LANDSCAPE PERFORMANCE SERIES
presented by the Landscape Architecture Foundation

Rainier Beach Urban Farm and Wetlands
Methods

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This investigation was conducted as part of the Landscape Architecture Foundation's 2025 *Case Study Investigation* (CSI) program. CSI matches faculty-student research teams with design practitioners to document the benefits of exemplary high-performing landscape projects. Teams develop methods to quantify environmental, social, and economic benefits and produce Case Study Briefs for LAF's *Landscape Performance Series*.

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The full case study can be found at: https://landscapeperformance.org/case-study-briefs/Rainier-Beach

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Acknowledgements

We acknowledge the Coast Salish peoples of this unceded ancestral land, the land which touches the shared waters of all tribes and bands within the Duwamish, Suquamish, Tulalip and Muckleshoot nations. We acknowledge the people – past, present, and future – on whose traditional lands we study and work.

To acknowledge this land is to recognize its longer history and our place in that history; it is to recognize these lands and waters and their significance for the peoples who lived and continue to live in this region, whose practices and spiritualities were and are tied to the land and water, and whose lives continue to enrich and develop in relationship to the land, waters, and other inhabitants today.

Many thanks to the wonderful staff and volunteers at Rainier Beach Urban Farm and Wetlands, who generously supported this research project and shared their time and knowledge with us. We are incredibly grateful to have had the opportunity to spend time in this special place.

Environmental Benefits

Benefit 1: Stormwater Management

- ***Retains and filters 98% of stormwater runoff through multifaceted green stormwater infrastructure improvements including 3 rain gardens with a combined area of 4,822 sf and over 700 trees planted on site.***

Background:

Rainier Beach Urban Farm & Wetland is located next to Lake Washington, a 34 square mile freshwater lake that is home to migrating salmon runs and many other aquatic animals. ("Lake Washington | Washington Department of Fish & Wildlife," n.d.) Green stormwater infrastructure can prevent polluted stormwater from reaching and disrupting aquatic ecosystems, protecting vital habitats and utilizing nature-based solutions to capture and treat stormwater. ("Green Stormwater Infrastructure Nature-Based Solutions for Managing Polluted Runoff Overview and Accomplishment Report SPRING 2020," n.d.) The design of the site incorporates rain gardens, infiltration fields, hundreds of planted trees, and

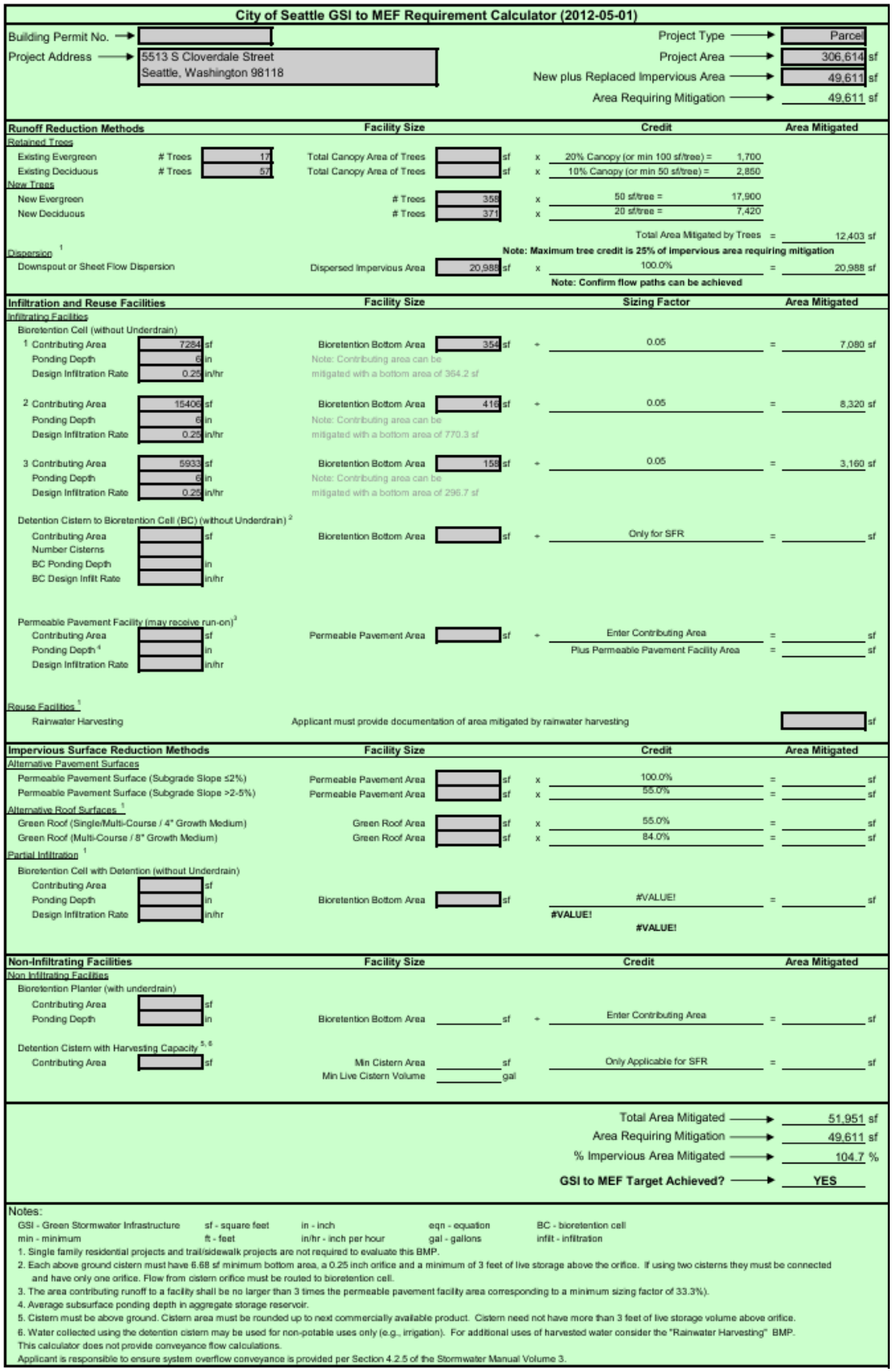
the original drainage ditch to help capture and filter stormwater runoff before it reaches Lake Washington.

Method:

To evaluate stormwater management on-site, secondary source analysis was performed using drainage reports from the engineering firm contracted by the City of Seattle to evaluate the site. Due to ongoing stormwater drainage monitoring of the site by the City of Seattle, the 2019 drainage report reflects the landscape performance of the site post-construction. The drainage report evaluates the percent of stormwater stored and filtered on a site over a 24-hour period at a .25 inch per hour infiltration rate.

The researchers referred to the drainage report to determine the percentage of total stormwater stored and filtered on site.

Tree count was provided by City of Seattle Green Stormwater Infrastructure to Maximum Extent Feasible spreadsheet published within the 2019 Drainage Report. Within the spreadsheet, assessors cite over 700 trees planted as mitigation for hardscaped elements on site, resulting in 104% mitigation for total site area (positive offset). Researchers directly referenced the published spreadsheet to report the number of trees planted in the reported benefit.



City of Seattle GSI to MEF Requirement Calculator (2012-05-01)

Building Permit No. →

Project Address → 5513 S Cloverdale Street, Seattle, Washington 98118

Project Type → Parcel

Project Area → 306,614 sf

New plus Replaced Impervious Area → 49,611 sf

Area Requiring Mitigation → 49,611 sf

Runoff Reduction Methods			Facility Size			Credit		Area Mitigated
Retained Trees								
Existing Evergreen	# Trees	17	Total Canopy Area of Trees		sf	x 20% Canopy (or min 100 sf/tree) =	1,700	
Existing Deciduous	# Trees	57	Total Canopy Area of Trees		sf	x 10% Canopy (or min 50 sf/tree) =	2,850	
New Trees								
New Evergreen			# Trees	358		x 50 sf/tree =	17,900	
New Deciduous			# Trees	371		x 20 sf/tree =	7,420	
						Total Area Mitigated by Trees =		12,403 sf
						Note: Maximum tree credit is 25% of impervious area requiring mitigation		
Dispersion [1]								
Downspout or Sheet Flow Dispersion			Dispersed Impervious Area	20,988	sf	x 100.0% =		20,988 sf
						Note: Confirm flow paths can be achieved		

Infiltration and Reuse Facilities			Facility Size			Sizing Factor		Area Mitigated
Infiltrating Facilities								
Bioretention Cell (without Underdrain)								
[1] Contributing Area	7284	sf	Bioretention Bottom Area	354	sf	÷ 0.05 =		7,080 sf
Ponding Depth	6	in	Note: Contributing area can be					
Design Infiltration Rate	0.25	in/hr	mitigated with a bottom area of 364.2 sf					
[2] Contributing Area	15406	sf	Bioretention Bottom Area	416	sf	÷ 0.05 =		8,320 sf
Ponding Depth	6	in	Note: Contributing area can be					
Design Infiltration Rate	0.25	in/hr	mitigated with a bottom area of 770.3 sf					
[3] Contributing Area	5933	sf	Bioretention Bottom Area	158	sf	÷ 0.05 =		3,160 sf
Ponding Depth	6	in	Note: Contributing area can be					
Design Infiltration Rate	0.25	in/hr	mitigated with a bottom area of 296.7 sf					
Detention Cistern to Bioretention Cell (BC) (without Underdrain) [2]								
Contributing Area		sf	Bioretention Bottom Area		sf	÷ Only for SFR =		sf
Number Cisterns								
BC Ponding Depth		in						
BC Design Infilt Rate		in/hr						
Permeable Pavement Facility (may receive run-on) [3]								
Contributing Area		sf	Permeable Pavement Area		sf	÷ Enter Contributing Area =		sf
Ponding Depth [4]		in				Plus Permeable Pavement Facility Area =		sf
Design Infiltration Rate		in/hr						
Reuse Facilities [1]								
Rainwater Harvesting			Applicant must provide documentation of area mitigated by rainwater harvesting					sf

Impervious Surface Reduction Methods			Facility Size			Credit		Area Mitigated
Alternative Pavement Surfaces								
Permeable Pavement Surface (Subgrade Slope ≤2%)			Permeable Pavement Area		sf	x 100.0% =		sf
Permeable Pavement Surface (Subgrade Slope >2-5%)			Permeable Pavement Area		sf	x 55.0% =		sf
Alternative Roof Surfaces [1]								
Green Roof (Single/Multi-Course / 4" Growth Medium)			Green Roof Area		sf	x 55.0% =		sf
Green Roof (Multi-Course / 8" Growth Medium)			Green Roof Area		sf	x 84.0% =		sf
Partial Infiltration [1]								
Bioretention Cell with Detention (without Underdrain)								
Contributing Area		sf						
Ponding Depth		in	Bioretention Bottom Area		sf	#VALUE! =		sf
Design Infiltration Rate		in/hr				#VALUE!		
						#VALUE!		

Non-Infiltrating Facilities			Facility Size			Credit		Area Mitigated
Non Infiltrating Facilities								
Bioretention Planter (with underdrain)								
Contributing Area		sf						
Ponding Depth		in	Bioretention Bottom Area		sf	÷ Enter Contributing Area =		sf
Detention Cistern with Harvesting Capacity [5, 6]								
Contributing Area		sf	Min Cistern Area		sf	Only Applicable for SFR =		sf
			Min Live Cistern Volume		gal			

Total Area Mitigated → 51,951 sf

Area Requiring Mitigation → 49,611 sf

% Impervious Area Mitigated → 104.7 %

GSI to MEF Target Achieved? → YES

Notes:

GSI - Green Stormwater Infrastructure; sf - square feet; in - inch; eqn - equation; BC - bioretention cell

min - minimum; ft - feet; in/hr - inch per hour; gal - gallons; infilt - infiltration

1. Single family residential projects and trail/sidewalk projects are not required to evaluate this BMP.
2. Each above ground cistern must have 6.68 sf minimum bottom area, a 0.25 inch orifice and a minimum of 3 feet of live storage above the orifice. If using two cisterns they must be connected and have only one orifice. Flow from cistern orifice must be routed to bioretention cell.
3. The area contributing runoff to a facility shall be no larger than 3 times the permeable pavement facility area corresponding to a minimum sizing factor of 33.3%).
4. Average subsurface ponding depth in aggregate storage reservoir.
5. Cistern must be above ground. Cistern area must be rounded up to next commercially available product. Cistern need not have more than 3 feet of live storage volume above orifice.
6. Water collected using the detention cistern may be used for non-potable uses only (e.g., irrigation). For additional uses of harvested water consider the "Rainwater Harvesting" BMP.

This calculator does not provide conveyance flow calculations.

