



King County

Small Habitat Restoration Program Annual Report 2014

Enhancing streams and wetlands for community, fish, and wildlife

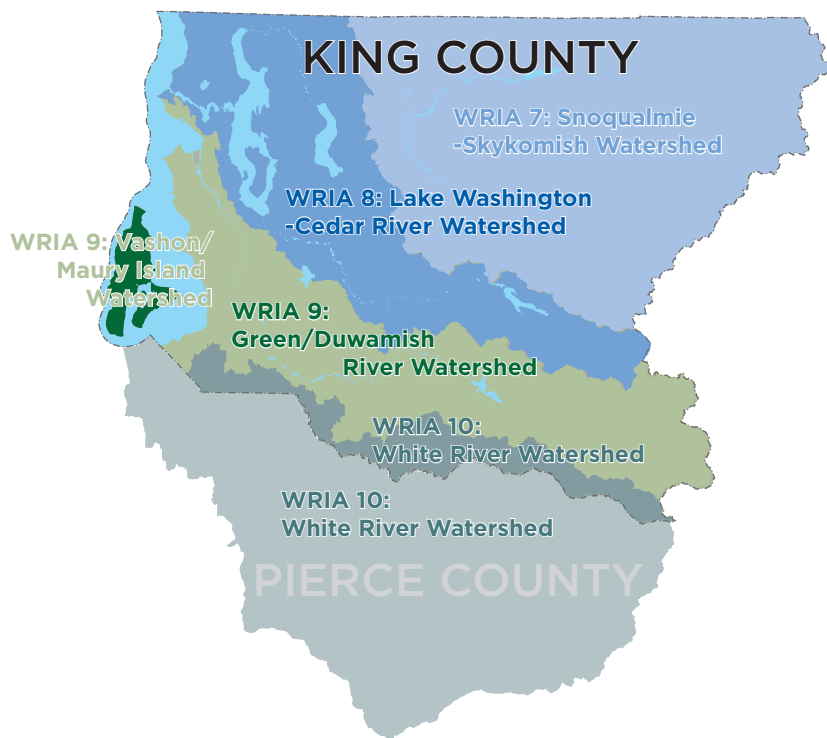


King County

Department of Natural Resources and Parks
Water and Land Resources Division

www.kingcounty.gov/shrp





Project Partners



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SHRP Mission



2014 Program Summary and Accomplishments



In 2014 the Small Habitat Restoration Program (SHRP) constructed and maintained 49 habitat projects to enhance and restore streams, wetlands, and riparian buffers throughout King County. SHRP staff worked with 28 private property owners to enhance fish and wildlife habitat on their property.

PROGRAM HIGHLIGHTS:

23 new construction or phased planting projects

26 projects maintained and monitored

7,295 lineal feet of streambank restored

14.4 acres of riparian buffer enhanced

1,306 square feet of wetland habitat restored

155 linear feet of nearshore or marine shoreline restored

2,178 square feet of estuarine habitat restored; and

16,153 native trees, shrubs and non-woody plants installed

In 2014, grant funding for SHRP totaled over \$85,500. Strengthening relationships with grant agencies and forging new partnerships with private landowners allows the program to maximize limited public funding to improve water quality and enhance habitat for fish, wildlife and future generations.

Spotlight projects within King County's Watershed Resource Inventory Areas (WRIAs) showcase successful collaborations with various private property owners, homeowner associations, community groups, and public agencies. These multi-year projects typically involve outreach, planning, site preparation, phased native plantings, and maintenance.

SPOTLIGHT PROJECTS INCLUDE:

WRIA 7: Snoqualmie-Skykomish Watershed

Lein Restoration Project

Part of a large scale effort to improve Chinook salmon habitat on the Snoqualmie River. SHRP Project Manager Cindy Young implemented the planting using SWM funds.

WRIA 8: Lake Washington-Cedar River Watershed

Huselton Phase 2 and Mourey Buffer Restoration

Two flood prone rural residential properties were converted to forested buffer along the Cedar River. The plantings are a second phase in a series of floodplain restoration projects along the

Cedar implemented by SHRP Project Manager Laura Hartema.

WRIA 9: Green/Duwamish Watershed

Collard Newaukum Buffer Enhancement

Along Newaukum Creek, the property owner was interested in enhancing their property to support healthy salmon populations. SHRP Project Manager Cody Toal worked with the owner to restore over an acre of degraded riparian buffer.

Vashon/Maury Island

Raab's Lagoon Estuary Enhancement

SHRP Project Manager Paul Adler implemented a shoreline enhancement project in the Raab's Lagoon Natural Area of Quartermaster Harbor. The project included planting, fencing and recreational enhancement.

WRIA 10: Puyallup/White River Watershed

Vanwieringen Boise Creek Buffer Restoration

Project Manager Laura Hartema continued weed control and planting on a farm to enhance Boise Creek buffers and provide cover for salmon.



