

SECTION 319 NONPOINT SOURCE POLLUTION CONTROL PROGRAM

PROJECT FINAL REPORT

NORTH FORK PAYETTE RIVER  
WATERSHED IMPROVEMENT PROJECT  
SUB GRANT #S554



PREPARED BY:  
IDAHO SOIL AND WATER CONSERVATION COMMISSION  
IN COOPERATION WITH:  
VALLEY SOIL & WATER CONSERVATION DISTRICT

MARCH 2020

## EXECUTIVE SUMMARY

PROJECT TITLE:	North Fork Payette River Watershed Improvement Project
GRANT NUMBER:	S554
PROJECT START DATE:	November 2016
PROJECT COMPLETION DATE:	February 1, 2020
TOTAL 319 GRANT BUDGET:	\$114,050.00
TOTAL MATCHING FUNDS BUDGET:	\$ 76,300.00
TOTAL PROJECT BUDGET:	\$190,350.00
TOTAL ACTUAL 319 GRANT EXPENDITURES:	\$114,050.00
TOTAL ACTUAL MATCHING FUNDS ACCRUED:	\$156,675.49
TOTAL ACTUAL PROJECT EXPENDITURES:	\$270,725.49

The North Fork Payette River Watershed Improvement Project was sponsored by the Valley Soil and Water Conservation District (SWCD) with strong support from the Idaho Soil and Water Conservation Commission (ISWCC) and the Natural Resources Conservation Service (NRCS). This project continued implementation of Best Management Practices (BMPs) identified in the Total Maximum Daily Load (TMDL) for the North Fork Payette River and Cascade Reservoir Tributaries, as well as the Cascade Reservoir Watershed Management Plan.

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## **Introduction and Accomplishments**

Valley SWCD has been implementing water quality projects in the North Fork Payette River watershed for over 25 years. The goal of this project was to continue implementing projects to improve water quality in Lake Cascade and its tributaries, and the North Fork Payette River and its tributaries in accordance to the District's annual and five-year work plans. Six sub-projects were implemented under this grant.

Recent algal blooms on Cascade Lake has renewed and regenerated a strong public interest regarding water quality on the lake and its tributaries. Four of the six projects implemented will help to reduce some of the sediment and nutrients in the lake. Two projects were located above the lake and included streambank stabilization on the North Fork Payette River and an offsite water experiment on a tributary to Lake Cascade. Two of the projects implemented had a direct impact to the lake and included bank stabilization on the shoreline and upland drainage improvements. The final two projects included streambank stabilization and a storm water treatment project that will impact the North Fork Payette River below the reservoir.

