

Lewis River Aquatic Fund Projects (SA 7.5.3.2)

Project Closeout Report

Project Title:	Lewis River Hydroelectric Project <i>Martin Access Riparian Forest and Off-channel Habitat Enhancement, the Two Forks Access Riparian Forest Enhancement, and the Plas Newydd Farm Riparian Forest Enhancement</i>
Project Approved By:	Aquatic Coordination Committee April 2007
Original Project Sponsor:	Cowlitz Indian Tribe
Project Funding	\$75,000
Project Description (work completed):	<ul style="list-style-type: none">• The Natural Resources Department of the Cowlitz Indian Tribe used ACC funding to plant a total of 1100 willow (Sitka willow <i>Salix sitchensis</i>, and Scouler's Willow <i>Salix scouleriana</i>), 950 Black Cottonwood (<i>Populus balsamifera ssp. trichocarpa</i>), 1020 Red-Osier Dogwood (<i>Cornus stolonifera</i>) and 124 Oregon Ash (<i>Fraxinus latifolia</i>) at four sites along the lower mainstem Lewis River of southwest Washington State. These numbers total, in all, 3270 plants.• Five species were selected for planting: Scouler's Willow, Sitka Willow, red-osier dogwood, black cottonwood and Oregon ash. These species were selected to accomplish multiple goals including: rapid growth for summer shade to shelter other plantings (cottonwood), hardiness to withstand inundation and predation (willow and red-osier dogwood), and creation of complex and dense shrub layers. Oregon ash will, in time, provide the large structure and woody input into the system needed. In the long term, these plantings will vegetatively armor and anchor the transient sandbar ridge structures and enhance their persistence. The lower mainstem Lewis River is tidally-influenced and river water levels can also fluctuate greatly with dam drawdowns and rainfall. Plant species selection and site-specific planting elevations took into account these important factors. Finally, these five species are well-represented in the area and make up the vast bulk of existing riparian tree and shrub species near the planting areas.• Willows were nursery-grown in Dpot cones 30 cm deep, and 7cm in diameter. These plants were around 45cm in height above the surface of the soil. Willows had been treated to stimulate root growth by cutting the mainstem. Willow leaders growing out of the cut mainstem were also approximately 45cm tall.• Cottonwoods, dogwoods and ash were grown in 1 gallon nursery pots. Aboveground growth was around one and a half meters in

height.

- No stakes or tubes were used for protection against beavers, voles, or other herbivores. It was felt that using tubes or fencing would create a potential source of restoration debris that would find its way down the Lewis and into the Columbia River and its estuary. Plants were put into the ground at the sites between August and December of 2007.
- Trees and shrubs were installed by creating holes with a gas-powered auger in the desired location to a depth and width of the root wad. Plants were then stuffed into the augered holes. Because plants were grown and planted with potting soil, no amendments or fertilizers were added to the planting sites. Plants were spaced about 1.5 meters apart at all sites, in alternating rows of single species per row.
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Workforce:

- **Personnel (by craft)**
- **Contractors:**

- Nathan Reynolds (Ecologist, Cowlitz Indian Tribe)
- James Gordon (Sci-Tech, Cowlitz Indian Tribe)
- Ed Arthur (Assistant cultural resources director, Cowlitz Indian Tribe)
- Holly Ballantyne (Sci-Tech, Cowlitz Indian Tribe)

Schedule Summary:

Planned Completion Date: October 2007
Actual Completion Date: December 2007

Problems Encountered:

- Plantings went in very late in the year
- First year survey found many of the plants had disappeared, no causes of mortality apparent (most likely washed away)
- First year surveys, and some plant growth response hampered by dense covers of *Phalaris arundinacea* (Reed-canary grass)

Things that went well:

- Of plants located in the first year survey, very few plants showed signs of girdling or lethal herbivory
- Planting areas were highly accessible.

Work Not Completed:

- Second year surveys have not yet been performed (Summer 2009)

Lessons Learned:

- Plantings should occur far earlier in the calendar year to allow for plant hardening and root structure anchoring
- Even in one-year timeframes, considerations should be made for invasive or exotic competitors such as *Phalaris arundinacea*
- Mechanical shear stresses from high water events should be considered when selecting planting locations.