Lein Restoration Project - during

Project Spotlight 1: WRIA 7 Snoqualmie-Skykomish Watershed

Mike Lein Snoqualmie River Riparian Restoration

A large scale effort is underway to improve Chinook salmon habitat on the Snoqualmie River downstream of Fall City. SHRP is working to improve floodplain habitat on a privately owned parcel. Approximately three acres of knotweed and blackberry was removed from the left bank floodplain of the Snoqualmie River over a three year period. Clematis was also removed from over 15 mature trees. In 2014 the cleared area was planted with 1,800 cottonwood and 3,000 willow stakes and 600 shrubs including Sitka spruce, ninebark, red twig dogwood, twinberry, snowberry, and salmonberry. The plants will help with erosion control, provide habitat for wildlife and provide shade to the river.



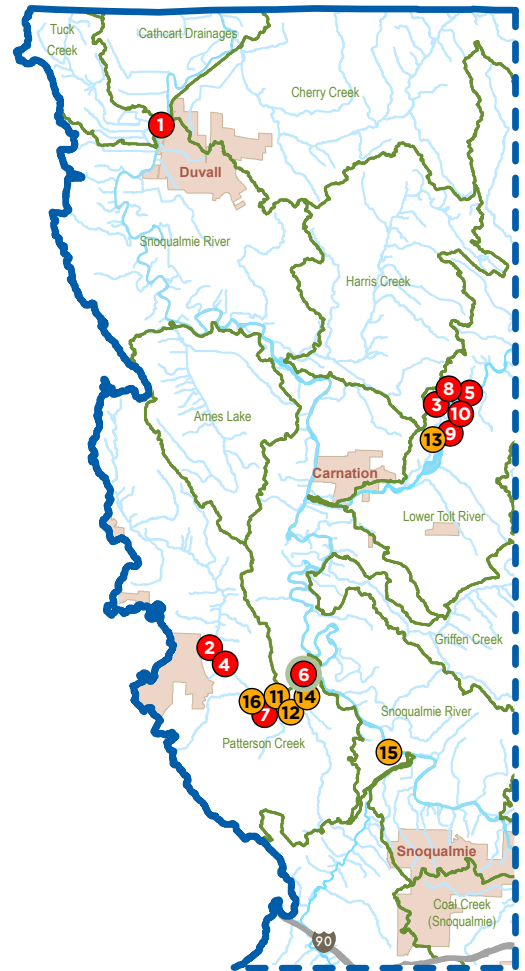
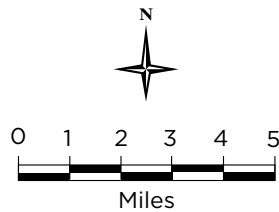


SHRP 2014 Projects: WRIA 7 Snoqualmie-Skykomish Watershed

- 2014 Construction Project
- 2014 Maintenance & Monitoring Project

— WRIA 7 Boundary

— Basin Boundary



	Project Name	Property Ownership	Trees Planted	Shrubs Planted	Streambank Resoration Linear Ft	Riparian Buffer Restoration Sq Ft
1	Andrews Tuck Creek Riparian Planting	Private	0	100	100	2,500
2	Crittenden Patterson Riparian Planting	Private	0	100	100	2,500
3	Estapa Tolt River Restoration	Public	0	50	50	1,250
4	Lee Patterson Riparian Planting	Private	50	100	150	3,000
5	McClosky/Mouncy Tolt River Restoration	Public	50	100	150	3,000
6	Mike Lein Snoqualmie River Riparian Restoration	Private	1,800	3,600	400	4,000
7	Montaine Patterson Creek Restoration	Private	150	150	150	6,000
8	Moran/Wait Tolt River Restoration	Public	50	0	160	3,200
9	Stansbury Tolt River Restoration	Public	0	50	50	1,250
10	Thornquist Tolt River Restoration	Public	490	632	100	30,000
	Total		2,590	4,882	1,410	56,700

- 11 Aldarra Patterson Riparian Planting
- 12 Gordon Patterson Riparian Planting
- 13 Heintz/Mernikas/Valenta Tolt River Restoration

- 14 Patrick Lein Patterson Creek Restoration
- 15 Quigley Park Snoqualmie Riparian Planting
- 16 Storybrook Patterson Creek Restoration



