

Pebble Creek Restoration Project

DEQ NPS Sub-grant S467

Final Report

September 2015



Overview of the two newly restored channels

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Portneuf Soil and Water Conservation District

In Cooperation With:

Idaho Association of Soil Conservation Districts

Idaho Soil and Water Conservation Commission

Idaho Department of Agriculture

USDA Natural Resources Conservation Service

Idaho Department of Environmental Quality

Conservation Basics, LLC.

Index

Abbreviations	2
Project Map	3
Overview	4
Historic	5
Goals	7
Load Reductions	16
Monitoring	17
Tours, Outreach	18
Financial Summary	21
Conclusions, Acknowledgements	22
Before and after photos, selected projects	24
Final Invoice, attached	
Monitoring Report, attachment A	

Abbreviations

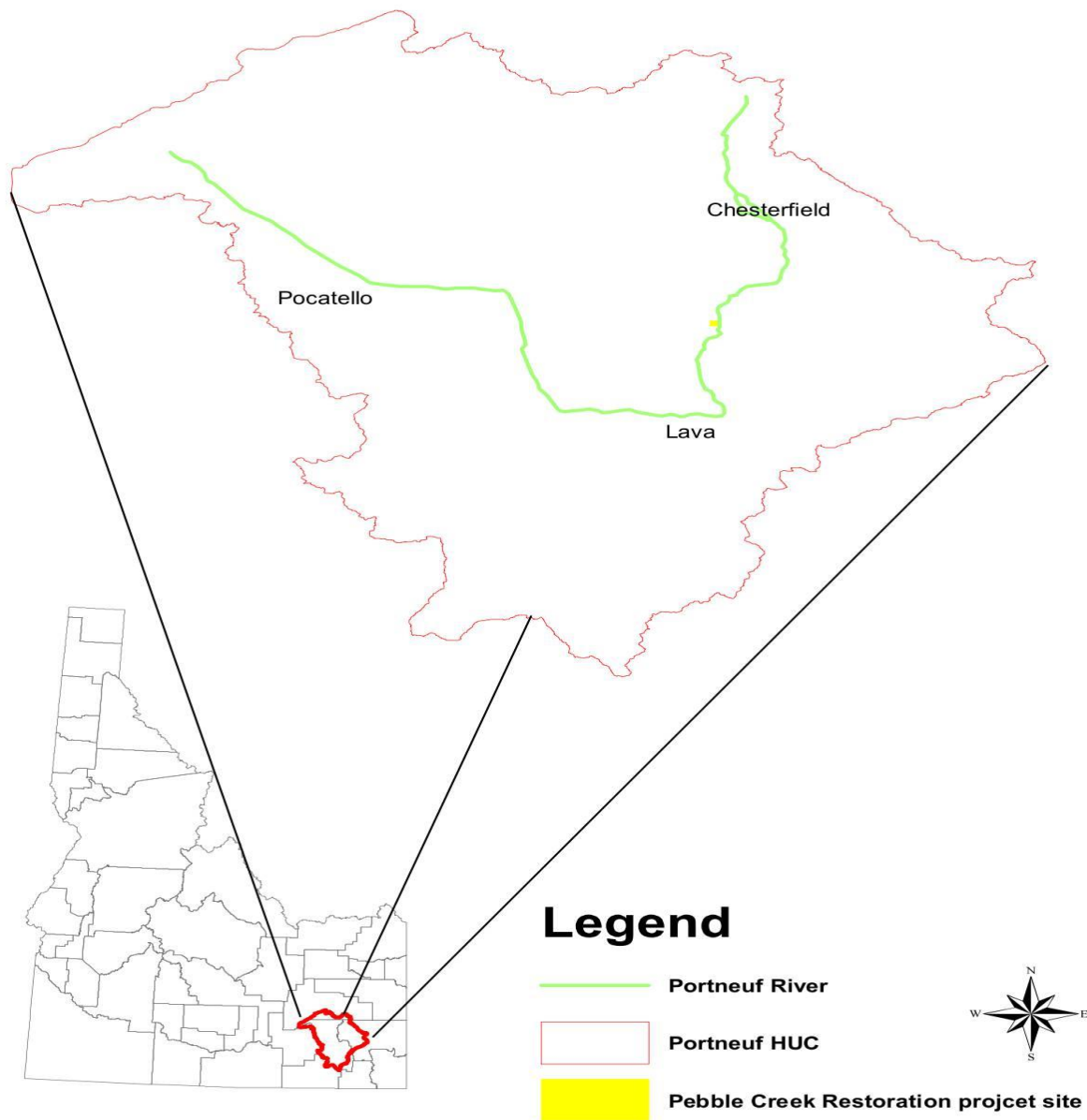
Idaho Association of Soil Conservation Districts - IASCD
Idaho Soil and Water Conservation Commission - ISWCC
Conservation Basics LLC-CBLLC
USDA Natural Resources Conservation Service - NRCS
Idaho Department of Environmental Quality - IDEQ
Portneuf Watershed Partnership – PWP
Portneuf River Project-PRP
Environmental Protection Agency – EPA
Total Maximum Daily Load – TMDL
Hydrologic Unit Code - HUC
Portneuf Soil and Water Conservation District – PSWCD
Best Management Practices – BMP
State Agricultural Water Quality Improvement Program – SAWQP
Stream Evaluation Control Indicator-SECI
Yellowstone Cutthroat Trout-YCT

