Brent Haddaway

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BY:_____

From: Brent Haddaway
Sent: Wednesday, January 18, 2012 3:42 PM
To: FIELD Dana; Davis, Jaimee NWP
Subject: Garret Cr 2011 Monitoring
Attachments: 2011_Monitoring FINAL.pdf; Garret Upland Monitoring Calcs 2011.xls; Garret wetland Monitoring Calcs 2010.xls; MonitoringDataform 2011 upland.xls; MonitoringDataform 2011 wetlandFINAL.xls

Dana and Jaimee,

This email is to provide you with the 2011 monitoring report for Garret Creek Mitigation Bank. My apologies for the later-than-usual timing; I was in a bike accident in December and that set me back a few weeks. I am providing you with a complete report following previous year's format, while incorporating comments from agencies last year.

I'm also providing the data entry spread sheets to "show my work". I tried to use the standard DSL monitoring spread sheets, and hide unnecessary rows. However, I can't get the total stems per acre equations to work correctly – I'm not an excel wiz by any means. So, I've provided a second set of spreadsheets developed by the monitoring person I work with to show that step – hope this makes sense.

As with previous years, the results look good across the board. Of special notice, our native herbaceous cover has gone up due to natural recruitment and weed control. 2012 monitoring will include wetland delineation, so I may be in contact next month to make sure I'm collecting all the data you'll need to feel comfortable with my results.

Other than that – I hope all is well, please feel free to contact me with any questions.

Brent

Brent Haddaway, PWS
Principal - Cascade Environmental Group
222 NW Davis, Suite 317
Portland, OR 97209
office 503 894 8585
cell 503 522 0855

Hard Copy of report Sorry for Delays

Brent

GARRET CREEK MITIGATION BANK

THIRD YEAR MITIGATION MONITORING REPORT

PREPARED BY:

Garret Creek Mitigation Bank, LLC
33711 S Dryland Road
Molalla, OR 97038
Contact: Brent Haddaway
503 894 8585; bhaddaway@cascadeenv.com

January 2012

Contents

Appendices

Appendix A. Groundwater Data
Appendix B. Site Photos
Appendix C. Vegetation Data

Acronyms and Abbreviations

Acronyms

Corps	Corps of Engineers
DSL	Department of State Lands
FACU	facultative upland
FACW	facultative wetland
FACW-	facultative wetland, minus
HGM	hydrogeomorphic
IRT	Interagency Review Team
MBI	Mitigation Bank Instrument
OBL	obligate wetland
OHWM	Ordinary High Water Mark
USFWS	United States Fish and Wildlife Service
UPL	upland

Chapter 1
Introduction

The Garret Creek Mitigation Bank (Bank) is owned and operated by Garret Creek Mitigation Bank, LLC in Molalla, Clackamas County, Oregon (Figure 1). The mitigation bank lies at the confluence of Garret and Rock Creeks, and was developed to offset unavoidable impacts to wetlands of the U.S. and State due to development in the Molalla – Pudding watershed, Hydrologic Unit Code 17090009.

The Bank is located at 33711 S. Dryland Road, between Molalla and Canby, in Clackamas County, Oregon. The Bank is contained within three tax lots: 51E2300500, 51E2300501 and 51E2300502 and located within Section 23, Township 5 South, Range 1 East.

Project Background

The Garret Creek MBI was signed by DSL and the Portland District Corps in July 2008 and the site was graded the same summer. The site was planted during winter 2008-2009, and the first year of formal monitoring began during the spring of 2009. The Bank is eligible to earn 15.49 wetland mitigation credits, and 220 stream credits (each credit is equivalent to 1 cubic yard of fill below the OHWM). Mitigation bank development included wetland restoration, wetland enhancement, riparian enhancement, stream restoration, and upland buffer enhancement. Table 1 summarizes the areas for each mitigation activity type: detailed explanations of mitigation activities can be found in the Garret Creek MBI, produced by Jones & Stokes Associates in 2008.