Huselton 1 DS Channel, April 2014

Huselton 1 DS Channel, July 2014



Huselton Phase 1 Planting, December 2013

Huselton Phase 1 Planting, July 2014

Project Spotlight 2: WRIA 8 Lake Washington-Cedar River Watershed

Huselton Cedar River Phase 2 and Mourey Cedar River SHRP

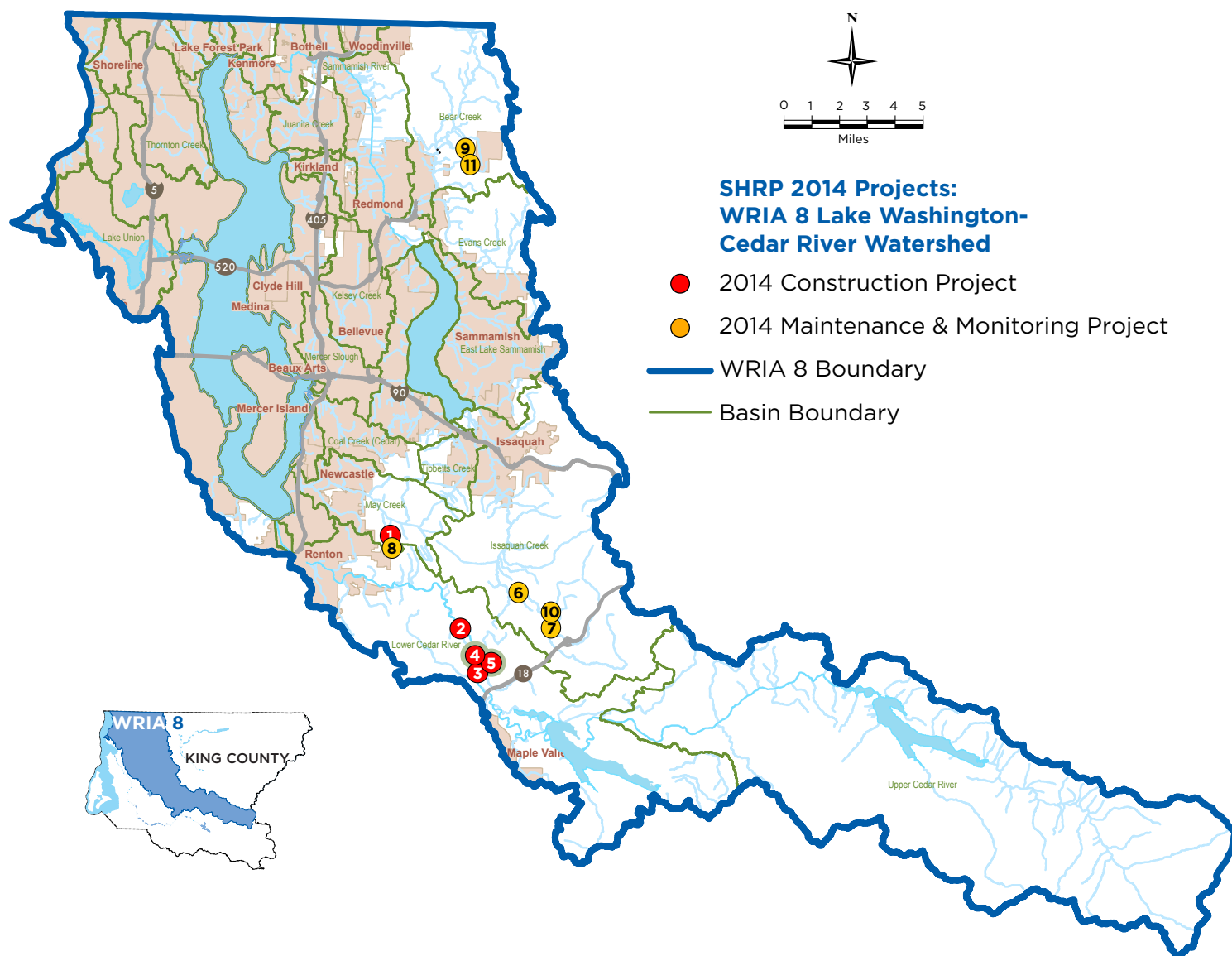
Two flood-prone properties along the Cedar River were acquired by King County for flood and habitat purposes. These parcels are included in a larger, reach-wide restoration goal to reforest the buffer and remove or setback the adjacent revetments. These actions will allow the river to reclaim the floodplain and increase the area of aquatic habitat available to salmon. Residential structures were removed, invasive weeds were controlled, and the sites were planted to convert past rural residential property and mowed pasture into forested buffer as follows:

- Huselton, Phase 2: 2,800 trees and 100 shrubs were installed along 1,000 LF (2.6 acres) of the Cedar River.
- Mourey: 1,365 trees and 425 shrubs were installed along 200 LF (2.07 acres) of the Cedar River. About five cubic yards of garbage were removed from the site.

Both sites will be maintained through 2017. About 15% of the Huselton, Phase 2 project was funded by Carbon Mitigation dollars.

Science in Action: SHRP implemented a cottonwood pole study in the Huselton 2 site to test the maintenance effects of watering, herbicide control of dense grasses, versus no treatment on cottonwood survival and cover.





	Project Name	Property Ownership	Trees Planted	Non-Woody Plants Installed	Shrubs Planted	Streambank Resoration Linear Ft	Riparian Buffer Restoration Sq Ft
1	Coalfield Park Buffer Enhancement and Interpretive Signs	Public	230	35	1,096	625	16,500
2	Cottage Lake Creek Enhancements, Upstream of Avondale	Private	58	0	271	160	32,275
3	Huselton and Dean Phase 1 Cedar River Planting	Public	325	0	100	1,000	108,900
4	Huselton Cedar River Phase 2	Public	2,800	0	100	1,000	113,256
5	Mourey Cedar River SHRP	Public	1,365	0	425	200	90,169
	Total		4,778	35	1,992	2,985	361,100