Pebble Creek Restoration Project §319

DEQ NPS Sub-grant S467

HUC 17040208 Portneuf River

December 2011



Project Overview

The Pebble Creek Project was nearly ten years in the making when it finally came to life 2011. Pebble Creek, a critical spawning tributary for Yellowstone Cutthroat Trout (YCT), runs east from the Portneuf Range through a deep and fairly narrow canyon ending up at the Portneuf River roughly 7 miles from where it begins. The Portneuf Range boasts mountain peaks with average heights of nearly 9,000 feet in elevation, which are prone to heavy snowfall throughout the winter months. Snowmelt has a tremendous effect on the flow in Pebble Creek especially in the thawing months.

Pebble Creek originates on National Forrest lands and then flows through private ground for approximately the last mile of its journey. The stream channel splits from one to three channels as it flattens out and flows across a large alluvial fan. The three channels flow across two different landowners properties on their way to the river.

The Project came to life after representatives from the forest service showed the participating landowner (two of the channels flow through his property) an aerial photo from 1941 (Photo 1), which showed a meandering stream, winding through his property. Photos of the stream from 1963 showed two channels which had been straightened (Photo 2), for irrigation purposes, but which had down cut severely averaging 6 feet in height in several places.

When the landowner saw the condition of the stream from the 1941 photo, and compared it to the 2011 photo he simply looked up and said “let’s put it back the way it was”. The Pebble Creek Project began to take shape, and quickly grabbed the attention of several partners who had interest in restoring the stream and improving the habitat for Yellowstone Cutthroat Trout (YCT).

Photo 1-This photo was used as the basis for the new channels to be designed, Pebble Creek Restoration.



Photo 2-This 1963 photo shows the two channels after they were straightened, Pebble Creek Restoration.



Pebble Creek Restoration Project

The original scope of the Pebble Creek Restoration Project began as a landowner approached the Portneuf SWCD about helping him with the planning and implementation of a stream restoration project on his property. The Portneuf SWCD said they would be very willing to help out with the project, and they would find ways to enhance the project beyond the stream restoration project to protect the investment. The landowner working with the Project Coordinator signed up to install fencing, off-stream watering facilities, use exclusion, heavy use protection, stream restoration, pest management, and stream crossings.

The landowner agreed to put the two straightened channels (1963 photo,#2) back into their original meandering beds (above 1941 photo, #1), which meant he was going to be giving up ground. The agencies started the leg work for this project and in 2012 the project left the blackboard and started its implementation phase.

The Pebble Creek Restoration Project drew the attention of many people, not only because it was in a highly visible area, but because of the nature and scope of the project. Volunteers flocked to the Project site to see where they could lend a hand, for example, students from North Gem High School (NGH) and The South East Idaho Fly-fishers (SEIFF) worked tirelessly to install 1500 feet of Buck and Pole Fence along the Portneuf River and 4500 Feet of Buck and Pole Fence along the newly formed North Channel. The Project was a huge success and was even submitted for a national fisheries award (Addendum 1a). Although the project did not win the award, it was a huge honor to even be nominated for the good work the landowner was doing.

Photo 4-This photo shows the south (main) channel prior to implementation, Pebble Creek Restoration.