Table 1. Mitigation Area Summary

Treatment Area	Area	Activities	Functions
Creek restoration	1,205 linear feet	Remove or breach berms, restore tributary channel	Hydrologic, water quality, habitat
Wetland restoration	10.68 acres	Disable tile, fill ditches, planting	Hydrologic, water quality, habitat
Cropped wetland enhancement	7.52 acres	Disable tile, fill ditches, planting	Hydrologic, water quality, habitat
Wetland enhancement	0.77 acres	Disable tile, planting	Habitat, hydrologic
Wetland buffer enhancement	0.79 acres	Protection	Habitat, hydrologic, water quality
Upland riparian enhancement	2.80 acres	Preservation, planting	Habitat
Upland buffer enhancement	1.72 acres	Preservation, planting	Buffering, habitat
Upland buffer preservation*	4.57 acres	Preservation	Buffering, habitat
Riparian Buffer	0.70 acres	Remove adjacent berm, protection	Habitat, buffering

*Does not generate mitigation credit

Chapter 2
Mitigation Goals, Objectives, and Performance Standards

Mitigation bank goals, objectives, and success criteria guide bank design elements, and are also used to evaluate mitigation bank success. Mitigation bank goals are broad and serve as an overarching descriptor for the project. Objectives for the Bank identify specific activities that were undertaken to achieve site goals; performance standards are specific thresholds that should be measured through quantitative monitoring to determine whether bank activities were successful, and therefore achieving the project goals. The goals and objectives from the Garret Creek MBI that include measures for Year 3 monitoring are provided below; performance standards that guide site monitoring are provided in the monitoring results section along with monitoring results.

Goal —To restore 10.68 acres of wetland and enhance 7.52 acres of cropped wetland to Riverine forested wetland class, to enhance 0.77 acres of wetland and 2.80 acres of upland riparian habitat, to provide protection to the Bank by providing sediment trapping and screening through establishing or preserving vegetation, and to restore stream area within the Bank.

Objective 1—Restore wetland hydrology by disabling drain tiles, filling ditches, removing berms, disking compact soils, and restoring overbank flooding to wetland areas.

Objective 2—Establish native palustrine wetland forest vegetation through planting.

Objective 3—Enhance 1.72 acres of upland buffer.

Objective 4—Restore the Garret Creek Tributary stream channel.

Monitoring Summary

2008	*Site Construction, Grading in July/August, Planting in Fall/Winter*
2009 (Year 1)	*Performance Standards 1.1, 1.2, 1.4, 2.1, 2.3, 2.5, 3.1, 3.3, 4.1, 4.2*
2010 (Year 2)	*Performance Standards 1.1, 1.2, 1.4, 2.1, 2.3, 2.5, 3.1, 3.3, 4.1, 4.2, 4.3*
2011 (Year 3)	***Performance Standards 1.1, 1.2, 1.4, 2.1, 2.3, 2.4, 2.5, 3.1, 3.3, 4.1, 4.2, 4.3***
2012 (Year 4)	*Performance Standards 1.1. 1.2. 1.3, 4.1, 4.2, 4.3*
2013 (Year 5)	*Performance Standards 1.1, 1.2, 1.4, 2.1, 2.2, 2.3, 2.4, 2.5, 3.2, 3.3, 4.1, 4.2, 4.3*

Chapter 3
Monitoring Methods

The physical, hydrologic, and vegetative conditions of the mitigation site were monitored relative to the MBI goals, objectives, and performance standards. The following methods have been used to directly address project performance standards and objectives. These methods follow the sampling approach described in the original MBI, with minor revisions: sampling increments have been changed to use English units of measure to more clearly relate to performance standards based on a "per acre", and sample size is determined statistically so sample numbers differ from the original MBI language.

- *As-Built Conditions*—The site was inspected after site construction to assess as-built conditions. Graded feature limits were surveyed to produce as-built plans, which were submitted in 2008.

- *Site Development*—Photographs are taken to document physical wetland condition and plant community development. Permanent photo stations are used each monitoring year to facilitate consistent year-to-year comparisons.
- *Soil Erosion and Sedimentation*—The bank is visually inspected for evidence of soil erosion and sedimentation, particularly at the bubble-up locations. Erosion or sedimentation is reported and assessed for whether it threatens site goals.
- *Wetland Hydrology*—The presence of saturation and inundation is monitored in groundwater monitoring wells in wetland restoration areas and recorded twice weekly during March, April, and early May. Tile discharge locations are also observed to verify that tiles are no longer discharging water.
- *Stream Restoration* –Stream flow is photo-documented and observed during annual IRT site visits and reported in annual monitoring reports.