- 6 Ahlstrom Middle Issaquah Bank Stabilization
- 7 Bonomi Middle Issaquah Creek Maintenance
- 8 Cemetery Ponds Wetland Enhancement
- 9 Craig Property, Bear Buffer Enhancement SHRP
- 10 Ellis Middle Issaquah Bank Stabilization
- 11 Lien Bear Creek Buffer Enhancement



Willow stakes leafing in the Spring



Live stake delivery



Willow stakes after installation



*Conservation Corps
planting the project*

Project Spotlight 3: WRIA 9 Green/Duwamish River Watershed

Collard Newaukum Buffer Enhancement

Project History:

The Collard family responded to an outreach letter sent out in 2012. They were interested in restoring their riparian buffers back to healthy salmon habitat. The buffers were dominated by reed canarygrass and invasive blackberry. The site was prepped by removing the blackberry and mowing down reed canarygrass, creating areas that could be planted. In 2013, 3,500 trees

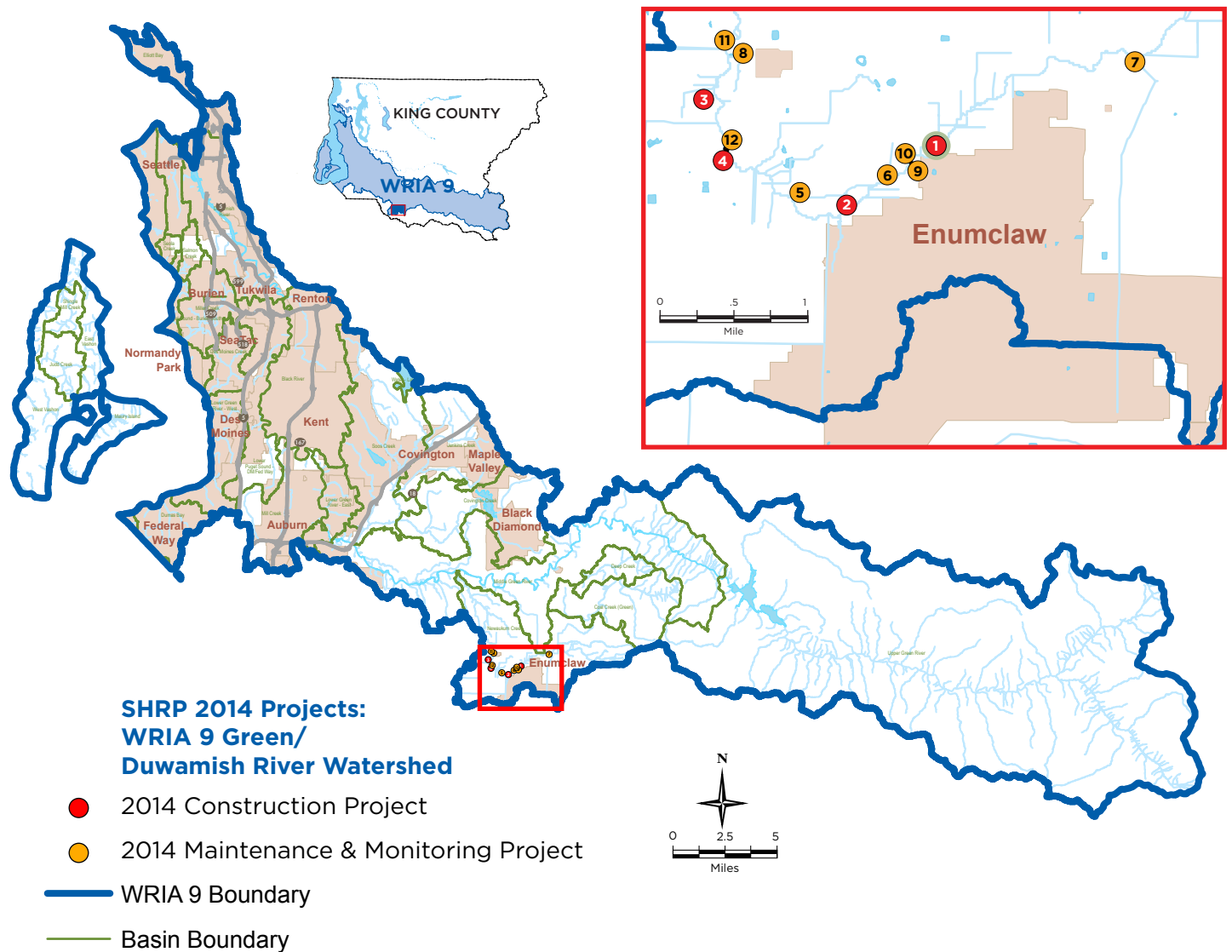
and shrubs were planted. In 2014, an additional 1,380 trees and shrubs were installed. The total area enhanced is 48,900 square feet (1.12 acres). The project was funded by King County funds as well as a Grant from the Rose foundation.

Conservation Significance:

Newaukum Creek is an important stream for maintaining salmon populations in the Green River watershed.

The Creek is used by Chinook, steelhead, chum, pink, and coho salmon and is a critical spawning area for Chinook, steelhead, and coho.