The goals of the Pebble Creek Restoration Project was to improve spawning habitat for Yellowstone Cutthroat Trout, by reducing sediment and nutrient loads in the Pebble Creek and Portneuf River Watersheds by:

- Establishing two meandering stream channels with sufficient bank cover, and riparian zones.
- Installing woody debris, riffles, and backwater pools for sufficient cover and spawning habitat.
- Improving grazing management with off-stream watering facilities, pasture and exclusion fencing.
- Stream bank restoration, willow plantings to reduce Total Suspended Sediment loads in the Water bodies.

This Photo shows the south channel before construction and shows severely eroding banks, which were a significant source of sediment to Pebble Creek and the Portneuf River, Pebble Creek Restoration.



Pebble Creek has HIGH priority rankings for sediment. These projects are in the Tier 1 category for treatment units in the Portneuf River TMDL Agricultural Implementation Plan (ISCC, 2002).

This photo shows a large washout where an estimated 99 Tons of sediment washed down the hill into Pebble Creek in 2011, this washout and the success of the Pebble Creek Restoration Project are in large part the reason there was a need for the Pebble Creek Irrigators Projects which was funded in September 2014 and is now underway.



With the work and completion of the Pebble Creek Restoration Grant, other landowners stepped forward to participate in a project to reduce soil erosion, enhance water quality, water quantity, and to convert 9 diversion structures on Pebble Creek to one single diversion point with a fish screen. This grant was funded in 2014 and is now underway with planning and contracting currently taking place.

Background

The decline of YCT populations and habitat in the western United States is well documented. These declines have led to YCT being considered as a potential candidate for federal listing under the Endangered Species Act (ESA). Not only does the Pebble Creek Restoration Project provide an ideal opportunity to support YCT conservation efforts in the Portneuf River watershed, it also supports the following criteria which are not only part of Portneuf SWCD's agenda, but it adheres to the agendas of our participating partners as well.

Protect

- Native trout watersheds
- Stream habitat and riparian zones

Reconnect

- Headwater tributaries to main stem streams

Restore

- Native and wild trout
- Riparian habitat and water quality

Sustain

- Trout fisheries through land conservancy
- Education and member development

The aerial photograph (Photos 1) from 1941 showed the lower end of Pebble Creek as having a natural floodplain, extensive riparian vegetation, and significant stream channel meanders. Sometime prior to 1963 (photo 2), the Pebble Creek stream channel through the project site was straightened, resulting in significant habitat loss. Grazing in the riparian zone resulted in further riparian, stream bank, and water quality degradation. Pebble Creek is currently 303(d) listed by the Idaho Department of Environmental Quality for E. coli pollution, and has a TMDL (Total Maximum Daily Load) for sediment.

This project reconstructed and reactivated the original stream channel, incorporating stream meanders, riffle/pool/run sequences, and a functioning floodplain. Re-vegetation of the riparian zone consisted of a combination of purchasing containerized plant stock and harvesting local, adjacent vegetation. Riparian vegetation included whole willow clumps, sedges, willow stakes, sod transplants, native seeding, and other riparian vegetation as was necessary. Exclusionary fencing and off-site stock watering also addressed current grazing concerns.

Conservation Impact

Southeast Idaho represents some of the last remaining critical habitat for YCT, and restoring lower Pebble Creek to its original condition provided increased spawning opportunities for fluvial Portneuf River adults and restored a resident population in Pebble Creek proper. Improvements in riparian habitat and water quality benefited not only Pebble Creek, but the entire Portneuf River watershed.

Other projects which have been completed or that are expected to be implemented are listed below:

Topaz Landing

The Topaz landing project is located downstream of the Pebble Creek Restoration project. It was the first project where members of the Portneuf River Project came together to work collectively toward a common goal. This project focused on reshaping approximately 3,500 Feet of river bank, converting the banks from an average height of 12 feet to an average height of 3 feet with inset flood plains. This project became a pilot project for landowners to see what could be done to help the Portneuf River.

Topaz Gauge

The Topaz Gauge Project, also downstream from the Pebble Creek Restoration Project, was part of the Phase 3 319 project, but it saw the cooperation of the PRP members coming together to reestablish 350 feet of stream bank, installing two stream barbs, planting willows and sedge mats, as well as installing riparian fencing with controlled access points (hardened water gap) to the Portneuf River.

