STILLAGUAMISH

Big Trees Project

Snohomish County Public Works
Surface Water Management Division

South Fork Stillaguamish Big Trees Project
Final Report
GRANT# G0700234

September 13, 2011

Snohomish County
Public Works
Surface Water Management

Working together for people, streams & fish.

FINAL PROJECT REPORT FOR
Agreement Number G0700234
South Fork Stillaguamish Big Trees
Snohomish County Public Works – Surface Water Management

Total Cost of Project: **$289,931**
Grant or Loan Amount: **$332,250**

Project Start Date: June 30, 2007
End Date: July 1, 2011

_____

(AUTHORIZED SIGNATORY) *DATE*

_____

&/or (PROJECT MANAGER) *DATE*

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South Fork Stillaguamish Big Trees
Snohomish County Public Works
Grant Number G0700234
June 30, 2007 – July 1, 2011
Final Total Project Cost: $289,931
Final Ecology Grant Contribution: $217,448

Douglas-fir (Pseudotsuga menziesii) staked in at Graafstra site

Project Summary

The South Fork of the Stillaguamish River is on the 303(d) list for the fecal coliform, temperature, pH and dissolved oxygen. Degraded riparian conditions are known to contribute to poor water quality, and existing riparian conditions on this section of stream are known to be degraded. A 2006 Land Cover analysis by Snohomish County SWM shows only 12% evergreen forest, 20% deciduous, and 30% shrub/small trees within 300 feet of the Lower South Fork Stillaguamish subbasin with over 36% without tree or shrub buffer of any kind. This project implemented a watershed scale approach to addressing these degraded conditions, specifically temperature, by working with public and private landowners to control invasive plants, plant large stock (4-8 foot) native conifers and install livestock exclusion fencing in degraded riparian habitat within 100 feet of the South Fork. The long-term goal is to decrease in-stream temperatures through accelerating establishment of native conifers near the stream to provide year-around shading and bank stabilization.

Project Accomplishments

- Over 6,700 large stock native conifers comprising six species were planted over nearly 47 acres across seven public and privately owned sites for a total of 4.6 river-miles brought into restoration.
- All tree stock was raised by the County or contracted growers to guarantee quality and quantity of supply.
- Over 8 acres of invasive Himalayan blackberry (Rubus bifrons) controlled.
- 3445 feet of livestock exclusion fencing installed.
- Over 98% survival of planted trees by 2011
- 3 consecutive years of outreach to hundreds of watershed residents at the Festival of the River.
- Land owners of project sites included a church-owned recreational park, three farms, two county parks and a newly established city conservation area.
- Employed over 35 Washington Conservation Corps members over 3 ½ years.
- Collaborated with Washington Conservation Corps, Snohomish County Parks, Snohomish County Roads Maintenance, The Church of Jesus Christ of Latter Day Saints, the Stillaguamish Tribe and Sound Salmon Solutions (formerly Stilly-Snohomish Fisheries Enhancement Task Force).

Water Quality Improvements

This project was designed to address long-range foundational ecosystem processes lost with the cutting of timber throughout the South Fork Stillaguamish watershed. Loss of near stream vegetation, especially mature conifers, has increased solar heat flux to the surface of the water as well as drastically reduced thermal microclimates that maintain cooler air temperatures, higher relative humidity, lower wind speeds and cooler ground temperatures along stream corridors. Loss of near stream conifers also affects flood plain and in-stream roughness through reductions of inputs of decay-resistant coarse woody debris. This in turn impacts sedimentation, stream substrate composition, and stream bank stability.

The anticipated benefits of in-stream temperature reduction, near-stream climate moderation, reduction in sediment inputs and increased coarse woody debris input will not be realized until the installed conifers reach a mature size which may take 50 years or more. However in the short term, restoring riparian areas of 4.6 miles of river provides a buffer to potential impacts such as nutrient loading, dissolved oxygen and fecal coliform. These benefits are especially critical at three active farms one of which raises livestock.

The Next Steps for Continued Success

The South Fork Stillaguamish Big Trees Project offers a watershed scale approach to forest succession management aimed at overcoming the barriers to the natural conifer regeneration in the watershed. In order to ensure a trajectory of eventual conifer dominance and persistence at the project sites the stands need active management to control invasive plants, especially Himalayan blackberry and knotweeds (Polygonum cuspidatum, sachalinense, and x bohemicum) as well as thinning of the deciduous canopy if self-thinning does not occur. Approximately 40% of the planting occurred in the understory of black cottonwood (Populus balsamifera) dominated flood plain forests. While retention of mature individuals is crucial, the developing conifers may benefit from removal of younger black cottonwood and red alder (Alnus rubra) saplings to reduce competition for resources.

Lessons Learned

The primary challenge of performing restoration in an active flood plain is seasonal flooding with often unpredictable results. While there are many benefits to installing larger stock trees, they are more vulnerable to being knocked over and washed out by floods. It was determined that staking the trees for the first flood season and the subsequent growing season allowed them to establish enough root mass to be flood resilient. It was also learned that scaling the methods and equipment used in invasive plant control and site preparation to the challenge at hand rather than relying on set solutions allowed for efficient and effective work. Heavy equipment was used for mowing Himalayan blackberry and for gaining site access when using brush cutters would have taken many days to accomplish the same task. The choice of herbicide was tailored to each situation so that stronger single application herbicides were used in areas lacking native vegetation and beyond impacting waterbodies.