Vegetation and Wildlife

- *Vegetation development*—Vegetation development is monitored using random transects to measure woody plant species survival, plants density, and aerial cover to address performance standards. Baselines are established along the boundary of the wetland and buffer areas. Transects are established perpendicular to the baselines extending into both wetlands and upland buffers to establish sampling areas. Transects are located every 150 feet along the baseline and oriented east-west or north-south to extend into planting areas. Transect distribution is regular, from a random starting point. Samples are calculated to assure that a confidence interval of 80%, with a confidence interval width of ±20% has been satisfied. Additional samples, as needed, are randomly located between transects. Transect locations are shifted as needed to incorporate underplanting areas. Sampling is performed as described in *Measuring & Monitoring Plant Populations* (Elzinga et al. 1998).

  Plant density (Performance Standards 2.1, 2.3, 2.5, 3.1, 3.3) is measured with 30 – 3 foot x 50 foot rectangular quadrats, distributed randomly along transect lines. All woody plants are identified to species and counted within the quadrat. The number of individual plants recorded within each quadrat will provide an estimate of plants per area. The number of plants within the samples will then be used to estimate plants per acre. This approach is used to estimate total number of woody plants, number of each species of woody plants, and number of native plants per acre. (Elzinga et al 1998, pp 170-172).

  Aerial cover (Performance standards 2.2, 2.4, 2.5, 3.2, 3.3) for invasive cover is measured using line-intercept along the full transect length. The length of intercept for each sample and total length of transects is used to calculate the aerial cover for species. (Elzinga et al 1998, pp 181)

  Vegetation Moisture Tolerance Index (Performance Standard 1.4) is measured in 30 – 3 foot square quadrats located randomly within Plant Density quadrats in wetland areas. Vegetation moisture tolerance index is calculated as described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Mountains, Valleys, and Coast* (Corps 2010)

- *Beaver Activity*—Any beaver activity is monitored to ensure that site goals and performance standards can be achieved. Beaver activity is described in monitoring reports.
- *Wildlife Activity*—Other wildlife activity is reported qualitatively, with particular attention to State or federally listed species.

Chapter 4
Monitoring Results and Management

Year 3 vegetation monitoring was conducted on July 10 2011. Due to a faulty camera, photographs taken during the site visit were unusable. A follow-up visit took place on December 10, 2011 to retake photos from each permanent photo station; photographs are included as Appendix B. Data collected during the site visit were entered into the DSL spreadsheet thingy, which is included as Appendix C to this report.

The Bank has achieved all performance standards to date and is being colonized by native plant communities in the wetter portions of the site. Bank sponsors have controlled invasive species and replaced dead plantings, and will continue to do so. Some portions of the site are dominated by non-native species; it is anticipated that site growing conditions will favor native species as woody cover continues to establish on the site.

2011 Monitoring Results

Performance Standard 1.1—The southern ditch will be filled to within 6" of surrounding grade.	Southern ditch was graded to plan, as indicated in as-built plans submitted in 2008. No subsidence of erosion has occurred since that time; elevations remain with 6" of surrounding grade.
Performance Standard 1.2—The tile outlets to Garret and Rock Creeks will not discharge water.	The plugging of a small leak in 2010 has remained effective; no other leaks have been observed.
Performance Standard 1.4—Vegetation recorded within wetland areas during vegetation monitoring sampling will show a moisture tolerance index of 3.0 or less in Years 1, 2, 3, and 5.	The moisture index recorded on vegetation samples taken within the wetland areas is 2.27, meeting the performance standard.
Performance Standard 2.1—Native woody species within wetland restoration and enhancement, and stream restoration areas will	Native woody species samples within the wetland restoration and enhancement areas indicate a stem density of 1,773 living stems per

