



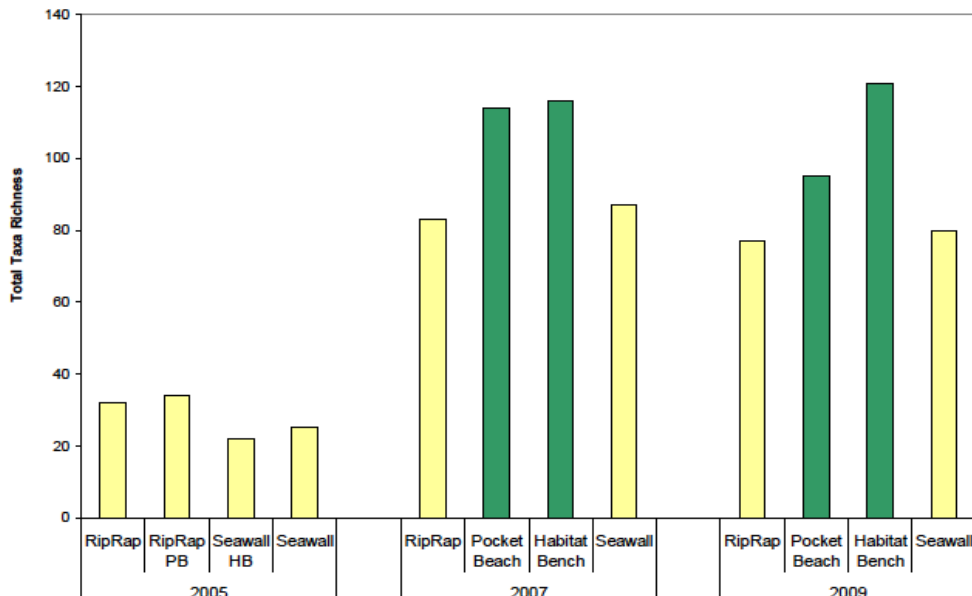
LANDSCAPE PERFORMANCE SERIES

Olympic Sculpture Park – Seattle, WA Methodology for Landscape Performance Benefits

Environmental

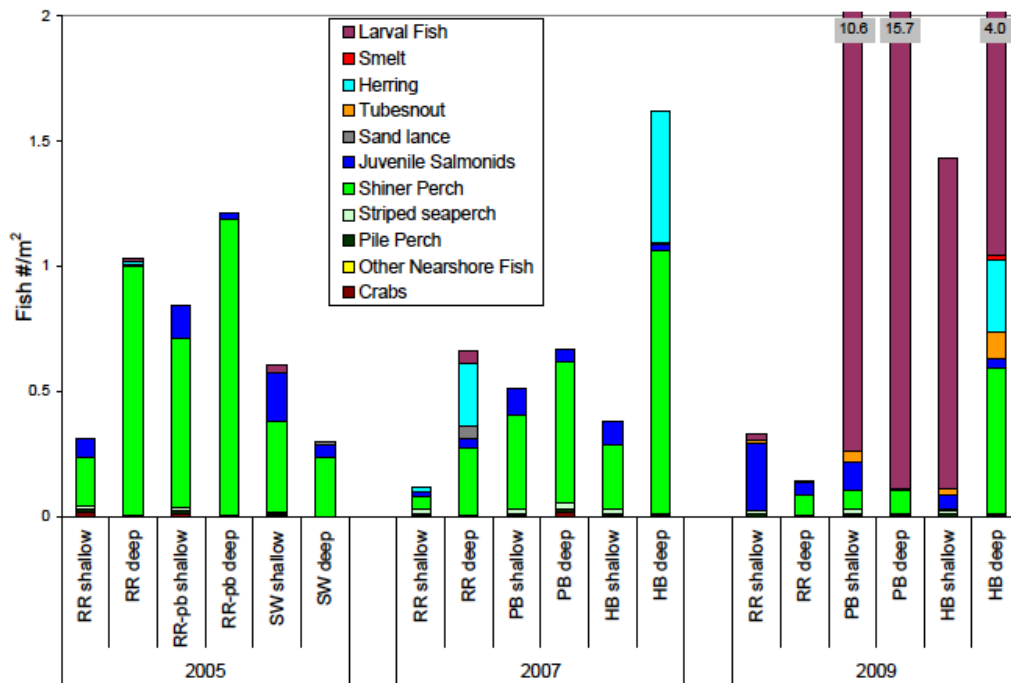
Increased biodiversity of epibenthic invertebrates, a staple food source for juvenile salmon, by 20% in the first 3 years of marine habitat monitoring.

