

**Northwest Stream Center
Wetland Boardwalk**

Project Update October 31, 2015

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1.0 INTRODUCTION

In the following report, an update is provided as to the progress of landscaping and invasive plant removal of our NWSC boardwalk and outdoor learning center, as well as suggestions for areas not yet completed. In addition, this report should help to explain some of the items on the to do lists given to the AASF board members at the last board meeting. The lists are again provided in the Appendix of this report.

2.0 INVASIVE PLANT REMOVAL

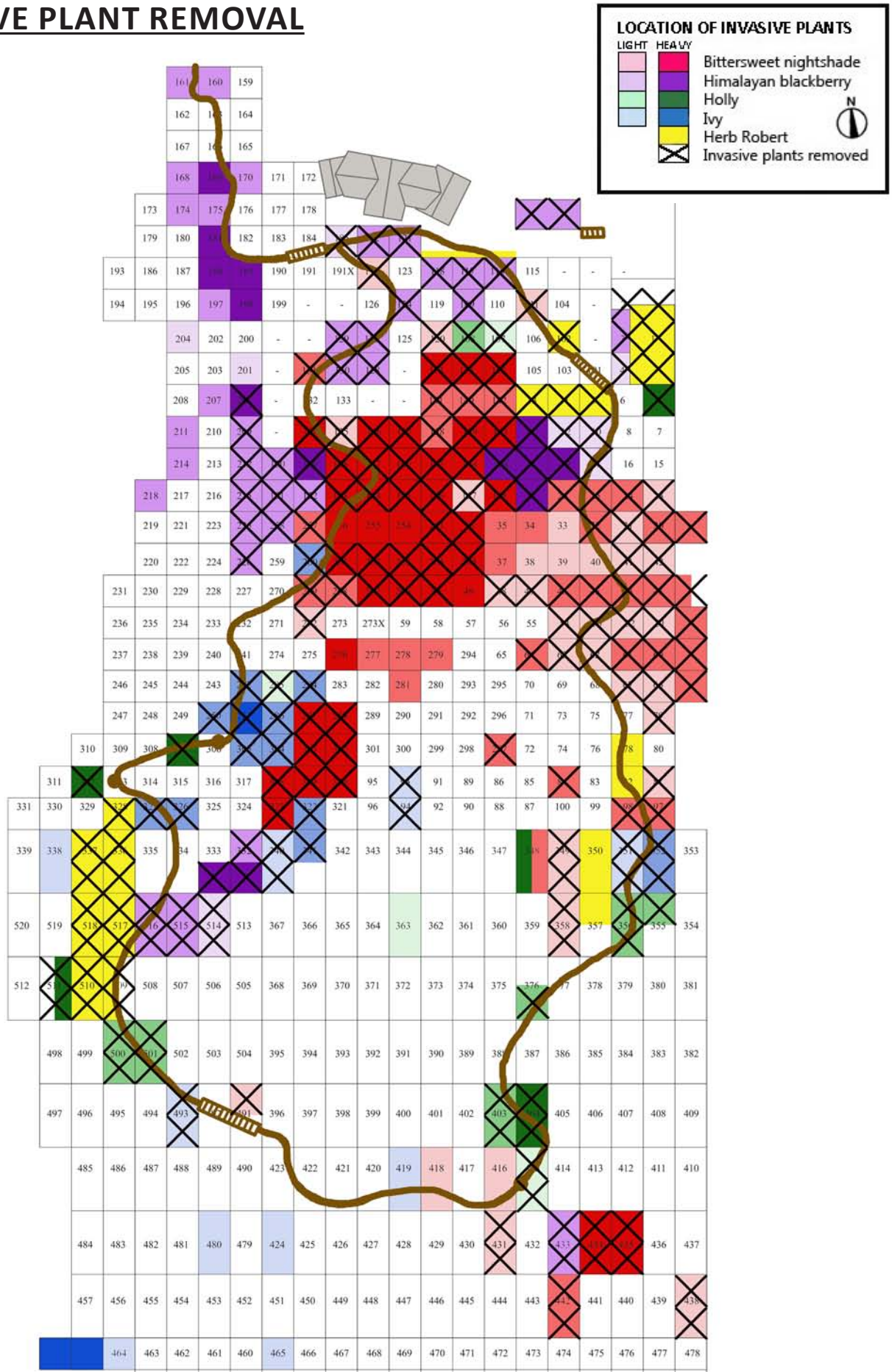


Fig. 2.1: Location of Invasive Plants (reed canary grass not included) from 2012 map, field notes & recent observation (Hanson 2015) Page 2

As I mentioned in the last report, the invasive plants have spread since I did the original site inventory, which is why each successive map of invasive plants seems to have more sectors marked. Their locations can be seen on the map (fig. 2.1). Here sectors are marked with the predominant invader, although others sometimes share the same space. The following is a summary of what I estimate we have removed. Sectors cleared of invasives have been crossed off on the map.

The **bittersweet nightshade** patches have grown much larger and thicker than originally noted, and have been time-consuming to remove. The drier summer helped, but much is located in areas where water is present year-round and difficult to move through. We have made a lot of progress with nightshade removal, but there is still a fair amount in the central wetland, and it continues to spread out into areas already cleared. That is why some nightshade (as well as ivy, morning glory and herb robert) can be seen in some areas where previously removed. Small pieces of vine, roots and seeds left behind will also resprout and these areas will need to be monitored over time. As I have told Tom, without volunteers to help, the nightshade spreads faster than I can remove by myself. Although sporadic, the volunteers I have had can be very helpful with this endeavor, but not all volunteers are good candidates to work in the harder conditions found in the wetter areas.

Himalayan blackberry is still present in the northwest area of the site, between the Trout Pond and North Creek. Some of this has been removed by volunteers and interns, but I will need to go back and review the work and get any that were missed. The other areas have been completed, but will need to be rechecked eventually to see if any roots or seeds left behind sprouted (especially southeast of the Detention Pond and southeast of the Trout Pond).

The worst of the **ivy** has been removed from the central third of the site. Ivy still remains south of the boardwalk and on the private chainlink fence just southwest of the site, west of North Creek (photo below right). Some was cut off probably by the property owner and tossed onto a nearby compost pile earlier this year, which has since taken root next to the creek bank. A Park's Dept. employee should discuss this with the property owner as it is spreading into the forest and towards the creek.

Most of the **holly** has been removed from the site, although we may see a few small ones occasionally.

I have marked the most prolific **herb-Robert** areas in yellow on the map (fig. 2.1). Even though it has been removed from these sectors (some more than once) it is robustly seedy and shows up quickly. These areas in particular will need to be revisited 2-3 times a year until the herb-Robert seed banks are depleted.

Reed canary grass is found in the center of the east side mixed with other grasses, as well as scattered in other areas such as the Front Meadow. We have pulled some where we are working, but it will be a large task that can be tackled by others later.

My rough estimate is that we have removed 85% of the bittersweet nightshade (although more has grown back making this number a bit sketchy), 99% of the holly, 70% of the Himalayan blackberry, 70% of the ivy, and less than 2% of the reed canary grass. This estimate is calculated by sector and weighted by how heavily the area is covered. It does not reflect the amount of time it will take, as some sectors are more difficult to work within than others, nor does it account for how quickly some invasives can spread if not removed in the near future.



Nightshade removal (left) can make a muddy mess on the boardwalk. Ivy on SW neighbor's fence (right) can spread easily to forest & creek.



3.0 SITE UPDATE BY SECTION

The following is an update of the landscape aspect of the boardwalk project. Here I will mention each section's progress pertaining to preparation and implementation of the planned landscape design, future suggestions, and what might be holding up progress. Since this is a large site, I have broken it up into sections which are labeled on the following map (fig. 3.1). Some of the section names are more of a nickname than scientific name, but this helps those of us involved in the project to locate the areas. This update by section should help to explain some of the items in the to do list found in the Appendix. Again, we could always use some help, as there is still plenty to do.

As mentioned in my last report, the outdoor learning center should be considered in three zones: the human zone, wildlife zone, and a mixed zone. The **human zone** considers the needs of the human visitors pertaining to comfort, safety and accessibility. The **wildlife zone** reflects the needs of wildlife habitat. In this zone I am endeavoring to retain the similar plant communities of this site, while attempting to minimize or repair damage after the boardwalk is built or invasives are removed. This should help to continue to support the wildlife found here and provide reference communities to those doing restoration projects at similar sites. The **mixed zone** provides a buffer for the wildlife habitats while allowing humans a view into the wildlife zone. With this in mind, each of the following sections has its unique characteristics and needs which the landscape plans should reflect.