Applicant is responsible to ensure system overflow conveyance is provided per Section 4.2.5 of the Stormwater Manual Volume 3.

Fig. 1: City of Seattle GSI to MEF Calculator Spreadsheet, 2019.

Calculations:

Per the AnchorQEA report, the site grading directs stormwater from impervious areas on site to dispersal through vegetated fields, the restored wetland buffer, and crushed rock surfaces (2019 p. 5). Stormwater runoff that is not dispersed drains into the channel, which connects to Lake Washington. The initial construction included one rain garden on the west side of the site, and additional rain gardens were constructed to accommodate more stormwater runoff from impervious surfaces on the north side of the site.

A tree count provided by City of Seattle GSI to MEF spreadsheet published within the 2019 Drainage Report estimates a minimum number of trees planted on site; the ongoing adaptive management of the wetland buffer by site managers is not incorporated into this number, and does not account for ongoing planting and stewardship since the Drainage Report was published in 2019. Within the spreadsheet, assessors cite over 700 trees (358 evergreen, 371 deciduous) planted as mitigation for hardscaped elements on site. The total area of pollution generating impervious surface mitigated by tree coverage is **12,403 sf**.

Per the GSI to MEF spreadsheet, the total area of pollution generating impervious surface mitigated by dispersion through vegetated or permeable surfaces is **20,988 sf**.

Additionally, three bioretention ponds (rain gardens) with a combined area of 928 sq. feet have ponding depths of 6 inches and an infiltration rate of .25 inches/hour, resulting in **18,560 sf**. of impervious polluting surfaces mitigated by bioretention areas on site.

The total stormwater runoff pollution mitigation provided by green stormwater infrastructure on site is calculated to be over 100% of the site area, with **104.7% mitigation of potential polluting stormwater runoff for the total site area** (positive offset) shown in the GSI to MEF spreadsheet.

The total amount of stormwater captured and infiltrated on site was determined through secondary source analysis of the AnchorQEA report, which cites and analyzes calculations by the Washington State Department of Ecology Western Washington Hydrology Model 2012 (WWHM2012). In the report, the stormwater infiltration rates showed that "**at an infiltration rate of 0.25 inch per hour, approximately 99 percent of the runoff that flows to the northwest rain garden will be captured, treated, and infiltrated; 96 percent of the runoff that flows to the rain garden north of Greenhouse 2 will be captured, treated, and infiltrated; and 99 percent of the runoff that flows to the rain garden in the northeast corner of the demonstration garden will be captured, treated, and infiltrated.**" (Anchor QEA 2019 page 12)

To calculate the total percentage of runoff captured, treated, and infiltrated on site, the individual percentages were averaged assuming percentage of infiltration as points out of 100 total points.

(99)% infiltration by northwest rain garden + (96)% infiltration by rain garden North of Greenhouse 2 + (99)% infiltration by northeast demonstration garden rain garden = (295)/3 total percentages or **98.3%** total average infiltration.

Total surfacing details provided by the Drainage Calculations in Appendix F of the 2019 Anchor QEA Drainage Report reports the total area of rain garden landscaping on site to be **4,822 sf.**

Relevant Excerpts from the Anchor QEA Drainage Report, 2019

"The Washington State Department of Ecology (Ecology) Western Washington Hydrology Model 2012 (WWHM2012), a continuous simulation rainfall-runoff model, was used to complete a hydrologic analysis of the site. The WWHM2012 was used to estimate surface water runoff, compare the pre-existing conditions of the Project to the developed conditions, and estimate the effectiveness of the selected GSI BMP. Each drainage area was evaluated to estimate peak recurrence interval runoff rates. Water quality flow rates and volumes were also estimated for the purpose of sizing the bioretention treatment facility. Pervious surfaces were modeled using outwash-grass land cover parameters. Roads, sidewalks, parking, and rooftops were modeled as impervious surface. The design standards utilized are from a combination of the City of Seattle Stormwater Design Manual and Ecology's 2012 Stormwater Management Manual for Western Washington (SMMWW).

The WWHM2012 computes simulated 2- through 100-year flow recurrence interval discharge estimates for the point of compliance of each drainage basin. The results of the hydrologic analysis are summarized in Table 3-2. These discharge rates represent runoff from surfaces within Basin 1 to and from the rain garden within that basin, runoff from surfaces within Basins 2 and 3 to and from the proposed rain gardens that will be constructed within the basin, and the total runoff from the site with the proposed drainage improvements. ***The model indicates that at an infiltration rate of 0.25 inch per hour, approximately 99 percent of the runoff that flows to the northwest rain garden will be captured, treated, and infiltrated; 96 percent of the runoff that flows to the rain garden north of Greenhouse 2 will be captured, treated, and infiltrated; and 99 percent of the runoff that flows to the rain garden in the northeast corner of the demonstration garden will be captured, treated, and infiltrated.*** *These results exceed the minimum requirement of treating 91 percent of the runoff that flows from PGIS at the site. A summary report with detailed WWHM2012 results is included in Appendix B." (Rice 2019)*

"The intent of the design that was constructed was that runoff from other impervious surfaces would sheet flow to adjacent vegetated or crushed rock surfaces and would be dispersed through planted areas, fields, or the vegetated wetland buffer. The adjacent planted areas and vegetated wetland buffer were intended to meet the requirements for basic filter strips to treat runoff from adjacent impervious surfaces. Runoff from rooftops would be collected and dispersed through adjacent fields. The site was graded so that all runoff that does not infiltrate drains to the on-site drainage ditch at the center of the site, which discharges directly to Lake Washington. As noted previously, prior to Project construction the stormwater system included six catch basins and associated piping located in the northern portion of the site that conveyed concentrated stormwater runoff to the on-site drainage ditch. Most of the existing stormwater system was removed or abandoned. However, two existing catch basins that served the existing greenhouse at the northeast corner of the site remained to provide drainage for watering in the relocated greenhouse. The discharge from this catch basin system is intercepted and routed to the adjacent wetland buffer. " (Rice 2019)

"The BMPs selected to meet FC #1 include bioretention, downspout dispersion, and sheet flow dispersion. Bioretention has been provided in the form of a rain garden that captures runoff from the driveway and paved surfaces in the northwest quarter of the site. Additional rain gardens are proposed to be added to capture runoff from the driveway and other PGIS in the northeast quarter of the site. One rain garden will be located north of Greenhouse 2 and will capture runoff from the east driveway entrance and surfaces adjacent to Greenhouse 2. Another rain garden will be located in the northeast corner of the demonstration garden, which is east of the wetland buffer and south of the driveway loop. It will capture runoff from the south half of the driveway, east of the ditch, and from surfaces adjacent to the driveway and office. The rain gardens will not have underdrains but are designed to infiltrate the collected stormwater to the maximum extent possible and reduce the amount of stormwater that discharges through the on-site drainage ditch to Lake Washington. Based on the geotechnical report, the on-site soils likely have low infiltration rates, and the groundwater is fairly shallow, especially near the drainage ditch in the middle of the property. The rain garden areas each include an overflow berm surfaced with quarry spalls that will discharge excess runoff to the wetland buffer adjacent to the on-site drainage ditch. The rain garden in the northwest quarter of the site has a ponding depth of 8 inches, with planted side slopes of 3 horizontal to 1 vertical. The rain gardens to be added to the northeast quarter of the site will have ponding depths of 6 inches, with planted side slopes of 3 horizontal to 1 vertical. On-site soils will be excavated, and a layer of bioretention soil mix at least 18 inches thick will be added, as shown on the design drawings included in Appendix H. Downspout and sheet flow dispersion BMPs were also incorporated to disperse runoff from impervious surfaces not tributary to the rain gardens. Runoff from impervious surfaces not adjacent to the rain gardens, including rooftops, pathways, and sidewalks, sheet flows to adjacent crushed surfacing, landscape areas, cultivated fields, or the wetland buffer adjacent to the on-site drainage ditch. Water infiltrates in the landscape areas, fields, or the wetland buffer to the extent possible based on the infiltration capacity of on-site soils. Excess runoff is collected and conveyed by the on-site drainage ditch. The City of Seattle's Green Stormwater Infrastructure (GSI) to the Maximum Extent Feasible (MEF) calculator was used to determine the suitability of the BMPs to meet this minimum requirement. A copy of the spreadsheet is included in Appendix F. The calculator indicates that the rain garden along with tree credits and dispersion achieve the GSI MEF requirements. More than 700 trees were planted as part of the Project. The calculator indicates that the rain garden should have a maximum ponding depth of 6 inches at a long term infiltration 0.25 inch per hour so that it drains within 24 hours. The rain garden in the northwest quarter of the site was constructed with 8 inches of ponding depth to provide some additional ponding volume. The rain garden in the northeast quarter of the site will be constructed with 6 inches of ponding depth. Based on discussions with the design team and Seattle Tilth, some ponding longer than 24 hours is acceptable and compatible with the uses of the site." (Rice 2019)

Sources:

Rice, David. 2019. "Rainier Beach Urban Farm and Wetland Revised Drainage Report." Anchor QEA LLC.

"Lake Washington | Washington Department of Fish & Wildlife." n.d. Wdfw.wa.gov. https://wdfw.wa.gov/fishing/locations/lowland-lakes/lake-washington.

"Green Stormwater Infrastructure Nature-Based Solutions for Managing Polluted Runoff Overview and Accomplishment Report SPRING 2020." n.d. https://www.seattle.gov/documents/Departments/SPU/Documents/Reports/GSI-ProgressReport2019.pdf.

Limitations:

- Using secondary data limits the scope of listed benefits to existent and available information, which can limit creativity and flexibility in reporting metrics.
- Limited time and skill in stormwater management research made on-site experiments difficult to execute within the allotted research period.

Benefit 2: Wetland Habitat Restoration

- ***Improves wetland habitat function by 69%, enhancing the formerly degraded wetland with over 23 species of native wetland plants, increasing key wetland habitat indicator features from 0 pre-construction to 5 post-construction and maintaining a fully shaded waterway embankment corridor to support diverse wildlife habitat throughout the site.***

Background:

Rainier Beach Urban Farm & Wetlands is located within feet of Lake Washington. Designers prioritized connecting and restoring the wetland corridor that bisects the site to the lake, supporting the creation of wildlife habitat corridors and restoring ecological functioning to the pre-construction drainage ditch. Today, the restored wetland is managed by Tilth Alliance, which hosts wetland planting events and maintains wetland habitat conditions on site. ("Rainier Beach Urban Farm & Wetland - Berger Partnership" 2016)

Method:

Researchers evaluated the quality of the restored wetland habitat according to the Western Washington Wetland Rating Form (2004, updated 2008), specifically evaluating wetland habitat function and potential to provide habitat within Rainier Beach Urban Farm & Wetlands.

The habitat assessment checklist was completed by researchers and compared to the habitat function section of the same wetland rating form completed by city contractors for the Atlantic City Nursery (pre-construction Rainier Beach Urban Farm & Wetlands) on March 19, 2010.

The assessor determined habitat function through direct observation via site visits and by referencing site information noted in the 2010 habitat assessment checklist.

The Wetland Rating Habitat Quality rating is numeric, influenced by the presence of habitat indicators, site context, and management strategies. There is a clear difference between the 2010 habitat quality

value and the 2025 habitat quality value, which was quantified as a ratio to determine percent change in habitat quality score.

Fig. 2: Site photo looking North, showing hoophouse, signage, and flooded wetland channel, 2012. **(City of Seattle)**

Fig. 3: Site photo, 2012. Drainage ditch in wet conditions (City of Seattle)

Fig. 4: Site photo, 2012. View across site looking East (City of Seattle)

Calculations:

The wetland rating habitat assessment scores from the 2025 evaluation reflect the increased overall vegetation and special habitat features present on site; the scores increased significantly in habitat interspersion, special habitat features, and in wetland buffer ranking.

Wetland Rating Habitat assessment results from 2010: 13/36 total possible points. (See Fig. 5)

Wetland Rating Habitat assessment results from 2025: 22/36 total possible points. (See Fig. 6)

Difference in score: 22 points (2025 habitat score) minus 13 points (2010 habitat score)= 9 points divided by 13 points x 100 (ratio of change), indicating that the **overall habitat score increased by 69.2%** from 2010 to 2025.

Major changes in habitat features and vegetation due to wetland buffer restoration are responsible for the changes in habitat quality score. Additionally, the presence of over 23 species of native plants and trees within the wetland buffer increases the suitability of the landscape for wetland habitat.