Portneuf River Fencing Project

The Portneuf River fencing project is an ongoing project established in the late 1980s. This project has implemented riparian fencing along a good majority of the upper-middle Portneuf River. Through the cooperation of landowners, Idaho Fish and Game, Caribou Soil Conservation District, Portneuf Soil and Water Conservation District, and Idaho Fish and Game this project has been a success and been able to expand further upstream. There is a desire to continue this project as funding comes available.

Upper Portneuf River Fencing and Off-stream Watering Project

The Upper Portneuf River Fencing and Off-stream Watering Project has been submitted each year for the past three years for funding in the 319 program, but has yet to rank high enough for funding. This project will focus on fencing nearly 4 miles of riparian habitat along the Chesterfield Reservoir and the Portneuf Marsh Valley Canal. The project will also install off-stream watering facilities to eliminate nearly 700 head of livestock from the Portneuf River System.

Organizational Structure

The PSWCD is comprised of five locally elected board supervisors who serve on a voluntary basis. There is one part time district employee and five associate board members who are non-voting but serve in an advisory capacity. Technical assistance for this grant was provided by Conservation Basics LLC., and the Idaho Soil and Water Conservation Commission.

The Portneuf SWCD set a goal to implement BMPs within the Middle Portneuf River Watershed, as part of their five year plan established in 2011. The District wanted to address animal feeding operations, overgrazed range and pasture issues, as well as sediment inputs to the Portneuf River and its tributaries.

The Portneuf SWCD would like to continue the work in both the Marsh Creek and the Middle Portneuf watersheds with other water quality projects and they are actively seeking funding sources to be able to accomplish those efforts.

The Pebble Creek Project continued the partnership formed between the Portneuf SWCD and other interested stakeholders. This group is known as the Portneuf River Project (PRP). This cooperative effort of private industry, educational institutions, scientists, and government agencies at numerous levels (City, County, State, Tribal, and Federal, and Idaho State University) have provided valuable donations of time, knowledge, and man power throughout the project. Trout Unlimited (TU) played a critical role as well, securing other smaller grants to help off-set the amount of matching funds the participating landowner needed to come up with.

Shown below are four photos looking upstream from the south crossing site funded through this project. These photos show a comparison of growth in the riparian zone one year after implementation. The project included re-establishing the stream channel, replanting riparian vegetation, including willows and sedge mats, installing backwater pools, and a bottomless culvert. Also, the entire 3652 foot section was fenced to reduce the impacts of livestock.

1 Week after Stream Restoration, Pebble Creek South Channel



1 month after Stream Restoration, Pebble Creek South Channel-Riparian fence also installed.



6 Months after Stream Restoration, Pebble Creek South Channel-(spring time)



1 Year after Stream Restoration, Pebble Creek South Channel-(spring time)



Partner USFS- Employee Brad Higginson, Surveying & Laying out new channel route, Pebble Creek Restoration.



Accomplishments

The Pebble Creek Restoration Project saw the implementation of: 4,917 feet of stream restoration, 2 stream crossings (bottomless culverts), 11,900 feet of riparian fencing, 345 feet of corral fence, 1 Water well, 1 pumping plant, 1500 feet stock pipeline, 3 watering facilities (troughs), 125 cubic yards heavy use protection (gravel), 20 acres pasture planting, 35 acres pest management (weed spraying), 16 acres of riparian use exclusion, planted 600 Red Osier Dog Woods, 600 Siberian Pea Shrubs, 100 Quaking Aspens, and 35 Elder Berry bushes.

We were also able to fly this project in a plane before implementation and then again with a Drone after implementation to show visual differences on the project site.

North Gem High School students lay out fence along North Channel, Pebble Creek Restoration.



Cumulative Load Reductions

A Stream Erosion Control Inventory (SECI) was completed in the fall of 2014. The 2014 inventory estimates showed the Pebble Creek Restoration Project will reduce sediment loading in the Marsh Creek and Middle Portneuf River Watersheds by approximately 661 tons/year.

Cumulative total nitrogen and phosphorous reductions:

Contract Number	Nitrogen Reduction (lbs./yr.)	Phosphorous Reduction (lbs./yr.)	Total Suspended Sediment (Tons/yr.)
South Channel	N/A	N/A	400
North Channel	N/A	N/A	261
Corral Site	2363	1152	N/A
Total Cumulative Savings	2363	1152	661

** The calculations for the inorganic nitrogen and phosphorous were taken from the Nutrient Management Manure Calculation Sheet from the Department of Agriculture.*

The photo below shows one of the new troughs installed after both stream segments of Pebble Creek were fenced off to reduce livestock impacts to the newly renovated riparian zones. Using tires have proven to be very useful and successful, they do not rust or bend and they hold approximately 700 gallons of water each.



