

FINAL PROJECT REPORT

FOR

G0500035

Lockwood Creek Restoration I

Clark Public Utilities

Total Cost of Project: \$ 333,333

Grant or Loan Amount: \$ 250,000

Project Start Date: August 16, 2004

End Date: June 30, 2008

PROJECT MANAGER

DATE

OVERVIEW DESCRIPTION OF PROJECT:

The Lockwood Creek Watershed has experienced ongoing and increasing water quality impairments including turbidity, temperature and fecal coliform. Conversion from forestry to agriculture has been ongoing for the last 70 years. The watershed is now beginning to urbanize and transition to small acreages and hobby farms creating new problems. This project’s goals are to address these impairments and changes in land uses to Lockwood Creek by planting trees, stabilizing streambanks and removing invasive non-native vegetation.

RESULTS & OUTCOMES:

All performance measures for this grant, except for one, met or exceeded. The primary tasks for this project included riparian plantings, livestock fencing, invasive non-native removal, bank stabilization and maintenance.

Task 1 – Project Administration/Management:

All project work under this task was completed as required. No costs were charged to the DEPARTMENT under this task.

Task 2 – Livestock Exclusion Fencing:

We did not meet the performance measure for this task. Three hundred and fifty feet of the planned 3,000 lineal feet of fence was installed. A good deal of the project had fence already installed. We increased performance measures for other tasks to make up for the lower fencing target.

<i>Required Performance:</i>	<i>Target</i>	<i>Actual</i>	<i>Percentage</i>
Install livestock fencing - Feet	3,000	350	- 88%

Task 3 – Invasive Plant Removal:

Approximately 95% of the project area was covered in Reed canary grass. Blackberries (Himalayan & Evergreen) were prevalent in the areas with established Oregon white oak. As the Reed canary grass was controlled other invasive non-native species, such as Thistle and Tansy, began to be established and required control. Control was by mechanical and chemical means.

<i>Required Performance:</i>	<i>Target</i>	<i>Actual</i>	<i>Percentage</i>
Maintain project site – Years	3	3	+ 100%

Task 4 – Bank Stabilization:

At total of 1,200 feet of eroding streambank was stabilized exceeding the grant performance measure by 600%. This reach previously had a dike partially removed but the stream was still incised with vertical banks. We installed large woody material to provide structure and covered the banks with coir fabrics to help stabilize the loose sediments until the willows and other native vegetation could get their roots established. The project has withstood 50 and 25 year floods plus prolonged inundation (5 months) since original installation.

<i>Required Performance:</i>	<i>Target</i>	<i>Actual</i>	<i>Percentage</i>
Streambank stabilized - Feet	200	1200	+ 600%

Task 5 – Riparian Plantings:

A total of 37,661 plants were installed over 21 acres; exceeding grant performance measures by 375% and 190% respectively. Plants were installed using a variety of crews including correction crews, contract crews, AmeriCorps, seasonal students and temporary staff. Plant survival ranged from 72% to 90% averaging about 84%. Areas with survival less than 85% were replanted. All areas were actively maintained.

Stream Length: A total of 5,050 lineal feet of stream was restored exceeding the grant performance measure by 126%.

<i>Required Performance:</i>	<i>Target</i>	<i>Actual</i>	<i>Percentage</i>
Riparian Plantings – Trees	10,000	37,661	+ 375%
Area restored - Acres	12	27	+ 190%
Stream length restored – Feet	4,000	5,050	+ 126%

Task 6 – Project Maintenance:

Maintenance was an important component of our grant expenditures. We maintained the project area for the last three years. Maintenance has included ongoing mowing of competing grasses and weeds as well as intensive watering the first two years and reduced watering this year. Each project will need to periodic maintenance until canopy is established.

Task 7 – Public Information & Education:

Our educational outreach measures were modest. We attended and staffed informational booths at several large scale events including the Clark County Home and Garden Fair for three years. Other venues included Earth Day events and our tree planting events. No signage was installed as all three projects were not located by any main roads. No costs were charged to the DEPARTMENT under this task.

EVALUATION:

In order to improve stream temperatures and decrease turbidity our primary objective for riparian plantings is to establish a self-sustaining native plant community. We use plant mixes that will establish a plant community quickly, that through time, will be able to keep reintroduction or take over by non-native species from occurring in the ten, twenty and fifty year time frame. To do that heavy cover (shade) needs to be established rather quickly. To do so requires an atypical approach using tighter tree spacings and liberal use of conifers typically Western red-cedar. We have employed this approach for about seven years and are now seeing the older projects create 100% dense canopy with little or no re-establishment of invasive non-native species. In fact, we are now beginning to see shade requiring shrubs and forbs from the historic seed bank, volunteer on their own where once Reed canary grass completely dominated.

Our approach for managing and reducing Reed canary grass has been very successful. We adopted the NW Chapter of the Society for Ecological Restoration's working group recommendations for Reed canary grass. The primary approach is to starve it to death and then provide heavy shade. The process includes mowing, chemical application and then followed by another mowing repeated for two to three years. This process, if employed correctly, the season before planting shows great promise. Plantings where this has been thoroughly applied do significantly better. On some of our older grant projects where the canopy has begun to close native forbs such as Carex, rush and Scirpus have begun to re-establish voluntarily. We found that where Cedar or other year round shade providing species were used Reed canary grass dominance was curtailed significantly and sometimes completely.

As with our Middle Salmon Creek Grant (G0500036) we are finding that our biggest threat is that of beavers. Beavers have always played a part in plant mortality but we have seen a significant increase in predation since the trapping initiative was passed six or seven years ago. The number of beavers has grown exponentially and they are removing plants as fast as we can plant them. They account for 60-70% of our mortality. Though beavers have evolved and been a part of providing excellent riparian habitat the normal coppicing and regeneration process has been truncated by Reed canary grass. Normally established trees will tolerate and sometimes thrive with beaver predation. What I have observed (as well as others) now is that once trees /shrubs are coppiced by beaver they will rebound once. The next time they are coppiced the plant is stressed and is out competed by Reed canary grass. We had one planting that was not

checked for two months and found over 400 trees had been taken by beaver. We replanted and they returned the following year and took another 400+ trees. We have employed many mechanisms to control beaver

We have tried many methods of protecting trees none of which is a true long term solution. Some, like installing a beaver barrier fence, have been good at protecting the streambank but not full proof. Beaver sometimes tunnel under as well as push down the fence and climb over it. It's maintenance intensive and requires some one to knock down flooding debris off the face to prevent the barrier from being flattened. Since it doesn't biodegrade the barrier eventually needs to be removed after seven to ten years.

FOLLOW-UP:

In order to assure canopy closure and long term attainment of our objectives we will continue to maintain non-natives and re-plant where necessary over the next three to four years. We have set aside funds to do so. We know there is pressure to keep grant periods as short as possible but three to four years does not provide adequate time to ensure goals of plant establishment and canopy cover.