Native wetland plants observed on site:

Malus fusca	Oregon Crabapple
Vaccinium ovatum	Evergreen Huckleberry
Spirea douglasii	Spirea
Ribes sanguineum	Red Flowering Currant
Physocarpus capitatus	Pacific Ninebark
Cornus sericea	Red-Osier Dogwood
Oemleria cerasiformis	Osoberry
Symphoricarpos albus	Snowberry
Rhamnus purshiana	Cascara
Salix hookeriana	Hookers willow
Fraxinus latifolia	Oregon ash
Salix lasiandra	Pacific willow
Corylus cornuta	Beaked Hazelnut
Mahonia nervosa	Low Oregon Grape
Lysichiton americanum	Skunk Cabbage
Polystichum munitum	Sword Fern
Tellima grandiflora	Fringecup
Scirpus acutus	Hardstem bulrush
Juncus balticus	Baltic Rush
Gaultheria shallon	Salal
Rubus parviflorus	Thimbleberry
Lonicera involucrata	Twinberry
Carex obnupta	Slough Sedge

Fig. 5 (Below): 2010 Wetland Rating Form- Western Washington. Pre-Construction Rainier Beach Urban Farm and Wetlands, site of former Atlantic City Nursery at 5513 S. Cloverdale St. Seattle, WA. Completed March 19, 2010 by Seattle Public Utilities for Emily Fuller, Project Manager, Seattle Parks Department.

These questions apply to wetlands of all HGM classes. **Points** (only 1 score per box)

HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat

H 1. Does the wetland unit have the potential to provide habitat for many species?

H 1.1 Vegetation structure *(see p. 72)* — Figure ___

Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ⅓ acre or more than 10% of the area if unit is smaller than 2.5 acres.

___ Aquatic bed
X Emergent plants
___ Scrub/shrub (areas where shrubs have >30% cover)
\ Forested (areas where trees have >30% cover)

If the unit has a forested class check if:

___ The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon

Add the number of vegetation structures that qualify. If you have:

	4 structures or more	points = 4
Map of Cowardin vegetation classes	3 structures	points = 2
	(2 structures)	points = 1
	1 structure	points = 0

1

H 1.2. Hydroperiods *(see p. 73)* — Figure ___

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ⅓ acre to count. (see text for descriptions of hydroperiods)

X Permanently flooded or inundated	4 or more types present	points = 3
X Seasonally flooded or inundated	(3 types present)	points = 2
___ Occasionally flooded or inundated	2 types present	point = 1
X Saturated only	1 type present	points = 0

___ Permanently flowing stream or river in, or adjacent to, the wetland
___ Seasonally flowing stream in, or adjacent to, the wetland
___ *Lake-fringe wetland* = 2 points
___ *Freshwater tidal wetland* = 2 points

Map of hydroperiods

2

H 1.3. Richness of Plant Species *(see p. 75)*

Count the number of plant species in the wetland that cover at least 10 ft². *(different patches of the same species can be combined to meet the size threshold)*

You do not have to name the species.

Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle

If you counted:	(≥ 19 species)	points = 2
List species below if you want to:	5 - 19 species	points = 1
	< 5 species	points = 0

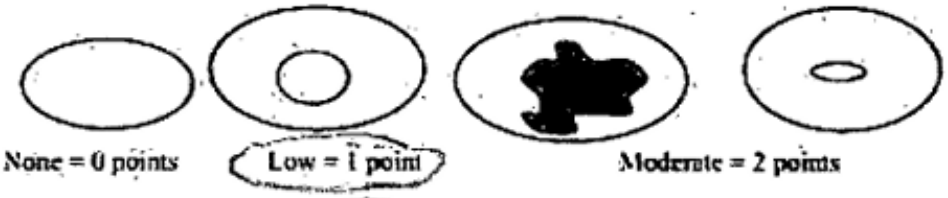
2

Total for page 5

H 1.4. Interspersion of habitats *(see p. 76)*

Figure ___

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



None = 0 points | Low = 1 point | Moderate = 2 points

High = 3 points | [riparian braided channels]

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes.

1

H 1.5. Special Habitat Features: *(see p. 77)*

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

____ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).

____ Standing snags (diameter at the bottom > 4 inches) in the wetland

____ Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

____ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

__/__ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)*

____ Invasive plants cover less than 25% of the wetland area in each stratum of plants

NOTE: The 20% stated in early printings of the manual on page 78 is an error.

1

H 1. TOTAL Score - potential for providing habitat

Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

3

Comments

H 2. Does the wetland unit have the opportunity to provide habitat for many species?

Figure 4

H 2.1 Buffers *(see p. 80)*

Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."

- [redacted]00 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5**
- [redacted]00 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4**
- [redacted]0 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4**
- [redacted]00 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3**
- [redacted]0 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3**

If buffer does not meet any of the criteria above

- [redacted]o paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2**
- [redacted]o paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** 2
- [redacted]eavy grazing in buffer. **Points = 1**
- [redacted]egetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.**
- [redacted]uffer does not meet any of the criteria above. **Points = 1**

Aerial photo showing buffers

H 2.2 Corridors and Connections *(see p. 81)*

H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? *(dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor).*

YES = **4 points** *(go to H 2.3)* NO = go to H 2.2.2

H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a Lake-fringe wetland, if it does not have an undisturbed corridor as in the question above? 1

YES = **2 points** *(go to H 2.3)* NO = H 2.2.3

H 2.2.3 Is the wetland:

within 5 mi (8km) of a brackish or salt water estuary **OR**
within 3 mi of a large field or pasture (>40 acres) **OR**
within 1-mi of a lake greater than 20 acres?

YES = **1 point** NO = **0 points**

Total for page 3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake with disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	6
TOTAL for H 1 from page 14	7
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	13

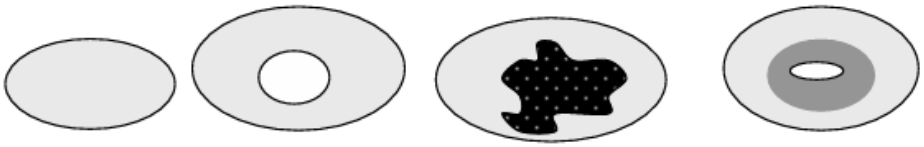
Fig. 6 (Below): 2025 Wetland Rating Habitat Quality Assessment. Completed June 17, 2025 by Piper Sallquist.

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed __x__Emergent plants __x__Scrub/shrub (areas where shrubs have >30% cover) __x__Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ____The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more points = 4 3 structures points = 2 2 structures points = 1 1 structure points = 0 Map of Cowardin vegetation classes	**Figure** 2
H 1.2. <u>Hydroperiods</u> ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* __x__Permanently flooded or inundated __x__Seasonally flooded or inundated ____Occasionally flooded or inundated __x__Saturated only ____ Permanently flowing stream or river in, or adjacent to, the wetland ____ Seasonally flowing stream in, or adjacent to, the wetland __x__ ***Lake-fringe wetland*** **= 2 points** ____***Freshwater tidal wetland*** **= 2 points** 4 or more types present points = 3 3 types present points = 2 2 types present point = 1 1 type present points = 0 Map of hydroperiods	**Figure** 2
H 1.3. <u>Richness of Plant Species</u> ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species points = 2 5 - 19 species points = 1 < 5 species points = 0 *List species below if you want to:* TBD ADDITIONAL POST SITE VISIT Red osier dogwood Salix sp. Populus trichocarpa Juncus balticus Oemleria cerasiformis	2

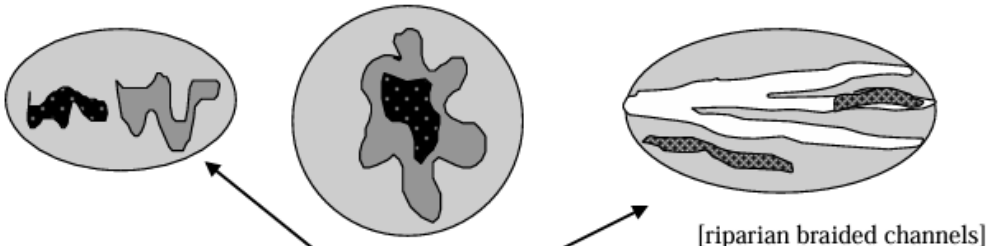
Total for page 6

H 1.4. Interspersion of habitats ***(see p. 76)*** — Figure 3

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



None = 0 points Low = 1 point Moderate = 2 points



High = 3 points [riparian braided channels]

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

H 1.5. Special Habitat Features: ***(see p. 77)***

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column. — 5

___X___ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).

___X___ Standing snags (diameter at the bottom > 4 inches) in the wetland

___X___ Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

___X___ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

___X___ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. *(structures for egg-laying by amphibians)*

____ Invasive plants cover less than 25% of the wetland area in each stratum of plants

NOTE: The 20% stated in early printings of the manual on page 78 is an error.

H 1. TOTAL Score - potential for providing habitat — 14

Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

Comments

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers ***(see p. 80)*** *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** x — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	**Figure** 3
H 2.2 Corridors and Connections ***(see p. 81)*** H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	2

Total for page 5

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	8
TOTAL for H 1 from page 14	14
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	22

Sources:

"Atlantic City Nursery Project Wetland Delineation Report." 2010. Seattle Public Utilities: Watershed Science and Strategy Section, Utilities System Management Branch.

Baldwin, Kim. 2012. "Site Photos." City of Seattle Department of Planning and Development.

"Rainier Beach Urban Farm & Wetland - Berger Partnership." 2016. Bergerpartnership.com. August 5, 2016. https://www.bergerpartnership.com/work/rainier-beach-urban-farm-wetland/.

"Rating Systems - Washington State Department of Ecology." n.d. Ecology.wa.gov. https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Rating-systems.

"Wetland Name or Number _____ RATING SUMMARY -Western Washington OVERALL WETLAND CATEGORY ____ (Based on Functions___ or Special Characteristics__)." n.d. Accessed April 30, 2025. https://apps.ecology.wa.gov/publications/parts/2306009part1.pdf.

Limitations:

- The evaluation of overall wetland habitat quality is a single part of the Western Washington Wetland Rating form, which limits the 2025 findings to wetland habitat quality specifically and does not evaluate the landscape regarding overall wetland quality rating.

Benefit 3: Pollinator Habitat Quality

- ***Increases the quality of pollinator habitat by 471%, including a 108% increase in positive habitat indicators and 60% reduction of known pollinator stressors on site.***

Background:

Pollinators are vital for both agricultural and wetland systems, supporting crop production and sustainable biodiverse habitats for plants and wildlife (The Xerces Society 2021). The pre-construction landscape of the former Atlantic City Nursery fostered large tracts of weedy plants, a wetland channel overrun with reed canary grass (*Phalaris arundinacea*), and fields covered with weed-suppressing plastic (Hoffer 2025). Designers included many pollinator-supportive elements throughout the landscape to enhance wild pollinator habitat, including large tracts of wetland planted with native trees and shrubs as well as pollinator borders around site buildings containing native flowers known to support native pollinators. Additionally, the flexible and adaptable design of the site allowed site managers to build and sustain a honeybee apiary adjacent to the orchard and wetland. The ongoing management of the site promotes habitat for native pollinators, which includes allowing areas of bare soil to remain undisturbed, creating areas where clean water and mud are available for insects to access, planting native species that support larval hosts, and using organic agricultural management practices to prevent pesticide introduction into the landscape.

Method:

To determine the farm and wetland's overall pollinator habitat quality, researchers completed the Earthcorps Pollinator Habitat Assessment for the site. This resource was developed by Earthcorps, an organization in Seattle that promotes ecological restoration throughout the Puget Sound region, as a tool for site designers to determine the quality of the pollinator habitat in both existing and potential landscapes. The habitat assessment is specifically developed for native pollinators of western Washington and is applicable to sites of varying sizes, ecosystems, and uses in both urban and rural areas. Rainier Beach Urban Farm and Wetland is a uniquely situated landscape; encompassing both agricultural and wetland ecosystems within an urban context required an assessment that was relevant to both elements of the site.

This assessment determines the site suitability for pollinator habitat by considering site size, habitat connectivity, total cover of native plants on site, native plant species richness, native evenness, structural complexity of the vegetation, and plant blooming season redundancy. Additionally, the assessment accounts for the presence of habitat enhancing features and habitat stressors on site to determine the overall site design score, referencing the quality of habitat as determined by the numerical score out of 62 total points.

Researchers conducted site visits to observe built landscape conditions, create a list of plant species on site, and observe habitat enhancing features such as presence of brush piles, undisturbed areas of soil, and clean water.

Aerial image analysis determined habitat connectivity and overall area of the site, used to complete the Earthcorps Pollinator Habitat Assessment.

Researchers completed the Earthcorps Pollinator Habitat Assessment for Western Washington two times to determine the change in habitat quality post-construction, once referencing past site conditions as noted in the 2010 Wetland Rating Report and archival photographs from 2012, and once referencing site conditions as observed in 2025 through direct observation.