	Project Name	Property Ownership	Trees Planted	Shrubs Planted	Streambank Restoration Linear Ft	Riparian Buffer Restoration Sq Ft
1	Collard Newaukum Buffer Enhancement	Private	1210	170	600	48,900
2	Rosatto Newaukum Riparian Planting	Private	0	240	300	2,000
3	Westby East Newaukum Buffer Enhancement	Private	10	350	100	4,000
4	Zech West Newaukum Buffer Enhancement	Private	1050	0	600	80,500
	Total		2,270	760	1,600	135,400

- 5 Big Springs Natural Area Newaukum Creek Buffer Enhancement
- 6 Brewer Phase 2 Newaukum Buffer Enhancement
- 7 Fallen Phase 2 Newaukum Buffer Enhancement
- 8 Lopez Newaukum Pond and Riparian Planting

- 9 Magnusson Newaukum Creek Habitat Enhancement
- 10 Newaukum Natural Area Buffer Enhancement
- 11 Walker Newaukum Buffer Enhancement
- 12 Zech Newaukum Buffer Enhancement

BACKGROUND

One type of problem we often encounter when planting restoration projects is a “wet field dominated by invasive reed canarygrass.” With a high water table and the aggressive root system of reed canarygrass, few species survive and outcompete as well as willows. Access to these sites for planting willows is typically difficult. Smaller diameter poles are lighter and easier to transport by hand labor, but do they survive as well and provide the desired cover as quickly as larger nursery and harvested stock? The question arises: How do we cost-effectively establish woody native cover in wet fields with reed canarygrass?

This experiment was conducted by Ecological Restoration and Engineering Services Section (ERES) Monitoring Program to determine whether survival and cover of Sitka willow (*Salix sitchensis*) poles planted in reed canarygrass is significantly different between size classes and stock (source).

In January 2013, a field along Newaukum Creek was planted with 6' tall Sitka willow poles at 3' on center as a King County Small Habitat Restoration Project (SHRP) project managed by Cody Toal.

In September 2014 (Year 2) we compared the survival, cover, and cost-effectiveness of the following three ‘treatments’.

- A. *Small nursery stock* ($\frac{1}{4}$ " to $\frac{1}{2}$ " diameter) from Skagit County.
- B. *Large nursery stock* ($\frac{3}{4}$ " to 1" diameter) from Skagit County.
- C. *Large field harvest* ($\frac{3}{4}$ " to 1- $\frac{1}{2}$ " diameter) collected from Thurston County.

QUESTION

What size class and source of Sitka willow is the most cost-effective for establishing woody cover in reed canarygrass?

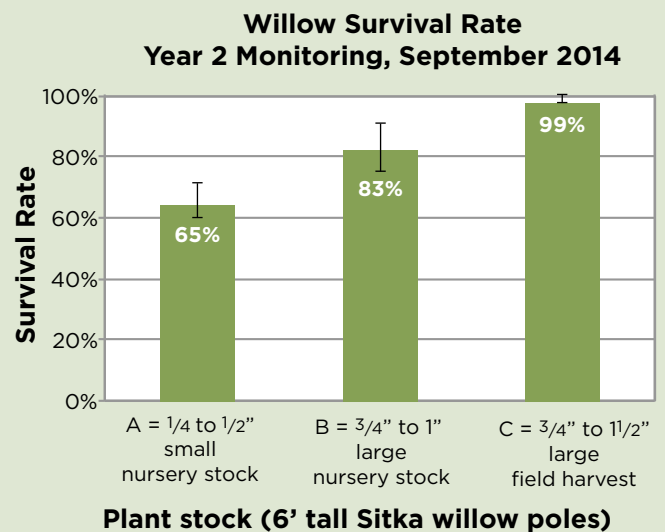
EXPERIMENTAL DESIGN

- Completely randomized, balanced design
- **30 plots**, each plot was 15' x 30'
- Each plot was planted with **50, 6' tall Sitka willow poles, at 3' on center.**
- Three treatment types (10 with small nursery stock, 10 with large nursery stock, and 10 with large field harvest.
- Treatments were applied at random to the plots.
- The response variables were cover and survival.

RESULTS

Was there a significant difference in SURVIVAL between the three “treatments” by 2014 (Year 2)? ANSWER: YES