average 786 living plants per acre (a 65% survival rate) in planted areas[1] at the end of Years 1, 2, and 3.	acre. (CI+/- 20%=2,126 – 1,417). Sample size required based on results is 4 (7 using Kupper correction factor) plots; 20 plots were recorded.
Performance Standard 2.3 - Woody plants or woody species will be comprised of 90% native species in Years 1, 3, and 5 of monitoring.	All woody plants detected by monitoring are native species.
Performance Standard 2.4—Phalaris arundinacea, Polygonum cuspidatum, Rubus armenicanus, Crataegus laevigata, Helix hedera, Solanum dulcamara, Polygonum cuspidatum, Lythrum salicaria, and any other Oregon Department of Agriculture-listed noxious weed will collectively cover less than 30% of the combined wetland restoration, wetland enhancement, wetland buffer enhancement, cropped wetland enhancement, riparian buffer, upland riparian enhancement, and upland buffer enhancement areas.	Invasive species cover was recorded via line intercept sampling, with *Phalaris arundinaceae, Rubus armeniacus,* and *Cirsium arvense*combining for 0.8% cover. Invasive species are being controlled with herbicide.
Performance Standard 2.5—At least four native woody species will provide 5% or more of the living plants or aerial cover in each of the wetland restoration, wetland enhancemen,t and tributary enhancement areas in Years 1, 2, 3, and 5.	*Rosa nutkana, Salix sitchensis, Salix lasiandra, Poplus balsamifera,* and *Fraxinus latifolia* each contributed greater than 5% of the living stems. Sampling design does not address enhancement and restoration areas separately; species are diverse site wide and stem density greatly exceeds performance standards.
Performance Standard 3.1—The upland buffer enhancement areas will include 650 living native woody plants per acres (65% survival rate) at the end of Years 1, 2, and 3.	Native woody species samples within the upland enhancement areas indicate a stem density of 1,104 living stems per acre. (CI+/- 20%=1,307 – 871). Sample size required based on results is 3.5 (7 using Kupper correction factor) plots; 5 plots were sampled.
Performance Standard 3.3—Woody plants or woody species cover within the enhanced upland buffer areas will comprise 80% native species in each year of monitoring (Years 1, 2, 3, and 5).	All woody species recorded in both wetland and upland areas are native; woody plant composition is 100% native.
Performance Standard 4.1—The restored Garret Creek tributary channel will be graded to within 6-12 feet in width and 6 -30 inches in depth, as	Garret Creek tributary channel was graded according to plan, as indicated on project as-built documents submitted in 2008. The

[1] Wetland enhancement areas east of the "informal roadway" include existing wetland forest that will be underplanted in appropriate areas. Areas not underplanted will not be included in plant density or aerial cover estimates.

depicted on site plan, Exhibit B.	channel appears to be stabilized.
Performance Standard 4.2— The restored Garret Creek tributary channel will flow seasonally in years of average or greater precipitation.	The Garret Creek tributary channel was flowing during winter, spring, and early summer 2011; water became stagnant during August 2011.
Performance Standard 4.3—The restored Garret Creek tributary channel will have less than 100 square feet of scour area in each year of monitoring from Years 2-5.	The Garret Creek tributary channel was graded according to plan, as indicated on project as-built documents submitted in 2008. The channel appears stabilized.

Chapter 5
Summary and Recommendations

The bank site has met all Year-1, Year-2, and Year-3 performance criteria, making the site eligible for further mitigation credit release. Site maintenance has been limited to vegetation management; no irrigation was performed in 2010 or 2011.

The primary area of concern expressed by the IRT is that a portion of the site along Garret Creek in the southern portion of the Bank is not developing a predominance of wetland plants and that clear hydric soil indicators are not observable with shovel probing. A groundwater monitoring well in this area has recorded soil saturation into late April, indicating sufficient soil saturation is occurring to develop wetland characteristics in the vicinity of the monitoring well.

Garret Creek Mitigation Bank, LLC will notify the IRT prior to the scheduled delineation of on-site wetlands inspring 2012. We will also continue bank maintenance to control invasive species, and otherwise manage vegetation. Monitoring will continue as described in the original MBI.

Appendix A Groundwater Data

	Water Depth Below Surface in Inches			
Date	**Well 1**	**Well 2**	**Well 3**	**Well 4**
03-22-2011	4	0	3	1
03-25-2011	4	0	4	2
03-28-2011	2	0	3	1
03-30-2011	3	0	1	0
04-04-2011	4	0	1	0
04-06-2011	3	0	1	0
04-08-2011	2	0	1	0
04-11-2011	0	0	0	0
04-13-2011	0	0	0	0
04-15-2011	0	0	0	0
04-25-2011	6	0	3	2
04-27-2011	2	0	1	0
04-30-2011	3	0	3	2
05-04-2011	15	0	14	12

Monthly Percent of Normal for Period Preceding Groundwater Data Collection Dates

Month	Total Precipitation (inches)[1]	Percentage of Normal Precipitation	Normal Range of Precipitation (inches)[2]
		2010	
December	9.95	**154%**	4.09 – 7.76
		2011	
January	3.25	**56%**	4.05 – 7.23
February	4.31	**85%**	3.90 – 6.13
March	7.16	**172%**	3.30 - 4.96
April	4.15	**150%**	2.15 – 3.74
May 1-4	0.07	**Not available**	1.64 – 3.00

[1] National Weather Service 2010, 2011 [Salem, OR]

[2] Natural Resource Conservation Service 2002 [N. Willamette Station #OR6151]

Note: Growing season extends from March 2 to November 21.