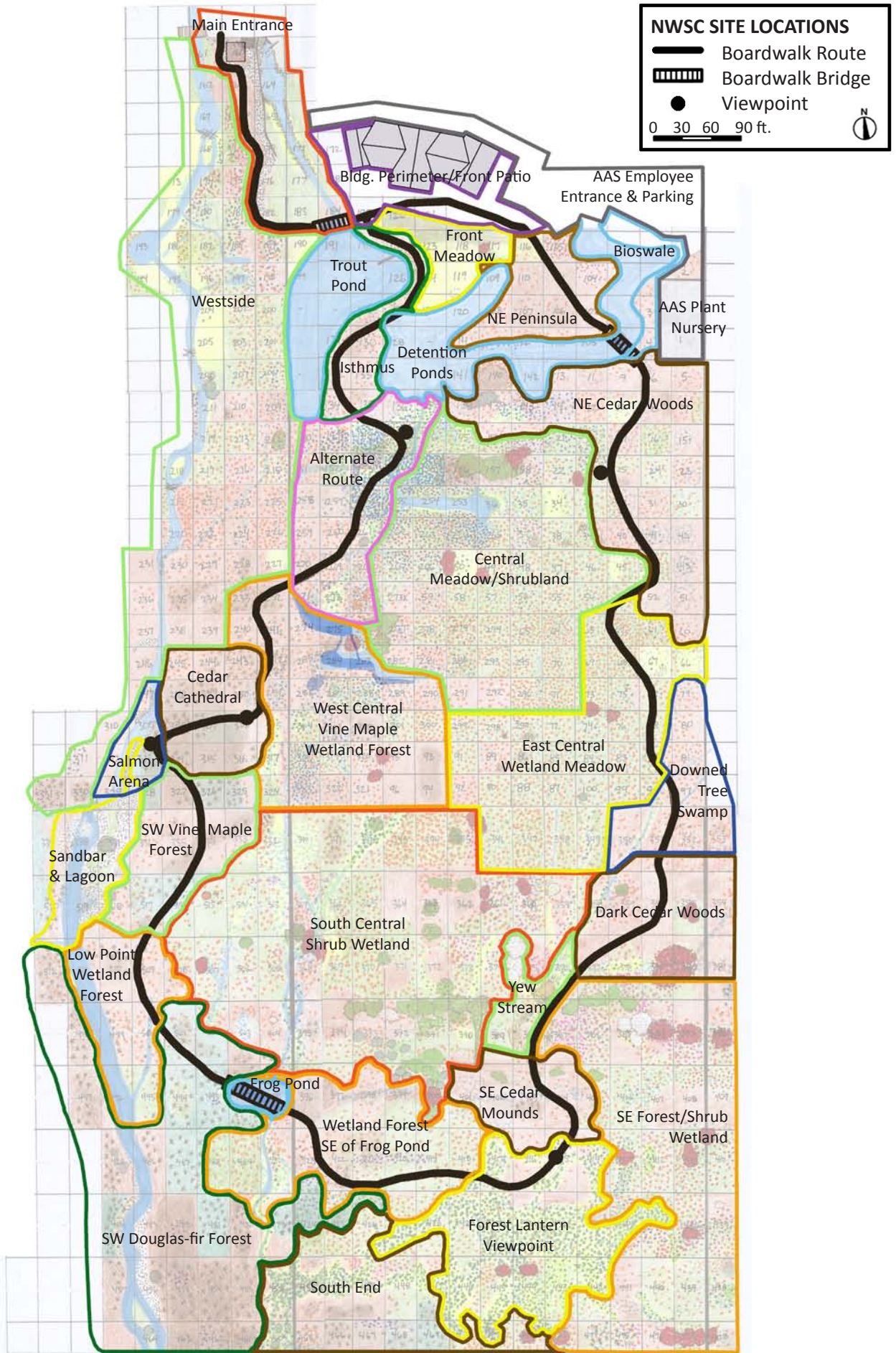


Figure 3.1: Site Section Locations Map (Hanson 2015)

3.1 Main Entrance

Larry and his crew have begun the work on the entrance, but there is much to do. When the Northwest Stream Center opens, it should welcome its visitors. While we have discussed the need for barriers, we should also remember that as the main entrance, it needs to look inviting. Barriers can be substantial enough without being too bold, too dark, or too restrictive. In addition, visitors have been going through the back gate area for so long that we will be essentially retraining them. Signage should be bold here. Paths, lighting, signage, fences, Trout Stream Exhibit work, landscape changes, etc. all need to occur. Interns have been weeding, but they are gone and there is still more to remove including Himalayan blackberry and seedy weeds. The rain garden and Trout Stream Exhibit landscapes both need to be modified, and the front needs actual landscaping. Tom says the Master Gardeners offered to do the front. From what I've heard, they'd be happy to cover all the concrete with ivy. I would be glad to lead the landscape endeavor with them using native plants. Master Gardeners are knowledgeable about plants and planting conditions, but are not necessarily Landscape Designers. (I know as I was a Master Gardener for years.) Currently, Larry's crew is very limited. He could use more help with the physical work, but also with information gathering, supply search, professional construction ideas, etc. for this area. Tom mentioned Christine could do the Trout Stream landscape, but if she doesn't get to it, I can tackle it sometime soon. It needs to have the shrubs thinned that are blocking the view from the path, red alder seedlings removed, and other plants selectively removed.

Recently, Larry and Steve connected the rain barrels to the Gate House green roof. We now need to connect the rain barrels to the soon-to-be-remodeled rain garden nearby (next to the southwest corner of the Gate House).

It would be nice to replace the weedy grass out front with a Pacific Northwest garden. Vine maple makes a good choice for a native tree here as it isn't large or aggressive, grows well in part shade to sun conditions, and is lovely with fall color. The space could take two to three trees if you want to block most of the view of the concrete wall, but the NWSC sign would need to be moved to be seen. The garden can also easily be smaller with more grass in front, or all the grass can be replaced with a larger patch of sedum and rocks in front. The fire hydrant and utilities located here would need to remain visible and accessible. While tall Oregon grape would do well here, I would not plant it in this garden as it spreads by tough rhizomes and the leaves are prickly like holly. This would be a problem for the fire hydrant and utilities access as well as the pedestrian and vehicle traffic. On the following page is a list of plants that would work well in this garden (Table A).



Proposed garden for the front entrance would replace some of the weedy grass with native plants.

PLANTS AND SUPPLIES FOR NWSC MAIN ENTRANCE DESIGN

Plants*Acer circinatum**Arctostaphylos uva-ursi**Gaultheria shallon**Polystichum munitum**Sedums**Vaccinium ovatum* *

(*can be used to substitute for some of the salal)

Common Name

Vine maple

Kinnikinnick

Salal

Sword fern

Stonecrop

Evergreen huckleberry

Supply Source

AAS Plant Nursery

Commercial nursery

Snohomish Conservation Dist.

Snohomish Conservation Dist.

Marian & commercial nursery

Snohomish Conservation Dist.

Supply

Large woody debris (stump, log, or large branch)

Round rocks (various sizes, place w/in sedum to prevent trampling)

Wood mulch

Supply Source

NWSC or AAS collection

NWSC collection

NWSC & Master Gardeners

Table A: Plants for Main Entrance Design

3.2 Building Perimeter/Front Patio

We have removed most of the coral berry and other invasives from the gardens bordering the north, south and east side of the building, as well as the north edge of the Front Meadow next to the brick patio. We have thinned out the garden shrubs next to the building to allow better lighting and open the view out the doors and windows. I added more rocks and reworked the rockeries to help keep the mud off the brickwork, and added drain rock “dry creeks” to allow water to run off the patio in a few places. However, the rain garden on the southwest corner still has some coral berry to remove and shrubs partially blocking the office windows that need transplanting. I will get to this probably when I tackle the Trout Stream Exhibit.

Most of the brick patio has been cleaned, weeded and resanded. I have not been able to do this to the front under the front overhand as the excess construction debris from the boardwalk has been piled there. It was just removed, so now I can finish this. Larry’s crew repaired/recented the brickwork near the southeast door along the edge of the fern garden as it was sinking here. The southeast brick walk near the meadow is also sinking where the interns wash out buckets from the pond. I have suggested they find a better place to do this rather than on the brick patio, as this is set in sand and they undermine the bricks when they do this regularly (see photo below). It also leaves a layer of duck weed on the patio which is unsightly. This practice needs to change before we can effectively repair it. Ten feet east from there we have a few bricks that need to be reset where a tree root has raised the bricks. Also mud and water accumulates in the east corner of the brick walkway next to the northeast parking lot. The AAS employees used to park the trailer here so the walkway has been damaged (see photo below). Thankfully, they have a new parking space in the asphalt lot near the Plant Nursery bridge. This area of the brick walkway should be raised slightly and sloped towards the trench drain to the east. I would also suggest when repairs are made to the brickwork, that the gravel layer be made thicker and the sand layer thinner to help support these sinking areas. The brickwork needs to be finished ASAP as this is a tripping hazard for visitors.



Above - The front patio and margins look much better cleaned and weeded. The construction debris seen above was just removed.



Top right - Mud accumulates in the areas where the bricks are sinking from washing buckets.



Lower right - This area collects mud and water where the brick path has sunk under the weight of the AAS trailer and cars that park over the line.

3.3 Front Meadow

The meadow is located south of the brick patio. Close to the building, this area provides a view into multiple wetland types: forested wetland, shrub-scrub wetland, wetland meadow and the ponds. It provides habitat for garter snakes, butterflies, hummingbirds, songbirds, bees, insects, owls, deer, and ducks. We have proceeded with some of the work here by removing and pruning shrubs and trees that were too close to the brick patio and were blocking the view. We have removed invasive blackberries, herb-Robert, bittersweet nightshade, and coral berry. I have added sedge plants (*Carex obnupta*) and Henderson's checkermallow, along with rocks and woody debris. I have placed rope barriers until the meadow is completed (probably this spring), as the area was starting to get used as a tree dumping ground by others crushing newly planted sedges.

I plan to limb the trees up a little higher, remove a few additional shrubs to open the view, remove some buttercups and reed canary grass to have space for more sedges and other wetland meadow plants, and add some wildflowers to the higher/drier meadow closer to the patio. We need to retain the features and plants that are providing the habitat to the wildlife mentioned above, and continue to consider their needs with the additional plants. I have provided plant lists at the end of this section keeping that in mind.



The Front Meadow is surrounded by many shrubs and trees beneficial to the wildlife found frequently here. The shrubs have taken over, however, so some will be selectively removed to retain the view from the patio and boardwalk.