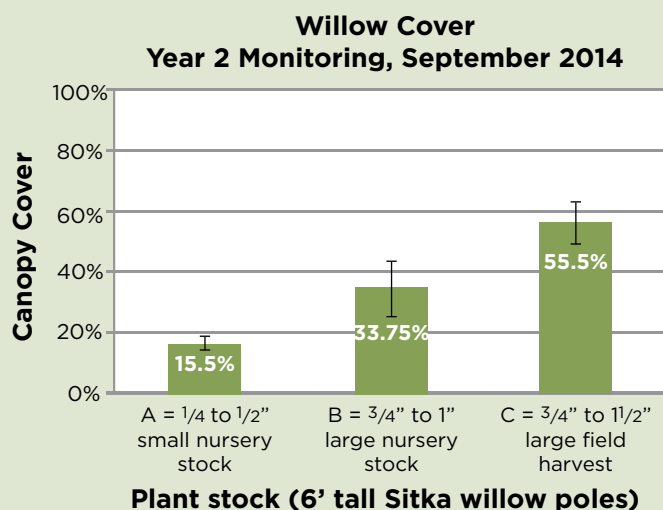
- There was a statistically significant difference in survival between the size class ‘treatments’ for Sitka willow (at $p < 0.05$).
- Average survival was lowest in the $\frac{1}{4}$ - $\frac{1}{2}$ " nursery stock and highest in the $\frac{3}{4}$ to 1- $\frac{1}{2}$ " field harvest stock.
- If permit or project performance standards required 80% survival, either large nursery stock or large field harvest treatment would have succeeded; small nursery stock would have failed to meet the standard.



Was there a significant difference in PERCENT COVER between the three “treatments” by 2014 (Year 2)? ANSWER: YES

- There was a statistically significant difference in cover between the size class ‘treatments’ for Sitka willow (at $p < 0.05$).
- Average cover was lowest in the $\frac{1}{4}$ " to $\frac{1}{2}$ " nursery stock and highest in the $\frac{3}{4}$ " to 1- $\frac{1}{2}$ " field harvest stock.





WHAT'S THE TAKE-AWAY?

- The large field harvest treatment showed the highest survival and cover in Year 2 of monitoring.
- The large field harvest had higher survival and cover than the same or smaller diameter nursery stock.
- No site preparation or maintenance of any kind was done on this project. It is an example of how we can achieve good cover in a short amount of time, using the best available plant stock.
- If the entire site was planted with the large field harvest at 3' on center, we'd expect a 55% cover by Year 2. Future data will help us set realistic performance targets for reed canarygrass dominated project sites.
- The large nursery stock was the most cost effective.

NEXT STEPS

We will monitor in Year 3 and 5 to see if survival and cover trends remain similar to what was observed by Year 2.

ACKNOWLEDGEMENTS

The study was funded by the ERES Monitoring Program.

SUGGESTED CITATION

Hartema, L, P. Adler, C. Toal, and Latterell, J.J. 2014. Rapid Update for the Zech Property Willow Study. King County Water and Land Resources Division. Seattle, WA.

AUTHORS' ROLES:

Laura Hartema: Ecologist. Managed the monitoring study, data collection and analysis.

Paul Adler: Ecologist. Originated concept for study. Assisted with experimental design.

Cody Toal: Ecologist. Helped develop and implement study.

Joshua Latterell, PhD, ESA-Certified Ecologist. Senior Ecologist. Experimental design and data analysis.

Photos at same focal length for each treatment, 2014 (year 2)



Size Class A, small nursery stock



Size Class B, large nursery stock



Size Class C, large field harvest



Raab's Lagoon planting and new fence completed



Goose exclusion to protect emergent vegetation



Installing split rail fence at Raab's Lagoon



Raab's Lagoon planting and new fence in progress

Project Spotlight 4: WRIA 9 Vashon/Maury Island

Raab's Lagoon Estuary Enhancement

Working with KC's Capital Improvement Program and KC Parks, SHRP completed a shoreline enhancement project in the Raab's Lagoon Natural Area. The project restored native vegetation to the intertidal zone and buffer of the lagoon. Because of the high use of this unique area, SHRP held a public meeting to solicit input on the project and adapted the design to maintain access to the shoreline and installed the planting behind both temporary (wire fencing) and permanent split rail fence. The planting design was more of a formal landscaped design than is typical of restoration

plantings. WCC crews installed 45 trees, 777 shrubs, 30 emergent, 36 perennials, and 95 yards of mulch along 155 feet of shoreline, covering 10,142 sq. ft. The fencing consisted of 150 feet of split rail, 210 feet of temporary wire fence and 200 feet of goose exclusion fence along the shoreline. A drip irrigation system was also installed consisting of over 4,000 feet of irrigation tubing with two water tanks. The site was maintained along with previous planting on the bluff above the shoreline of Quartermaster harbor.

The project will enhance marine habitat along 300 feet of shoreline by replacing non-native vegetation with native emergents, shrubs and trees in the intertidal zone and buffer of the lagoon. Emergent plants will be protected by a goose exclusion fence that will remain in place for 3-5 years until the plants are established. The upland plots will be protected by permanent fencing to limit impact by park users and their dogs.



