

FINAL PROJECT REPORT

FOR

**G0500036**

**Middle Salmon Creek Restoration II**

**Clark Public Utilities**

Total Cost of Project: \$ 312,000

Grant or Loan Amount: \$ 234,000

Project Start Date: August 16, 2004

End Date: June 30, 2008

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PROJECT MANAGER

DATE

**OVERVIEW DESCRIPTION OF PROJECT:**

The middle reach of the Salmon Creek Watershed has experienced gradual water quality degradation from land use practices and urbanization and is not meeting state water quality standards for a Class A water body. The major water quality impairments are temperature, fecal coliform and turbidity. This project’s goals are to address these impairments in the middle reach of Salmon Creek by stabilizing streambanks, planting trees, fencing out livestock and removing non-native vegetation. These are well-recognized practices to reduce erosion and runoff and in the long term will improve water quality in the Salmon Creek Basin.

**RESULTS & OUTCOMES:**

All performance measures but one for this grant were 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:*

Fencing was planned for both the Agnew and Nixon projects. The Nixon project was fenced by Clark Conservation District and NRCS for a total of 1,851 feet –The Agnew project landowner decided to not have his project area fenced off. The Agnews discontinued their dairy operation and are no longer running livestock. They are focusing on hay production and corn. This project, had it been fenced, would have included 1,834 lineal feet of fencing.

<i>Required Performance:</i>	<i>Target</i>	<i>Actual</i>	<i>Percentage</i>
Install livestock fencing - Feet	3,500	1,850	- 53%

*Task 3 – Invasive Plant Removal:*

All projects worked on had significant numbers of invasive non-native species present. The primary and most abundant was Reed canary grass. Blackberries (Himalayan & Evergreen) were prevalent on almost every project. Other non-native species controlled or eradicated included Thistle, Tansy, Poison hemlock and Bitter nightshade. We estimate that approximately 85% of the project area was dominated by invasive non-native plants. Through multiple control mechanisms invasive non-native species are an estimated 85-90% controlled or eradicated.

<i>Required Performance:</i>	<i>Target</i>	<i>Actual</i>	<i>Percentage</i>
Maintain project site – Years	3	4	+ 133%

*Task 4 – Bank Stabilization:*

At total of 410 feet of eroding streambank was stabilized exceeding the grant performance measure by 164%. The seven foot tall eroding bank on the Nixon project was dumping fine sediments into Salmon Creek at the rate of 1.5 to 3.0 feet per year. Stabilization was completed employing passive type practices. Banks were sloped back at a 3:1 slope and covered with coir fabric and willows. No rock or large woody material was used. There has been some, but not excessive, undercutting due to lack of toe stabilization. To address this we installed coir (jute) logs at the toe which seems to have arrested the undercutting and hopefully allow the willows and other vegetation to get established before they decompose. The project has withstood 50 and 25 year floods since originally being installed.

<i>Required Performance:</i>	<i>Target</i>	<i>Actual</i>	<i>Percentage</i>
Streambank stabilized - Feet	250	410	+ 164%

*Task 5 – Riparian Plantings:*

A total of 36,120 plants were installed over 27 acres; exceeding grant performance measures by 300% and 225% respectively. Plants were installed using a variety of crews including correction crews, contract crews, AmeriCorps, seasonal students and temporary staff. Plant survival ranged from 69% to 89% averaging about 81%. The lower survival numbers were seen on the smaller plantings where watering was not feasible. The two main projects, Agnew and Nixon, were 75% and higher. Areas with survival less than 85% were replanted. All projects were actively maintained. The North project, the smaller of the three, was not watered and mowed a bit less frequently due to remote and difficult access issues.

*Stream Length:* A total of 5,620 lineal feet of stream was restored exceeding the grant performance measure by 140%.

<i>Required Performance:</i>	<i>Target</i>	<i>Actual</i>	<i>Percentage</i>
Riparian Plantings – Trees	10,000	36,120	+ 300%
Area restored - Acres	12	10,000	+ 225%
Stream length restored – Feet	4,000	5,620	+ 140%

*Task 6 – Project Maintenance:*

Maintenance was an important component of our grant expenditures. We maintained all project areas for at least three years with many projects now in their fourth year. Inmate, contract, AmeriCorps and seasonal students were used to maintain projects in this grant. 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, 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. This 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.

We did not meet our livestock fencing goal due issues beyond our control. The Agnew project was slated for 1,800 lineal feet. Between the time of grant writing and implementation the landowner discontinued their dairy operations and sold their livestock. This is not an isolated case. Almost all small and medium sized dairies have ceased operations. Demand or need for fencing is decreasing significantly in this region. It has caught us off guard and we are left scrambling to find substitute fencing projects to replace the projects we originally planned to fence.

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 that Reed canary grass dominance was curtailed significantly and sometimes completely.

With regard to riparian plantings 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.

We will also take the opportunity when visiting the Agnew site to make sure that they do not resume livestock in or near the project area.

One recommendation would be to extend grant periods for riparian plantings to seven years so that funds would be available to do long term maintenance and set right any projects that may be doing poorly or where non-natives are beginning to reestablish. To prevent sponsors from procrastinating and not initiating and completing plantings timely (i.e. within the first two planting seasons) performance measures could be written that only a certain portion of the grant could be spent in years 5-7 and that spending would be limited to maintenance. This recommendation would closely follow mitigation requirements for reestablishing plant communities. Permits for mitigation plantings are typically written for ten years and require 90-100% survival with 5-10% surface non-native surface coverage. It used to be just five years. The time frame was modified due in large part to longer term evaluations showing that a high percentage of permittees, though showing success at five years, had projects not meeting performance standards at 7 and 8 years. It is curious that we can expect "volunteer" restoration, being far less well funded, to miraculously produce success in shorter time periods. Our program started modifying practices and time frames after evaluating not only our own riparian projects but also ones funded by Salmon Recovery Funding Board, Centennial and CREP.

We know that modifying time frames, especially with Section 319 federal funds, probably isn't going to happen. Maybe the conversations could at least begin.

**Middle Salmon Creek Restoration II (SC 04)**

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These longer grant periods would obviously not apply to activities such as bank stabilization which can be completed rather quickly and require little or no maintenance compared to plantings.