To complete the native richness score for the 2025 landscape assessment, researchers compiled a plant list through site visits and observation, referencing the Xerces Society "Native Plants for Pollinators & Beneficial Insects: Maritime Northwest" Plant List to determine each species' relevance to pollinator habitat. The past native richness score was determined by referencing the 2010 Wetland Rating Report and archival photographs from 2012.

Calculations:

<u>Current Landscape Conditions Habitat Quality Assessment</u>

Site visits determined the presence of habitat enhancement indicators on site. Additionally, native plants, vegetation strata and general habitat diversity surveys inform the assessment answers for the current landscape.

Fig. 7: "Southwest Wetland" trail, July 2025. (Piper Sallquist)

Fig. 8: "Southwest Wetland" vegetation and irrigation, July 2025. (Piper Sallquist)

Fig. 9: "Southwest Wetland" fallen tree, July 2025. (Piper Sallquist)

Fig. 10: Wetland channel facing South, July 2025. (Piper Sallquist)

Plant Observation List (2025)

This list notes plant species observed on site in the wetland, rain gardens, pollinator planting bed (next to the staff office), and agricultural fields. This list is not exhaustive, but reflects a moment in time; the plants observed on this list were noted on site in June and July 2025 or referenced by Rainier Beach Urban Farm & Wetlands in educational signage.

Botanic Name	**Common Name**	**Native (Y/N)**	**Pollinator Host Species (Y/N)**	**Bloom Season Early(Feb-Jun)/Mid (May-Aug)/Late (Jun-Oct)**
Malus fusca	Oregon Crabapple	Y	Y	Early
Vaccinium ovatum	Evergreen Huckleberry	Y	Y	Mid
Spirea douglasii	Spirea	Y	N	Mid
Ribes sanguineum	Red Flowering Currant	Y	Y	Early
Physocarpus capitatus	Pacific Ninebark	Y	Y	Mid
Cornus sericea	Red-Osier Dogwood	Y	N	Early
Oemleria cerasiformis	Osoberry	Y	N	Early
Symphoricarpos albus	Snowberry	Y	Y	Mid
Rhamnus purshiana	Cascara	Y	Y	Early
Salix hookeriana	Hookers willow	Y	Y	Early
Fraxinus latifolia	Oregon ash	Y	N	Early
Salix lasiandra	Pacific willow	Y	Y	Early
Corylus cornuta	Beaked Hazelnut	Y	N	Early
Mahonia nervosa	Low Oregon Grape	Y	N	Early
Achillea millefolium	Yarrow	Y	N	Mid
Lysichiton americanum	Skunk Cabbage	Y	N	Early
Polystichum munitum	Sword Fern	Y	Y	N/A- Host Plant
Tellima grandiflora	Fringecup	Y	N	Mid
Scirpus acutus	Hardstem bulrush	Y	N	Mid

Botanic Name	Common Name	Native (Y/N)	Pollinator Host Species (Y/N)	Bloom Season Early(Feb-Jun)/Mid (May-Aug)/Late (Jun-Oct)
Juncus balticus	Baltic Rush	Y	N	Mid
Gaultheria shallon	Salal	Y	Y	Mid
Rubus parviflorus	Thimbleberry	Y	Y	Early
Thuja plicata	Western Red Cedar	Y	N	Early
Lonicera involucrata	Twinberry	Y	Y	Mid
Equisetum arvense	Horsetail	N	N	N/A
Convolvulus arvensis	Field bindweed	N	N	Mid
Ranunculus occidentalis	Buttercup	N	N	Early
Rubus armeniacus	Himalayan Blackberry	N	N	Mid
Symphyotrichum subspicatum	Douglas Aster	Y	N	Late
Chamerion angustifolium	Fireweed	Y	N	Late
Lupinus polyphyllus	Big-Leaf Lupine	Y	Y	Late
Carex obnupta	Slough Sedge	Y	N	N/A
Vaccinium sp.	Blueberry	N	N	N/A
Ribes uva-crispa	Gooseberry	N	N	N/A
Helianthus annuus	Sunflower	N	N	N/A
Daucus carota	Carrot	N	N	N/A
Malus pumila	Apple	N	N	N/A
Fragaria sp.	Strawberry	N	N	N/A
Solanum lycopersicum	Tomato	N	N	N/A
Cucurbita sp.	Pumpkin	N	N	N/A
Ipomoea batatas	Sweet potato	N	N	N/A
Portulaca oleracea	Purslane	N	N	N/A
Abelmoschus esculentus	Okra	N	N	N/A

Botanic Name	Common Name	Native (Y/N)	Pollinator Host Species (Y/N)	Bloom Season Early(Feb-Jun)/Mid (May-Aug)/Late (Jun-Oct)
Eragrostis tef	Teff	N	N	N/A
Corchorus olitorius	Molokhia	N	N	N/A
Porophyllum ruderale	Papalo	N	N	N/A
Withania somnifera	Ashwaganda	N	N	N/A
Dysphania ambrosioides	Epazote	N	N	N/A

Fig. 11: Aerial Photograph analysis of pollinator habitat area and greenspace proximity to site

Fig. 12 (Below): Earthcorps Habitat Assessment: Rainier Beach Urban Farm and Wetland, 2025

Site Design

Positive Indicators

	1	2	3	4	5	Score
Size:	*<0.1 acre*	*0.1-0.5 acre*	*0.5-1 acre*	*1-2 acres*	*>2 acres*	5
Determine and rank overall size of pollinator habitat						
Connectivity:	*>2 miles*	*0.5-2 miles*	*0.1-0.5 miles*	*<500 feet*	*adjacent*	5
Indicate and rank based on general proximity to relatively natural or intact habitat						
Native Cover:	*<25%*	*26-50%*	*51-75%*	*76-90%*	*>90%*	3
Estimate and rank the total cover of native plant species across the site						
Native Richness	*<50%*	*51-70%*	*71-80%*	*81-90%*	*>90%*	2
Determine and rank native species richness on site (# native/total # of species)						
Native Evenness	*>60%*	*51-60%*	*41-50%*	*31-40%*	*<30%*	4
Determine if any single species dominates the site and rank based on above criteria						
Structural Complexity		*one*	*two-three*	*four or more*		3
Identify vertical strata and rank based on vegetative complexity						
Redundancy:	*one*	*two*	*three*	*four*	*five or more*	3
Rank based on the number of native plants present that will bloom during ***each of the three seasons*** *(early, mid, late) - see plant list for details*						

Total Positive Indicator Score (from 7 to 35): 25

Habitat Enhancement Indicators

Shelter:	*None*	*Low*	*Med*	*High*	
☑ Areas of undisturbed or un-manicured habitat	0	1	2	3	3
☑ Dead wood	0	1	2	3	2
☑ Compost or brush piles	0	1	2	3	3
☑ Large rocks or rock piles	0	1	2	3	1
☑ Areas of bare soil	0	1	2	3	2
☑ Pithy or hollow stems	0	1	2	3	2
☑ Larval host plants (see plant list)	0	1	2	3	3
☑ Native bunchgrass or sedge species	0	1	2	3	1
☑ Clean water or wet, muddy areas	0	1	2	3	2

Indicate and quantify each feature present on your site and tally points (from 0 to 27): 19

Habitat Stressor Indicators

Invasive Cover:	0	-1	-2	-3	-4	-5	
	<1%	*1-5%*	*6-10%*	*11-30%*	*30-50%*	*>50%*	-3
Estimate and circle the total cover of invasive plant species across the site							

Other Stressors	*None*	*Low*	*Med*	*High*	
☐ Known pesticide use on or adjacent to site	0	-1	-2	-3	0
☐ Mowing (esp. large scale or during bloom periods)	0	-1	-2	-3	0
☐ Excessive human impacts or disturbance	0	-1	-2	-3	0
☐ Presence of artificial light	0	-1	-2	-3	-1

Total Stressor Indicator Score (from 0 to -17): -4

OVERALL SITE DESIGN SCORE (from 0 to 62): 40

To complete the habitat assessment, researchers referenced aerial photographs to determine the size of pollinator habitat and connectivity to undisturbed habitat areas. (Fig. 12) These observations resulted in scores of 5 for both size and connectivity.

Researchers ranked the native cover of the site through general observations of vegetation during site visits (reference Figs. 7-10 for examples of vegetation documentation) and referencing Earthcorps Pollinator Handbook plant lists to determine native plant presence and density throughout areas of the site. The vegetated wetland encompasses approximately 50-70% of the site (determined by visual estimate of aerial photograph), and the vast majority of the vegetation in the wetland area is composed of native species. Therefore, native cover was ranked as a 3, 51-75% of the site.

Native richness was determined through assembling a plant list of observed species on site. The number of native species is 28 of a total 48 species observed, resulting in 58% native species cover. This resulted in a score of 2 for native richness, which is significantly influenced by the large number of diverse agricultural plants cultivated on site. Calculation: (28/48=58.3)

Native evenness and structural complexity were determined through researcher observations on site, identifying the estimated proportion of native species within view at several points on site (reference Figs. 7-9 for examples of vegetation observation areas) as well as identifying the structural layers of vegetation present in those areas. Native evenness received a score of 4, reflecting that no single species dominated the landscape. The landscape received a score of 3 for structural complexity, reflecting the upper canopy of the tallest trees, mid-level canopy of larger shrubs, and groundcover present in some areas of the wetland and wetland buffer.

The habitat enhancement indicators were ranked by researcher observation on site visits; examples of the indicator in question were noted and ranked by relative frequency of occurrence within the landscape.

Habitat stressor indicators were ranked by researcher observations on site visits; the adaptive management of the site by Tilth Alliance incorporates organic farming practices and permaculture principles into the stewardship of the landscape, and after researcher observations the site received scores of 0 (none present) for pesticides, mowing, and excessive human disturbance. The landscape received a score of -1 for artificial light due to the location of the landscape within an urban context.

Pre-Construction Landscape Conditions Habitat Quality Assessment

Fig. 13: Aerial Photograph analysis of pollinator habitat area and greenspace proximity to site (Google Earth, Piper Sallquist)

Fig. 14: Site photo, 2012. Shows presence of bare soil, wet/muddy areas, stands of deciduous trees, and piles of branches on site. (City of Seattle)

Estimated Plant List 2012

This list includes plant species observed by researchers in archival photographs of the site pre-construction (Fig. 14). Additional species referenced by Chris Hoffer, Tilth Alliance Director of Community Agriculture & Ecology, are also included. (Hoffer, 2025.) This is a general reference limited by analysis of secondary archival data and should not be considered wholly representative of all plants on site in 2012.

Botanic Name	Common Name	Native	Pollinator Host Species
Phalaris arundinacea	Reed canarygrass	N	N
Malus fusca	Oregon Crabapple	Y	Y
Equisetum arvense	Horsetail	N	N
Convolvulus arvensis	Field bindweed	N	N

Ranunculus occidentalis	Buttercup	N	N
Rubus armeniacus	Himalayan Blackberry	N	N

Fig. 15: Earthcorps Habitat Assessment: Atlantic City Nursery/Pre-Construction (c. 2012, completed 2025)

Site Design

Positive Indicators — Score

Size:	1 *<0.1 acre*	2 *0.1-0.5 acre*	3 *0.5-1 acre*	**4** *1-2 acres*	5 *>2 acres*	4
Determine and rank overall size of pollinator habitat						
Connectivity:	1 *>2 miles*	2 *0.5-2 miles*	**3** *0.1-0.5 miles*	4 *<500 feet*	5 *adjacent*	3
Indicate and rank based on general proximity to relatively natural or intact habitat						
Native Cover:	**1** *<25%*	2 *26-50%*	3 *51-75%*	4 *76-90%*	5 *>90%*	1
Estimate and rank the total cover of native plant species across the site						
Native Richness	**1** *<50%*	2 *51-70%*	3 *71-80%*	4 *81-90%*	5 *>90%*	1
Determine and rank native species richness on site (# native/total # of species)						
Native Evenness	**1** *>60%*	2 *51-60%*	3 *41-50%*	4 *31-40%*	5 *<30%*	1
Determine if any single species dominates the site and rank based on above criteria						
Structural Complexity	**1** *one*		3 *two-three*		5 *four or more*	1
Identify vertical strata and rank based on vegetative complexity						
Redundancy:	**1** *one*	2 *two*	3 *three*	4 *four*	5 *five or more*	1
***Rank based on the number of native plants present that will bloom during each of the three seasons** (early, mid, late) - see plant list for details*						

Total Positive Indicator Score (from 7 to 35): 12

Habitat Enhancement Indicators

Shelter:	*None*	*Low*	*Med*	*High*	
☐ Areas of undisturbed or un-manicured habitat	0	**1**	2	3	1
☐ Dead wood	**0**	1	2	3	0
☐ Compost or brush piles	**0**	1	2	3	0
☐ Large rocks or rock piles	0	**1**	2	3	1
☐ Areas of bare soil	0	**1**	2	3	1
☐ Pithy or hollow stems	**0**	1	2	3	0
☐ Larval host plants (see plant list)	**0**	1	2	3	0
☐ Native bunchgrass or sedge species	**0**	1	2	3	0
☐ Clean water or wet, muddy areas	0	1	**2**	3	2

Indicate and quantify each feature present on your site and tally points (from 0 to 27): 5

Site Indicator Notes

Habitat Stressor Indicators

Invasive Cover:	0	-1	-2	-3	-4	-5	
	<1%	*1-5%*	*6-10%*	*11-30%*	*30-50%*	*>50%*	-5

Estimate and circle the total cover of invasive plant species across the site

Other Stressors	*None*	*Low*	*Med*	*High*	
☐ Known pesticide use on or adjacent to site	0	-1	-2	-3	0
☐ Mowing (esp. large scale or during bloom periods)	0	-1	-2	-3	-2
☐ Excessive human impacts or disturbance	0	-1	-2	-3	-2
☐ Presence of artificial light	0	-1	-2	-3	-1

Total Stressor Indicator Score (from 0 to -17): -10

OVERALL SITE DESIGN SCORE (from 0 to 62): 7

Habitat quality score, 2025: 40/62

Positive Habitat indicators: 25

Habitat Enhancement indicators: 19

Stressors: -4

Habitat quality score, 2012: 7/62

Positive Habitat indicators: 12

Habitat Enhancement indicators: 5

Stressors: -10

Overall change in score: **(40-7)/7 x 100, a 471.4% increase in habitat quality score point value.**

Change in positive habitat indicator scores: (25-12)/12 x 100, a 108% increase in positive habitat indicator score.

