

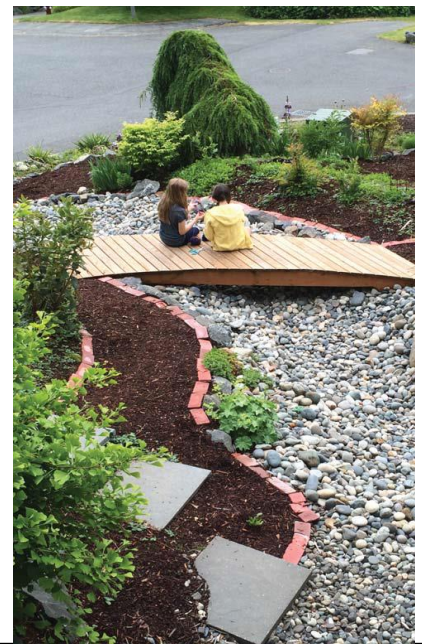
**Lake Whatcom Homeowner Incentive Program**  
**City of Bellingham and Whatcom County Public Works Departments**  
**Grant Number #G1100173**  
**January 2011-June 2015**  
**Final Total Project Cost: \$690,000**  
**Final Ecology Grant or Loan Contribution: \$500,000**

**Project Description**

The Lake Whatcom Homeowner Incentive Program (HIP) was a pilot program launched to promote homeowner stewardship of water quality within a phosphorus-limited watershed. The HIP provided technical assistance and financial incentives to homeowners to facilitate the design, permitting, and construction of phosphorus-reducing Best Management Practices (BMPs). These projects were retrofits of existing developed areas and consisted of reforestation, infiltration, runoff treatment, permeable paving, and rainwater reuse BMPs, and various combinations of these.

The incentives were available for a four-year period and advertised to approximately 1000 eligible residences. More than 250 homeowners requested an on-site visit, and approximately 150 of these completed retrofit projects within the grant period.

City of Bellingham and Whatcom County staff provided technical assistance including design guidance, permit facilitation, construction oversight, and material specifications. Of the total project cost, 80% was spent directly on reimbursements to homeowners for eligible expenses.



HIP bioretention system with a personal touch. Installed 2012



HIP permeable paver driveway in use. Installed 2013.

**Project Accomplishments**

A total of 153 retrofit projects, installing 362 individual best management practices, were funded by the HIP pilot grant. These projects addressed runoff from more than 20 acres of developed site area and reduced phosphorus loading to Lake Whatcom by approximately 19lbs. of P per year.

These projects also included stormwater retrofits for two elementary schools in the watershed and one shared alleyway adjacent to a number of participating homeowners' lots.

In-depth geotechnical explorations, coordinated outreach efforts, multiple workshops for homeowners and contractors, and project inspections were also completed using the grant funding.

The initial goals of the program, to install 550 BMPs on the 250 lots, were not met. The initial goal assumed that each BMP would cost, on average, \$1,000. Instead, the BMPs averaged around \$1,500 each. This is, however, a positive for the watershed as this represents the installation of more complex BMPs, which reduced phosphorus more than less complex options. On average, participating homeowners addressed more phosphorus per lot than expected.

## Water Quality and Environmental Outcomes

More than 20 acres of development addressed using Phosphorus-reducing BMPs. This equates to more than 78 residential lots (of 1000) completely retrofit to be phosphorus-neutral.

More than 19 lbs. of Phosphorus (per year) retained on private properties and not discharged to Lake Whatcom.

More than 8,400,000 gallons of phosphorus-laden runoff per year prevented, treated, infiltrated, or captured.

8,628 Northwest native plants and 3,073 cubic yards of low-phosphorus soil amendments and mulch installed to replace lawn areas in the watershed.

7.4 acres of new native forested areas created within the watershed

13.1 acres of developed area retrofit to match forested hydrology through infiltration and detention.

21,000 square feet of residential pavement converted to permeable paving systems.

51,000 square feet of roof area diverted into rainwater harvesting systems for re-use and dispersion.