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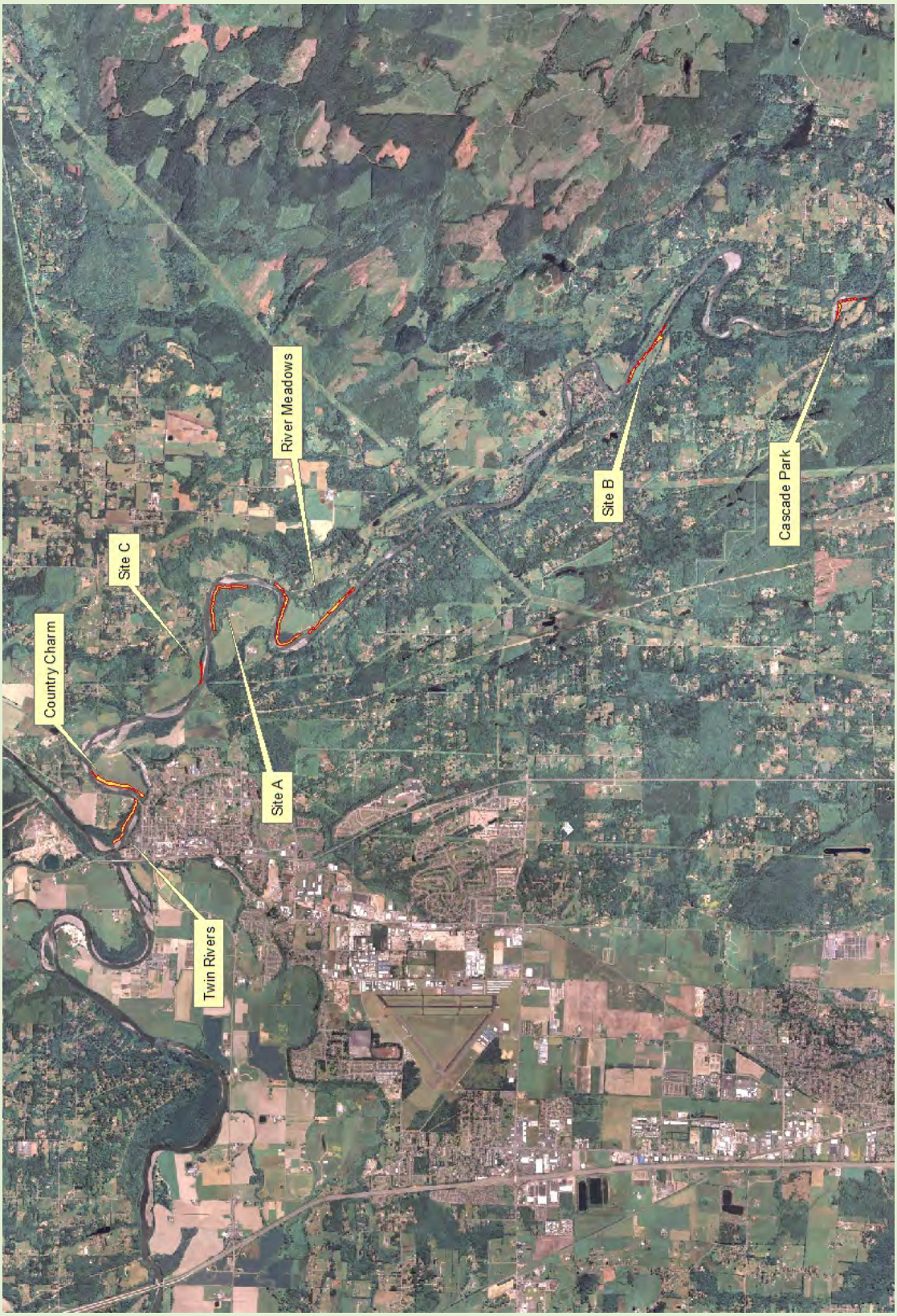
Newly planted grand fir (Abies grandis) at Connolly-Gahm site

South Fork Stillaguamish Big Trees Project Sites



Project Description

The South Fork of the Stillaguamish River is on the 303(d) list for the fecal coliform, temperature, pH and dissolved oxygen. Degraded riparian conditions are known to contribute to poor water quality, and existing riparian conditions on this section of river are known to be degraded from current and historic land use. The 2006 Land Cover analysis by Snohomish County Surface Water Management (SWM) shows only 12% evergreen forest, 20% deciduous, and 30% shrub/small trees within 300 feet of the Lower South Fork Stillaguamish subbasin with over 36% without tree or shrub buffer of any kind. This project implemented a watershed scale approach to addressing these degraded conditions, specifically temperature, by working with public and private landowners to control invasive plants, plant large stock (4-8 foot) native conifers and install livestock exclusion fencing in degraded riparian habitat within 100 feet of the South Fork. The long-term goal is to decrease in-stream temperatures through accelerating establishment of native conifers near stream to provide year-around shading and bank stabilization. The short-term goal is to establish riparian buffers and bring them into long-term management to ensure the dominance and persistence of near-stream native vegetation and to reduce impacts from adjacent land uses such as nutrient loading, fecal coliform and sediment.

The South Fork Stillaguamish Big Trees Project addresses the persistently increasing temperatures in the lower South Fork Stillaguamish subbasin through implementation of a watershed scale forest succession management project aimed at overcoming the barriers to the natural conifer regeneration in the watershed. The key elements of the project implementation were:

- Soliciting willing landowners via personal contacts and mail who were willing to allow an average minimum buffer width of 50 feet. A flexible buffer approach was attractive to land owners desirous of retaining productive land, recreational facilities and river front access. In all cases land owners offered more than the average 50 feet minimum.
- Guaranteeing the quality, size and quantity of conifer stock needed through raising potted and field-grown balled in burlap stock (b/b) in the Snohomish County Native Plant Nursery, on County Parks land, on project partner land and with contract growers.
- Aggressive noxious weed control, mostly Himalayan blackberry (Rubus bifrons), at least one season prior to planting using a combination of mechanical and chemical controls.
- Complimenting the existing tree density at all sites to achieve moderately high stocking rates to account for expected mortality in both existing and planted trees.
- Using scale appropriate methods and equipment in site preparation and planting. For larger sites heavier equipment was used to mow large patches of blackberry and create access paths.
- Teaching planting crews to plant the trees properly according to current best practices. Planting the trees 'shallow and wide' establishes maximal root contact with the soil for access to moisture and physical stability.
- Reducing losses from seasonal flood disturbance by temporary staking through the first growing season. Installed trees grew enough root mass in the first growing season to allow them to be flood resilient the following flood season.
- Spreading a native grass seed mix to reduce erosion from soils left bare by suppression of monotypic patches of invasives.
- Thorough follow-up noxious weed control through targeted spot herbicide application and manual removal.

Project Outcomes

As per the Grant Agreement the expected water quality outcomes from this project were:

1. A minimum of 10 riparian restoration sites covering over 27 acres (4.6 miles) of main stem South Fork Stillaguamish River will be planted with conifers and other suitable species. Conifer densities will be set at 204 trees per acre and smaller stock using both trees and shrubs will be 750 per acre.
2. Reduce the solar impacts to South Fork Stillaguamish River main stem and side channel water bodies due to lack of nearshore conifer canopy by 10% in 75 years.