The University of Washington Fisheries Department monitored changes in nearshore habitat along the shoreline of the Olympic Sculpture Park from 2007-2009. The monitoring team tracked and reported changes using a variety of environmental health indicators specific to nearshore habitat including type and density of vegetative cover, taxa richness, adult and juvenile fish populations, and the ratio of prey to predator species. More information regarding the methods and findings of the monitoring report for Olympic Sculpture Park can be accessed [here](#).¹



The above graph charts the increase in the richness of variety of epibenthic invertebrates by year and site. The enhanced habitats are colored in green.²

Increased the number of observed juvenile fish by over 530-fold in 3 years. Populations rose from just over 500 in 2007 to over 265,600, within the first 3 years of shoreline monitoring along the park's pocket beach and habitat bench.



The above graph illustrates the “average total of fish densities at shallow and deep transects by habitat type. RR = Riprap, RR-pb= Riprap at location where pocket beach was later created, SW = Seawall at location where habitat bench was later created, PB = Pocket Beach, HB = Habitat Bench.”³ The purple bars indicate a large increase in larval fish populations within enhanced habitat areas observed in 2009. The increase count 265,600 divided by the initial count of 500 = a 531.2 fold increase in juvenile fish populations over the 3 years of monitoring.⁴

Reduces water needs by nearly 95,000 gallons per week during the dry season by incorporating a 3.5-acre meadow with a drought tolerant plant palette instead of more conventional turf-scaped sculpture garden. Annual cost savings associated with this water conservation total nearly \$7,900.

The amount of water savings were calculated based on the estimated amount of water needed to irrigate the same amount of area seeded with a more conventionally used turf grass. The meadow was reported by SAM lead gardener Bobby McCullough⁵ to be a relatively “hands off area” with no need for watering for the last two years. The zero water cost for the 3.5 acre meadow is compared to the estimated cost of irrigation for a conventional lawn by calculating the cost needed to provide the weekly 1” of water (or .623 gallons of water/ sq ft) that required to lawn maintenance (May – September) ⁶

The total area of the meadow = 152,460 sq ft
 $152,460 \times .623 = 94,983$ or approximately 95,000 gallons per week of water that would be required to maintain the appearance of a conventional grass lawn during the dry season.

The cost benefit was calculated based on the 2012 general service commodity rates for water in Seattle⁷ cited at \$5.15 / 100 CCF at Peak Usage between May 16 and September 15. Using the lawn irrigation and water costs calculator ⁸, the total sum for water savings equals \$492 for each watering. \$492 was multiplied by the 16 weeks of average dry season in Seattle for a total savings of \$7870.

Lead Gardener Bobby McCullough reports that irrigation in the meadow has been shut off completely for the last three years providing a total estimated savings of \$23,600 in water costs over the last 3 years.

Social

Provides round-the-clock, free, open air public access to world-renown sculpture and Puget Sound for an average of over 425,000 annual visitors.

Annual visitor data provided by Seattle Art Museum Admissions Manager, Amy Domres⁹

Olympic Sculpture Park Fiscal Year Attendance (July thru June)

	Estimated	School Tours	Events	Box Office	Art in Action	GRAND TOTAL
FY07	378,345	3,930	8,276	0	0	390,551
FY08	463,170	2,376	17,202	436	296	483,480
FY09	494,950	2,933	11,981	160	0	510,024
FY10	406,800	1,970	5,050	2,245	0	416,065
FY11	333,000	1,643	6,262	721	0	341,626
Average	415,253	2,570	9,754	712	0	428,349

OSP opened Jan 20, 2007.
This FY is 1/20-6/30/07.

Very bad summers in 2010
and up until June 2011

Economic

Saves an estimated \$63,000 in annual maintenance and operating costs through a variety of volunteer-based stewardship and work party opportunities.

The estimated savings is based on the recorded volunteer hours logged in 2011 and the average hourly wage for large park landscape maintenance in Seattle.