Change in stressor scores: [**-4-(-10)]/-10 x 100, showing a 60% decrease in habitat stressor scores, total reduced by 6 points or 60% of 10 total points.**

Sources:

"Atlantic City Nursery Project Wetland Delineation Report." 2010. Seattle Public Utilities: Watershed Science and Strategy Section, Utilities System Management Branch.

Baldwin, Kim. 2012. "Site Photos." City of Seattle Department of Planning and Development.

Hoffer, Chris. Letter to Piper Sallquist. 2025. "Rainier Beach Urban Farm and Wetland Visitor Numbers." Email, April 30, 2025.

Salisbury, Nelson, and Matthew Schwartz. n.d. “THE NATIVE POLLINATOR HABITAT RESTORATION GUIDE Best Management Practices for the Puget Sound Lowlands.” https://www.earthcorps.org/wp-content/uploads/The-Native-Pollinator-Habitat-Restoration-Guide-EarthCorps.pdf.

The Xerces Society. 2021. “Building Pollinator Habitat in Towns and Cities: Pacific Northwest Region.” YouTube. January 19, 2021. https://www.youtube.com/watch?v=NS0iM4uyNC8.

Limitations:

- Evolving plant communities on site shift dependent on Tilth management, and the results of current habitat quality are a snapshot and not necessarily reflective of long-term trends.
- A fully comprehensive plant survey was not possible to complete due to the maintenance structure of the site and the ongoing expectation of seasonally shifting plant species on working farms.

Benefit 4: Waste Reduction (+ Operations & Maintenance Savings)

- ***Creates 832 cu ft of compost mulch per year through on-site composting practices such as compost windrows, diverting 2,709 cu of organic waste from landfill and saving $1,185 annually in compost acquisition costs.***

Background:

Rainier Beach Urban Farm & Wetlands practices on-site composting, preventing organic matter and food waste from entering landfills while also supporting soil health by re-introducing nutrients to planting beds in a closed-loop system. Compost windrows are long and narrow heaps of organic matter that slowly decompose over time, creating compost. (“Keeping Food Waste Local.” 2025.) The farm and wetlands maintains three compost windrows within easy walking distance of the production fields and wetland, providing compost for the farm as well as an educational opportunity for visitors to learn about the benefits of passive composting. (“Fall Composting Practices” n.d.)

Fig. 16: Compost windrow #2 (left)

Fig. 17: Compost windrow #3 (right)

Method:

Researchers calculated the total area of compost windrows by noting their locations on site, drafting each windrow onto a site plan in Rhino assuming a consistent average width of 3 feet, and using Rhino Area commands to determine the total windrow area in square feet. The volume of each windrow was calculated by multiplying the area (sq. ft.) of each windrow base by 3 feet, the average height of each windrow. (Volume= Area (sq. ft.) x Height (ft.)) Researchers extrapolated the total volume of each windrow to be the volume of organic matter diverted from landfills and reincorporated into the soil as compost.

To calculate the total area (sq ft) supplemented by finished compost, the total windrow volume was multiplied by a shrink factor of 60%, estimated by the Vermont Department of Natural Resources Compost Sizing Guide (McSweeney n.d.) According to the McGill Compost Calculator, the ideal compost amendment ratio is approximately 2 inches of compost per square foot of planting area. ("Compost Calculator," n.d.) The total finished compost volume (cubic feet) was multiplied by a factor of 6 to convert units of compost from cubic feet to 2 inch layer of compost per square foot as per the following equation: 1 cubic foot of compost x 6 (2-inch deep compost/foot) = 6 sq ft of 2-inch deep compost.

Compost savings were calculated by dividing the total compost volume in cubic feet by 27 to determine total compost volume in cubic yards, then multiplying cubic yards by cost of compost/cubic yard. Researchers used Cedar Grove Composting, a local composting company, as the base price. ("Compost" 2025)

Calculations:

Each compost windrow was drafted in Rhino on a base plan, indicated in ***Fig. 18, Compost Windrow Area***. The area and volume were calculated with these measured representations of the windrows. The volume of each windrow fluctuates by season, but researchers used an average width of 3 feet and an average height of 3 feet in these calculations, derived from on-site observations of the windrows between April and July, 2025.

Windrow 1:

Length (linear feet): 145 ft

Width (linear feet): 3 ft

Area (sq ft): 145 ft (length) x 3 ft (width) = 435 sq ft

Volume (cubic ft): **435 sq ft** (area) x **3 ft** (height) = **1305 cubic feet**

Windrow 2:

Length (linear feet): 45 ft

Width (linear feet): 3 ft

Area (sq ft): 45 ft (length) x 3 ft (width) = 135 sq ft

Volume (cubic ft): **135 sq ft** (area) x **3 ft** (height) = **405 cubic feet**

Windrow 3:

Length (linear feet): 41 ft

Width (linear feet): 3 ft

Area (sq ft): 41 ft (length) x 3 ft (width) = 123 sq ft

Volume (cubic ft): **123 sq ft** (area) x **3 ft** (height) = **369 cubic feet**

Total Windrow Volume:

1305 cubic feet (windrow 1 volume) + **405 cubic feet** (windrow 2 volume) + **369 cubic feet** (windrow 3

volume) = **2,079 cubic feet (Total windrow volume)**

The total volume of the three windrows reflects the amount of organic matter diverted from landfills and reincorporated back into the soil on site, boosting soil fertility.

Total Compost Volume:

Total windrow volume x shrink factor = Total compost volume

Shrink factor: 60% total shrinkage, multiplied total windrow volume x 0.4

2079 cubic feet (Total windrow volume) x **0.4** (shrink factor) = **832 cubic feet (total compost volume)**

Planting Bed Amendment Area:

Equation: 1 cubic foot of compost x 6 (2-inch deep compost/foot) = 6 sq ft of 2-inch deep compost.

832 cubic feet (Total compost volume) x **6** (2-inch deep compost/foot) = **4,992 sq feet** of planting beds amended with 2-inch deep compost derived from compost windrows.

Compost Savings

Price of compost from Cedar Grove: $ 38.50/ cubic yd

Compost volume in cubic ft / 27 = Compost volume in cubic yds

832 cubic ft compost/ 27 = 30.8 cubic yds compost

30.8 cubic yds x $38.50 = **$1,185 compost cost savings**

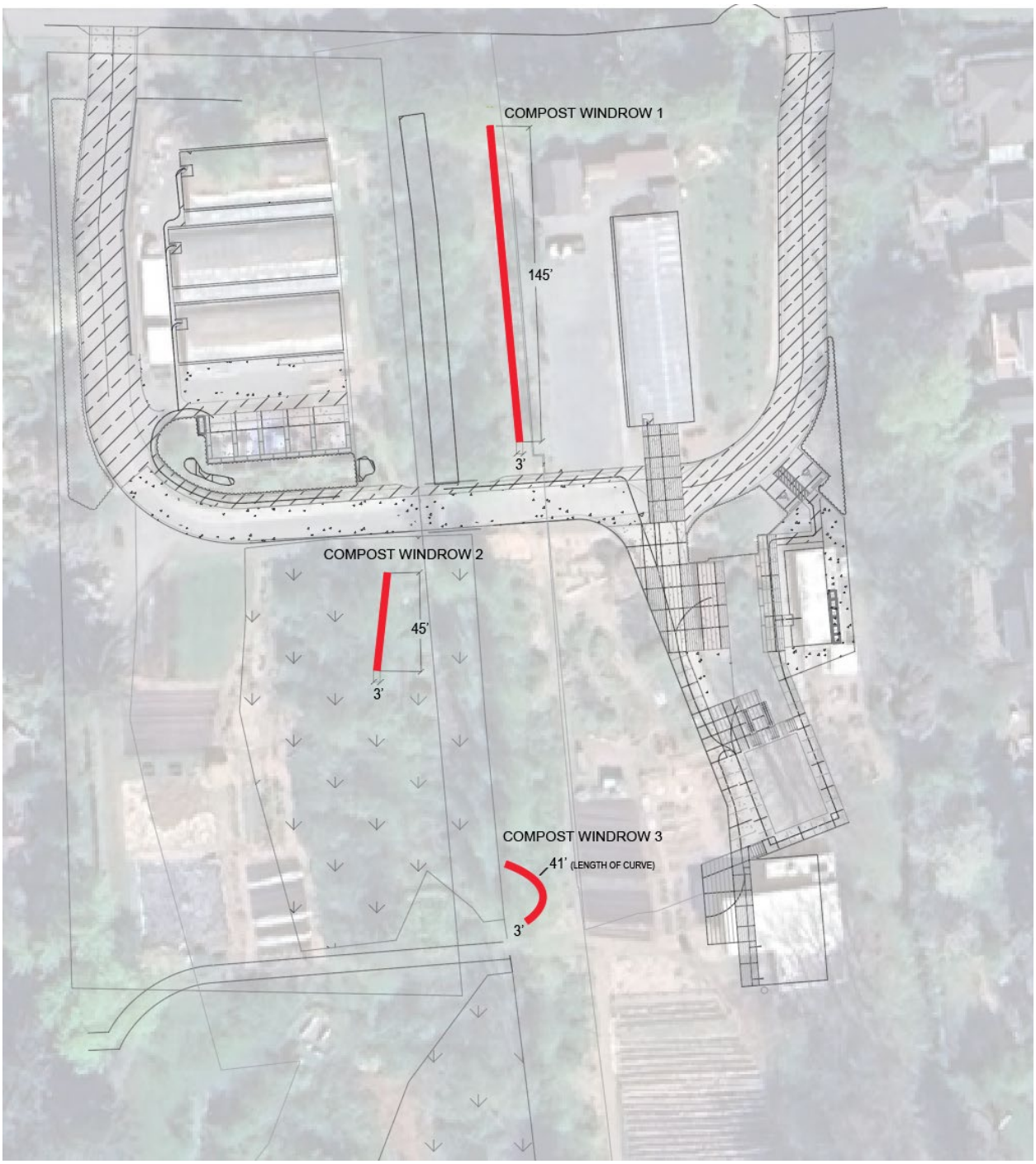


Fig. 18: Compost Windrow Area

Sources:

"Compost." 2025. Cedar Grove. 2025. https://cedar-grove.com/store/soil/compost.

"Compost Calculator." n.d. McGill Compost. https://mcgillcompost.com/compost-calculator/.

"Fall Composting Practices." n.d. Tilth Alliance. Tilth Alliance. Accessed July 27, 2025. https://tilthalliance.org/resources/fall-composting-practices/.

"Keeping Food Waste Local." 2025. Https://Tilthalliance.org/Blog/Keeping-Food-Waste-Local/. July 27, 2025. https://tilthalliance.org/blog/keeping-food-waste-local/.

McSweeney, James. n.d. "Turned Windrow Composting: Sizing Your Compost Pad." Vermont Agency of Natural Resources, Department of Environmental Conservation. Accessed July 27, 2025. https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/ANR%20Sizing%20Your%20Composting%20Pad.pdf.