Year 1 survivorship:

Of the 3270 plants that were put into the ground, only 1371 plants were accounted for in the first year survey done in the mid-summer of 2008. Of these, 1215 were alive. Survivorship among all sites was significantly lower than we had hoped for. Exact causes of mortality were difficult to determine due to significant numbers of plants which could not be found in the first year survey. It is likely that a large

number of plants were put into the ground too late in the planting window and were not given enough time to establish roots in the soil and therefore washed away in the subsequent high water events of the winter of 2007/2008.

Total number of plants invoiced and planted at each site					
	Red	Cotton	Ash	Willow	Totals
Plas Newydd West	200	360	0	400	960
Plas Newydd East	220	230	0	240	690
Martin Access	220	160	0	300	680
Two Forks	380	200	200	160	940
Totals	1020	950	200	1100	3270

Total number of plants found at each site during the census taken in the summer of 2008					
	Red	Cotton	Ash	Willow	Totals
Plas Newydd West	73	0	NA	91	164
Plas Newydd East	114	31	NA	172	317
Martin Access	89	26	NA	73	188
Two Forks	368	133	84	117	702
Totals	644	190	84	453	1371

Of the plants that were found, mortality from herbivory appeared to have been very low. Very little evidence of girdling was found. We are certain that the loss of plants to herbivory was minimal compared to the loss from poor planting times. This is evidenced by the relatively low disappearance of plants (with the exception of willows which were planted at lower elevations, near to the water's edge) at the Two Forks site and the low evidence of girdling or other herbivory. At all four sites survivorship among plants that were found were at levels expected in riparian planting sites in the area (see table three). In most cases, herbivory resulted in vigorous regrowth among willows and cottonwoods.

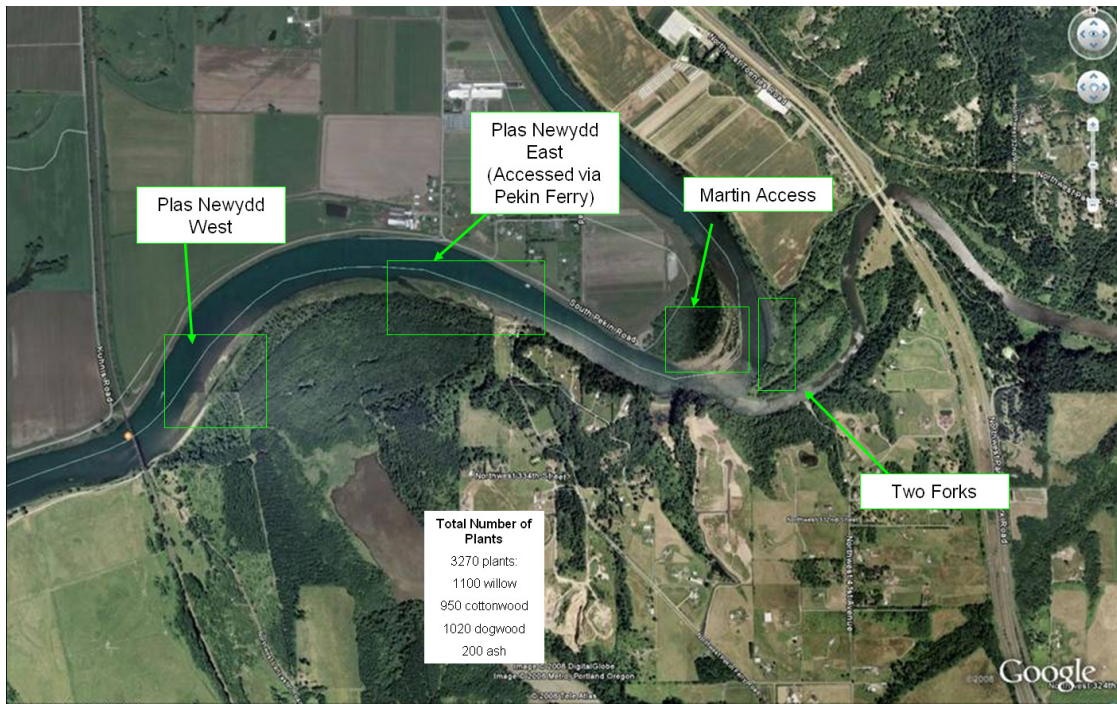
Survivorship among plants found in the summer 2008 census				
	Red	Cotton	Ash	Willow
Plas Newydd West	0.9863	0	NA	0.9451
Plas Newydd East	0.8596	0.6129	NA	0.8721
Martin Access	0.9775	0.8462	NA	0.9452
Two Forks	0.9293	0.6992	0.9881	0.8034