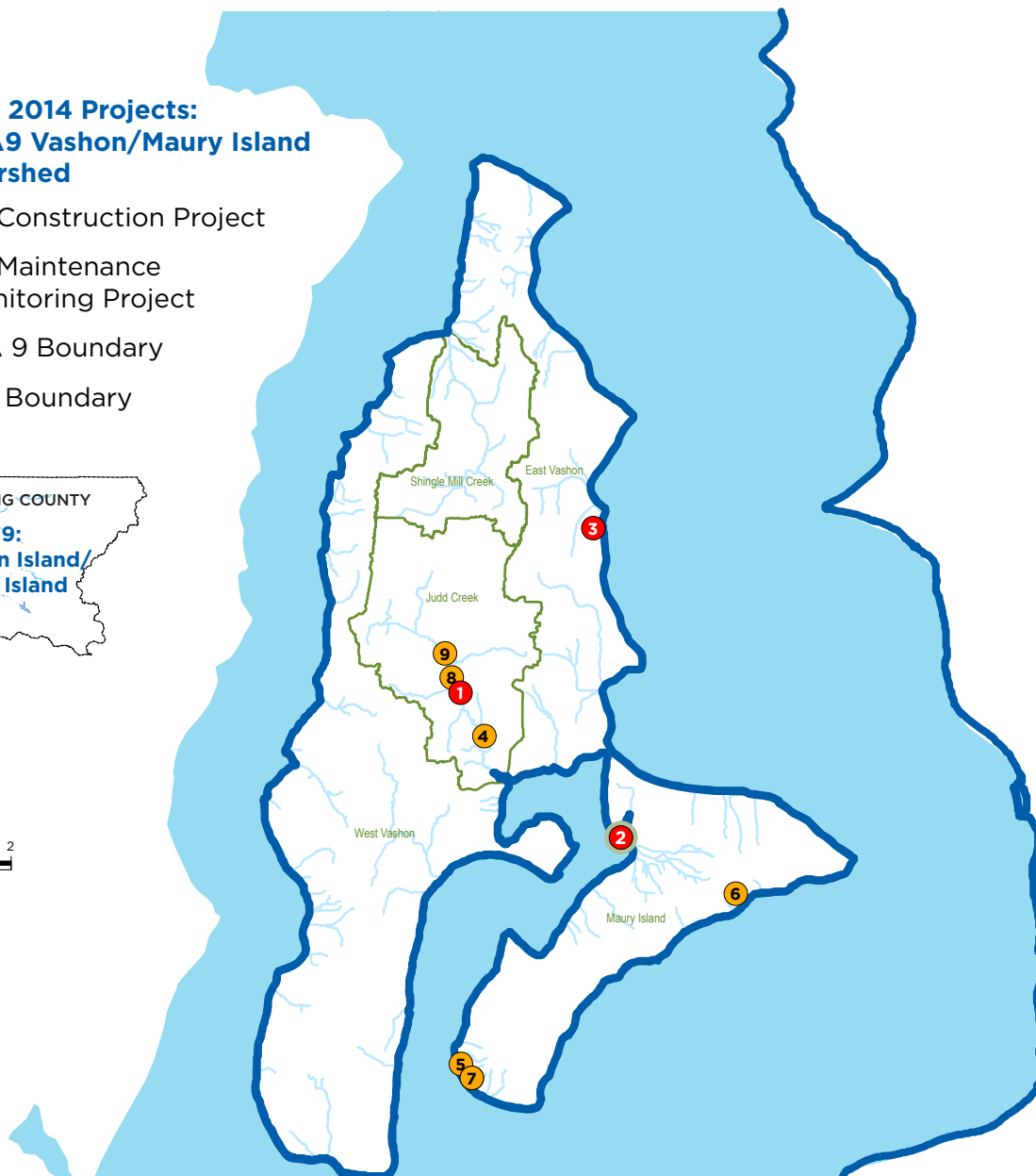
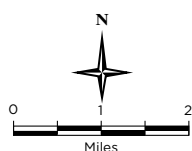
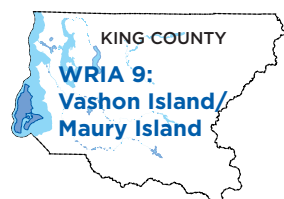
SHRP 2014 Projects: WRIA9 Vashon/Maury Island Watershed

● 2014 Construction Project

● 2014 Maintenance
& Monitoring Project

— WRIA 9 Boundary

— Basin Boundary



					Acres of Wetland Habitat Restored or Enhanced	Streambank Resoration Linear Ft	Riparian Buffer Restoration Sq Ft	Number of linear feet of nearshore or marine shoreline restored	Number of acres of restored estuarine habitat
Project Name	Property Ownership	Trees Planted	Non- Woody Plants Installed	Shrubs Planted					
1 Anderson and Eagleson Properties, Judd Creek Habitat Enhancement	Public	710	35	1,820	0.03	400	45,600	0	0
2 Raabs Lagoon Estuary Enhancement	Public	45	66	777	0	0	10,142	155	0.05
3 Timmons Property, Point Heyer Enhancement	Public	59	0	114	0	0	7,100	0	0
Total		814	101	2,711	0.03	400	62,842	155	0.05

- 4 Douglas Judd Creek Enhancement
- 5 Manzanita Natural Area Ivy Removal
- 6 Maury Island Marine Park
- 7 Northilla Natural Area Ivy Removal
- 8 Palmer Judd Creek Buffer Planting
- 9 Singer Judd Creek Pond Enhancement

Project Spotlight 5: WRIA 10 Puyallup/White River Watershed

Vanwieringen Boise Creek Buffer Restoration



Vanwieringen buffer 2009

This project is located on the Vanwieringen Organic Dairy Farm south of Enumclaw. This project on Boise Creek has replaced non-native plants with native trees and shrubs in stages from 2008-2014. Plant maintenance was conducted through 2014. In November 2014, an additional 70 trees and 480 shrubs were installed along Boise Creek. Overall, the project removed Himalayan blackberry by hand labor and installed over 1,300 trees and 1,300 shrubs along 1,200 linear feet.