## The Next Step for Continued Success

The restoration of water quality in the Lake Whatcom Watershed is a major undertaking which is projected to take up to 50 years to complete. The City of Bellingham and Whatcom County are implementing robust capital facility retrofits which could manage up to 75% of the excess phosphorus (currently around 3,000 lbs. annually) entering the Lake. However, this is only part of the proposed restoration strategy. The remaining 25% of excess phosphorus will need to be dealt with on private properties, by actions of the homeowners living there.

This pilot program gave great insights into the motivations and barriers of homeowners living in the targeted areas of the watershed. Our next step is to expand the program to the entire watershed. Budgeting for a long-term funding strategy to propel the residential retrofitting program into the future is underway. Audience research, exit interviews, focus groups, and surveys are planned for the near term, with the intention of rolling out a fully-functional, evolved version of this program in early 2016. In the interim, the City of Bellingham and Whatcom County are funding a transitional program that follows the structure of the pilot program very closely. The work will continue with shared funding between the City of Bellingham and Whatcom County, through the Lake Whatcom Management Program, through the next five year work plan and likely beyond.

Development regulations will require homeowners to maintain functionality of their systems in order to stay in compliance with code. Municipal inspectors will provide oversight and education toward this end in future years.

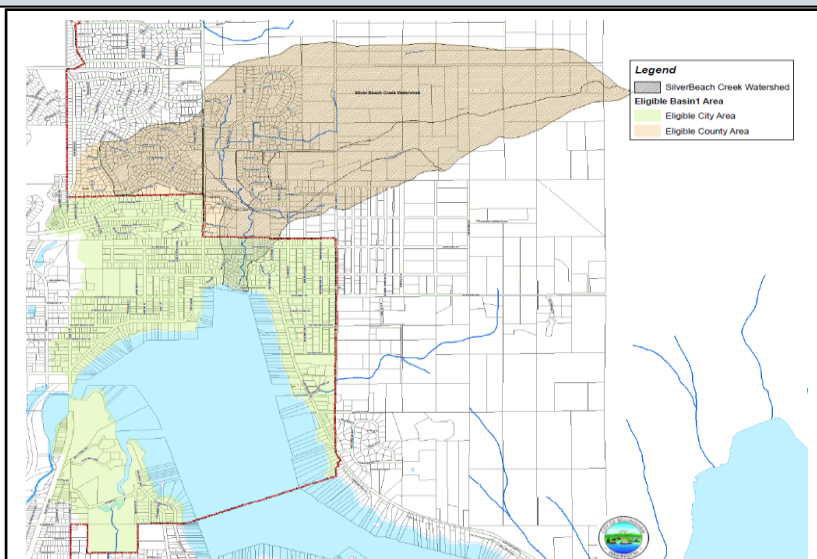
## Recipient Contact Information

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HIP-eligible areas, by jurisdiction. The red line is the City of Bellingham City Limits. Next generation of program will apply to entire watershed (not shown).

## OVERVIEW DESCRIPTION OF PROJECT:

The Lake Whatcom Watershed Homeowner Incentive Program (HIP) was intended to address excess phosphorus entering Lake Whatcom via stormwater runoff from private properties. The purpose of HIP was to provide technical and financial assistance to homeowners to complete watershed-friendly stormwater retrofits using approved best management practices for phosphorus reduction and removal. Phosphorus reduction BMPs included replacing lawn areas with naturalized landscaping (reforestation), restoring eroding slopes and disturbed areas, removing impervious surface, and creating forested buffers around streams, ditches, and shorelines. Phosphorus removal BMPs supported through the HIP included infiltration systems, treatment devices, rainwater harvesting and reuse, bioretention, rock-filled trenches, and permeable pavement.

HIP participants were eligible for free technical assistance, project design, permitting, and construction management from HIP staff. Reimbursements for eligible project expenses were provided on a sliding scale, where improving up to 30% of the property qualified for up to \$1,000 in reimbursement and improvement to 92% of the property was eligible for \$6,000.

Summary and detail of all project expenses, by project and category, were recorded in the HIP Calculations spreadsheet provided as part of the document hand-off at the completion of HIP.