Monitoring

Monitoring of the Pebble Creek Restoration Project consisted of three parts; background research, photo points, and water quality data. Monitoring took place through the help of project partners and the project coordinator.

Background Research

In order to restore the two channels of Pebble Creek correctly and effectively extensive time and research were spent in trying to determine what the stream looked like prior to the straightening of the channels. Photo documentation found in the USFS archives from 1941 (photo 1) showed two meandering channels flowing through the project reach; the 1941 photo was used for base information in channel formation and length. This photo proved to be one of the most critical parts of this projects success. A 1963 photo (photo 2) showed the two channels straightened, for irrigation purposes, with a lack of vegetative cover. This photo helped to show the difference between a meandering healthy stream to a straightened channel which was already down cutting.

Photo Points

Photo points were established to show the progress of each BMP before, during, and after installation. These photo points will also be used to track the condition of the BMPs throughout the life span of each project. Photos will also be used in this final report document, as well as, in future presentations about this project to showcase to other landowners who might be interested in participating in future 319 projects, what type of projects can be done to not only improve the environment. It has been said that pictures can say a thousand words, and it is no different with this project. The photos shared in this document captured the great work which has taken place through this concerted effort to improve water quality and restore Yellowstone Cutthroat Trout spawning habitat in Pebble Creek and the Portneuf River. Photos were taken extensively during the entire Pebble Creek Restoration Project. These photos have been used to show the before, during, and after aspects of the different aspects of the project.

Water Quality Monitoring

Water Quality monitoring was performed by the North Gem High School Biology and Advanced Biology Classes in cooperation with the Pocatello IDEQ Regional office. Ralph Peterson (Biology Teacher) working in close relationship with Lynn Van every (IDEQ) installed water quality monitoring as part of his curriculum for his Biology classes. Their report is attached at the end of this report.

Tours & Outreach

The PSWCD board sponsored a tour of the Pebble Creek Restoration §319 project in September 2012 and Caribou SCD Sponsored a tour in July of 2012 for other conservation districts to increase their awareness of the DEQ NPS §319 program, and to showcase the water quality work that could be accomplished with this funding.

Project coordinator Chris Banks also showcased the project on two other occasions once in July of 2013 when a group of Government Agencies and Non-Government Organizations contacted the Portneuf SWCD about the Pebble Creek Project and wanted to see the sight. Members of the tour included Forrest Service, Trout Unlimited, Idaho Fish and Game, United States Fish and Wildlife Service, South East Idaho Fly-fishers, IDEQ, and Simplot. The second tour was held in September of 2014 when a group led by Sarah Lien Rupp of Trout Unlimited brought national and regional staff to view the work that had been done at the site. Congressman Mike Simpson had a staffer on that tour as well, and he indicated how impressed he was with the work and stated he would recommend the continued funding of project like the Pebble Creek Restoration Project. The second occasion was in the summer

One of the largest outreach opportunities was with the participation of North Gem High School in the Pebble Creek Restoration Project. North Gem sent 65 students, grades 9-12, to plant willows, build fence, and learn about stream ecology and water quality. North Gems biology classes also performed water quality test and measurements and submitted a report to the Caribou SCD and the Pocatello IDEQ Regional office with their findings. (Addendum 1A)

Students ride on the wagon transporting assembled crossbucks to the fence location, Pebble Creek Restoration Project.



North Gem High School students lay out bucks and poles for the riparian fence along the north channel, Pebble Creek Restoration Project.



Members of the South East Idaho Fly-fishers work to erect the buck and pole fence which was laid out long the riparian zone by the North Gem High School students, Pebble Creek Resotration Project.



Financial Summary

319 Payment	Match Amount	Description
\$ 135,477.75	\$ 118,364.05	BMP installation
\$ 22,943.47		Project Coordination
\$ 1,670.50		Project Monitoring
	\$ 1,781.25	ISWCC Engineering
	\$ 4,500.00	PSWCD Board Members
\$ 1,866.48	\$ 772.51	Education/ Outreach
\$ 4,368.75		Portneuf SWCD – Administrative
\$ 6,936.80	\$ 1,874.20	Audit
\$ 173,263.75	\$ 127,292.01	

Conclusions

The Pebble Creek Restoration Project proved to be very successful, while it did have its setbacks and challenges, the overall quality of the work done is remarkable. The Pebble Creek Restoration Project has been the talk of Southeast Idaho, and many people have taken the trip to the project location to see the project before, during, and post implementation.