3. Reduce turbidity impacts from treatment reaches to South Fork Stillaguamish River main stem and side channels by 50% in 25 years.

The outcomes for task 1 were exceeded for total acreage and total trees per acre, met for number of river-miles and not met for total number of project sites (Table 1) and shrubs planted.

Table 1: Task 1 Project Outcomes – Expected & Realized

OUT-COMES	TOTAL TREES/ ACRE	TOTAL ACRES	TOTAL RIVER-MILES	# OF PROJECT SITES
Expected	204	27	4.6	10
Realized	231	47	4.6	7

Fewer project sites were realized since the first sites recruited into the project secured large acreages with long continuous riverfronts and full 100 foot buffers which in total far surpassed the expected total acreage. It was decided that fewer sites with more continuous riverfront would provide greater water quality outcomes and ecological integrity than several smaller discontinuous sites.

Table 2: Average Trees Densities – Existing, Planted and Total – Trees/Acre

PROJECT SITE	AVERAGE EXISTING DECIDUOUS	AVERAGE EXISTING CONIFER	AVERAGE PLANTED	AVERAGE TOTAL
Cascade Park	92	10	133	235
Site A	133	31	115	279
Country Charm	26	0	230	256
Site B	28	0	286	312
Site C	20	0	175	195
River Meadows	63	24	87	174
Twin Rivers	106	0	57	163
PROJECT AVERAGES	67	9	155	231

On the ground conditions such as invasive presence, stand density, large woody debris, soils, and infrastructure such as access roads, recreational facilities etc. varied greatly at each project site which in turn influenced final assessed densities from 1/10th acre monitoring plots. Under-stocking at Site C was due to 2/3rds of the site being under power line right-of-ways (ROWs) which cannot be planted with trees while under-stocking at River Meadows and Twin Rivers County parks was due to large woody debris and recreational facilities such as trails and a disc golf course (Table 2). The assessed overall survival of planted trees thus far has been over 98% with only 11 trees of 650 assessed in all monitoring plots found dead. Average growth for all planted trees assessed in the monitoring plots varied by species with an average 15 cm of growth in the first growing season after planting (Table 3). Many trees were observed to have impressive spurts of growth with current year's growth adding 50 cm or more. Soils were tested in 2008 at selected Big Trees sites to assess for nutrient deficiencies. Overall soils were found to have adequate levels (>5%) of organic matter (OM) which typically indicates sufficient nitrogen, phosphorus, potassium and other nutrients. Tests for these nutrients confirmed this. Micronutrients such as boron, copper and zinc which can be essential for growth and disease/pathogen resistance were found to be somewhat low on some sites. This is correlated with lower OM at these sites however the deficit was not crucial enough to warrant fertilization or OM amendment. Unless the soils receiving native plantings have been extensively depleted through poor land management practices and/or loss of topsoil from erosion, intact native riparian soils with some native vegetation should support in-planted trees without needing amendments.

Table 3: Growth in Height of Planted Trees Across all Project Sites

SPECIES	AVERAGE HEIGHT 2010 (cm)	AVERAGE HEIGHT 2011 (cm)	CHANGE IN HEIGHT (cm)
Grand fir	64	77	13
Shore pine	125	145	20
Sitka spruce	102	115	13
Douglas-fir	117	124	7
Western red cedar	129	147	18
Western hemlock	99	139	40
ALL TREES	112	129	15

Native shrub cover was found to be robust even given the pervasive presence of Himalayan blackberry (Rubus bifrons) at all of the project sites. Out of 41 plots monitored, 37 had at least one native shrub species with the number of species per plot ranging from 0 to 10. On average there were 6 species per plot with the most common being snowberry (Symphoricarpos albus), salmonberry (Rubus spectabilis), Indian plum (Oemlaria cerasiformis), red-twig dogwood (Cornus sericea), Pacific ninebark (Physocarpus capitatus) and beaked hazelnut (Corylus cornuta). Given the strong presence of native shrubs, only areas under power line ROWs were planted Shrubs were only planted under power line (ROWs) at the Neubauer (300 plants) and Graafstra (200 plants) project sites. Table 4 summarizes the cover and frequency of all native shrub and small tree species found in the monitoring plots.

In the short term the impact of the Big Trees project on native understory vegetation will be twofold: inhibition from invasive control, planting preparation and tree installation followed by recovery. Areas where understory vegetation was cleared to allow access for planting have already grown back and areas formerly dominated by Himalayan blackberry have shown recruitment of native understory vegetation from both rhizomes and seed. In the long term the growing dominance of the canopy by installed conifers will eventually shade out much of the existing native shrub layer transitioning to a more shade tolerant understory community if seed sources are available and conditions are favorable.

Table 4: Native Shrub Cover & Frequency Across Plots

SPECIES	AVERAGE COVER	%PLOTS FOUND
SYAL -snowberry	3	90
RUSP - salmonberry	2	76
COSE – red-twig dogwood	2	56
PHCA – Pacific ninebark	2	56
COCO – beaked hazelnut	2	49
OECE – Indian plum	2	71
ACCI – vine maple	2	29
VAPA – red huckleberry	2	10
ROPI – peahip rose	1	37
RUPA - thimbleberry	1	32
SARA – red elderberry	1	22
AMAL - serviceberry	1	2
FRPU - cascara	1	10
LOIN - twinberry	1	20
MAFU – Pacific crabapple	1	2
RIBR – stink currant	1	5
SAEX – coyote willow	1	2
SALU – Pacific willow	1	2
SASI – Sitka willow	1	10

Daubenmire scale: 1=0-5%; 2=5-25%; 3=25-50%; 4=50-75%; 5=75-95% 6=95-100%;
41 plots total, 37 with native shrubs

Invasive presence varied greatly across project sites from Cascade Park with very little invasive presence to Country Charm with 4 acres of solid Himalayan blackberry. In most cases invasives were distributed patchily throughout the forest understory and along banks, fence line and field edges making an assessment of total area difficult. Over all 9 acres of Himalayan blackberry, knotweeds (Polygonum x bohemicum, P. sachalinense and P. cuspidatum) and reed canarygrass (Phalaris arundinacea) along with other occasional invasives like Canada thistle (Circium arvense) and poison hemlock (Conium maculatum) have been subjected to on-going control efforts. Invasive control efforts so far have been highly effective

having reduced at project sites like Country Charm from 100% cover pre-treatment to less than 5% on average 2 years after treatment. Table 5 summarizes the reductions in average cover for the three major invasive species targeted.