FY11 Volunteer Numbers ¹⁰

Category	Assignment	Hours	Volunteer Count
Environmental Programs	Intern	0	0
	Park Steward	158.50	11
	Work Party	218.00	17
	Total	376.50	28
Visitor Services	Ambassador	1,741.77	63
	Total	1,741.77	63
Grand Total		2,118.27	89

According to the records provided, the total number of volunteer hours logged in 2011, an average year for volunteer numbers and hours, is 2118.27. Services specified by SAM lead gardener Bobby McCullough included invasive plant identification and removal, trimming and maintenance of existing plants, and native planting work parties, as well as leading park tours.¹¹ The hours donated were multiplied by the average hourly wage for routine park maintenance in Seattle, is estimated at \$30/ hour. ¹² The total sum of maintenance costs saved through volunteer based stewardship programs equals \$63, 548.10 or approximately \$63,000 annually.

Methodology for Cost Comparison

By reusing the construction cut material from the offsite Seattle Art Museum expansion project as fill for the Olympic Sculpture Park site, 300,000 cubic feet (14,250 tons) of excavated soil was diverted from landfills, saving an estimated \$1.47 million in disposal and materials costs.

The amount of fill required on site was verified in the grading plan. Source of fill verified via project manager's documentation from construction process. The number of tons in 300,000 cu. ft. of waste soil was calculated using Reade data for packed soil (95lbs/cu.ft)

A total of 14, 250 tons of fill was reused.

Referenced king county disposal fees for solid waste ¹³

Referenced king county disposal fees for charitable organizations \$91.92/ ton

Cost savings for soil reuse vs. disposal fee is \$1,309,860 + an estimated cost savings of \$122,221 in fill material (based on average cost of fill soil estimated at \$11/ cu yard.)¹⁴

Total cost savings = \$1,432,081

Using the integrated seawall/habitat bench design to reinforce the existing seawall cost \$5.5 million compared to the initial estimate of \$50-80 million to completely replace that portion of seawall.

Quoted from Management Summary of the UW Habitat Monitoring Report: "Construction along OSP's portion of the seawall cost \$5.5 million to reinforce the existing seawall, which was cost-effective compared to the initial estimate of \$50-80 million to completely replace that portion of seawall." ¹⁵

¹ "Olympic Sculpture Park" Accessed online 8.1.12 at: <https://sites.google.com/a/uw.edu/olympic-sculpture-park/home>

² Toft, J., A. Ogston, S. Heerhartz, J. Cordell, E. Armbrust, and C. Levy. 2010. Olympic Sculpture Park: Year 3 Monitoring of Shoreline Enhancements. Technical report SAFS-UW-1002, School of Aquatic and Fishery Sciences, University of Washington. Prepared for Seattle Public Utilities, City of Seattle. 110 pp.

³ Ibid.

⁴ Ibid.

⁵ Phone interview with Bobby McCullough conducted by Delia Lacson on July 27, 2012

⁶ Lipford, Danny. "How to calculating Lawn Irrigation Water Usage and Costs" Published online at: <http://www.dannylipford.com/calculating-lawn-irrigation-costs/> Accessed 8.1.12.

⁷ "Seattle Public Utilities- Commercial Water Rates" Accessed online 8.1.12 at <http://www.cityofseattle.net/util/Services/Water/WaterRates/CommercialWaterRates/index.htm>

⁸ Lipford, Danny. "How to calculating Lawn Irrigation Water Usage and Costs" Published online at: <http://www.dannylipford.com/calculating-lawn-irrigation-costs/> Accessed 8.1.12.

⁹ Data provided to Pam Emerson via email correspondence with Cara Egan

¹⁰ Volunteer Data provided to Pam Emerson on August 18th, 2011 via email correspondence with Kathleen Maki, Manager of Volunteer and Employee Programs Seattle Art Museum

¹¹ Hourly wage estimate provided to Delia Lacson via phone interview with Bobby McCullough, lead gardener for Seattle Art Museum.

¹² Ibid.

¹³ King County Solid Waste Division "Fees - Solid Waste Disposal, Recycling, and Unsecured Loads"

Accessed online 7.15.11 at: <http://your.kingcounty.gov/solidwaste/facilities/disposal-fees.asp>

¹⁴ "Cost of Soi: Prices Paid and Estimates" Accessed 7.25.12 via: [costhelper.com](http://home.costhelper.com/soil.html) online at: <http://home.costhelper.com/soil.html>

¹⁵ Toft, J., A. Ogston, S. Heerhartz, J. Cordell, E. Armbrust, and C. Levy. 2010. Olympic Sculpture Park: Year 3 Monitoring of Shoreline Enhancements. Technical report SAFS-UW-1002, School of Aquatic and Fishery Sciences, University of Washington. Prepared for Seattle Public Utilities, City of Seattle. 110 pp.