts on either side of door	7 ft length total (purchase 1 8-ft board)	\$10.75	\$21.50
Hinges	2	\$9.88	\$19.76
Latching mechanism	1	\$12.31	\$12.31
Wire cutters	1	None (already have)	None
Hammer	1	None (already have)	None
Shovel	1	None (already have)	None
Fasteners (screws, wood nails, staples with staple gun)	various	None (already have)	None
Total Cost (before tax):			\$427.52

Finally, if birds begin to be a problem (crows tend to be menaces and often knock smaller nursery pots over just for fun), adding bamboo sticks to make the t-posts taller and adding bird netting would be fairly easy and inexpensive; similar construction is already in place elsewhere in the nursery with shade cloth instead of completely enclosed netting.

References

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3. Pojar, J., & MacKinnon, A. (2014). *Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia & Alaska*. Lone Pine Publishing.
4. WADFW. (n.d.). *Living with wildlife: Deer*. Washington Department of Fish & Wildlife. Retrieved December 2, 2021, from <https://wdfw.wa.gov/species-habitats/living/species-facts/deer#>.
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