Table 5: Invasive Percent Cover Average Across all Project Sites on Daubenmire Scale

INVASIVE SPECIES	2009 COVER (estimated)	2010 COVER	2011 COVER
Himalayan blackberry	5	2	1
Japanese knotweed	4	3	2
Reed canarygrass	4	3	2

Daubenmire scale: 1=0-5%; 2=5-25%; 3=25-50%; 4=50-75%; 5=75-95% 6=95-100%

In the short term the impact of invasive control efforts at Big Trees sites will be to reduce the dominance of invasive species, primarily Himalayan blackberry and knotweeds. In areas where these species strongly dominated there is sparse native understory vegetation and often exposed bare soil after successful control efforts. As previously mentioned, native grass seed mix composed of blue wildrye (Elymus glaucus), meadow barley (Hordeum brachyantherum), Chewing's fescue (Festuca rubra spp. fallax) and Roemer's fescue (Festuca roemerii) was used to control erosion in these situations. Native shrub recovery from seed and rhizomes, as previously noted, has been observed in areas formerly dominated by invasives. In the long term it is expected that invasive suppression will be ~90% effective within the interior of project sites. The edges of the project sites will remain problematic since they are beyond the project boundaries and not subject to Big Trees control efforts. Efforts were made to extend invasive control somewhat beyond project site boundaries to mediate reinvasion. No control efforts can be 100% and minor invasive presence should be anticipated in the long term given an invasive seed bank and persistent invasive seed input from wildlife, people, floods and wind. Deeper perennial shade provided by a conifer dominated canopy will tend to suppress many invasive species however anywhere there are exposed banks, canopy gaps, paths/trails/roads and transitions to deciduous forests or fields there will be an invasive presence.

Complete project implementation plans/as-builts plus a project summary for each site is provided in the appendix.

The outcomes for tasks 2 and 3 cannot be evaluated at this point given the time scale in which efficacy can be assessed. However base line in-stream temperature with concurrent in-stream flow and air temperature data was collected during the summers of 2008, 2009 and 2010 (Figures 1, 2 and 3). Figures show in-stream temperatures as the running seven day average daily maximum temperatures in °C, air temperatures as the daily maximum in °C and flow as the daily maximum in cubic feet per second for the most upstream monitoring location, Cascade Park, and most downstream monitoring location, River Meadows. Monitoring results show that in-stream temperatures increased from upstream to downstream and were highest on the warmest days with lowest flows. During the summer warm period from approximately later July through mid-August, in-stream temperatures remained continuously elevated above the Washington State Water Quality Standard for core salmonid habitat maximum 16°C for 43%, 79%, and 58% of the monitoring period in 2008, 2009 and 2010 respectively. Any period of temperature decreases during the period of lowest flow/warmest air temperatures coincided with increases in flow due to precipitation. Over all cooler in-stream temperatures as well as fewer days above 16°C during summer 2008 can be attributed to the extraordinarily heavy snowpack of 2008 (Figure 1). This base line data clearly underscores the urgent need to promote perennial shade along the mainstem South Fork Stillaguamish as well as its tributaries to provide near-stream temperature attenuation for salmonid habitat. The base line data also show the profound effect seasonal fluctuations in snow pack and summer precipitation can have on in-stream temperatures, showing the importance of taking climate change into consideration in managing temperature TMDLs.

Figure 1: In-stream Flow and Air Temperature Influence on In-stream Temperature on Lower South Fork Stillaguamish – Summer 2008

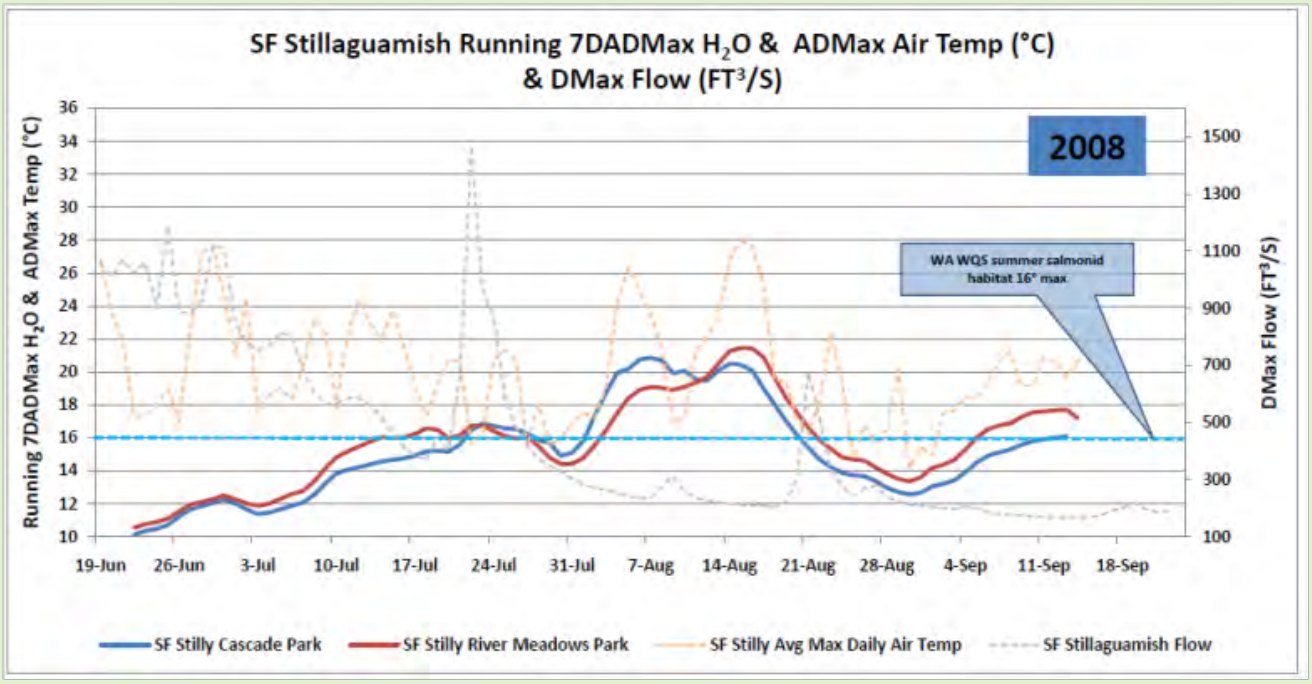


Figure 2: In-stream Flow and Air Temperature Influence on In-stream Temperature on Lower South Fork Stillaguamish – Summer 2009