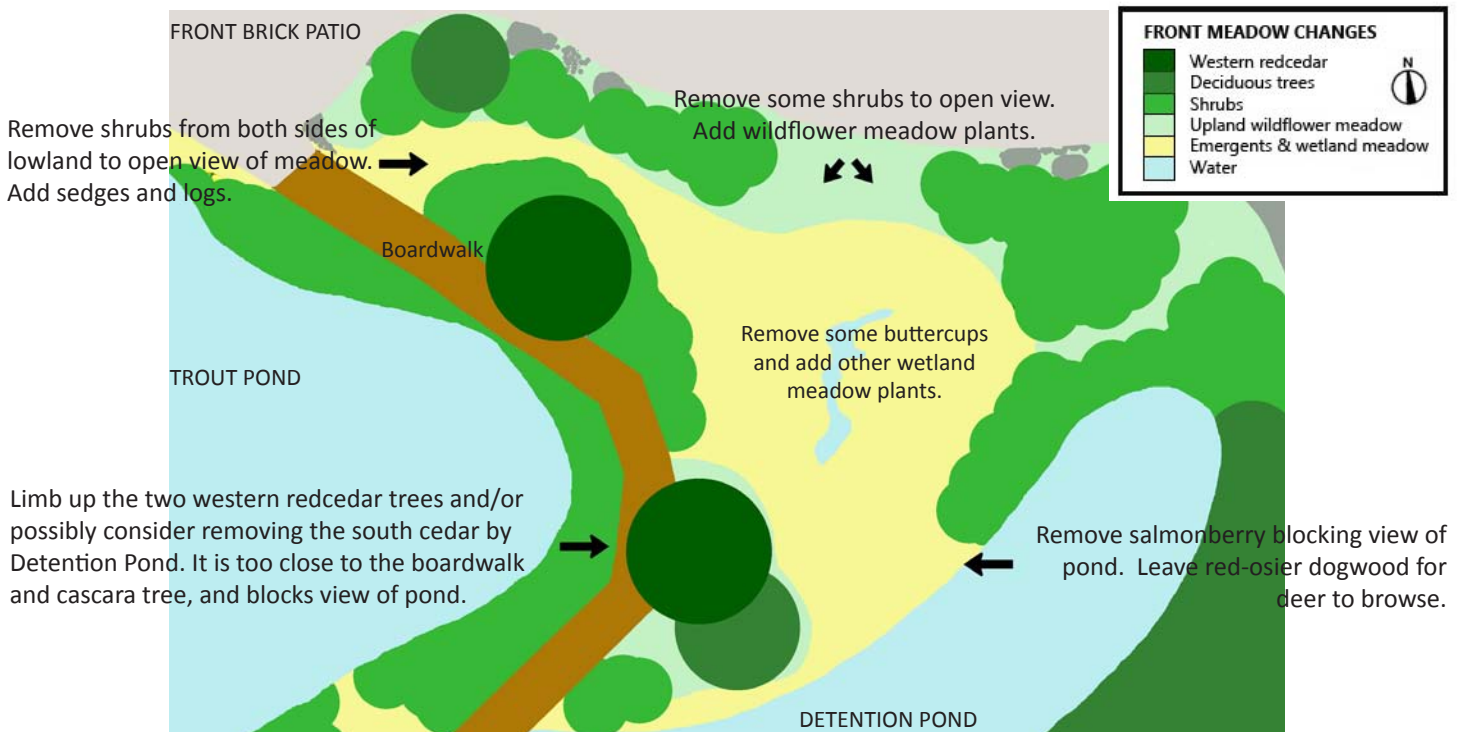


Figure 3.2: Diagram of Front Meadow Changes

The diagram (fig. 3.2) shows my plan for the Front Meadow. By strategically removing shrubs, habitat is retained for the garter snakes, butterflies, pollinator insects, song birds, hummingbirds, owls, and other wild-life found in this area, while thinning out shrubs that are taking over the meadow. In the following (Tables B and C), I have compiled a list of plants for butterflies and hummingbirds. The wetland meadow plants can be added to the emergents and wetland meadow area (in light yellow) on the diagram. The wildflower meadow plants would enhance butterfly and hummingbird habitat for the upland meadow area (light green). The list of shrubs and trees for butterflies and hummingbirds would be helpful to refer to so we don't remove too much of the habitat already present for them while removing shrubs from the meadow.

PLANTS FOR WESTERN WASHINGTON LOWLAND MEADOWS

Wetland Meadow Plants for Butterflies

<u>Plants</u>	<u>Common Name</u>	<u>Hummingbirds</u>	<u>Present</u>
<i>Aster subspicatus</i>	Douglas' aster		
<i>Eupatoriadelphus maculatus</i>	Spotted Joe Pye weed		
<i>Heracleum maximum</i>	Cow parsnip		
<i>Mentha arvensis</i>	Field mint		X
<i>Penstemon serrulatus</i>	Cascade or coast penstemon	X	
<i>Scutellaria lateriflora</i>	Mad-dog skullcap		
<i>Sidalcea hendersonii</i>	Henderson's checkermallow	X	X
<i>Stachys</i> spp.	Hedge-nettle	X	
<i>Trifolium variegatum</i>	Whitetip clover		
<i>Trifolium willdenowii</i>	Tomcat clover		
<i>Trifolium wormskioldii</i>	Springbank or cow clover		
<i>Viola adunca</i>	Early blue violet		
<i>Viola glabella</i>	Yellow wood violet		

Wildflower Meadow Plants for Butterflies

<u>Plants</u>	<u>Common Name</u>	<u>Hummingbirds</u>	<u>Present</u>
<i>Achillea millefolium</i>	Yarrow		
<i>Allium acuminatum</i>	Hooker's or taper-tip onion		
<i>Allium cernuum</i>	Nodding onion		
<i>Anaphalis margaritacea</i>	Pearly everlasting		
<i>Antennaria rosea</i>	Rosy pussytoes or everlasting		
<i>Aquilegia formosa</i>	Western or red columbine	X	
<i>Aster</i> spp.	Asters		
<i>Carex</i> spp.	Sedges		X
<i>Danthonia californica</i>	California oatgrass		
<i>Delphinium menziesii</i>	Menzies' or coastal larkspur	X	
<i>Erigeron speciosus</i>	Aspen fleabane daisy		
<i>Fragaria vesca</i>	Woodland strawberry		X
<i>Lupinus polyphyllus</i>	Bigleaf or large-leaved lupine	X	
<i>Prunella vulgaris</i>	Common self-heal		
<i>Sedum oregonum</i>	Oregon stonecrop		X
<i>Solidago canadensis</i>	Canada goldenrod		

Table B: Front Meadow Plants for Butterflies (Plant info from Robson et al. 2008)

SHRUBS AND TREES FOR BUTTERFLIES

<u>Plants</u>	<u>Common Name</u>	<u>Hummingbirds</u>	<u>Present</u>
<i>Acer circinatum</i>	Vine maple		X
<i>Alnus rubra</i>	Red alder		X
<i>Arctostaphylos uva-ursi</i>	Kinnikinnick	X	X
<i>Betula papyrifera</i>	Paper birch		X (SE)
<i>Cornus sericea</i>	Red-osier dogwood		X
<i>Crataegus douglasii</i>	Black hawthorn		X (NW)
<i>Gaultheria shallon</i>	Salal	X	X
<i>Holodiscus discolor</i>	Oceanspray		X
<i>Mahonia</i> spp.	Oregon grape		X
<i>Malus fusca</i>	Pacific crabapple		X (SE)
<i>Philadelphus lewisii</i>	Lewis' mock orange		X
<i>Populus balsamifera</i> ssp. <i>Trichocarpa</i>	Black cottonwood		X
<i>Prunus emarginata</i>	Bitter cherry		X
<i>Prunus virginiana</i>	Chokecherry		X
<i>Rhamnus purshiana</i>	Cascara		X
<i>Ribes bracteosum</i>	Stink currant	?	X (SW)
<i>Ribes lacustre</i>	Black swamp gooseberry	?	X (SE)
<i>Rubus</i> spp.	Brambles		X
<i>Rubus parviflorus</i>	Thimbleberry		X
<i>Rubus spectabilis</i>	Salmonberry	X	X
<i>Salix</i> spp.	Willows		X
<i>Sambucus racemosa</i> var. <i>racemosa</i>	Red elderberry	X	X
<i>Spiraea</i> spp.	Spirea, hardhack		X (S)
<i>Symphoricarpos albus</i>	Snowberry		X
<i>Vaccinium</i> spp.	Huckleberry	X	X
<i>Viburnum edule</i>	Highbush cranberry		X
<u>Additional Shrubs and Trees for Hummingbirds</u>			
<i>Lonicera ciliosa</i>	Orange honeysuckle	X	X
<i>Lonicera involucrata</i>	Twinberry	X	X
<i>Oemleria cerasiformis</i>	Indian plum	X	X
<i>Ribes</i> spp.	Currant or gooseberry	X	X
<i>Ribes sanguineum</i>	Red-flowering currant	X	X

Table C: Front Meadow Shrubs and Trees for Butterflies (Plant info from Robson et al. 2008)

3.4 Isthmus (Boardwalk West Entrance)

This area between the Trout Pond and the Detention Pond has been planted with many shrubs and short understory plants that provide habitat and wildlife buffers while still maintaining the view of the ponds. Many logs and branches were placed to add organic matter to the hard rocky soil here, and mulch was added to help the groundcovers and maintain some moisture in this area. Some of the new plants here will take a bit of time to mature, but this area is fully planted and ready to go. While most invasives were removed here, there is still some reed canary grass in the low point (duck crossing) between ponds. Care should be taken not to trample the plants when removing it. Native blackberries sometimes poke through the boardwalk in this section, but these can be pulled down to the side to encourage them to grow into the woods.

The Isthmus at right is growing beautifully with the addition of the shrubs, ferns, ground covers, woody debris and mulch. This photo (looking west) shows the area where the ducks like to cross to change ponds. Larry did a great job keeping the boardwalk out of the way here for them.



3.5 Trout Pond

Please see the NWSC Report Update of November 2014 for my suggestions for the Trout Pond. Since I have little control over the skimming and mucking activities that Tom wants for the pond, I will leave it up to him to replant the aquatic and emergent plants here. Along the shoreline, however, I have marked locations to dump muck and duck weed debris, per Tom and Larry's requests, to protect newly planted shrubs and trees.

3.6 Westside (Old Parks Road through North Creek)

Many of the invasive plants have been removed along the west and south side of the Trout Pond, but Himalayan blackberry is still present in places west of the Old Parks Road, and will need to be revisited and removed. The higher ground just west of the Trout Pond has been replanted with trees, shrubs, and ferns. Many plants were lost here when a very large pile of large woody debris was dumped on top of the first round of planting that I did, and I had to replant the area. I have put up markers and signs, but it still gets suggested as a dumping site. If it needs to be replanted again, I will let the AAS staff do it as I do not plan to do it again. We have removed the invasives south of the Trout Pond and replanted it with many shrubs and a few cedars. Logs, brush and shrubs were planted where the old access trail was, and the buttercups have finally filled in to hide the muddy mess we made. Deer still frequent this trail, but it looks much better. To keep it that way, please stay off the trail. Access to the Trout Pond should occur preferably from the northwest shoreline where I removed Himalayan blackberry and coral berry so there is a path and an open area to work.

3.7 Alternate Route

Just south of the Trout and Detention Ponds, the boardwalk winds through the sunny open meadow wetland where the Detention Pond overflows at the Headwater Stream Viewpoint, then past the Beaver Pond which flows south to the small Frog Ponds located east of the Cedar Cathedral. Here you will find ducks feeding and moving through the meadow in the trench, signs of deer traveling between forested areas, past beaver activity, and encounters with hummingbirds, songbirds, woodpeckers, dragonflies, butterflies, and the occasional blue heron. Lush in the summer, sweet-smelling and colorful in the fall, and full of water in the winter, this area was covered in nightshade when we began our project. The Navy volunteers helped me greatly the spring of 2014 with nightshade removal and I was then able to replant the area both sides of the trench here. However, the area had to be abandoned when the Navy went back to Bremerton and the west side of the boardwalk route needed clearing for the construction workers. Now a few nightshade root pieces and seeds left behind are resprouting and nearby areas not completely cleared are slowly spreading back into this open space. In the northwest section near the trench, is a growing patch of morning glory where Himalayan blackberries were removed and light became more available to it, which also needs attention. I have begun invasive removal again in this area with Larry's help, but am trying to recruit others. Larry has enough to do.