Total Survivorship by site and species					
	Red	Cotton	Ash	Willow	Totals
Plas Newydd West	0.360	0.000	NA	0.215	0.165
Plas Newydd East	0.445	0.083	NA	0.625	0.387
Martin Access	0.395	0.138	NA	0.230	0.262
Two Forks	0.900	0.465	0.415	0.588	0.651
Totals	0.587	0.141	0.415	0.363	0.372

An informal census performed during the low water period between the winter rainy season and the spring runoff was performed. Survivorship appeared to be high during this census. However plants

were not counted at this time, so no actual survivorship data was collected. Inundation during the spring 2008 runoff time was particularly long, where the plants were inundated until mid July. It is thought that between the rainy season and the spring runoff many of the plants began to leaf out, increasing the amount of drag created by the plants during the spring inundation. In addition to the drag, the short amount of time the plants had to root and establish most likely played a factor in a significant amount of plants being washed away.

The plantings done in the summer of 2008 (funded by LCREP) were censused at the end of March 2009. Preliminary counts show a survival rate of around 90% at all three sites (Martin Access, Plas Newydd West, and Plas Newydd East). No site differential was detected. However this pattern of high survivorship was observed in the early monitoring of the ACC2007 planting effort. Another key difference between the LCREP project and the ACC funded project is the planting arrangement. LCREP plantings were done in dense clusters of hex grids with sides of .5 meters. The ACC funded plantings were done in long rows with spaces of 1 – 1.5 meters between them. If drag during spring runoff was indeed an issue, then the tightly arranged LCREP plantings may fare better. Another of survey of these plants will be done in summer 2009, concurrent with the surveys of the plants done in this survey to address these possibilities.



Planting sites along the Lewis River (Photo source: Google Earth)



Plantings on Plas Newydd West. Green bars indicate where rows of willows planted, blue lines represent red-osier dogwood, and yellow bars represent black cottonwood plantings. Orange bars indicate where willow cuttings were placed.



Overview of planting sites on Plas Newydd East. Plantings were done in three areas (Source: Google Earth) Site A had three rows of red-osier dogwood planted at the tip of the island.



Plantings done on section “B” at Plas Newydd East. Green bars indicate where willows were planted. Blue bars show red-osier dogwood, and yellow bars indicate black cottonwood. (Source: Google Earth)



Plantings at Plas Newydd East, section “C”. Green bars indicate willow plantings, blue bars indicate red-osier dogwood, yellow bars indicate black cottonwood plantings. (Source: Google Earth)



Plantings along Martin Access. Green bars indicate where willow were planted. Blue bars represent red-osier dogwood, yellow lines show black cottonwood. (Source: Google Earth)



Plantings at Two Forks. Green bars indicate where willows were planted. Blue bars represent red-osier dogwood, yellow bars represent black cottonwood. Orange bars represent Oregon ash. (Source: Google Earth)



Plating areas at the Martin Access site. (Photo: Nathan Reynolds August 2007)



Plants being staged in an area at the Two Forks site. The site was prepared for planting by mowing reed-canary grass (Photo: Nathan Reynolds October 2007)



Plantings at Two forks with Martin Access plantings in the foreground. The plantings can be identified by the orange flagging. (Photo: Rudy Salakory December 2008)