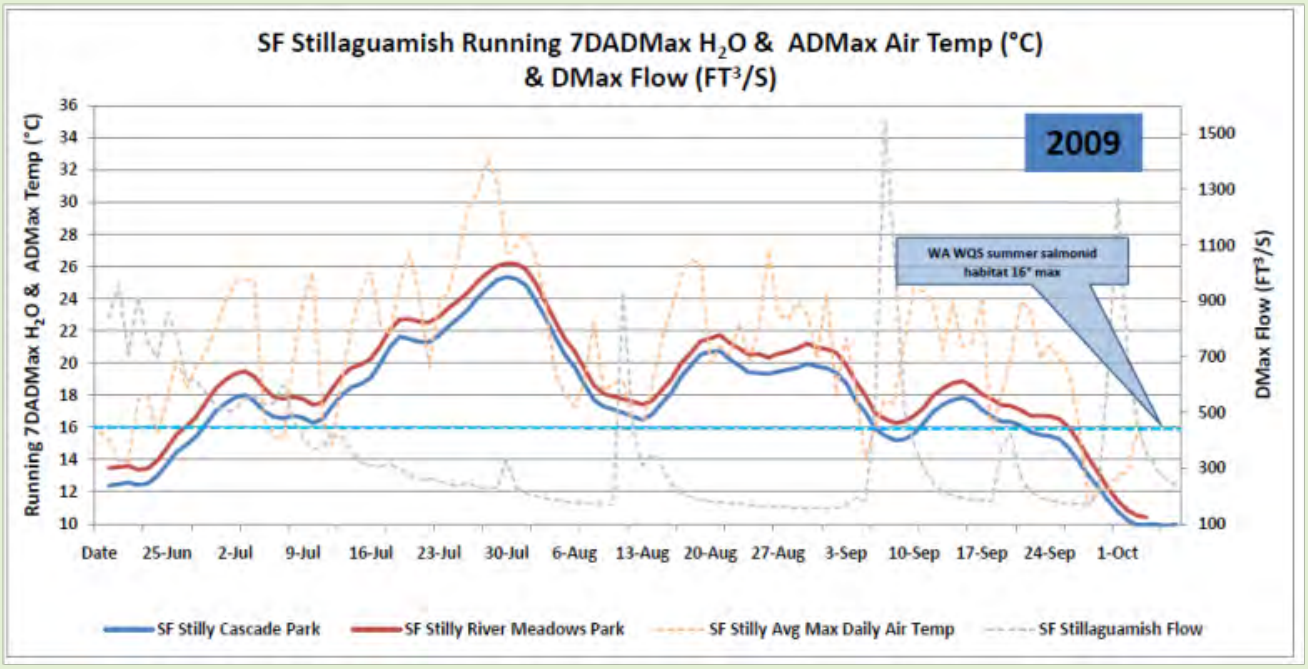
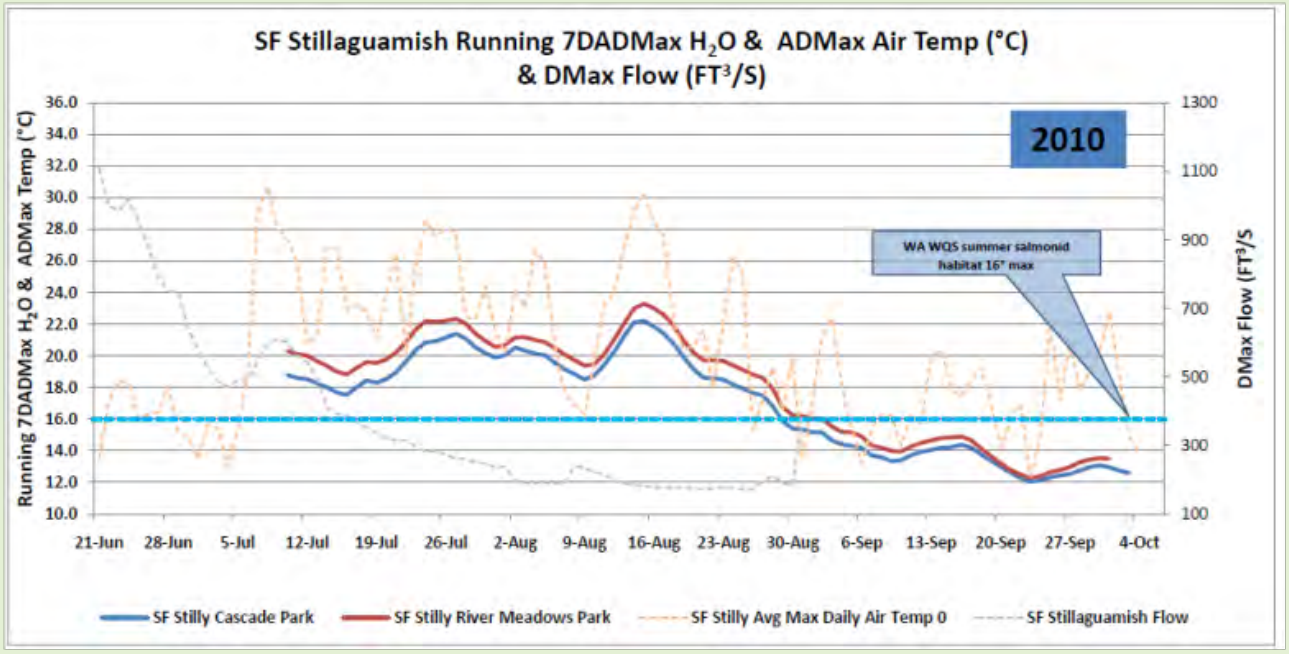


Figure 3: In-stream Flow and Air Temperature Influence on In-stream Temperature on Lower South Fork Stillaguamish – Summer 2010



Benefits to be realized in the long term due to promoting near stream conifer dominance not only include in-stream temperature reduction but also greater bank stability, and inputs of decay resistant large woody debris. Short term benefits were also gained by the establishment and restoration of buffers in terms of preserving and enhancing habitat and existing cover in addition to pollutant load reductions through filtration. The STEPL calculated pollutant load reductions submitted with the annual 319 reports are summarized below in Table 6.