The Pebble Creek Restoration Project brought people together, working together, to accomplish a common goal. The work performed through this project is already proving to be incredibly beneficial to the Yellowstone Cutthroat Trout that call the stream home. It has been amazing to see the fish, through sampling efforts, utilizing the newly constructed channels.

The 319 source of funding has proven itself over and over again to be invaluable in the aspect of cooperation from landowners and agencies. The enthusiasm of the participants in completing their projects on time, the hard work of the project coordinator, and the dedication of the engineer helped to make sure projects were completed in a timely matter.

Acknowledgements

Current Portneuf SWCD Board members Kevin Koester, Kit Tillotson, John McNabb, Scott Henderson, and Dave Jackson wish to thank the project participants, associate board members, and cooperating agencies, cities, and Bannock County for their assistance and hard work enabling the design, implementation and completion of the Pebble Creek Restoration Project.

The willingness of the participants to undertake these projects allowed for a great deal of work to be accomplished in the watershed over the three years. Thanks to Dave Pisarski, Lynn Van Every, and Charlie Parkins of IDEQ for their support and assistance; Chad Chorney of Trout Unlimited for his on the ground work and for his ability to bring in more grant funds to match with the 319 dollars for this project.

A special thanks to North Gem High School for their willingness to help with several different aspects of the project. The student's dedication and hard work made fencing the channels fun and easy! Also, a huge thank you to the South East Idaho Fly-Fishers their sweat equity and monetary donations to the project made it possible to complete everything in a timely and efficient manner.

The Portneuf Soil and Water Conservation District sends many thanks to Chris Banks, project coordinator of Conservation Basics, LLC. (formerly of IASCD). Also the Portneuf SWCD would like to thank Krystal Harmon of PSWCD, office administrator for her efforts in keeping track of all the financials and managing the paperwork coming from each of the different partners involved in this project. The Board also wishes to acknowledge and thank Patty Nottingham IASCD; Steven Smith (formerly of ISWCC), and Allan Johnson, ISWCC; Nate Matlack, Bannock County District Conservationist, our invaluable NRCS partners.

This photo shows the newly constructed south channel and riparian area looking east from the bottomless culvert, Pebble Creek Restoration.



Photo Documentation of BMPS as they were installed

The Photo Below depicts the 1500 feet of Buck & Pole Fence which was installed along the Portneuf River to reduce livestock impacts to the riparian area, Pebble Creek Restoration.



A stock well was dug to supply adequate water for livestock on the property. This was necessary as all live water was fenced throughout the landowners' entire property, Pebble Creek Restoration.



The photo below shows a portion of the 35 acres which was tore up and reseeded to improve production for livestock forage and grazing management as part of the project, Pebble Creek Restoration.



The photo below shows one of 3 troughs which were installed to supply water to livestock. Each trough was installed with a float and a drain, and was protected with gravel around the trough to keep the livestock from digging holes around the base of the trough, Pebble Creek Restoration.



The next two photos show a large track hoe digging the new (South channel) of pebble creek. The channel was surveyed and laid out according to a 1941 photo which was found, and used as the basis for the new channel.



The next few photos show how the willow clumps were installed along the new channel to help give stability and provide adequate fish habitat, Pebble Creek Restoration.



The photos on this page show the installation of the bottomless culverts. Each culvert was installed to be one and one half times the size of the channel to allow high flows and debris to move easily through the culvert without getting snagged or blocking the end, Pebble Creek Restoration.





The next sequence of photos show the different riparian fences which were installed to protect the newly constructed channels and the riparian zones. The fences were installed also to help with grazing management, Pebble Creek Restoration.







This aerial photo of Pebble Creek shows the two straightened channels prior to construction, this photo was taken during high flows in the spring of 2011, Pebble Creek Restoration.



This photo shows the Pebble Creek after implementation, this photo was taken in the spring of 2014 after the stream channels had been reconstructed, but before the riparian fence was installed along the North Channel.



These next photos show the Pebble Creek Restoration Project from an aerial view post project implementation. These photos were taken with by a drone owned by Conservation Basics LLC.