In addition, water flowing in a couple of places under the boardwalk here has some potential to erode the pier blocks holding up the boardwalk. I have done what I could to lesson the pressure, and have mentioned it to Tom, Larry and the AAS ecologists who need to monitor it and possibly improve the situation further, as this is their area of expertise.



This beautiful view was once covered with bittersweet nightshade. Here the Headwater Stream Viewpoint will be added to the boardwalk if funded.

3.8 Central Meadow/Shrubland

The Central Meadow (which includes shrubland) is a large area that was also covered with nightshade, and we made great progress here in 2014. As areas were cleared, I enhanced shrub islands with more woody debris and additional shrubs and small trees (such as Pacific crabapple, willows, twinberry, vine maple and red-osier dogwood). It has not been worked since then as the Navy left town. There are still plants that need planting, and the nightshade is currently spreading from the leftover patches back into the areas cleared earlier. This is why nightshade can again be seen from both the west and east sides of the boardwalk loop. The Central Meadow and the Alternative Route retain water year-round and water/mud levels are over the knee here in many places. Hauling bags and tarps of invasive plants, woody debris and tools through this can be difficult and volunteers need to be able to handle the conditions. It would be best to finish this project before the bulk of the rainy season hits as this increases the difficulties, and before the site opens to the public as it can bring a muddy mess to the boardwalk during the process. I have worked much of this area alone in the past, but this is not enough to keep up with the progress of the nightshade here during the growing season, and I have others areas that need attention also. This area will continue to degrade unless I am provided with an able bodied group of volunteers to complete this part of the project. I know the nightshade has not been a priority to most involved with the boardwalk project, but the central nightshade problem is capable of taking over all of the area within the boardwalk route, as it spreads quickly. Pointing out invasive plants frequently from the comfort of the boardwalk is easy, but not necessary. I know they are there. What I need is help to remove them.

3.9 West Central Vine Maple Wetland Forest

The West Central Vine Maple Wetland Forest (located between the old Park's Dept. trench and the Cedar Cathedral) features a view of the small Frog Ponds, a Beatrix Potter peek-a-boo moment, colorful vine maple, sword ferns, salal, false azalea, deer ferns, sedges, skunk cabbages, deer, songbirds, wood peckers, and squirrels. At the moment it also features a water-filled muddy route to an area that was thick with bittersweet nightshade, which was recently removed by the interns and I with some help from Larry and his wife Susan. Here water from the small Frog Ponds overflows heading south through very wet forests before it hits the larger Frog Pond and North Creek. I just finished adding leftover woody debris and replanting the area with Pacific willow, twinberry and red-osier dogwood. I have also repaired some of the damage we caused to get into this very wet area, but it will probably take some time for this to recover. This area will need to be monitored once or twice a year to remove additional nightshade, and would benefit from having sedges planted here.



Here is a small portion of the area mentioned above where we recently removed nightshade. Just beyond view of the boardwalk, nightshade completely covered the plants (which is why the vine maple at right is hunched over). By next year, the nightshade here would have spread to the point of being quite obvious to visitors standing on the boardwalk.

3.10 Cedar Cathedral

The Cedar Cathedral is a wonderful place to listen to song birds and the gentle flow of North Creek while sitting on the beautiful benches handmade by Larry. Under the canopy of large western redcedars, this area hosts an understory of salal, sword ferns, and native blackberry, with a backdrop of vine maple. Once denuded by unauthorized camping activities, it is nice to see the false-lily-of-the-valley, moss and salal creeping back into the space. We replanted the area with additional salal, sword ferns, false-lily-of-the-valley, red huckleberry and bunchberry on the ground, and in woody debris hummock areas we built after removing nearby invasive holly and ivy. We also planted additional vine maple, small western redcedar and Indian plum in the background perimeter. With the dry summer, it was a chore watering here by myself so I decided to finish planting during the wetter season. I would like to add a few red huckleberry, evergreen huckleberry, salal, and sword ferns to the bare spots that are left.



Under the large western redcedars, the Cedar Cathedral area (above) and the Salmon Arena (below) are both open and fairly dry.

3.11 Salmon Arena

In addition to the above mentioned plants, I began planting a shrub buffer of thimbleberry, Pacific ninebark and salmonberry along with some of the larger woody debris left behind from the trailblazing, to the east bank of North Creek to cover some of the social trails that cross the creek here from the park next door, while keeping the view of North Creek open to the Salmon Arena Viewpoint. However, we have some large trees being undermined by the creek that will need to be removed, so Tom said to wait until after then to finish planting. It would be nice to leave some of the downed logs on the **Sandbar** (which begins on the west side of this section) to resemble a natural log jam and to attempt to prevent some of the human activity here, without blocking the view of North Creek or access to water for deer. Salal and ferns can be planted next to the boardwalk to camouflage it from the view west of North Creek also.



3.12 Southwest Vine Maple Forest

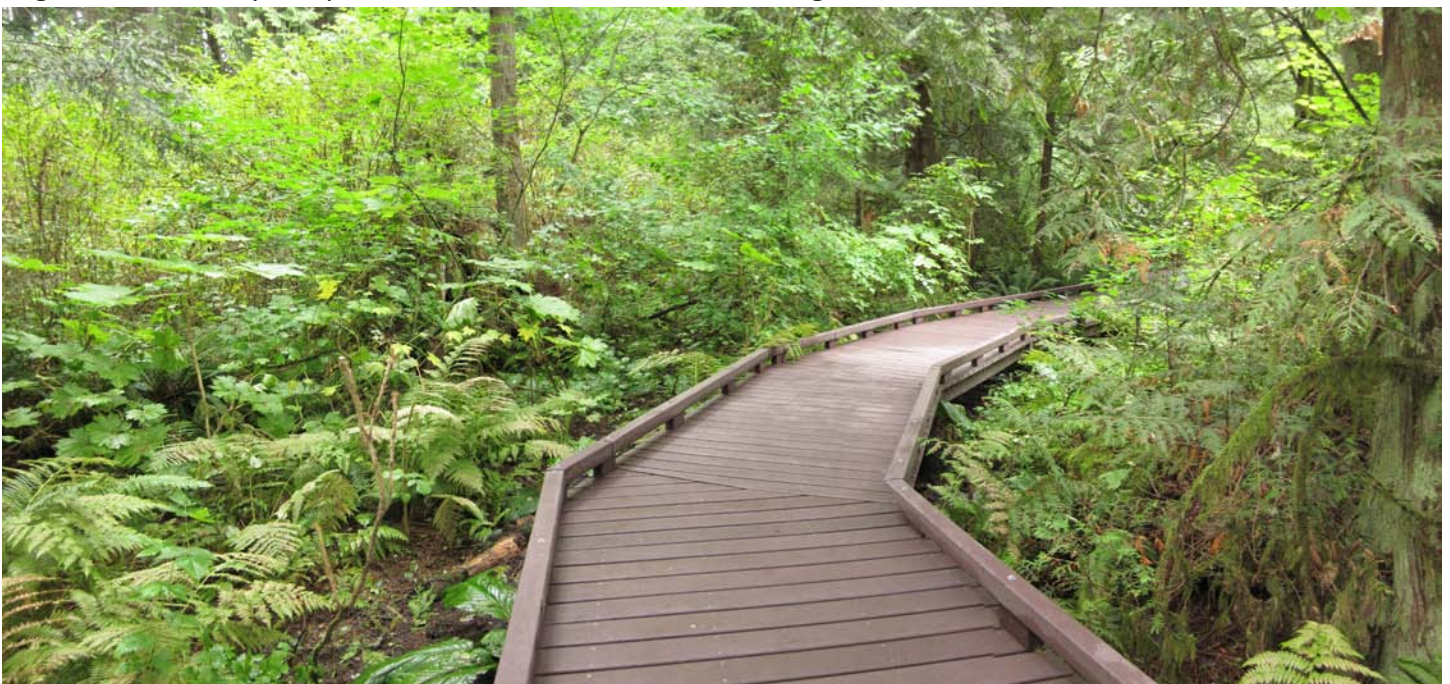
Continuing south from the Salmon Arena, vine maple, salal, multiple fern species, piggy-back-plants and coniferous trees form a lush forest of evergreen and beautiful fall color, while old large nurse stumps add history lessons for human interest. On the west side, the **Sandbar** continues along the east bank of North Creek which forms a lovely lagoon mostly unseen from the boardwalk here, but one that can attract human activity from the park next door. I have removed garbage (mainly alcohol containers), invasive plants (herb-Robert in particular is a constant pest here), and replanted with many shrubs and trees to fill in the mounds of the southern part of this section on both sides of the boardwalk. This area appears ready for opening day.



The Southwest Vine Maple Forest is lush and cool in the summer.

3.13 Low Point Wetland Forest (West)

This section dips in elevation and allows some of the water from the west central and south central meadows to drain into North Creek. Due to the presence of some moving water, a unique plant community occurs here including devil's club, stink currant, deer fern, skunk cabbage, large patches of piggy-back-plants, spruce, western hemlock, as well as the plants found more abundantly at this site such as vine maple, shield/wood ferns, and western redcedar. There are several large nurse stumps along the way and North Creek can be heard and seen from a few spots. After removing holly from the creek's east bank, I replanted it with salmonberry, tall Oregon grape, and a few other shrubs to block the view of the boardwalk from the other side of the creek, as the westside's park trail comes close to the creek here. When the wood fence is built in the park next door, this would be a good area to add some shrubs to protect the creek. I also added a few skunk cabbages to this muddy low point and would like to add some sedges to the west side of the boardwalk as well.