Table 6: Calculated Pollutant Load Reduction for 319 Reporting 2009-2011

	NITROGEN (lbs/yr)	PHOSPHORUS (lbs/yr)	BOD (lbs/yr)	SEDIMENT (t/yr)
2009	71.7	7.3	0.2	0
2010	14,605.3	13,887.1	335.9	52.5
2011	1,030.3	971.3	52.6	8.2
TOTALS	15,707.3	14,865.7	388.7	60.7

Project outreach was performed predominantly through three main methods: targeted mailings to specific landowners, outreach at the annual Stillaguamish Tribe Festival of the River, and personal referrals from project partners and Snohomish County co-workers. In the recruitment phase letters were sent out to landowners along selected reaches of the South Fork who owned significantly long continuous sections of riverfront and/or showed a severe lack of vegetated buffer. The recruitment letter is included in the appendix. Three of the seven property owners participating in the project came from this effort. Unfortunately the property owners with the most impacted riverfronts were not interested in participating. A brochure was created for outreach to educate the public about the Big Trees Project and is also attached in the appendix. This brochure served as a supplement to face-to-face outreach done at the Festival of the River as well as an education tool sent out to Stillaguamish watershed residents upon request. Finally, a Stillaguamish Big Trees participating project partner sign was created for our partner landowners to display at the entrance to their properties (Figure 4) as a way to acknowledge their participation and advertise the project to the local community.

Figure 4: Stillaguamish Big Trees Project Partner sign

Project Evaluation

The South Fork Stillaguamish Big Trees project's greatest accomplishment has been in pioneering an approach to watershed scale restoration of degraded riparian forests through successional management. Low elevation Puget Sound flood plain forests largely have failed to regenerate their conifer component due to the legacy of historic timber extraction, conversion of land to agriculture, fragmentation from development, and inhibition from invasive species. Overcoming these barriers requires securing available buffers and applying large scale invasive control and targeted planting that allows for regeneration of conifer dominated stands that can persist providing ecological services and serving as seed sources for further natural recruitment. The Big Trees approach to restoration provides a complement to more intensive restoration of available land lacking native vegetation such as formerly cultivated buffers to native vegetative cover. Often adjacent unmanaged degraded floodplain forests that border production lands harbor invasive species that re-invade restorations. Managing transition of these deciduous dominated forests protects both intensively planted expanded buffers and moves these forests towards long term resistance and resilience that provide the benefits of bank stability and in-stream temperature moderation.

Key to the success of this successional management approach has been in planting more mature trees. Large potted and balled in burlap stock 4 to 7 feet tall with well-established fine root systems allows for faster establishment and resistance to common riparian disturbances than 12 to 18 inch bare root or small potted stock typically used in riparian restoration. A more extensive root system at planting means trees can access moisture deeper in the soil profile during summer drought as well as anchor trees more securely to resist being washed out in winter floods. Taller, fuller trees survive deer browsing far better than smaller trees as well as compete more effectively with surrounding vegetation for light. For these reasons, using larger tree stock most likely shortens the time to the establishment of a mature conifer canopy over the use of smaller trees. Smaller trees may languish in a suppressed state for years due to competition and disturbance while larger trees are more resistant and compete more effectively for light and soil resources. The difference in time to establishment of a mature conifer canopy between larger and smaller stock would take decades to know precisely but it is safe to say larger stock give at least a 10-20 year head start towards full buffer establishment. Natural recruitment and successional processes cannot be relied upon to bring about a mature conifer canopy. If it could there would be more extensive multi-aged stands of conifers already established throughout the watershed. Fewer, more fragmented reproductively mature conifers, invasive species and less undeveloped land has largely suppressed conifer forest regeneration.

From a project management perspective this approach has been economical and effective. 47 acres were restored with aggressive invasive control and conifer planting at a cost of approximately $6,200/acre, far less than the $15,000-20,000/acre estimated for more intensive, smaller scale 'complete' riparian restorations that include installing deciduous trees and shrubs. Property owners are far more willing to participate in restoration of "unproductive" land like flood plain forest patches and the typically heavily invaded transition between forest and fields on their land than they would sections of "productive" land. The Big Trees approach serves as a "foot in the door" that educates and hopefully encourages the land owner to allow restoration efforts to expand beyond the forest boundary.

Follow-up

All project installation work is complete and all that remains is follow-up maintenance and monitoring. Monitoring will continue as per the grant contract in the 5th and 10th years of the project. Maintenance will be performed through the 5th year after planting for each project site on as needed basis. As per the landowner agreement, property owners will be expected to maintain the plantings after that. It is anticipated that maintenance needs will be minimal given the effectiveness of invasive control thus far and the 98% survival and strong initial growth of the installed trees. Once established, the planted trees will be tall enough to compete with surrounding vegetation and survive seasonal flood disturbance. Active thinning of existing deciduous trees is likely not necessary as natural processes should result in self-thinning. If, in the 10th year of monitoring, it is found that thinning would benefit the health of the developing conifer stand the property owner will be provided guidance on proper thinning techniques. The project will not be actively continued without grant funding. However, the techniques and approaches developed during implementation of this project will be applied to other projects and advocated in future grant applications.

Appendix A: Property Owner Recruitment Letter

Snohomish County
Public Works
Surface Water Management
Aaron Reardon County Executive
FAX (425) 388-6455
(425) 388-3464
3000 Rockefeller Ave., M/S 607
Everett, WA 98201-4046

<date>
<landowners>
<address>

<greeting>:

Snohomish County Surface Water Management (SWM) has received a grant from the Washington State Department of Ecology (DOE) to improve salmon habitat in the North and South Forks of the Stillaguamish River. The goal of this project is to plant conifer trees along the riverbanks to provide year around shade and bank stability in the long term. Currently there is less than 16% conifer cover along the South Fork and less than 30% along the North Fork. Without bringing conifer trees back to the riverbanks the water will stay too warm for salmon and be more vulnerable to erosion.