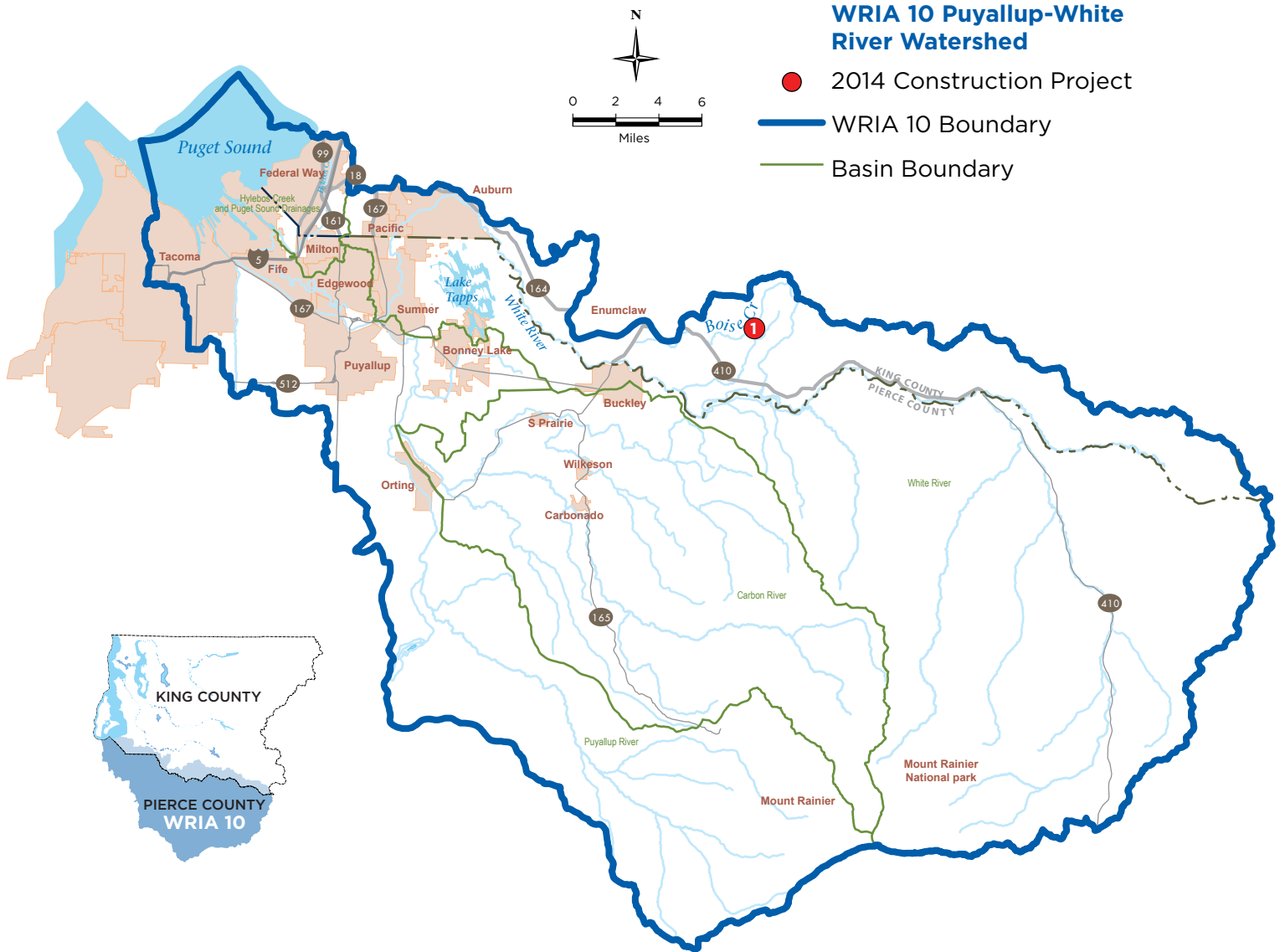


Vanwieringen buffer 2012



Vanwieringen buffer 2014

SHRP 2014 Projects: WRIA 10 Puyallup-White River Watershed



Project Name	Property Ownership	Trees Planted	Shrubs Planted	Streambank Restoration Linear Ft	Riparian Buffer Restoration Sq Ft
1 Vanwieringen Boise Creek Buffer Restoration	Private	70	480	1,200	12,000



Our Mission:

"Enhancing streams and wetlands for community, fish, and wildlife"

The Small Habitat Restoration Program (SHRP) works with local property owners and public agencies to design, permit, and construct habitat enhancement projects at no cost to the property owner.



www.kingcounty.gov/shrp
Mason Bowles, program manager

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