## OUTCOME:

The project engaged more than 250 homeowners and resulted in the completion of approximately 150 unique projects and 350 best management practices. Completed projects reduce phosphorus loading in runoff by an estimated 19lbs. per year. Approximately 20 acres of developed private property were retrofit to meet forested hydrology or replace phosphorus sources (lawn) with phosphorus sinks (forested landscapes).

Lessons learned from this portion of the project are many and, for the most part, are very specific to environmental conditions, regulatory structure, land-use, and BMP effectiveness within this particular geographic area. Other specific lessons learned were derived from one-on-one interactions with homeowners and contractors, and apply mostly to attitudes and willingness of homeowners in the watershed.

In preparing for interviews, surveys, evaluation, and design for the next version of the program, the City's HIP staff developed a long (12+ page) document listing the themes, anecdotes, and lessons learned from the staff's perspective. This document is helpful for development of concepts, but is not **by any means a scientific document**. Therefore, the City doesn't recommend the use of this document for any meaningful analysis and we remain hesitant regarding the utility of this information. We hope to, however, confirm these themes through our research and release a final lessons learned report. Currently, this long list is in draft format and will be finalized once the research is complete, to reflect the data gathered in the surveys. The City will provide this fact-checked document to Ecology at that point. However, if other jurisdictions would be interested in reviewing our working draft, we would be more than happy to share, and to make ourselves available to provide technical support to similar programs.

WHAT ARE THE WATER QUALITY BENEFITS?

<b>Table 1: HIP Outcomes and Project Summary</b>				
<b>Measureable Metrics</b>				
<b>Properties Retrofit</b>	Number	122		
<b>Adjacent ROW Areas Retrofit</b>	Number	31		
<b>Total Projects Completed</b>	Number	153		
<b>BMPs Installed</b>	Number	362	3.0	BMPs per project
<b>Low-Phosphorus Mulch Replacing Lawn</b>	CY	3,073		
<b>Native Plants Installed</b>	Plant	8,628	1270	plants per acre
<b>Lawn Converted to Forest</b>	SF	220,869	5.07	AC
<b>Traditional Landscape Converted to Forest</b>	SF	99,182	2.28	AC
<b>Area Treated (60% assumed efficiency)</b>	SF	117,565	2.70	AC
<b>Impervious Surface Dispersed or ReUsed</b>	SF	51,682	1.19	AC
<b>Area Infiltrated (95% average efficiency)</b>	SF	401,334	9.21	AC
	<b>TOTAL</b>	<b>890,632</b>	<b>20.45</b>	<b>AC</b>
<b>Calculations Accounting for Inefficiencies of BMPs, Normalizing Results</b>				
<b>100% Effective Forested Areas Created</b>	SF	296,047	6.80	AC
<b>100% Effective Forest Hydrology Matched</b>	SF	464,727	10.67	AC
<b>Total Area of Effective Full Mitigation</b>	SF	760,774	17.46	AC
<b>Summary Calculations</b>				
<b>Phosphorus Removed</b>	Lbs/Yr	19.37		
<b>Flow Removed</b>	Gal/Yr	8,411,590		
<b>Average Lots Removed</b>	Lots	78	10,057	SF Average Lot

<b>Table 2: HIP Best Management Practices Installed, 2011-2014</b>	
<b>BMP Specific Types</b>	<b>#</b>
Native Planting	131
Infiltration Trench	66
Rainwater Harvesting and ReUse	40
Permeable Paving	30
Impervious Surface Removal	18
Bioretention	17
Eroding Slope Mitigation	12
Impervious Surface Dispersion	12
Sand Filter	11
Invasive Species Removal	11
Riparian Buffer Planting	4
Vegetated Berm	4
Shoreline Restoration	3
Sheet Flow Dispersion	1
Compost-Amended Soil Installation	1
Media Filter Drain	1
<b>TOTAL</b>	<b>362</b>