Limitations:

- Compost windrows are not the only source of compost production at Rainier Beach Urban Farm & Wetlands, so the actual volume of compost produced is greater than our calculated estimate. Other composting methods including worm bins and food digesters are also utilized on site, at lower overall volume than the compost windrows.
- The seasonal variation in the amount of organic matter produced and allocated toward compost windrows was not taken into account in these calculations.

Social Benefits

Overall Methods: *Survey*

The significance of community involvement at Rainier Beach Urban Farm & Wetlands inspired researchers to conduct a survey of site visitors to determine community perceptions of the landscape. A nine-question survey evaluates site visitors' frequency of visits, overall sense of community enhancement, and perception of access to healthy and fresh foods provided by the Farm & Wetlands.

Accessibility and ease of administration influenced the structure of the survey, which included graphic representations of each question and was intended to take 2-3 minutes to complete. The survey was administered between June 1, 2025 and July 11, 2025, with paper surveys collected by Tilth Alliance employees on-site throughout the survey period and shared with researchers via scanned copies. An online survey of identical format was available through a QR code posted to the community bulletin board at the site entrance and was available to the public between June 1, 2025 and July 11, 2025. Researchers collected 57 paper survey responses and 3 online responses in total. One paper survey response was partially completed, but the responses that were provided were included in the survey analysis. Overall, survey response numbers are low when compared to the total annual number of visitors to the site included in this report.

The response rate for the paper surveys was significantly higher than the response rate for the online survey. This may be due to the culture of the site and the assistance of Tilth Alliance staff with survey administration; the site hosts volunteer work parties frequently during the summer months, and Tilth Alliance staff provided verbal explanations of our research and provided paper copies to visitors during the survey period. Volunteers and other visitors to the site may have engaged more readily with the paper survey when introduced and administered by trusted Tilth Alliance staff, as opposed to the digital survey format, which requires a phone to scan the QR code. Despite the vastly disparate response rates for each survey medium, the types of responses gathered through the online and paper surveys were very similar. For the discussion of the survey responses, the online and paper survey responses were combined into a single overall survey for analysis.

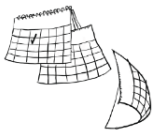
Fig. 19 (Following pages): Rainier Beach Urban Farm & Wetlands Community Survey

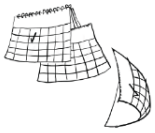
Rainier Beach Urban Farm & Wetlands Community Survey

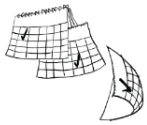
Hi! We are researchers from the University of Washington working with the Landscape Architecture Foundation to celebrate the successes of the design of Rainier Beach Urban Farm & Wetlands. Vincent Javet is a professor of Landscape Architecture at the University of Washington, and Piper Sallquist is a Master of Landscape Architecture candidate (expected 2026).

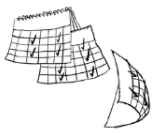
We would love to hear from you to learn more about the farm and wetlands!
We'll share our findings with other landscape architects and designers who are interested in learning more about sustainable and community supportive design. To learn more about the Landscape Performance Series, check out their website: (https://www.lafoundation.org/what-we-do/research/case-study-investigation) This is where our research will be shared later this year.
Thank you for your time!

1. How often do you visit Rainier Beach Urban Farm & Wetlands? (Circle one)


First visit

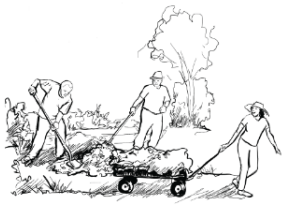

Occasionally
(a few times a year)


Regularly
(monthly)


Frequently
(weekly or more)

2. What brings you to the farm and wetlands today? (Circle all that apply)


Community event


Volunteering


Picking or receiving fresh produce


Enjoying nature


Educational program

_____
Other (please specify)□

3. What are your favorite parts of Rainier Beach Urban Farm & Wetlands? (Circle all that apply)


Community activities


Educational opportunities


Community meals and food


Wildlife


Exploring trails


Wetland restoration

_____
Other (please specify)

4. How did you learn about Rainier Beach Urban Farm & Wetlands? (Circle one)

Word of mouth/ friends or family

Social media/ website

Community organization

Passing by

_____

Other (please specify)

5. Do you feel that Rainier Beach Urban Farm & Wetlands enhances your sense of community? (Circle one)

Strongly agree

Agree

Neutral

Disagree

Strongly disagree

6. Do you think this farm improves access to fresh, healthy food for the community? (Circle one)

Agree

Disagree

Not sure

7. Have you harvested or received food from the farm? (Circle one)

Yes

No

8. How would you rate your overall experience at Rainier Beach Urban Farm & Wetlands? (Circle one)

Excellent

Good

Neutral

Poor

9. Any other thoughts you'd like to share? (Open-ended)

Fig. 20: Rainier Beach Urban Farm & Wetlands Community Survey Poster

Rainier Beach Urban Farm & Wetlands
Community Survey

Hi! We are researchers from the University of Washington working with the Landscape Architecture Foundation to celebrate the successes of the design of Rainier Beach Urban Farm & Wetlands. Vincent Javet is a professor of Landscape Architecture at the University of Washington, and Piper Sallquist is a Master of Landscape Architecture candidate (expected 2026).

We would love to hear from you to learn more about the farm and wetlands!

We'll share our findings with other landscape architects and designers who are interested in learning more about sustainable and community supportive design.

Scan the QR code to take the online survey!
To learn more about the Landscape Performance Series, check out their website: (https://www.lafoundation.org/what-we-do/research/-case-study-investigation)
This is where our research will be shared later this year.

Thank you for your time!

-Vincent and Piper

Scan the code to take the survey!

Survey Results

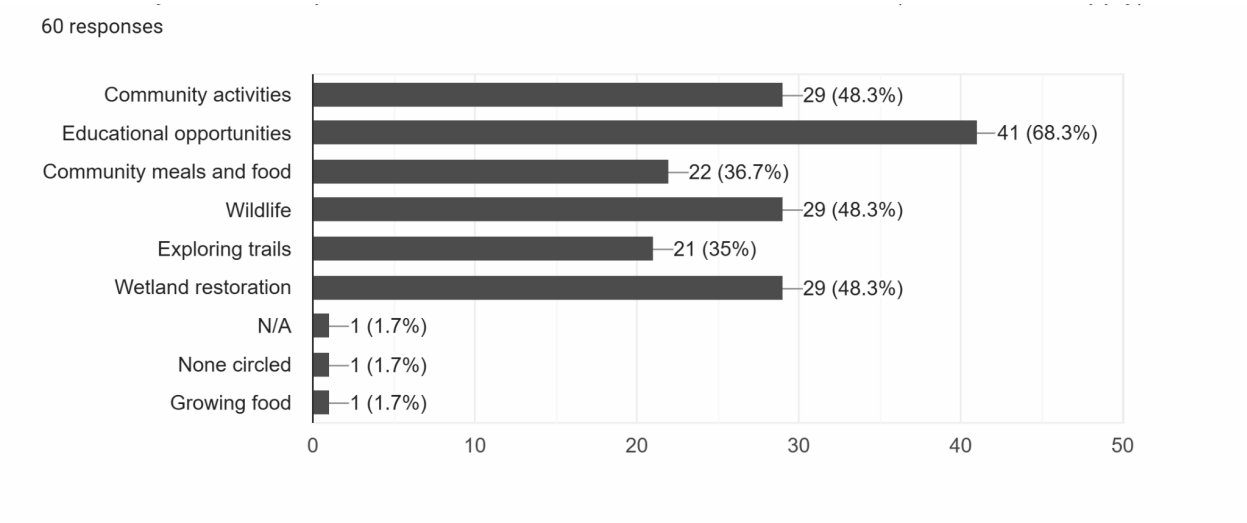


Fig. 21: Responses to "How often do you visit Rainier Beach Urban Farm & Wetlands?" (59 responses)

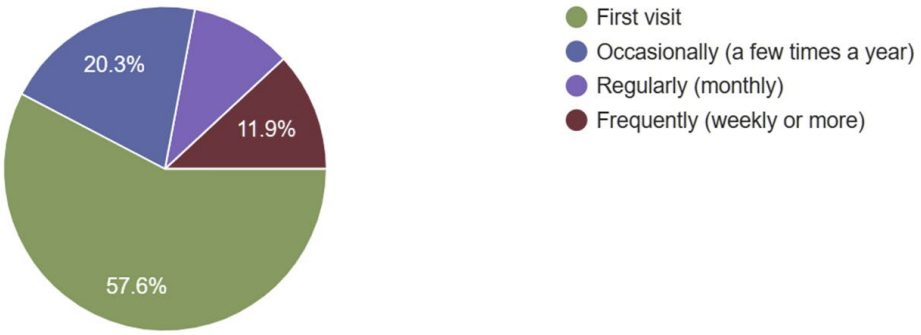


Fig. 22: Responses to "What brings you to the farm and wetlands today?" (60 responses)

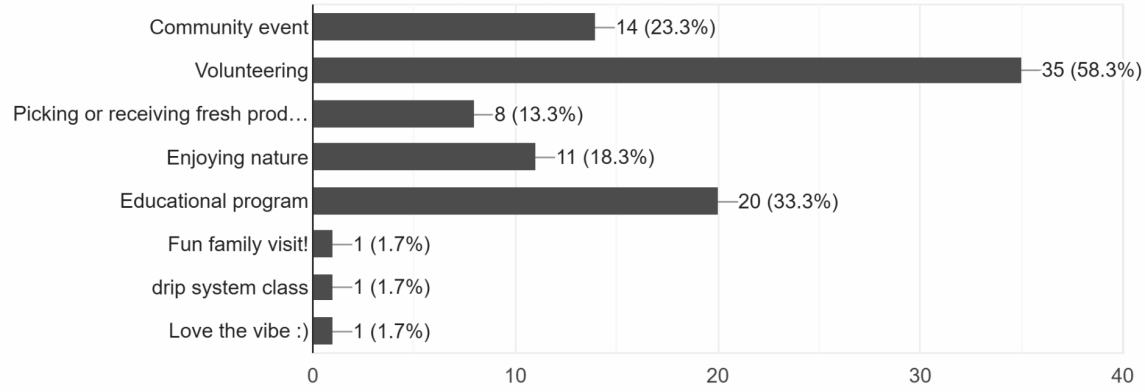


Fig. 23: Responses to "What are your favorite parts of Rainier Beach Urban Farm & Wetlands?"

Fig. 24: Responses to "Do you think this farm improves access to fresh, healthy food for the community?" (59 responses)

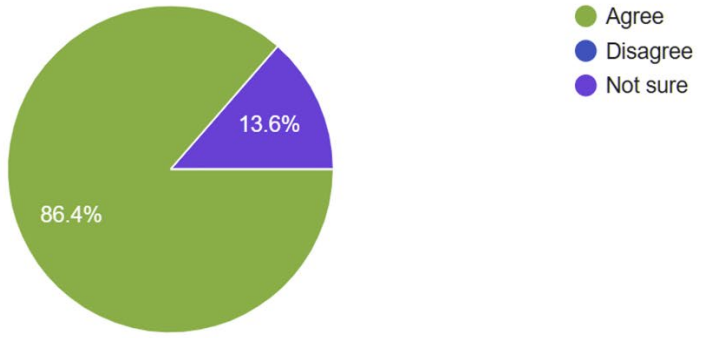


Fig. 25: Responses to "Do you feel that Rainier Beach Urban Farm & Wetlands enhances your sense of community?" (59 responses)

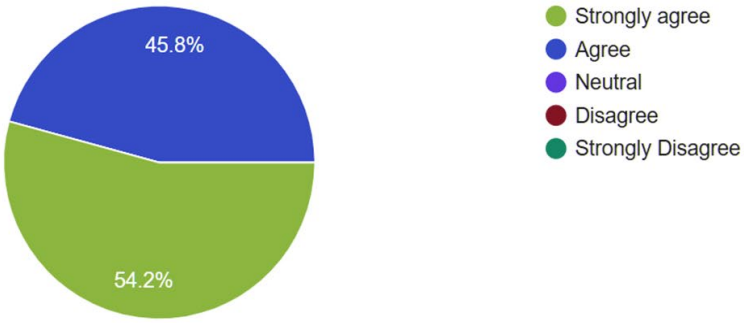


Fig. 26: Responses to "Have you harvested or received food from the farm?" (59 responses)