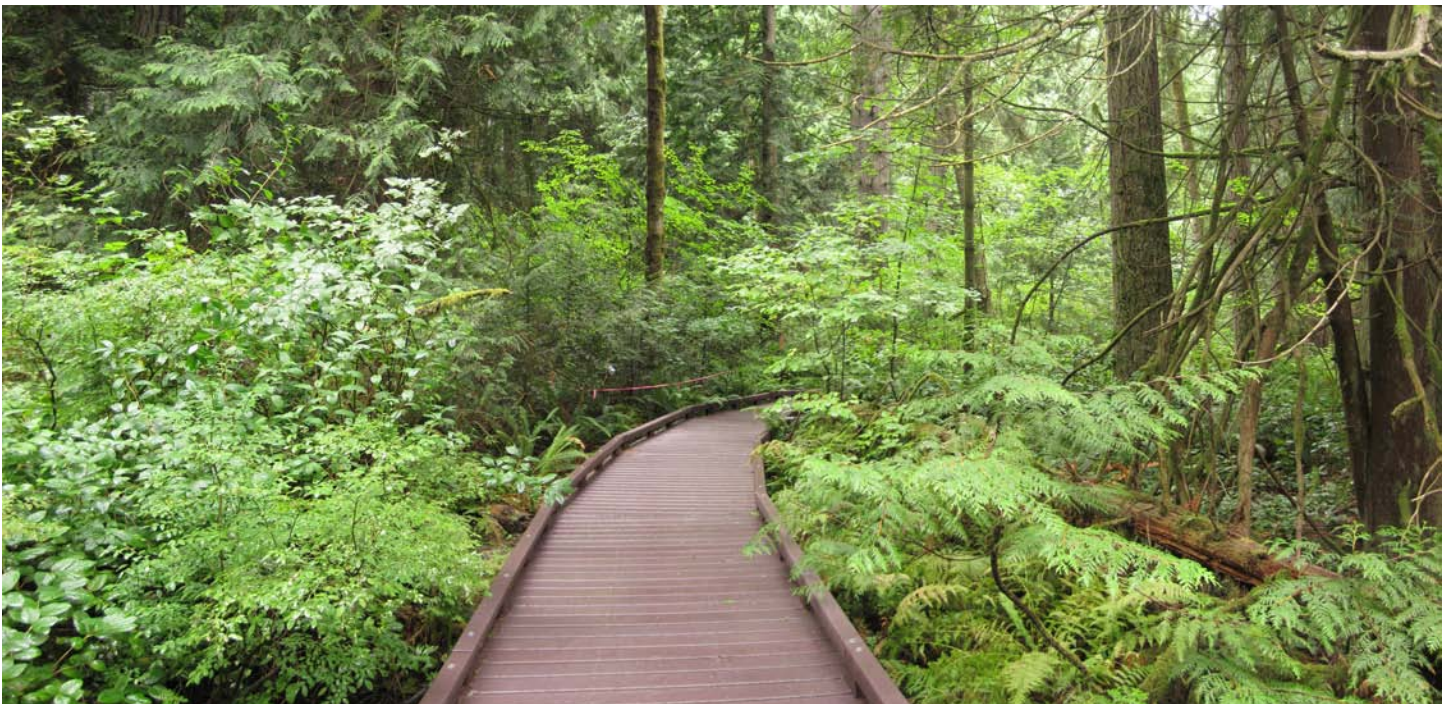


3.14 South Central Shrub Wetland

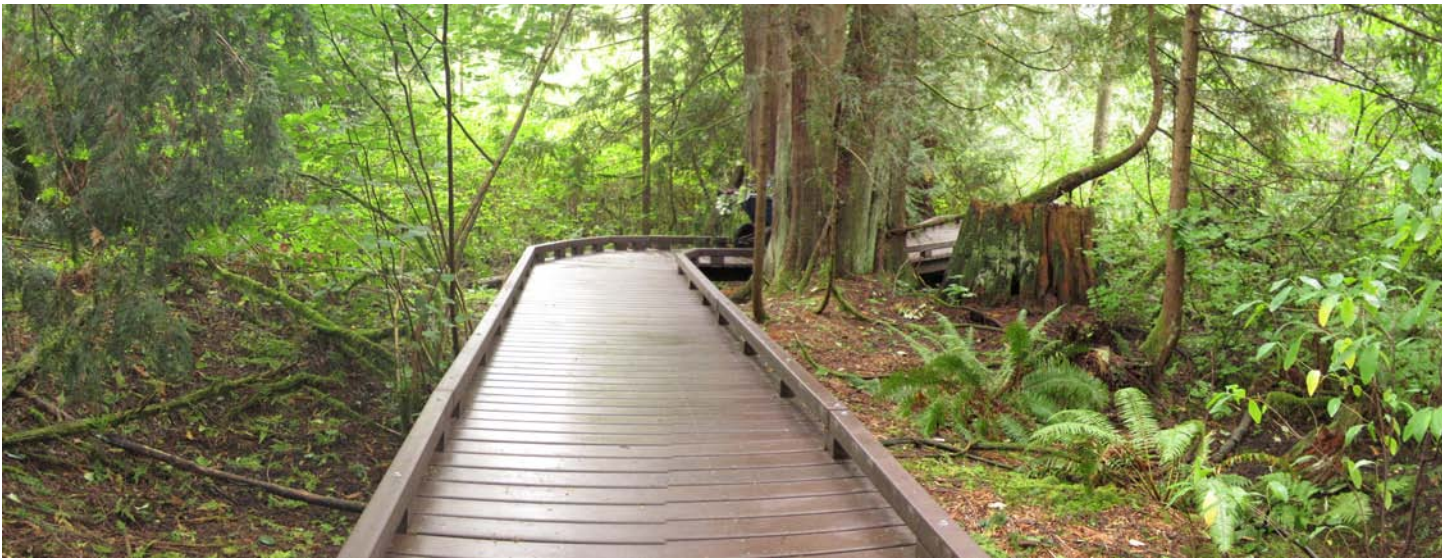
This section is a tangle of various shrub species with scattered western red cedars and falling red alders. The usual mud and water found at this site is deeper than the boot-tops in many places here. Once the few invasives are removed, this section would probably be best left to the wildlife. However, when I get time, I would like to take another look at the water flow patterns here and compare them with my original inventory from 2011-12. I may be wrong, but it seems that the water flow may have increased to the Low Point Wetland Forest (west), and possibly decreased to the Frog Pond. It's more of a hunch that I would like to look into, but in the section to the north, water flow splits between the Low Point stream and the Frog Pond inlet in an area where several red alders fell three winters ago, and I am curious if this made a difference. It is very interesting to see the dynamic processes that change this wetland.

3.15 Southwest Douglas-fir Forest

This beautiful park-like, higher and drier area contains Douglas-fir and western redcedar with an understory of beaked hazelnut, a little Indian plum, salal, sword ferns, low Oregon grape, bleeding hearts, and of course salmonberry. It also contained campsites, garbage, a small log cabin-like structure full of empty alcohol bottles, social trails and occasional visitors to the boardwalk. After we cleaned up the garbage, cabin and invasives (holly and some laurel), I added large branches to the trail and planted tall and low Oregon grape, Indian plum, salal transplants, my pink ribbon barrier (seen in center of photo below) and a sign asking people to stay out of the restoration area. People still come through here and my sign is gone, but the path is starting to recover. Now if I can just keep Tom and his crew of Park Rangers off the path.... I have suggested they come from the established path in the park next door to chase away campers, but I suppose that would just continue to encourage the same from that side of North Creek. It is easy to access this area from the west side and it is quite beautiful in here. After the wood fence is put up, this is another area that would benefit from shrub plants west of the creek. The southwest aspect of this section still contains some ivy, and when I get a chance, I will go out and remove it. However, as long as the private property across the southwest corner of this site has so much ivy, it will probably be a continuous battle there.



Looking west from the Frog Pond, you can see the location of the old social trail from the creek (where the pink ribbon is center of photo). I also replanted this trail as it extended to the northeast side of the boardwalk (right side of photo) and it is filling in nicely. I think people stay off of this side.



3.16 Wetland Forest East of Frog Pond

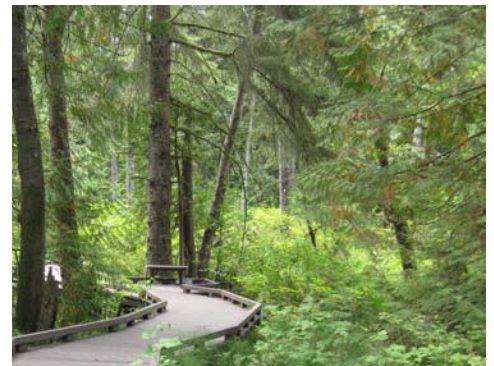
I added a few common rush, branches and a skunk cabbage to the **Frog Pond**, but for additional ideas to enhance amphibian habitat, please see my NWSC November 2014 Update. To the mound (above) which used to be a campsite and garbage pit, I added sword ferns, Indian plum, tall Oregon grape, piggy-back-plants, mulch, logs and other woody debris. I added salmonberry, vine maple and more woody debris to the social trail just south of this mound (right of photo above) and woody debris, mulch, ferns and shrubs to the “mud stream” areas at the boardwalk curves. In the photo (left), this forest is lovely with its colorful vine maple. It



does, however, have a few red alder hazard trees near the boardwalk to cut down, also ivy and bittersweet nightshade in the north to remove.

3.17 Forest Lantern Viewpoint

This viewpoint showcases an emergent wetland filled with skunk cabbages, horsetails, and sedges. Here woodpeckers love to visit the dead snags and Douglas squirrels noisily hang out at the spruce trees,



both animating the place. Larry built the boardwalk’s viewpoint area (photo above) with seating to watch the activity. However, there are rotting branches and a loose tree just above and behind the bench that need to be removed. I removed the Himalayan blackberry and holly on the squirrel mound, and a significant patch of bittersweet nightshade, both to the southeast (beyond center of left photo). We also planted skunk cabbage starts in the low mud.

3.18 Southeast Cedar Mounds

Since we cleaned up and planted this area, it has improved. We added sword and shield ferns, red huckleberry and bunchberry on logs, skunk cabbages and sedges in the wet muddy areas, and covered it with woody debris and mulch to encourage the false-lily-of-the-valley groundcovers to return. I would like to add a few more ferns, red huckleberries, evergreen huckleberries, bunchberries, Indian plum, sedges, and small skunk cabbages in the spring.



Once a large campsite with a sprawling lean-to, the ground here was denuded over time from the activity (since my original inventory of 2011). Now the area is looking better.