We are looking to partner with landowners who have riverfront property to assist us in bringing conifer trees back to the river. This is done at no cost to the landowner with few hassles; Snohomish County SWM pays all costs associated with weed control, site preparation, trees, planting, mulch, exclusion fences (if necessary) and follow-up maintenance. The terms of this grant asks for a minimum average 50' buffer over the length of the riverfront. This means the width can vary to accommodate working land and river access as long as it averages out over the length of the riverfront. Many times the average 50' buffer lies well within the existing vegetation along the riverbank. Benefits to you the landowner include improving your riverfront view, stabilizing your river bank over the long term, reducing pest & weed habitat (esp. rodents), and easing your riverfront maintenance burden.

Participation in this project is completely voluntary and in no way allows Snohomish County or the State of Washington to claim your land, enter your property without your permission or require you to perform maintenance. Your rights of ownership will remain the same as they were prior to participation. You as a landowner are only asked to let the trees grow and to allow Snohomish County to monitor and maintain the trees with advance notice to you for the term of the grant.

We would like to hear back from you regardless whether you are interested or not. Just fill out the enclosed participation interest form and return it in the self-addressed stamped envelope provided. If you are interested, please let us know the best time and way to contact you. If you're not interested let us know and you won't be contacted regarding the Stillaguamish Big Trees Project again. We appreciate your time and thank you for your consideration.

Sincerely,

Rodney Pond
Watershed Steward
Stillaguamish Big Trees Project
Snohomish County Surface Water Management
Ph.425.238.6965
rodney.pond@snoco.org

cont. on next pg.

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detach here

❑ Yes, please contact me to discuss participating in the Stillaguamish Big Trees Project

Name:

Phone:

Email:

Best time to call:

❑ No thanks, not interested.

<landowners & address, river fork>

APPENDIX B: Big Trees Outreach Brochure

Got Blackberries? Let Us Replace Them with Trees!

Partnerships with landowners lie at the heart of the Stillaguamish Big Trees Project. Willing landowners have agreed to have over 40 acres of conifers planted along their river fronts on the North and South Forks. Landowner partners contribute to salmon recovery in the Stillaguamish watershed. They also benefit from having their riverfronts cleared of invasive weeds like Himalayan blackberry and Japanese knotweed and replaced by attractive, long lived conifers at no cost to them.

We're looking to partner with landowners on the North and South Forks! *If you or someone you know might be interested, please contact us for an on-site consultation. Contact information is on the back of this brochure.*

Contact Stilly Big Trees

Stillaguamish Big Trees Project
Rodney Pond, Watershed Steward
Snohomish County Public Works
Surface Water Management
3000 Rockefeller Ave, M/S 607
Everett WA 98201-4046
Phone: 425.388.3464 x4570
E-mail: rodney.pond@snoco.org
visit our website at surfacewater.info

Snohomish County Public Works
Surface Water Management

STILLAGUAMISH

Big Trees Project

Bringing the Forest Back to the River

Why Conifers?

Old growth conifers such as cedars and hemlocks used to tower over the Stillaguamish casting year-round shade to the river and the salmon who lived there. Salmon need cool waters to reproduce, survive and thrive.

Less than 25% of the forest along the North and South Forks is conifer dominated. While deciduous trees like alders, cottonwoods, and maples provide shade, it is not enough to cool the river to salmon-friendly temperatures. Warmer river temperatures have contributed to the drastic loss of Chinook salmon and to decreased runs of other salmon species in the Stillaguamish. It will take decades for the conifers we plant now to be tall enough to shade the river.

Why Big Trees?

The Stillaguamish Big Trees Project has its name for three reasons. First, we are planting 4-6 foot trees. These are over twice as large as what normally gets planted for reforestation. We do this so they can get a running start on the invasive species. Second, conifers are among our tallest trees in the region. And lastly, this is a watershed scale project spanning over many miles of the Stillaguamish river.

We need to take every opportunity we have to lay the foundation of the future forest so our grandchildren can walk with their children under the shade of those trees by a river full of shimmering salmon.

Project Area

Snohomish County Surface Water Management received two grants totaling nearly $1 million from the Washington State Department of Ecology to plant conifers on the North and South Forks of the Stillaguamish. The target project area runs from Arlington to just beyond Oso on the North Fork and from Granite Falls to Arlington on the South Fork. Any landowner with riverfront property or in this area is eligible to be a potential participant no matter how big or small.

APPENDIX C: Big Trees Project Landowner Agreement

LANDOWNER AGREEMENT
For Restoration Projects Sponsored by
Snohomish County Public Works
Surface Water Management Division

This agreement is made and entered into by and between the parties whose names appear below:
Landowner Name (Landowner):
Street Address: _____
City, State, Zip Code:

Phone: Home_____ Cell _____ Work _____
Tax parcel _____

Sponsoring Organization (Grantor)

Snohomish County Public Works
Surface Water Management Division
3000 Rockefeller Avenue, M/S 607
Everett, WA 98201

The purpose of this Agreement is to identify and confirm the terms, conditions and obligations agreed upon between the Grantor (County), undertaking the Water Quality/Salmon Habitat Improvement Project (Project), and the Landowner, who owns the property on which the Project will take place.

The Grantor and Landowner mutually agree to participate in conducting those restoration activities described in Attachment "A " on lands owned by Landowner in __ Watershed, Snohomish County, State of Washington, which is located in Section__Township__ , Range__. Attachment "A" is attached and incorporated herein.
The Grantor agrees:

- to provide the Landowner with one week notice prior to commencement of the Project;
- to provide the Landowner with an estimated date of Project completion and to regularly keep the Landowner informed of Project activities and timelines;
- to leave the property, at completion of the Project, in as near to original condition as reasonable or as otherwise agreed upon in writing with Landowner, and

The Landowner agrees:

- at reasonable times of business or other mutually agreeable time periods to provide reasonable property access to the Grantor, its agents, employees and contractors, to plan, complete, and monitor the long-term condition of the project;
- to inform the Grantor, its agents, employees and contractors, of all known safety hazards on the property;
- not to intentionally compromise the integrity of the project;
- to maintain structures installed; and
- to provide access to employees of the following agencies: Snohomish County, its agents, employees and contractors for the purposes of viewing and showing the Project to interested parties for information or educational purposes with a one week prior notice.