**Table 3: HIP BMP Cost and Project Effectiveness Analysis, Installed BMPs**

BMP Classes	# BMPS	Lbs P Mgmt	Cost	Cost/Lb	Cost/BMP	Cost/Managed Acre	P-reduction /acre	Effectiveness Factor	Acres to equal 1lb P removal	Cost/Treated Acre
Reforestation	194	7.70	\$232,046.12	\$30,116.95	\$1,196.11	\$31,582.25	85%	0.94	1.1	\$33,440.02
Infiltration	113	9.93	\$357,747.73	\$36,019.70	\$3,165.91	\$38,829.23	90%	1.00	1.0	\$38,829.23
Treatment	15	0.86	\$47,488.64	\$55,392.23	\$3,165.91	\$17,595.42	45%	0.50	2.0	\$35,190.83
Rainwater Re-use	40	0.96	\$36,546.13	\$38,098.68	\$913.65	\$30,802.78	25%	0.28	3.6	\$110,890.01
<b>TOTAL</b>	362	19.45	\$673,828.62	\$34,638.09	\$1,861.41	\$32,956.34				

**Table 4: Project-specific reimbursable items**

<b>Native Planting Projects</b>					
Landscape Design	Native Plants		Mulch	Planting Materials	Planting Labor
\$4,701.05	\$45,212.26		\$77,858.28	\$21,992.65	\$52,216.54
<b>Infiltration or Treatment Projects</b>					
Drain Rock/Sand	Permeable Paving	Pipe and Fittings	Filter Fabric	Excavation Labor	Equipment
\$71,017.12	\$38,057.55	\$17,610.66	\$4,804.85	\$181,686.38	\$73,672.23
<b>Miscellaneous and Other</b>					
Rainwater Tanks	TESC	Delivery	Haul Away	Sales Tax	
\$11,353.19	\$6,068.43	\$11,653.14	\$6,881.04	\$48,564.47	
<b>Totals</b>					
Total Reimbursable	Total Reimbursed		Total Cost	Remaining To Award	
\$673,349.84	\$535,755.55		\$731,825.57	-\$55,089.55	

## DELIVERABLES;

All education and outreach and technical assistance documents created as part of the project were included in the information transferred to Ecology via file transfer. These documents include:

1. Example site plans showing project (and BMP) designs that can be used for templates.
2. Education and outreach materials intended to garner interest in the program and
3. Education and outreach materials intended to train homeowners about the program and their individual project
4. BMP design checklists and guidance for contractors and homeowners
5. Materials developed for workshops, public presentations, and cooperative training events.

## Trainings and Outreach

<b>Table 5: HIP Trainings and Public Outreach Summary</b>		
<b>Date</b>	<b>Event Title</b>	<b># of Attendees</b>
7/8/2010	Silver Beach Neighborhood Association Meeting	40
9/24/2010	Sustainable Landscape Tour	18
3/10/2011	Silver Beach Elementary Parent-Teacher Organization Meeting	10
7/6/2011	Silver Beach Creekside Meeting	10
7/12/2011	Lake Whatcom Rain Garden Workshop	20
1/26/2012	Silver Shores Homeowners Association Annual Meeting	8
2/9/2012	Silver Beach Neighborhood Association Meeting	40
9/11/2012	Gardening Green Lake Whatcom Presentation	18
10/19/2012	Make a Difference Day Rain Garden Planting - Geneva	80
3/15/2013	The Dirt on Low Impact Development	30
3/28/2013	HIP Suppliers Workshop	10
6/1/2013	Lake Whatcom Rain Garden Tour	35
6/1/2013	Watershed-Friendly Project Expo	65
8/19/2013	International Low Impact Development Symposium	80
11/8/2013	Silver Beach Elementary Students "Friday Club"	20
11/15/2013	Silver Beach Elementary Rain Garden Planting Party	60
1/31/2014	Silver Shores Homeowners Association Annual Meeting	8
2/13/2014	Silver Beach Neighborhood Association Meeting	5
3/15/2014	Lake Whatcom Solutions Workshop	80
3/20/2014	Sightline Stormwater Learning Cohort Presentation	20
3/24/2014	Whatcom Conservation District Native Plant Sale Table	10
6/12/2014	Peter's Street Trail ROW Planting Party	60
	TOTAL	727 people