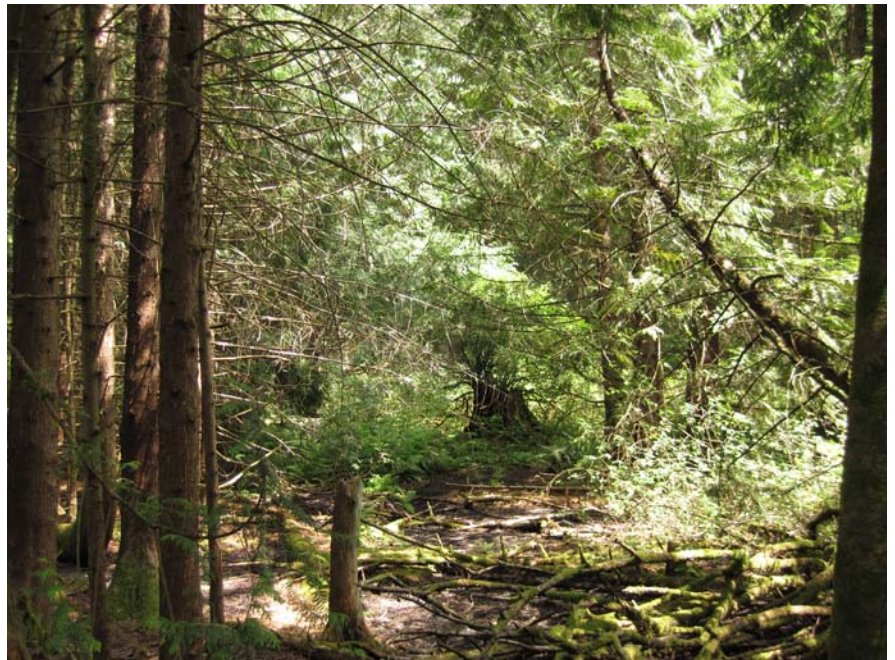
3.19 Yew Stream/Sedge Ribbon

The stream here flows southwest from the property east next door. This is another unique plant community for this site as it contains a large black cottonwood tree, large paper birch trees and large cascara trees with an understory of twinberry, spirea, salmonberry (not so unique), black swamp gooseberry, a ribbon-like patch of sedges along the stream, skunk cabbages, and the only yew trees seen on the whole site (except for one I planted in the NE Forest). Since the stream has no name that we know of, I call it the Yew Stream after this lonely patch of yews. The background contains Pacific willow, much of it growing from a downed tree to the west, with an old beaver dam in front of it that can only be seen in the winter when the plants lose their leaves. A mixture of spirea, Pacific crabapple and Pacific willow also flows in from the southeast with more sedges in front. This area provides an interesting mixture of plants with beautiful fall color.

In the open areas both sides of the boardwalk, we added woody debris and shrubs (thimbleberry, red flowering currant) to higher areas. We removed struggling sword ferns from the lower wet areas and added shield ferns and sedges which are growing well. Then I added mulch to help the false-lily-of-the-valley and to define the “mud streams”. I will plant more sedges when I get them, and possibly a few small skunk cabbage transplants.

3.20 Dark Cedar Woods

Once a rather dark and creepy part of the route, this forest now has its own sort of beauty. We removed some woody debris and added larger pieces, some planted with red huckleberry. We opened up the view of the nurse stump seen in the photo (right), which made this space less claustrophobic. Under the canopy of western redcedar, the ground is muddy with flow patterns that radiate out northwest and southwest directions from the central east. We accentuated the effect by adding woody debris, ferns and mulch to the margins, leaving mud to form the stream. In the winter, these “mud streams” will be full of water enhancing the effect.



The nurse stump with red huckleberry and salal can be seen in the distance.

In the spring, I would like to plant more bunchberries and red huckleberry to the rotting logs, add a few shield ferns and small skunk cabbages to enhance the stream flow pattern, and transplant a few twinberry from the Front Meadow where there are too many currently, to the periphery here.



Sedges planted in the foreground and the surrounding plants are doing well in this wetland going through changes.

3.21 Downed Tree Swamp

This section provides a look at the dynamic processes that shape a wetland. When the trees fell three years ago, this area changed from a wetland forest to a scrub-shrub wetland. The Yew Stream crosses the east border of the property through here and forms a small pond behind the root ball of a large fallen tree. I removed invasive plants and pruned the shrubs and small Pacific crabapple and cascara trees over the stream to open the view of the water. I also planted sedges, common rush, twinberry, piggy-back plants and ferns along the boardwalk. Soon I will buy more sedges to plant here to form a flowing pattern that weaves back and forth between the mud puddles along both sides of the boardwalk. As you can see in the photo (left), the sedges that I planted earlier are doing quite well here.

Along both sides of the boardwalk through this area, herb-Robert is very persistent and will need to be removed regularly.

Across from the Dark Cedar Woods, a large chunk of a western redcedar fell onto a muddy salmonberry shrubland. I removed some of the woody debris and replanted with red-osier dogwood, twinberry and salmonberry all transplanted from the Front Meadow.

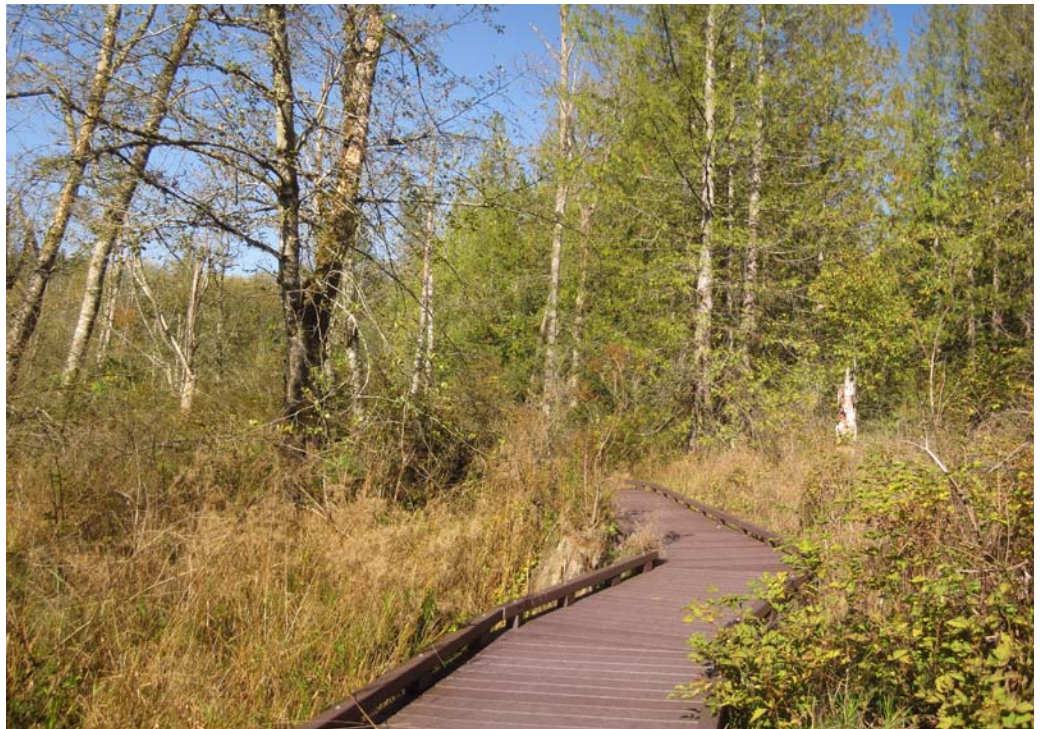
3.22 East Central Wetland Meadow

A sunny open space, it offers a nice contrast to the cooler and darker forested areas of the site, especially in fall, winter and spring. The Bird Alley Viewpoint will be located here when financed, as songbirds, hummingbirds, woodpeckers, flickers and others can be frequently seen or heard throughout this section. Butterflies, dragonflies, garter snakes and frogs are also common visitors here, making this a lively area. This plant community is a wetland meadow full of fowl grass, reed canary grass and willow herb, some of which we have cleared and replanted with sedges. Scattered throughout are small mounds containing shrubs and/or small trees such as Pacific crabapple and salmonberry with a base of false-lily-of-the-valley, ferns, and of course herb-Robert. Throughout the area I pulled invasive plants but also pulled some of the grass and willow herb away from the shrubs and planted a few more (such as Pacific willow, red-osier dogwood, Pacific crabapple, twinberry) adding woody debris also to allow shrub island to grow within a sea of grass on both sides of the boardwalk. Time will tell how well the livestakes do in the grass. I will leave it up to someone else to sort out the reed canary grass from the fowl grass. However, it might be nice to add more patches of sedges and other emergents to the area, especially on the east side of the boardwalk where I do plan to fill in some invasive areas with sedges.

This section goes to the east border of the property where nightshade was heavily invading. I pulled it out of the neighboring property along the border. This area will need to be monitored.

The photo (right) looking northeast shows the open sunny space of the East Central Wetland Meadow. Within it are several dead or partially dead red alders that make great tree snags for the birds, but aren't so great next to the boardwalk.

Below is the base of one of those tree snags which needs to be removed. This tree is probably over 40 feet tall and within reach of the boardwalk.



While this section of the site has great tree snags for the birds, there are two in particular that are hazards to the boardwalk space and need to be removed soon. One of them is located just southeast of the lower right corner of the photo above, next to the stream. The base of that tree can be seen in the photo (left). It is actually hidden from view behind another tall cedar so it can easily be overlooked from the boardwalk. This tree needs to be removed soon before it falls onto the boardwalk. The other tree is a large old red alder that is partially dead and also next to the boardwalk. In the photo above it appears to the right of the boardwalk in the background, but is actually on the northwest side of it near the curves. Even though there are some invasive plants below these trees and sedges to plant here, I will not risk the safety of volunteer groups at this point, by having them work under these two trees.

3.23 Northeast Cedar Woods

The Northeast Cedar Woods is located just south of the AAS Plant Nursery and the Detention Ponds, and contains a lovely western redcedar wetland forest with an understory of salmonberry, twinberry, sedges, horsetails, skunk cabbage, false-lily-of-the-valley, and ferns. Often the owls can be seen or heard in this area.