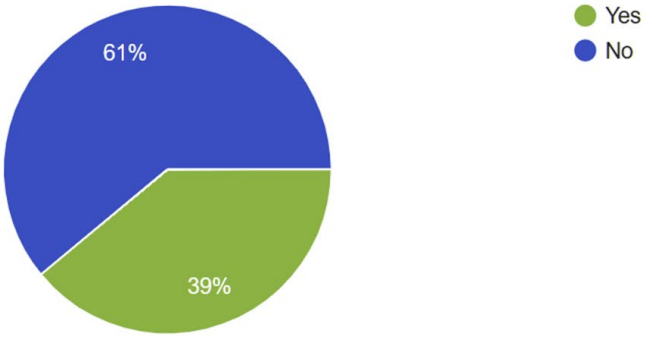


Fig. 27: Responses to "How did you learn about Rainier Beach Urban Farm & Wetlands?" (59 responses)

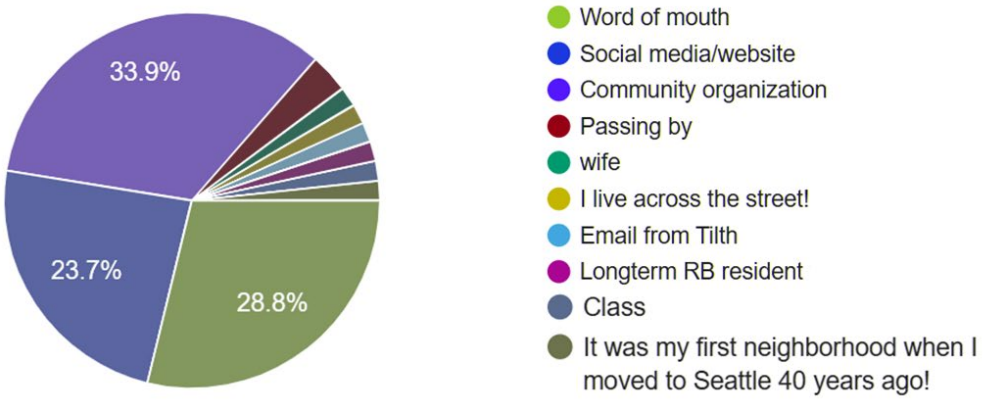
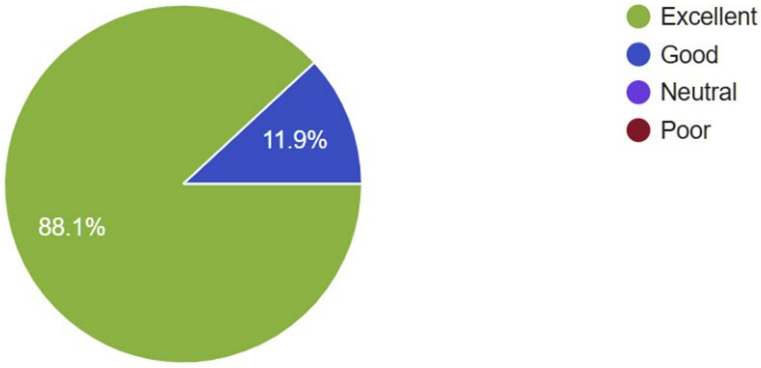


Fig. 28: Responses to "How would you rate your overall experience at Rainier Beach Urban Farm & Wetlands?" (59 responses)



Comments from survey respondents, ordered chronologically by response date from first to last receipt:

Question 9: Any other thoughts you'd like to share? (open-ended, optional)

- No, it was great
- I love it a lot
- My family loves Rainier Beach Urban Farms & Wetlands and are always looking forward to our visit! Great people, great community. I've made friends there from the community events. This is truly my third place.
- It was a good experience

- Love the garden events that are hosted, appreciate urban U-Pick
- Would (heart symbol) to see more labels on plants/ written out explanations about how they are taken care of/tips
- this was very fun!
- There should be one of these in every city
- It would be great to see more community urban farms like this
- Loved this morning!
- Keep the great programs of farm for our community- we will volunteer to support
- How to get word out more?
- (Smiley face symbol)
- Chris was a very capable and enjoyable guide.
- LOVE RBUFW!
- THANKS!
- Great community resource!
- No comment
- So beautiful here I can tell a lot of people have a lot of love for this place :)
- Special :)

Benefit 1: Recreational and Social Value

- ***Supports an estimated 14,000 visitors annually through community meals, volunteer events, school visits, educational workshops, and summer camps in addition to public trails and gardens.***

Background:

Rainier Beach Urban Farm & Wetlands is a community hub that provides opportunities for the public to volunteer, attend community meals, harvest from free You-Pick fields, attend classes and summer camps, and recreate by spending time in the gardens and wetland trails. There is a long history of community involvement on site, including a community garden implemented pre-construction after the closure of the Atlantic City Nursery ("History" 2019). The ongoing maintenance and direction of the site is informed by community members' involvement. (Hoffer, 2025)

Method:

Data was gathered by Tilth Alliance and shared with researchers. From these data, researchers reported the estimated number of visitors to the site. Further investigation of Tilth Alliance and Rainier Beach Urban Farm & Wetland website and social media (Tilth Alliance Facebook) provided specific types of events and programming available to the public.

Calculations:

These data reflect the information shared by Tilth Alliance, which estimates annual visitors to the site. As reported by Chris Hoffer, Tilth Alliance Director of Community Agriculture and Ecology, "In our public benefits report to the Parks Department, we estimate about 14,000 visitors/participants a year at the farm. Our food production varies year to year but is about 5000 lbs." (Hoffer, 2025)

Sources:

"History." 2019. Blogspot.com. 2019. https://rburbanfarm.blogspot.com/p/history-of-farm.html.

Hoffer, Chris. Letter to Piper Sallquist. 2025. "Rainier Beach Urban Farm and Wetland Visitor Numbers." Email, April 30, 2025.

Limitations:

- Researchers had a limited ability to monitor site usage in public space over long periods of time due to the scope of the project and time limitations.

Benefit 2: Health and Well-being

- ***Offers significant opportunities for community connectedness, with 100% of 59 surveyed visitors reporting that the farm enhances their sense of community, an important element of health and well-being.***

- ***Increases community access to fresh organic produce according to 86% of 59 surveyed visitors. 39% of 59 surveyed visitors report receiving fresh food or produce from the farm through the Farm Stand, Community Kitchen dinners, or by harvesting from the farm's two free "you-pick" fields.***

Background:

Community building is an integral element of Rainier Beach Urban Farm & Wetlands. The educational and experiential programming provided by Tilth Alliance and Friends of Rainier Beach Urban Farm & Wetlands provides many diverse opportunities for social engagement and community connection building, which supports mental health and overall sense of wellbeing. (Park et al. 2023)

Method:

Researchers provided paper copies of the survey to the staff at Rainier Beach Urban Farm and Wetlands. Staff distributed paper copies of the survey to visitors and collected completed surveys after educational events and community programs. Researchers provided Rainier Beach Urban Farm & Wetlands staff with a poster advertising the digital version of the survey with a scannable QR code on the north

community bulletin board near the main entrance to the park. Researchers analyzed survey responses to determine the number of users who report enhanced levels of community connectedness on site, increased access to fresh produce, and emotional wellbeing.

Fig. 29: Survey Poster with QR Code at Farm Entrance, 2025. (Piper Sallquist)

Calculations:

Of 59 total survey respondents, all 59 answered “Agree” or “Strongly Agree” to Question 5, “Do you feel that Rainier Beach Urban Farm & Wetlands enhances your sense of community?”.

This result demonstrates a 100% positive response to perception of sense of community for participants in the survey.

Sources:

Park, Eunice Y., Thomas R. Oliver, Paul E. Peppard, and Kristen C. Malecki. 2023. “Sense of Community and Mental Health: A Cross-Sectional Analysis from a Household Survey in Wisconsin.” *Family Medicine and Community Health* 11 (2): e001971. https://doi.org/10.1136/fmch-2022-001971.

Limitations:

- Limited time and survey delivery methods prevented researchers from directly surveying every visitor to the site, limiting the responses to a subset of visitors who participated in the survey.
- The yes or no questions in the survey, which takes approximately two minutes to complete, limit more nuanced responses to questions about community connectedness; while the survey's simplicity was intentional to support accessibility, participation, and reduce time burden for participants, more information could have been gathered through a more in-depth open-ended survey.

Benefit 3: Educational Value

- ***Provides an estimated 34 organized educational opportunities on site annually, including 11 large-scale community events, 12 youth programs for students ages 3-15, and 11 skill-building classes centered around nutrition, cooking, and agricultural practices.***
- ***Supports over 140 volunteer opportunities annually, with site managers providing guidance, tools, and organization for public community work parties centered around agricultural production and ecological restoration up to 5 times per week throughout the growing season.***

Background:

Rainier Beach Urban Farm and Wetlands is a vibrant community organization with diverse opportunities for public participation, centered around accessible, participatory, and culturally relevant nutrition education. Opportunities range from large community events such as "Farm Fest" and the annual spring plant sale to weekly volunteer opportunities that support members of the public in growing produce, planting and maintaining the restored wetland, and cooking community meals. Rainier Beach Urban Farm & Wetlands is a multi-generational community, serving young children and families, teens, adults, and elders through varied community gatherings that integrate gardening and nutrition education into hands-on workshops and community events. ("Get Involved: Attend an Event" 2025)

Method:

Researchers consulted Tilth Alliance social media posts on Facebook, Tilth Alliance website calendar posts, archived educational programming announcements by Tilth Alliance, and volunteer sign up spreadsheets on the Tilth Alliance volunteer webpage to estimate and report annual event numbers and volunteer attendance at Rainier Beach Urban Farm & Wetlands. ("Get Involved: Attend an Event." 2025; "Gardeners: Classes." 2025; "Facebook." 2018)

Calculations:

Events, Classes, and Community Meals at Rainier Beach Urban Farm & Wetlands

DATE	EVENT TITLE	EVENT TYPE
9/12/25	Bat Night	Event
9/X/25	Community Kitchen Dinner	Community Meal
8/18/25	Seed to Snack Summer Camp (1 week program)	Class- Youth
8/11/25	Wildcrafters Summer Camp (1 week program)	Class- Youth
8/9/25	Seedlings Summer Camp (1 week program)	Class- Youth
8/4/25	Cooking for Community Summer Camp (1 week program)	Class- Youth
8/X/25	Community Kitchen Dinner	Community Meal
8/4/25	Powerful Pollinators Summer Camp (1 week program)	Class- Youth
7/28	Grow a Farm Stand Summer Camp (1 week program)	Class- Youth
7/26	Saplings Camp	Class- Youth
7/21/25	My Friend the Garden Summer Camp (1 week program)	Class- Youth
7/30/25	The Seasonal Table	Community Meal
7/X/25	Community Kitchen Dinner	Community Meal
7/14/25	“It’s a Wild World” Summer Camp (1 week program)	Class- Youth
6/21/25	Seasonal Meal Prep on a Budget	Class
7/2/25	The Seasonal Table	Community Meal
8/20/25	The Seasonal Table	Community Meal
9/10/25	The Seasonal Table	Community Meal
6/9/25	The Common Table	Community Meal
6/4/25	Community Kitchen Dinner	Community Meal
5/13/25	Gardening with Plant Guilds	Class
5/14/25	Garden-Fresh Cooking with Students	Class, Community Meal- Youth

5/30/25	Beaver Night	Event
5/31/25	Seed to Seed	Class
4/23/25	Joy of Chickens: 101	Class
4/23/25	Planning a School Garden	Class- online
4/19/25	Keeping Honeybees	Class
4/5/25	Afterschool K-5 program (7 week program)	Class- Youth
4/1/25	Fundamentals of Organic Gardening	Class
4/14/25	“Build, Make, Create”: Spring Break Camp	Class- Youth
3/18/25	Second Chance Plant Sale	Event
3/15/25	Edible Plant Sale	Event
2/1/25	Seed Swap & Community Kitchen	Event, Community Meal
1/27/25	Mid-Winter Break Camp (1 week program)	Class- Youth
12/14/24	Winter Market	Event
12/15/24	Winter Market	Event
12/11/24	Year-Round Gardener (8 month program)	Class
12/2/24	Community Cafeteria	Class, Community Meal- Youth
11/23/24	Rainier Beach Youth Conference	Event- Youth
12/7/24	Growing Microgreens	Class
11/12/24	Homemade Vinegar Workshop	Class
10/26/24	Green Seattle Day	Event- Volunteer
10/23/24	Go Green! Garden Club	Event- Youth
10/4/24	Little Garden Chefs: Apple Sauce! Family Camp	Event
9/29/24	“Food is Love, Food is Life”	Community Meal
9/21/24	Farm Fest	Event

East African Elders Senior Meal Program

Friday mornings throughout the year. Assuming four Friday lunch events hosted per month, there are an

estimated 48 community meal events specifically for East African Elders at Rainier Beach Urban Farm.