This Agreement shall remain in effect for a period of ten years from the date of final signature.

Only the restoration activities (Attachment "A") of this Agreement may be modified at any time by mutual written consent of all the parties. No work shall be commenced in connection with this Agreement until this Agreement and any amendments to this Agreement have been signed by both parties.

A change of ownership shall not change to terms of this Agreement. The Landowner will notify the Grantor of changes in ownership within thirty (30) days of transfer. In the event of such transfer of ownership, the Landowner shall provide a copy of this Agreement to the succeeding owner prior to such transfer.

Either party may seek termination of this Agreement by providing written notice to the other party. Such termination shall only be effective after authorized representatives of both parties have agreed in writing to such termination and County has been provided with a thirty (30) day advance written notice of such termination. At Grantor's discretion, if termination is initiated by the Landowner or Grantor, the County may require up to full reimbursement for all costs of the restoration project funded by the County.

This Agreement does not authorize the County to assume jurisdiction over, or any ownership interest in the premises. The Landowner retains all rights to control trespass and retains all responsibility for taxes, assessments, and damage claims.

The Landowner acknowledges that he/she is voluntarily participating in the habitat restoration activities (described in Attachment A) that are the subject of this Agreement and is permitting the Landowner's property to be used for such activities pursuant to the terms of this Agreement. The Landowner agrees not to make any claim against the County and releases the County from any and all liability for damage, whether direct, indirect or consequential, to Landowner's property or for injury or death to Landowner or any invitee of Landowner related to or occurring as a consequence of the habitat restoration activities conducted in accordance with this Agreement except for damages arising out of the sole negligence of Snohomish County

Unless otherwise stated, the Landowner assumes full and complete responsibility for all restoration maintenance and developments made under this Agreement upon expiration of the agreement or termination of the work, whichever comes earlier.

Landowner guarantees ownership of the above-described land and warrants that there are no outstanding rights which interfere with this Agreement.

Landowner guarantees maintenance of insurance against claims for injuries to persons or damage to property which may arise from or in connection with the above-described land.

IN WITNESS WHEREOF, the parties have executed this Agreement.

Snohomish County Representative	Date	Landowner	Date

Attachment "A"

This work will commence __, and be completed by the end of __ .
These restoration activities will be completed by Snohomish County and its partners and contractors. Partners may include Stillaguamish Tribe, Stilly Snohomish Fisheries Enhancement Task Force, various public schools, Washington Native Plant Society, and WA DOC Community Service Volunteers.

This project will include the following activities (check all that apply):

	Activity		Activity
❑	Fish Barrier Removal: Option 1❑ or 2❑	❑	Site Preparation for Planting
❑	Installation of a Dry Crossing: Option 1 or 2	❑	Revegetation with Native Plants
❑	Fish Habitat Enhancement using LWD	❑	Site Maintenance
❑	Bank Stabilization	❑	Monitoring
	Installation of Streamside Fencing		

Description of the restoration activities follows:
Fish Barrier Removal – A barrier to fish migration will be removed by one of two methods.
Option 1. The undersized culvert will be removed.
Option 2. The perched culvert will be backwatered with a series of full spanning weirs downstream, or the culvert will be retrofitted with interior baffles.

Installation of a Dry Crossing - A dry crossing will be provided by either the installation of a new culvert, or with a farm bridge. The bridge will be approximately__wide and __long. It is designed and built to handle loads from livestock and foot traffic only. Motor vehicle and equipment use is not advised. Semi-annually inspect the bridge abutments and approach for signs of deterioration including, but not limited to, settlement, erosion, cracks, weathering, displacement, decay, and from any other damage or defects that would impair its usefulness, durability, or strength. All maintenance on the bridge will be the responsibility of the landowner. Promptly make the repairs necessary to protect the structure from the elements and from the effects of animal manure.

Fish Habitat Enhancement - The LWD (Large Woody Debris, also known as logs and logs with rootwads attached) will be installed in the stream in such a fashion as to be stable and secure, not migrate downstream, and not cause excessive lateral migration of the stream channel.

Bank Stabilization – Stabilization will be accomplished by integrated methods, which incorporate a variety of materials such as rock, LWD, soil or plants, fascines, and brush mattresses. It may also include fabrics such as jute or coir mesh. Types include: joint plating, vegetated geogrids, live cribwalls, tree revetments and large woody debris.

Fencing - New fencing will be __, constructed to NRCS standards. All corner and turn posts will be treated 6-7" diameter wood posts. Metal t-posts will be installed at 10' centers between turns. Gates will be installed as needed for access to streamside for planting and maintenance activities. Fencing will be installed no closer than __ to the stream bank along a line amenable to both the Landowner and Snohomish County. Repair and maintenance of the fence and gates will be the sole responsibility of the Landowner for the duration of this Agreement.

Site Prep for Planting - Snohomish County will use Integrated Pest Management (IPM) strategies to control invasive plants. This may include mechanical cutting back or applying chemicals as needed until site is ready for new trees and plants.

Revegetation - Native plants appropriate for this site will be planted at densities deemed necessary for success. Buffer widths will average a minimum of __ from the vegetated edge of the river bank. Plant materials used will be northwest native plants suitable for the location, and all riparian planting will be completed using native plants and materials supplied by Snohomish County or its partners.

Site Maintenance - A maintenance plan will be developed and given to the landowner. Restoration site maintenance will be provided by Snohomish County for a minimum of 3 years after planting. Target survival is 80% of the new plant material. If the site is impacted severely by animal browse during this period, then Snohomish County will help develop a plan to minimize damage to key plants. Snohomish County will not be responsible for managing wildlife activities. Invasive plant control will be conducted using integrated best management practices for the invading species. Responsibility for maintenance will shift to the landowner at the end of the 3 year maintenance period. Snohomish County may provide maintenance support services during this later period of the agreement if able and appropriate.

Monitoring – A monitoring plan will be developed and given to the landowner. Implementation of the monitoring plan will be the responsibility of Snohomish County and its partners for the duration of the agreement. Regular monitoring reports will be provided to the landowner.