Many of us volunteers were involved in removing debris from here. Steve has done a terrific job reorganizing the AAS Plant Nursery with its new potting and storage sections hidden behind the bioswale to the north of the AAS Plant Nursery. I personally removed over 2,000 pots from the property next door and hauled away three vans full of pots to another nursery. With the Microsoft volunteers, again we had to clean up debris that was dumped over the plant yard fence into the property next door by staff, before we could plant the area in the second photo below. Debris included Christmas trees, large branches, a large chunk of the big tree that fell, and other yardwaste from the plant yard. This is not our property. Some of this is a fire hazard and there was already one fire in the woods this summer on that side. We shredded and/or reused most of it and replaced some of their shrubs that were damaged. I have also cleaned up and planted the area south of the pot pile twice. Please use the new area north of the plant yard for storage, maybe buy a shredder, or haul excess debris to the dump. I have been told that clean-up is not in the budget. I would think it is one of the costs of doing business and should be added to the cost of the projects involved. If this area needs to be cleaned up or replanted again due to dumping, I will not be the one to do it, nor should other volunteers.

On the west side of the boardwalk, the understory was bare where Christmas trees and other debris had been piled in the past here also. I have added a few sword ferns and vine maple, but this space under the tall evergreen trees could use some additional plants such as salal, sword ferns, evergreen huckleberry, and red huckleberry on rotting wood, which I would like to do in the spring.

At right is a view of sectors 5-6 showing the plant nursery potting area in April 2014 looking northeast.



Above is the current view of the former potting area looking northeast from the same point after we replanted it. Moving the potting area north of the Plant Nursery is a big improvement, as debris was constantly piling up here and into the forest. It should fill in nicely if we stay off of it.

3.24 Detention Ponds and Bioswale

The Detention Ponds (below) are a beautiful site especially when the water isn't too murky. The ducks raise their ducklings here, while the owls watch from above. A visiting turtle hangs out at the log, and dragonflies make their rounds looking for food. In the photo (below) looking west, the Northeast Cedar Woods is on the left and extends into the background as a mounded peninsula. Along the shoreline in those two areas are mounds of mud and woody debris that the interns removed from the pond. At some point it would be great to plant sedges and skunk cabbages here to cover the mess and provide water filtration. I think this would be a good pond to try educational experimentation with phytoremediation techniques, and study water quality with regards to wetlands. In my last NWSC boardwalk project update (November 2014), I provided information on phytoremediation for those who want to learn more about it.

The Northeast Peninsula is located on the right in the photo (below). The shoreline of this peninsula was heavily invaded with nightshade and a 10 by 20-foot patch of *Vinca minor* (periwinkle), both of which we removed and replanted with Pacific ninebark, twinberry and red-osier dogwood. I have left a space open on the shoreline next to both the north and south ends of the bridge that crosses the Bioswale, to allow access to the pond for the mucking activity. I have suggested the interns or volunteers deposit the muck from the pond immediately where it can be used along the shoreline. Otherwise it creates extra work and a mess when left on tarps, as they did before, which I had to clean up. I would love to see sedges and skunk cabbages planted also in these areas along the shoreline after the pond muck is piled up here, but, as it is with the Trout Pond, I have no control over that activity so I will let Tom and his crew do it.



Notice how the owl at right enjoys watching the ducks in the pond below, in this beautiful view of the Detention Pond from the bridge looking west.

3.25 Northeast Peninsula (Boardwalk East Entrance)

Nestled between the Detention Ponds and the AAS log piles by the gravel path, this forested area forms the southern and eastern borders of the Front Meadow. Deer trails and their resting places are evident here. Past beaver activity has riddled this mound with caverns and tunnels that we filled as we found them, but more probably exist. We removed herb-Robert (which runs rampant here), holly and nightshade, added woody debris (while preserving deer resting areas), and mulch. We replanted with shrubs, trees, and ferns.

Larry and his crew added the gravel path with a drain underneath where water was accumulating on the route. Then a group of junior high students helped me put in the “dry creek bed” where the drain pipe ends east of the Detention Pond (lower left in photo). The shrubs and ferns we planted along the east entryway should fill in well while still allowing a glimpse of the Front Meadow.



These shrubs, recently planted, line the east entry to the boardwalk.

3.26 AAS Employee Entrance/Parking and AAS Plant Nursery

The AAS Plant Nursery has been expanded in the north end and now includes the potting area, storage for AAS supplies, as well as additional plants. Steve has done a wonderful job setting this up and Larry built a great bridge crossing the Bioswale, so now the AAS employees can have easy access when loading and unloading the trailer for their off-site projects. The photo below (left) shows some of the parking perimeter landscape where the interns and I removed herb-Robert, nightshade, and many Himalayan blackberry plants (several from the bank of the Bioswale). We removed piles of branches, construction debris and AAS supplies from here. I also limbed up the trees to get them off the cars and removed some poorly-pruned shrub branches. Then we replaced the blackberries with shrubs, mulched, and now the area looks much better and should also function well for the AAS employees.



Legend has it Tom plans to get rid of the white car at right, but this legend is long-standing. It would be nice to open up another parking space, and have room to repair this back door ramp (with concrete?) That or put a “Room for Rent” sign on the car’s windshield and make a little extra money.

The photo (left) shows the paved AAS employee parking lot looking north.

The photo (below) shows the back door ramp made of loosely placed blocks that form a tripping hazard with its irregular surface.



4.0 ADDITIONAL PLANTS

The following plant list (Table D) will be helpful for selecting plants for the areas I mentioned earlier in Section 3 of this report, where I would like to add a few more plants as fillers.

NWSC ADDITIONAL NATIVE PLANTS LIST BY PLANT COMMUNITY TYPES

Drier Forest Community Plants

<u>Drier Forest Community Plants</u>	<u>Common Name</u>	<u>Supply Source</u>
<i>Gaultheria shallon</i>	Salal	Snohomish Conservation Dist.
<i>Mahonia aquifolium</i>	Tall Oregon grape	Commercial nursery
<i>Oemleria cerasiformis</i>	Indian plum	Snohomish Conservation Dist.
<i>Polystichum munitum</i>	Sword fern	Snohomish Conservation Dist.
<i>Rubus parviflorus</i>	Thimbleberry	Bldg. perimeter & SCD
<i>Vaccinium ovatum</i>	Evergreen huckleberry	Snohomish Conservation Dist.
<i>Vaccinium parvifolium</i>	Red huckleberry (on wood)	Marian (rooted cuttings) & SCD

Wet Forest Community Plants

<u>Wet Forest Community Plants</u>	<u>Common Name</u>	<u>Supply Source</u>
<i>Acer circinatum</i>	Vine Maple	AAS Plant Nursery
<i>Dryopteris expansa</i>	Shield/wood ferns	Marian
<i>Lonicera involucrate</i>	Twinberry	NWSC cuttings/transplants from NWSC Front Meadow
<i>Vaccinium parvifolium</i>	Red huckleberry (on wood)	Marian (rooted cuttings) & SCD
<i>Viburnum edule</i>	Highbush cranberry	Layering (on-site shrubs)

Scrub Shrub Wetland Plants

<u>Scrub Shrub Wetland Plants</u>	<u>Common Name</u>	<u>Supply Source</u>
<i>Cornus sericea</i>	Red-osier dogwood	NWSC cuttings/transplants
<i>Lonicera involucrate</i>	Twinberry	NWSC cuttings/transplants
<i>Malus fusca</i>	Pacific crabapple	Snohomish Conservation Dist.
<i>Physocarpus capitatus</i>	Pacific ninebark	NWSC cuttings, AAS Nursery
<i>Salix lucida</i>	Pacific willow	NWSC cuttings
<i>Salix scouleriana</i>	Scouler's willow	NWSC lvestakes or layering

Emergent Wetland and Wetland Meadow Plants

<u>Emergent Wetland and Wetland Meadow Plants</u>	<u>Common Name</u>	<u>Supply Source</u>
<i>Carex obnupta</i>	Slough sedge	Storm Lake Growers & Master Gardener Penny
<i>Eleocharis palustris</i>	Creeping spike-rush	Commercial nursery
<i>Juncus effusus</i>	Common rush	NWSC transplants &/or commercial nursery
<i>Lysichiton americanum</i>	Skunk cabbage	NWSC seedlings & seeds
<i>Scirpus microcarpus</i>	Small-fruited bulrush	NWSC transplants? & Storm Lake Growers
Local wildflower seed mixes from reputable source (natives only)		SCD or commercial nursery

Table D: NWSC Additional Native Plants (Plant info from Robson et al. 2008, Pojar et al. 2004 and my experience)

5.0 FUTURE MAINTENANCE

The AASF board needs to consider who will continue to maintain the landscape of the site once the NWSC outdoor learning center is completed. I have noticed a trend here of the landscape being low on the priority list, probably because the list was so long and the boardwalk was the hot topic. But we have essentially added another 17 acres of responsibility to the site and should consider this seriously. Does the NWSC Director have time to do this and/or properly supervise these activities on top of running the new NWSC facilities? It needs someone with a knowledge of plants, wildlife habitat, human visitors' requirements and project management skills.

Knowledge of plants goes beyond mere identification skills. What are the characteristics of a plant, its requirements, plant communities/associates, habitat value for this site, pruning and propagation techniques? What are the invasive plants, where are they, when is the best time to remove them and how? Much of this information can be found easily, written into a manual, or scheduled. What usually happens is interns (or sometimes volunteers) are just sent out to work for a period, often with little knowledge or supervision, and little planning on how it affects the rest of the work at the site. Someone should have the overall plan of the site, a master plan for maintenance, and be able to integrate the interns and volunteers into this plan in a way that fits the parts together cohesively.

Zonal locations and functions (wildlife, human or mixed zones) must be understood to care for the needs of human visitors, employee needs and wildlife. This site is multi-functional. It provides wildlife habitat, educational opportunity, human interest, wetland appreciation, a functioning wetland, and a base for the Adopt-a-Stream projects. While we all understand that, conflicts do occur, and an overall spatial plan helps. Where should supplies be deposited, what should be taken to the dump/transfer station, how can yardwaste debris be used, repurposed, or strategically placed? These have been problems since the boardwalk project began. We should not be dumping on top of the very things we want to see. It is unsightly and sends the wrong message to our audience. We need to remember why we chose the route we did.

Project management skills will also be important in the area of oversight, site management, scheduling, and supervising manpower (interns and volunteers). Projects are often started but not finished. Manpower is often wasted unnecessarily. An example can be seen in the photo (below) where oversight and planning could be improved. We need to value the time volunteers spend helping us. Oversight can help to streamline activities or cut them down into smaller chunks that can be started and finished in a designated period of time, which would help when working with volunteers who have varying schedules.