Appendix B Site Photos

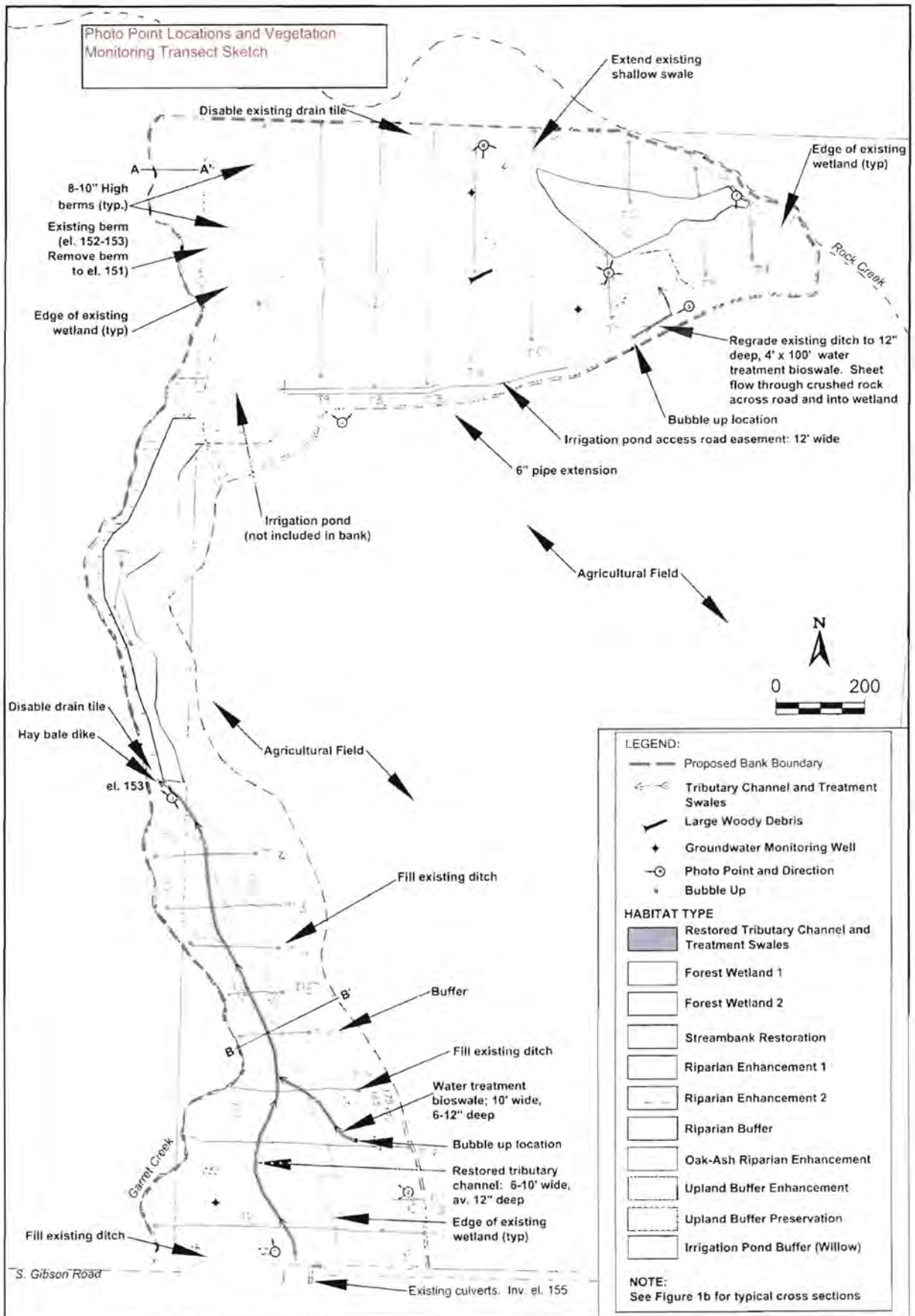
Photo Point Locations and Vegetation Monitoring Transect Sketch
Extend existing shallow swale
Disable existing drain tile
Edge of existing wetland (typ)
A
A'
8-10" High berms (typ.)
Existing berm (el. 152-153) Remove berm to el. 151)
Rock Creek
Edge of existing wetland (typ)
Regrade existing ditch to 12" deep, 4' x 100' water treatment bioswale. Sheet flow through crushed rock across road and into wetland
Bubble up location
Irrigation pond access road easement: 12' wide
6" pipe extension
Irrigation pond (not included in bank)
Agricultural Field
N
0
200
Disable drain tile
Hay bale dike
el. 153
Agricultural Field
Fill existing ditch
B'
Buffer
B
Fill existing ditch
Water treatment bioswale; 10' wide, 6-12" deep
Bubble up location
Garret Creek
Restored tributary channel: 6-10' wide, av. 12" deep
Edge of existing wetland (typ)
Fill existing ditch
S. Gibson Road
Existing culverts. Inv. el. 155
LEGEND:
Proposed Bank Boundary
Tributary Channel and Treatment Swales
Large Woody Debris
Groundwater Monitoring Well
Photo Point and Direction
Bubble Up
HABITAT TYPE
Restored Tributary Channel and Treatment Swales
Forest Wetland 1
Forest Wetland 2
Streambank Restoration
Riparian Enhancement 1
Riparian Enhancement 2
Riparian Buffer
Oak-Ash Riparian Enhancement
Upland Buffer Enhancement
Upland Buffer Preservation
Irrigation Pond Buffer (Willow)
NOTE:
See Figure 1b for typical cross sections