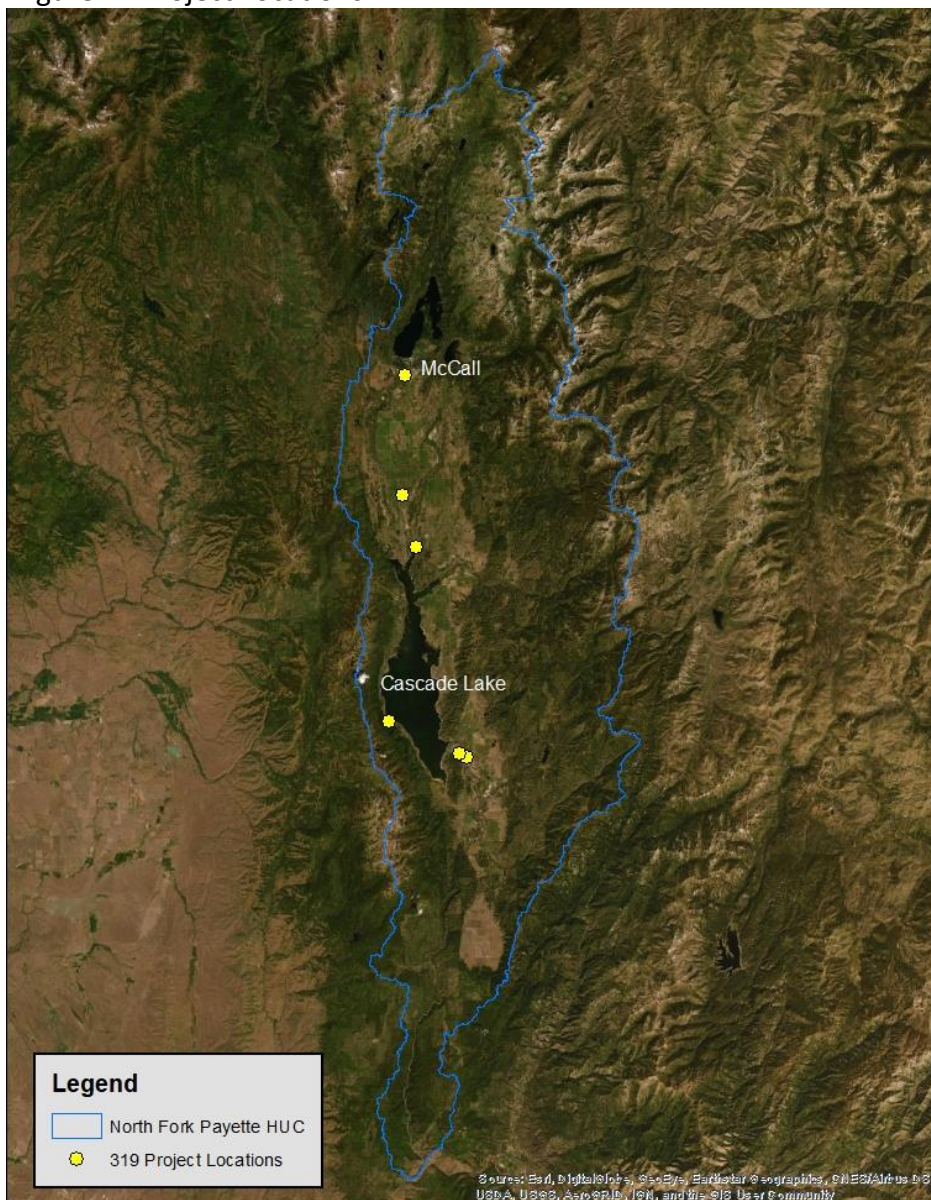
This project was very successful and a key factor to that was the many partners and volunteers involved. Numerous volunteer and student hours were spent harvesting and planting willows and potted plants, and weaving willows into beaver dam analogs on the Strand project. Volunteer and student hours were also a major component of the off-site water experiment project. Project details are discussed later in this report, but the many partners, participants and volunteers included the following:

- Idaho Soil and Water Conservation Commission
- Idaho Fish and Game
- Natural Resources Conservation Service
- University of Idaho MOSS Program
- Donnelly Elementary 5<sup>th</sup> grade class
- Cascade High School
- Trout Unlimited
- Valley County
- Valley County Road Department
- City of Cascade
- City of Donnelly
- City of McCall

Along with engineering and design work, the ISWCC engineer provided many hours of outreach and education to local youth in the district. The ISWCC engineer met with the fifth-grade class at the Donnelly Elementary School to discuss a ram pump design for local animal watering systems. He gave them an overview of the design parameters and evaluated existing supplies. Once the class had assembled the pump, he assisted with troubleshooting and testing of their design.

The ISWSC engineer met with the science classes at Cascade High School to discuss geology, geomorphology, and hydrologic processes as it relates to the Cascade Strand – a waterfront area on the Payette River. He discussed the unstable nature of the glacial till and granitic sands in the area and assisted them in brainstorming bank stabilization methods to be utilized at the Strand. He designed modified Beaver Dam Analog structures to redirect high water flow away from eroding banks adjacent to the City of Cascade wastewater treatment ponds and led the classes in installing the modified Beaver Dam Analog structures and planting the banks with willows, with the aid of local volunteers and state agency personnel. He redesigned the structures after high flows led to partial failures and worked with students and other volunteers to install the modifications, along with additional streambank planting. Finally, he worked with the Cascade High School shop program to design and install a fence to protect the bank stabilization work along a busy recreational trail.