Dumping mucking debris where Larry was currently working to build the plant nursery bridge was poor planning and unnecessary extra work for volunteers.

When we are done setting up this center, I will be happy to write a maintenance manual for the landscape of the site and provide suggested schedules for what needs to be done. Larry has mentioned he would like to do this for his aspects of the site also, and Tom would probably like to add his part to maintain ponds, etc. This should help keep the site in good shape into the future.

6.0 CONCLUSIONS

First, we need to make a few changes (think a little differently) in order to bring this center to the next level. We want this to be a premiere learning center and a destination that the public enjoys enough to pay to see. That raises the bar. Please consider some of the above suggestions.

Second, we need could use more help getting the NWSC ready for public. Please consider the following to do lists found in the Appendix of this report.

Third, the AASF board needs to consider who will continue to maintain the landscape of the site once the NWSC outdoor learning center is completed. The NWSC Director may not have the time to do this.

We have made so much progress since we began this project. We should feel proud to be a part of it. This site is a treasure and will be a wonderful asset to the area when finished. Tom, we applaud you for your vision, and thank all the volunteers that helped make this happen.

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APPENDIX A

NW STREAM CENTER BOARDWALK PROJECT
Items To Do BEFORE Boardwalk Is Opened

LOCATION & PROJECT	LEADER CONTACT		
	LARRY	MARIAN	TOM
Administrative:			
Decide on entry costs, discounts, etc.			X
Decide on days & hours of operation			X
Estimate grand opening date (early 2016)			X
Train the docents/tourist guides			X
Investigate docent microphone/receivers (groups larger than 10)			X
Interpretive Signs/Educational Signs:			
Write text, gather artwork & order signs			X
Proofread text		X	X
Install signs at designated points along boardwalk route	X		
Make acrylic or polycarbonate plastic sign covers	X		
Seal rain access points with caulk on sign frames	X		
Main Entrance:			
Decide materials for front entry trail (porous concrete, fine gravel)	X		X
Install new entry trail (porous concrete?, fine gravel?, boardwalk?)	X		
List & price all parts needed for 6 ft, black-powder coated, chainlink security fence at entry area (refer to previous fence pricing & details - All City Fence Co. in Seattle)	X		
Install main gate & chainlink fence	X		
Investigate low voltage outdoor lighting options for entry trail (lumens, wiring requirements, locations, costs, etc.)	X		
Install outdoor lighting	X		
Design & install new entry landscape design/planting plan		X	
Install gatehouse ramp & handrails	X		
Order & install gatehouse phone, computer lines & internet			X
Find affordable furniture source (donation?) for Gate House (desk, chair, file cabinet)			X
Repair Trout Stream Exhibit window leak	X		X
Install Trout Stream Exhibit window frames, shutters & signs	X		
Modify rain garden	X	X	
Modify trout stream exhibit landscape		X	X
Building Perimeter & Front Patio:			
Remove old white car from property			X
Repair or build new concrete ramp to back door (white car here now)	X		
Consider paving gravel parking strip (constant seedy weed mntn.)			X
Repair sinking brick problem in brick walkway & patio	X	X	
Finish landscape remodel of raingarden near SW window		X	
Remove construction materials from front patio	X		

LOCATION & PROJECT	LEADER CONTACT		
	LARRY	MARIAN	TOM
Boardwalk in General			
Find local source for engraved recognition plaques (boardwalk section donor plaques) & get samples of plaques			X
Order recognition plaques with correct info			X
Decisions for contributor recognition lists			X
Attach donor plaques to boardwalk toe rails at designated locations	X		
Remove dangerous trees	X Professionals		X
Clean up after tree removal (haul out debris to shred or use)	X		X
Shred excess woody debris (1.5" diameter or smaller)		X	
Boardwalk West Entrance, Trout Pond & Isthmus between Ponds:			
Finish work on interpretive sign installation	X		
Finish mucking Trout Pond (place muck for emergents planting)			X
Westside (Old Parks Road thru North Creek):			
Remove Himalayan blackberry (west, SW, & south of Trout Pond)	X		
Remove patch of morning glories SE of Trout Pond		X	
Build wood rail fence along path west side of North Creek (next door)	X		X
Alternative Route:			
Remove nightshade & irises from Headwater Stream Viewpoint		X	
Remove invasive plants (NS, MG, HBB) from trench @ BW		X	
Fix water erosion potential w/2 pin foundations under BW	X		X
Central Meadow:			
Revisit areas where nightshade was removed & remove remains		X	
Remove old nightshade-piled tarps (requires 2-4 people)		X	
Remove large expanse of untouched nightshade		X	
Finish replanting nightshade removal areas with shrub "islands"		X	
West Central Vine Maple Forest (Trench to Cedars):			
Replant nightshade removal restoration area (ASAP) w/shrubs		X	
Verify invasive mapping N of "ivy tree" & remove invasives if present		X	
Cedar Cathedral:			
Water transplants (ferns, salal, bunchberry, vine maple, huckleberry)		X	
Salmon Arena:			
Cut down large leaning trees undermined by North Creek (use the large logs as a "log jam" on sandbank to block social trails)	X		X
Haul out excess woody debris from tree cutting to shred pile	X		X
Shred excess woody debris for mulch		X	

LOCATION & PROJECT	LEADER CONTACT		
	LARRY	MARIAN	TOM
<p>Wetland Forest East of Frog Pond: Evaluate hazardous red alder trees near boardwalk for possible removal (consult with James Yu who is a Certified Arborist) Cut down hazardous red alder trees & haul out to shred pile Shred excess woody debris</p>	X X	X	X X
<p>Forest Lantern Viewpoint: Have James Yu evaluate loose dead tree next to bench for removal Prune rotten spruce branches above bench at viewpoint & haul out Shred/use excess woody debris</p>	X X	X	X X
<p>Downed Tree Swamp: Remove invasive plants (nightshade, herb Robert, Him. blackberry) Add sedges, piggyback plants & sh. ferns to ephemeral ponds by BW Selectively prune branches from downed cedar tree top & shred</p>		X X X	
<p>East Central Meadow: Remove tall rotting dead tree east side boardwalk north of stream Remove remaining invasives (nightshade & herb Robert)</p>	X professionals	X	X
<p>Northeast Cedar Woods: Plant shield ferns & sedges north boardwalk curve (both sides)</p>		X	
<p>Detention Ponds & Bioswale: Finish mucking pond (dump in designated shoreline areas) Finish mucking bioswale (dump in designated shoreline area)</p>			X X
<p>Eastside Boardwalk Entrance/Exit: Remove AAS lumber pile east side boardwalk to storage Remove & recycle AAS metal pile Replant east side of boardwalk after AAS piles removed</p>	X Steve	X	X John
<p>AAS Plant Nursery & Bridge: Continue organizing nursery & moving AAS storage into plant yard & off visitor area</p>		X Steve	
<p>Back Gate/AAS Entrance/Employee Parking: Reuse/remove boardwalk construction pile near tool shed Repair leaking AAS vehicles</p>	X Steve		X Staff X

APPENDIX B

NW STREAM CENTER BOARDWALK PROJECT

Items That Can Wait Until AFTER Boardwalk Is Opened

LOCATION & PROJECT	LEADER CONTACT		
	LARRY	MARIAN	TOM
<p>Front Meadow: (Spring 2016) Install changes to front meadow design & enhance habitat value Remove excess shrubs & put into pots for AAS or transplant if needed Remove invasive plants Plant sedges & other wetland emergent/meadow plants</p>		X X X X	
<p>Boardwalk West Entrance, Trout Pond & Isthmus between Ponds: Plant aquatic plants (trout habitat) Plant shoreline emergent plants (sedges, skunk cabbages, etc.)</p>		X	X X
<p>Westside (Old Parks Road thru North Creek): Add plants west side of North Creek (buffer & minimize social trails)</p>			X
<p>Alternative Route: Build Headwater Stream Viewpoint (if financed)</p>	X		
<p>Central Meadow: Revisit nightshade removal areas and remove resprouting nightshade Remove reed canary grass & replant w/other wetland meadow plants</p>		X	X
<p>West Central Vine Maple Forest (Trench to Cedars): Build small bench at trench (Small Frog Ponds Viewpoint)</p>	X		
<p>Cedar Cathedral: (Spring 2016) Add plants to bare areas (bunchberry, salal, ferns, red huckleberry) Add shrubs to open area periphery (Indian plum, vine maple)</p>		X X	
<p>Salmon Arena: Plant thimbleberry & salal to block view of BW w/o blocking our view Add salal, ferns, bunchberries, evergreen & red huckleberry</p>		X X	
<p>Southwest Vine Maple Forest: Recheck sandbar periodically (herb Robt, garbage, social activities)</p>		X	X
<p>Low Point West Wetland Forest: Add small skunk cabbages & sedges to muddy stream area Remap/compare water flow rt. (Cedar Cath. to LP stream & Frog Pond) Recheck sandbar periodically (herb Robt, garbage, social activities)</p>		X X X	X
<p>Frog Pond: Continue enhancing amphibian habitat with plants & structures</p>		X	

Items That Can Wait Until AFTER Boardwalk Is Opened

LOCATION & PROJECT	LEADER CONTACT		
	LARRY	MARIAN	TOM
Wigwam Mounds:			
Add shield ferns, sword ferns & evergreen huckleberries to bare spots		X	
Add additional red huckleberry & bunchberries to woody debris		X	
Add additional mulch to false-lily-of-the-valley mounds where needed		X	
Yew Stream/Sedge Ribbon Wetland:			
Finish improvements to woody debris storm mess		X	
Add sedges, small skunk cabbages, shield ferns & common rush to muddy areas on both sides of the boardwalk		X	
Dark Cedar Woods:			
Selectively remove more dead tree branches along boardwalk		X	
Add sh. ferns, skunk cabbages, stink currant & mulch to mud margins		X	
Add bunchberries & red huckleberry to decayed wood		X	
East Central Meadow:			
Plant additional shrubs, sedges & use old wetland seeds from Walt		X	
Remove some reed canary grass & replace w/wetland meadow plants			X
Remove salmonberry that is too close to boardwalk when needed		X	X
Northeast Cedar Woods:			
Plant salal & evergreen huckleberry to mound so. of Detention Pond		X	
Detention Ponds & Bioswale:			
Replant shoreline dumped muck with sedges & skunk cabbages		X	X
Fix bioswale flow to add aeration w/o blocking duck & turtle routes	X		X