Photo Point #1, Looking Northeast

Photo Point #1, Looking North

Photo Point #2, Looking West

Photo Point #2, Looking Northwest

Photo Point #3, Looking South

Photo Point #3, Looking Southwest

Photo Point #4, Looking Northwest

Photo Point #4, Looking Northeast

Photo Point #5, Looking Northeast

Photo Point #5, Looking West

Photo Point #6, Looking West

Photo Point #6, Looking North

Photo Point #6, Looking East

Photo Point #6, Looking South

Photo Point #7, Looking North

Photo Point #7, Looking West

Photo Point #7, Looking South

Photo Point #8, Looking West

Photo Point #8, Looking South

Photo Point #8, Looking East

Appendix C Vegetation Data

Garret Creek Wetland Monitoring Data Statistics

Transect/Plot	Stem Count
1	7
2	4
3	7
4	11
5	6
6	5
7	5
8	6
9	6
10	1
11	7
12	7
13	6
14	4
15	6
16	8
17	4
18	6
19	10
19b	6
Total sampled quads	20
total sampled sf	3000
total sf	196,020
% sampled	1.53%
MEAN	6.1
STD	2.149663376
n (=(1.28)^2*(B245)^2/(0.2*B243)^2)	5.08675936
n* (corrected Kupper & Hafner value)	7
stems per ac	1771.44
290.4	
Performance Criteria (80% of original installed number)	
Number Needed per acre for 80%	-1771
Acres per site for Zone	30.35
Plants Needed by Zone (=B259*B258)	-53763
Survival by Zone	B39/planted number of stems per ac
Confidence Interval Width +/- 20% (=0	354
plus 20%	2126
	B57/planted number of stems per ac
minus 20%	1417
	B59/planted number of stems per ac

Garret Creek Upland Monitoring Data Statistics

Transect/Plot	Stem Count
1	
2	4
3	5
4	2
5	4
6	4
Total sampled quads	5
total sampled sf	750
total sf	196,020
% sampled	0.38%
MEAN	3.8
STD	1.095445115
n (=(1.28)^2*(B245)^2/(0.2*B243)^2)	3.403878116
n* (corrected Kupper & Hafner value)	7
stems per ac	1103.52
290.4	
Performance Criteria (80% of original installed number)	
Number Needed per acre for 80%	-1104
Acres per site for Zone	30.35
Plants Needed by Zone (=B259*B258)	-33492
Survival by Zone	B39/planted number of stems per ac
Confidence Interval Width +/- 20% (=0	221
plus 20%	1324
	B57/planted number of stems per ac
minus 20%	883
	B59/planted number of stems per ac