(12 months/year x 4 lunches/month= **48 meal gatherings/year**)

Calculations from Events Table

Total General Category Events: 11

Total Classes: 23

Total Community Meals: 12 general category + 48 East African Elders Senior meal gatherings = 60

Total Events Hosted

(11 General events + 23 classes + 60 community meals= 94 events (not including school field trips or volunteer events)

Volunteer Opportunities

Weekly Volunteer Opportunities September-May (approx. 35 weeks)

Friday mornings and every other Saturday morning

Fridays: 1/week x 35 weeks = **35 Friday work parties (September-May)**

Saturdays: 1/biweekly x 17.5 biweekly meetings = **17.5 Saturday work parties (September-May)**

Weekly Volunteer Opportunities June-September (approx 17 weeks)

General work parties Friday mornings and every other Saturday morning, Culturally Relevant Plant starts volunteer opportunities Tuesdays and Thursdays. Gathering Gardens opportunities Wednesdays.

Fridays: 1/week x 17 weeks = **17 Friday work parties (June-September)**

Saturdays: 1/biweekly x 8.5 biweekly meetings = **8 Saturday work parties (June-September)**

Culturally Relevant Plant Starts: 2/week x 17 weeks = **34 Culturally Relevant Plant Start volunteer opportunities**

Gathering Gardens: 1/week x 17 weeks = **17 Wednesday Gathering Garden Work Parties**

Total Weekly Opportunities per year:

(35 September-May Friday work parties +17 September-May Saturday work parties) + (17 Friday work parties (June-September) +8 Saturday work parties (June-September) +34 Culturally Relevant Plant Start volunteer opportunities +17 Wednesday Gathering Garden Work Parties)= **128 weekly volunteer**

opportunities annually

Monthly Year-Round (12 months)

Community Kitchen Dinners

1/month x 12 months = **12 Community Kitchen Dinner volunteer opportunities**

Estimated total volunteer opportunities annually:

128 weekly + 12 monthly = **140 volunteer opportunities annually.**

Sources:

"Volunteer: Garden with Us." 2025. Tilth Alliance. Tilth Alliance. July 23, 2025. https://tilthalliance.org/get-involved/volunteer-with-us/get-your-hands-dirty/.

"Facebook." 2018. Facebook.com. 2018. https://www.facebook.com/TilthAlliance/.

"Get Involved: Attend an Event." 2025. Tilth Alliance. Tilth Alliance. July 23, 2025. https://tilthalliance.org/get-involved/attend-an-event/.

"Gardeners: Classes." 2025. Tilth Alliance. Tilth Alliance. July 23, 2025. https://tilthalliance.org/our-work/gardeners/classes/.

Kodama, Yuko. 2025. "Community Perspectives | East African Elders Gather to Garden, Ben Santos Appointed First Filipino American King County Superior Court Judge." South Seattle Emerald. May 2, 2025. https://southseattleemerald.org/news/2025/05/02/community-perspectives-east-african-elders-gather-to-garden-ben-santos-appointed-first-filipino-american-king-county-superior-court-judge.

Limitations:

- Relying on Tilth Alliance social media reporting archives for past events, researchers were unable to count all school and volunteer visits due to limited access to documentation.

- Only the published volunteer opportunities are considered in this calculation, but Rainier Beach Farm & Wetland notes on their website that there are often other less standardized seasonal volunteer opportunities throughout the year that are ephemerally published on their volunteer postings website, so the actual number of volunteer opportunities is higher than this estimate.

Benefit 4: Food Production

- ***Produces an estimated 5,000 lbs of organically grown food annually, distributed to the community through 2 free "you-pick" fields, the "Good Food Bags" CSA program, a seasonal farm stand, and community meals on site.***

Background:

As the City of Seattle's largest public working urban farm, Rainier Beach Urban Farm & Wetlands provides the surrounding community of Rainier Beach with fresh produce, community meals, and free access to You-Pick fields for harvesting. ("Rainier Beach Urban Farm and Wetlands - Parks | Seattle.gov" 2021)

Method:

Consult data reported by Tilth Alliance and Seattle Parks records to determine the total estimated amount of food produced on site annually. As reported by Chris Hoffer, Tilth Alliance Director of Community Agriculture and Ecology, "In our public benefits report to the Parks Department, we estimate about 14,000 visitors/participants a year at the farm. Our food production varies year to year but is about 5000 lbs." (Hoffer, 2025)

Calculations:

Researchers consulted with Chris Hoffer, Tilth Alliance Director of Community Agriculture and Ecology, who reported that approximately 5000 lbs. of food is produced by the farm every year. This is a secondary source citation.

Sources:

"Rainier Beach Urban Farm and Wetlands - Parks | Seattle.gov." 2021. Seattle.gov. 2021. https://www.seattle.gov/parks/allparks/rainier-beach-urban-farm-and-wetlands.

Hoffer, Chris. Letter to Piper Sallquist. 2025. "Rainier Beach Urban Farm and Wetland Visitor Numbers." Email, April 30, 2025.

"Volunteer: Garden with Us." 2025. Tilth Alliance . Tilth Alliance. July 23, 2025. https://tilthalliance.org/get-involved/volunteer-with-us/get-your-hands-dirty/.

"Facebook." 2018. Facebook.com. 2018. https://www.facebook.com/TilthAlliance/.

"Get Involved: Attend an Event." 2025. Tilth Alliance. Tilth Alliance. July 23, 2025. https://tilthalliance.org/get-involved/attend-an-event/.

"Gardeners: Classes." 2025. Tilth Alliance. Tilth Alliance. July 23, 2025. https://tilthalliance.org/our-work/gardeners/classes/.

Limitations:

- Scope of project and limited ability to monitor site usage in public space over long periods of time
- Relying on Tilth Alliance reporting for past events, unable to count all school and volunteer visits due to limited access to documentation

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Economic Benefits

Benefit 1: Job Creation

- ***Creates 9 permanent on-site, 14 permanent multi-site, and 5 seasonal on-site jobs.***
- ***Supports 45 local youths employed as Youth Stewards in 3 seasonal cohorts annually.***

Background:

The staff at Rainier Beach Urban Farm & Wetlands sustain the numerous programs that make this landscape a community resource; among many other responsibilities, staff members farm, manage the wetland channel and buffer, support and train an enormous cohort of volunteers on a weekly basis, create educational programming and signage, manage produce harvest and distribution at the Farm Stand, and host community events. In addition to permanent employees, seasonal cohorts of Youth Stewards support the farm and wetlands' operations.

Method:

Researchers referred to Tilth Alliance documentation of employees on site, published Tilth Alliance documentation of seasonal employment, and youth employment postings on Tilth Alliance social media (Facebook) and the Tilth Alliance website.

Calculations:

Permanent and Seasonal Employees

Researchers determined the number of permanent and seasonal jobs for adult employees on site through investigation of published Tilth Alliance media, including the "Our Staff & Board" web page. Employees at Rainier Beach Urban Farm & Wetlands were determined through observation and extrapolation from published staff information on the "Our Staff & Board" web page. Of the total number of Tilth Alliance employees listed in the "Our Staff & Board" web page on the Tilth Alliance website, nine people specifically mentioned Rainier Beach Urban Farm & Wetlands in their job description and biography. 14 people mentioned that they were general staff or multi-site in their job description.

(**9 permanent on-site** + **14 permanent multi-site employees** = 23 total employees)

Seasonal staff job postings to a Tilth Alliance Facebook group in 2022 listed 4 openings for Summer Garden Educators. ("Facebook" 2018) The Summer Garden Educator job posting is consistently posted annually, but the facebook post was the only mention of the number of employees hired each summer.

There is a job posting (consistently posted annually) for a Seasonal Farm Stand Project Manager.

(4 summer educators + 1 farm stand project manager = **5 seasonal employees**)

<u>Youth Employees</u>

The Summer Youth Steward cohort in 2024 provided seasonal employment for 15 youth. ("Community Kitchens Ft. The Rainier Beach Youth Stewards " 2024)

In job postings advertised on the Tilth Alliance website and Tilth Alliance social media (Facebook), researchers extrapolated that cohorts of Youth Stewards provide seasonal employment to youth in spring, summer, and fall annually.

(3 seasonal cohorts/year X 15 stewards/cohort = **45 seasonal jobs annually for youth**)

Sources:

"Facebook." 2018. Facebook.com. 2018. https://www.facebook.com/TilthAlliance/.

"Rainier Beach Youth Stewards." n.d. Tilth Alliance. Tilth Alliance. Accessed April 29, 2025. https://tilthalliance.org/our-work/environmental-stewardship/rainier-beach-youth-stewards/.

"Tilth Alliance: Our Staff and Board." 2025. Tilth Alliance. Tilth Alliance. July 23, 2025. https://tilthalliance.org/about-us/our-staff/.

"Community Kitchens Ft. The Rainier Beach Youth Stewards." 2024. Tilth Alliance. Tilth Alliance. August 30, 2024. https://tilthalliance.org/wp-content/uploads/2024/09/Community-Kitchens-Program-Rainier-Beach-Youth-Stewards.pdf.

Limitations:

- Relying on reported data or extrapolations from published job postings from Tilth Alliance website rather than direct observation due to time constraints.

Benefit 2: Grocery Cost Offset

- ***Reduces grocery costs for Good Food Bag recipients and "you-pick" free produce harvesters by up to $250 annually.***

Background :

Rainier Beach Urban Farm and Wetlands is a community food hub, providing public access to produce from free You-Pick fields throughout the year as well as distributing fruits and vegetables through Good Food Bags, a sliding-scale weekly CSA program. Each Good Food Bag includes organically grown produce, recipes, food storage information, and a profile of the farmer from which the produce was sourced. In addition to harvests from Rainier Beach Urban Farm and Wetlands, the bags include produce from other small organic farms in Western Washington. ("Good Food Bags" 2025) The You-Pick fields include educational signage about specific plants, harvest guidelines, and produce bagging stations to support public harvesting. Each plant is labeled in multiple languages, creating a culturally inclusive and accessible experience.

Fig 30: You-Pick field produce sign, 2025. (Piper Sallquist)

Fig. 31: You-Pick Stand at Rainier Beach Urban Farm and Wetlands, 2025. (Piper Sallquist)

Method:

Researchers consulted the "Rainier Beach Urban Farm & Wetlands" page on the Tilth Alliance website to source data about the Good Food Bags program and You-Pick fields. Site visits by researchers supplemented You-Pick data with observations of specific signage and food harvest protocols. Researchers extrapolate available data on cost and duration of Good Food Bag distribution and seasonal You-Pick harvest capacity to estimate potential cost savings for an individual participating in both programs simultaneously.

Calculations:

The "Rainier Beach Urban Farm & Wetlands" Tilth Alliance website indicates that the value of the produce in a Good Food Bag is $10. Subsidized memberships to the program cost $5/bag, so weekly savings for Good Food Bag recipients could be up to $5/week. ($10 value- $5 subsidized cost= $5 saved per Good Food Bag)

Assuming the cost of a week's worth of produce is the $10 cost of a full-price Good Food Bag from Rainier Beach Urban Farm & Wetlands, a subsidized CSA membership for $ 5/week would provide $500 worth of fresh produce for $250, assuming 1x weekly deliveries for 50 weeks/year.

($5 saved/Good Food Bag x 50 weekly bag deliveries = $250 annual savings on fresh, organic produce)

Free You-Pick fields could support an individual person's weekly vegetable needs throughout summer and early autumn, offsetting grocery costs for produce for 16 weeks (June, July, August, September).

The savings for You-Pick produce harvesters could be up to $160 annually, or $10 weekly produce harvest value/16 weeks. ($10 value of week's worth of produce x 16 weeks = $160)

Sources:

"2019 Fresh Bucks Impact Report." 2019. Seattle Office of Sustainability and Environment. City of Seattle . 2019. https://www.seattle.gov/Documents/Departments/OSE/FoodAccess/FreshBucks-ImpactReport-2019-WEB.pdf.

"Good Food Bags." 2025. Tilth Alliance Food and Nutrition. Tilth Alliance. July 23, 2025. https://tilthalliance.org/our-work/food-nutrition/good-food-bags/.

Staff, Seattle Child. 2023. "A Tilth Alliance's Good Food Bag Favorite." Seattle's Child. December 12, 2023. https://www.seattleschild.com/tilth-holiday-potato-hash/.

Limitations:

- The actual value of a week's worth of organic produce was not calculated for this benefit due to wide national and seasonal fluctuations in grocery prices, cost of living, and variability in household size and produce needs. Rather than calculate projected cost per average household, the standardized $10 value per bag provided by the Tilth Alliance Good Food Bags program website offers a consistent metric to gauge savings by, but this limits the ability to calculate cost offset when influenced by cost of living, which would likely make savings on organic produce even greater than the estimated savings in this report.
- Researchers relied on the reported costs of Good Food Bags to estimate the overall value of produce for an individual each week, which is an assumption made due to time constraints.