<b>Table 6: Documentation of Effort, Site Visits</b>		
Site Visits, One-on-one (or one-on-two) Outreach		
Type of Contact	Year	Number
Introductory Site Visit	2010	42
	2011	52
	2012	29
	2013	44
	2014	40
Follow-Up Site Visit	2010	28
	2011	71
	2012	48
	2013	58
	2014	68
Construction Assistance	2010	0
	2011	15
	2012	16
	2013	34
	2014	28
Inspection/ Reimbursement	2010	1
	2011	19
	2012	26
	2013	57
	2014	58
Total		734 visits
Annual Average		147

**EVALUATION:**

In mid-spring to early summer 2015, the City of Bellingham completed an in-depth survey through a consultant (PRR, Inc.) to evaluate the program. The completed report and recommendations are included in the documents submitted to Ecology at the completion of the project.

**FOLLOW-UP:**

This program will continue as a locally-funded project, cooperatively implemented and funded by the City of Bellingham and Whatcom County. We are currently undertaking a robust research project to evaluate the ways to improve the program to reach more participants, incentivize a higher level of participation, and expand to additional areas around the Lake. This research is focusing on three target audiences, shoreline properties, properties with at least 10,000ft<sup>2</sup> of impervious surface, and those with at least 5,000ft<sup>2</sup> of lawn. These types of properties represent not only the biggest impact to the Lake, but especially in the case of the shoreline residences, are

in locations that otherwise would not be able to be captured in municipal stormwater systems. The combination of projects on these target lots and large-scale capital improvements in applicable areas is expected to be the primary approach to restoring water quality in Lake Whatcom and meeting the aggressive goals of the Lake Whatcom Total Maximum Daily Load (TMDL) response plan.

Upon completion of two large-scale surveys, the City and County will hold focus groups to test messaging and develop outreach materials. Once completed, this information will expressly drive the development of a new generation of residential retrofit programs, likely with multiple levels of participation and varying incentive structures intended to maximize the benefit of projects while minimizing the barriers.



# Homeowner Incentive Program

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## By the numbers; Program Totals (2011-2015)

**283** site visits requested and completed

**450+** residents engaged in project development

**241** projects designed and queued for construction

**180** projects completed within the grant period

**422** Best Management Practices (BMPs) for phosphorus reduction installed

**8.53** acres of lawn and traditional landscape converted to forest

**3,468** cubic yards of low-phosphorus mulch spread

**10,069** native plants installed to replace lawn

**10.27** acres of development infiltrated to match forested hydrology

**21.53** pounds of phosphorus reduction achieved (per year)

**9,448,670** gallons of runoff reduction achieved (per year)

**\$39,595** per pound of phosphorus reduction (71% of this was reimbursed, on average)

# Homeowner Incentive Program: Progress by Program Year

Year	Site visits	Projects Complete	BMPs	Pounds P removed	Gallons of flow removed	Reimbursements
<b>2011</b>	104	16	33	2.23	1,121,380	\$47,459.90
<b>2012</b>	50	19	41	2.00	732,770	\$54,699.01
<b>2013</b>	42	48	111	6.08	3,289,612	\$141,589.62
<b>2014</b>	49	69	176	8.97	3,242,648	\$290,396.62
<b>2015</b>	38	28	61	2.25	1,062,260	\$75,526.31
<b>Total</b>	283	180	422	21.53	9,448,670	\$609,641.46
<b>Reimbursable Expenses Submitted<sup>1</sup></b>						\$782,587.46
<b>Total Project Costs<sup>2</sup></b>						\$852,471.54

1 = Reimbursement amount tied to scale of project. This is the amount that would be reimbursed if there were no cap/sliding scale.

2 = Labor charges were 75% reimbursable and total reimbursement was capped. This is the amount that would be reimbursed if there were no cap/sliding scale and 100% of labor costs were reimbursed.