Species	Origin (N / NN)	Wetland Status (1 - 5)	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	Row Average
Native Herbaceous Species																							
Transect & Quad Number																							
Dulichium arundinaceum	N	2	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	1
Carex stipata	N	1	0	0	0	0	0	0	15	15	0	37.5	0	0	0	0	0	0	0	0	0	0	3
Eleocharis palustris	N	1	0	0	0	0	0	0	0	67.5	85	0	0	0	0	0	0	0	0	0	0	0	9
Epilobium ciliatum	N	2	0	0	0	15	0	0	0	0	0	0	0	0	15	15	0	0	0	0	0	0	2
Fraxinus pennsylvanica	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	15	0	0	2
Glyceria striata	N	2	0	0	0	0	15	0	0	15	0	15	0	0	0	0	0	0	0	15	0	0	3
Juncus acuminatus	N	1	0	0	0	15	15	15	0	37.5	0	0	0	15	0	0	0	0	0	0	0	0	5
Juncus articulatus	N	1	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Juncus effusus	N	2	0	0	0	15	0	0	0	0	0	0	0	15	0	0	15	0	15	0	0	0	3
Juncus tenuis	N	2	0	0	0	15	37.5	15	37.5	15	0	15	15	0	0	15	0	0	0	0	0	0	8
Oenanthe sarmentosa	N	1	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	1
Poa palustris	N	3	37.5	15	0	37.5	0	15	15	0	0	0	15	0	37.5	0	0	15	15	37.5	0	0	12
Prunella vulgaris	N	4	0	0	0	0	0	0	0	0	0	0	85	0	0	37.5	0	0	0	0	0	0	6
Veronica americana	N	1	0	0	0	0	0	0	0	0	0	0	0	62.5	0	0	37.5	15	0	0	0	0	6
Vicia americana	N	1	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	1
Invasive Herbaceous Species			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phalaris arundinacea	I	2	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Non-Native Herbaceous Species			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agrostis stolonifera	NN	3	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.5	0	4
Alopecurus pratensis	NN	2	37.5	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37.5	0	5
Daucus carota	NN	5	2.5	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	1
Elymus repens	NN	3	0	0	0	0	15	0	15	15	0	0	0	0	0	0	0	0	0	0	0	0	2
Festuca arundinacea	NN	3	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	37.5	0	0	5
Holcus lanatus	NN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37.5	0	2
Hypochaeris radicata	NN	5	0	0	0	15	37.5	15	37.5	37.5	0	0	0	2.5	15	15	0	0	0	0	0	0	9
Lotus corniculatus	NN	3	0	0	0	0	0	0	0	0	0	0	0	62.5	15	0	0	62.5	37.5	0	0	0	9
Polygonum longisetum	NN	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus repens	NN	2	15	62.5	0	0	0	0	15	0	0	37.5	62.5	0	0	85	85	85	85	37.5	0	0	29
Raphanus sativus	NN	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rugosa	NN	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex acetosella	NN	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crispus	NN	3	0	37.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	62.5	0	6
Trifolium repens	NN	3	15	0	0	0	0	85	15	37.5	0	0	0	15	0	0	0	0	0	37.5	15	0	11
Native Shrub and Tree Species			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Native Shrub and Tree Species			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Invasive Shrub and Tree Species			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bare Ground			0	0	0	0	15	0	0	0	15	0		0	0	0	15	37.5	0	0	0	0	4
			0																				

Routine Performance Standards	Routine Threshold	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	Habitat Average	Standard Error	Standard Met?
Cover of Native Herbaceous Species	>=60%	38	30		98	83	45	88	105	85	88	130	108	53	83	53	30	30	68	0		70	10 %	YES
Lower CI (80%)																						56		
Upper CI (80%)																						84		
Cover of Invasive Herbaceous Spe	<=10%	0	0		15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	1	YES
Lower CI (80%)																						0		
Upper CI (80%)																						2		
Bare Substrate	<=20%	0	0		0	15	0	0	0	15	0	0	0	0	0	15	38	0	0	0		5	2	YES
Lower CI (80%)																						2		
Upper CI (80%)																						8		
Cover of Invasive Shrubs and Tree	<=10%	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	YES
Lower CI (80%)																						0		
Upper CI (80%)																						0		
Native Diversity	11																							
Prevalence Index	<3.0	2.81	2.30		2.53	2.72	2.90	2.95	2.05	1.00	1.64	2.88	2.12	3.45	2.88	1.73	2.40	2.40	2.65	2.53		2.44	N/A	Yes
Weighted Prevalence Index		320	418	0	323	368	420	443	565	85	173	555	308	338	485	238	463	403	518	608	0			
Sum of plant cover		123	175	0	128	135	145	150	285	85	105	193	188	98	183	138	193	168	195	215	0			

Site: Garret Creek Mitigation Bank	Sample Date(s): June 2011																					
Shrub-Dominated and Forested Wetland Habitat Unit																						
												Stem Count										
Native Shrub and Tree Count																						
Fraxinus latifolia	N	2	4	0	5	10	1	2	3	1	3	0	6	5	3	2	3	2	4	6	4	3.37
Populus balsamifera	N	3	2	4	0	1	2	1	0	0	0	0	0	2	0	0	1	0	1	1	0	0.79
Quercas garryana	N	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05
Salix lasiandra	N	2	0	0	1	0	1	2	0	2	0	1	0	0	0	1	1	0	0	0	1	0.53
Salix sitchensis	N	2	0	0	0	0	0	0	1	2	2	0	1	0	1	0	3	2	1	1	1	0.79
Acer macrophyllum	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Cornus sericeae	N	2	0	0	0	0	0	0	1	1	1	0	0	0	2	0	0	0		0	0	0.28
Rosa nutkana	N	3	0	0	1	0	2	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0.32
Pseduotsuga menzesii	N	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
			7.00	4.00	7.00	11.00	6.00	5.00	5.00	6.00	6.00	1.00	7.00	7.00	6.00	4.00	8.00	4.00	6.00	10.00	6.00	6.11
																						#DIV/0!
Density of Woody Vegetation	>=1,600 per acre	Average per acre																				#DIV/0!
Plot Area (shrub/tree plot)	150																					
Per acre multiplier: Input 4,047 if plot area entered in B84 is in sq.meters or 43,560 for sq feet	43560																					

Site: Garret Creek Upland	Sample Date(s):																						
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T19B	Row Average
											Plant Count (Shrubs) + Stem Count (Trees)												
Native Shrub and Tree Count																							
Fraxinus latifolia	N			1	1																2	3	1.75
Populus balsamifera	N			1						2											2		1.67
Quercas garryana	N																				0		0.00
Salix lasandra	N			1	2																0		1.00
Salix sitchensis	N																				0		0.00
Acer macrophyllum	N																				0		0.00
Cornus sericeae	N																				0		0.00
Rosa nutkana	N																				0		0.00
Pseduotsuga menzesii	N			1	2																0	1	1.00
																					0.00		0.00
																					0		0
Density of Woody Vegetation	>=1,600 per acre	Average per acre																					#DIV/0!
Plot Area (shrub/tree plot)	150																						
Per acre multiplier: Input 4,047 if plot area entered in B84 is in sq.meters or 43,560 for sq feet	43560																						
Cover of Native Shrubs and Trees	>=50% (alternative)																						#DIV/0!
Lower CI (80%)																							#DIV/0!
Upper CI (80%)																							#DIV/0!

Invasive Species Cover via Line Intercept

				T1	T2	T3	T3	T3 Up	T3 Up	T5	T5	T5	T5	T5	T6	T10	T10	T10	T10	T10	T10	T10	Sum of Intercept	Total Cover
			Transect Length (ft)																					
Cirsium arvense	Canada thistle	FAC	Start	37	73					54						73	77							
			Stop	37.5	78					55						74	78							
			Total Length (ft)	0.5	5	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	8.5	0.2%
Rubus armeniacus	Himalayan blackberry	FACU	Start					52		24	27	47	49	52	11									
			Stop					52.5		25	28	48	50	55	11.5									
			Total Length (ft)	0	0	0	0	0.5	0	1	1	1	1	3	0.5	0	0	0	0	0	0	0	8	0.1%
Phalaris arundinaceae	reed canarygrass	FACW	Start			4	54	9	19							7	81.5	83.5	88	136	157	160		
			Stop			6	57	10.5	30							8	82	85.5	89.5	138.5	158	160.5		
			Total Length (ft)	0	0	2	3	1.5	11	0	0	0	0	0	0	1	0.5	2	1.5	2.5	1	0.5	26.5	0.5%
																						Combined Species Cover	**43**	0.8%