Figure 1. Project Locations





## Financial/Match Summary

Table 1. Original Budget Categories

<i>Category</i>	<i>Total</i>	<i>319 Amount</i>	<i>Match Amount</i>
<b>Administration</b>	\$ 12,800.00	\$ 10,000.00	\$ 2,800.00
<b>Subcontractual</b>	\$ 78,300.00	\$ 40,000.00	\$ 38,300.00
<b>Travel</b>	\$ 1,050.00	\$ 1,050.00	\$
<b>Supplies/ Equipment</b>	\$ 98,200.00	\$ 63,000.00	\$ 35,200.00
<b>Totals</b>	<b>\$ 190,350.00</b>	<b>\$ 114,050.00</b>	<b>\$ 76,300.00</b>

Table 2. Actual Expenditures

<i>Category</i>	<i>Total</i>	<i>319 Amount</i>	<i>Match Amount</i>
<b>Administration</b>	\$ 11,871.50	\$ 8,504.00	\$ 3,367.50
<b>Subcontractual</b>	\$ 221,218.10	\$ 95,067.99	\$ 133,156.99
<b>Travel</b>	\$ 1,818.30	\$ 1,818.30	\$
<b>Supplies/ Equipment</b>	\$ 28,810.71	\$ 8,659.71	\$ 20,151.00
<b>Totals</b>	<b>\$ 270,725.49</b>	<b>\$ 114,050.00</b>	<b>\$ 156,675.49</b>

Match Ratio – 57%

Match Sources:

Valley SWCD - \$3,367.50  
 Idaho Soil and Water Conservation Commission - \$ 66,858.80  
 City of Donnelly – \$13,485.60  
 City of McCall - \$20,672.40  
 Idaho Fish and Game- \$2,350.00  
 Cascade High Students/Teacher- \$4,380.00  
 U of I Moss- \$1,950.00  
 Trout Unlimited Hours and Signage - \$2421.00  
 Valley County Road Department - \$27,846.20  
 Donnelly Elementary Teacher - \$100.00  
 American Legion - \$4,293.99  
 Landowners - \$100.00  
 Willows - \$9000.00

## **Load Reductions**

The projects implemented with this grant will reduce 302.5 tons of sediment, 476 lbs. of phosphorus, and 956.3 lbs. of nitrogen in the watershed. Sediment loads were calculated using various methods depending on the BMP. DEQ Technical Services estimated the load reductions for the Donnelly Boat Dock, American Legion Storm Water Improvements, The Strand, and the West Mountain Watershed/Silver Creek.

Table 3. Load Reductions per Project

<b>Sub Project</b>	<b>Sediment (tons)</b>	<b>Phosphorus (lbs.)</b>	<b>Nitrogen (lbs.)</b>
Donnelly Boat Dock Retaining Wall	22.5	30.5	61.1
McCall Riverfront Stream Bank	160	256	512
Strand	5.62	9	17.98
West Mountain Watershed/Silver Creek	110	175	351
American Legion Storm Water Improvements	4.4	5.5	14.2
<b>Totals</b>	<b>302.5</b>	<b>476</b>	<b>965.3</b>

Sediment load reduction for the stream bank erosion (McCall Riverfront Stream Bank and Donnelly Boat Dock Retaining Wall) were estimated using the Lateral Recession Rate formula in the "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual"; Michigan Department of Environmental Quality, Surface Water Quality Division, Nonpoint Source Unit; Lansing Michigan. June 1999," which considers bank length, height, lateral recession rate and soil weight.

The West Mountain Road Watershed/Silver Creek load reductions were calculated at the time of application using the FSWEPP (Forest Service Watershed Erosion Prediction Project 1999). Reductions for the Strand Project were also calculated by Idaho DEQ Technical Services at the time of application and were extrapolated from TMDL.

The American Legion Storm Water Improvement project load reductions were calculated using the STEPL (Spreadsheet Tool for Estimating Pollutant Load) model used by EPA which calculates nutrient and sediment loads from different land uses and estimates the load reductions that would result from various BMPs.

## **Monitoring**

Measurements of each project were taken during the design phase. Monitoring will include photo documentation of the installed BMPs along with evaluation of maintenance needs.

Post-project monitoring includes photo documentation of the completed project BMPs along with photos taken at annual or biennial intervals. The Valley SWCD plans to continue photo monitoring these sites for a minimum of 5 years.

Idaho DEQ's BURP monitoring and 5-year review process will also help track results.



## Summary of Sub-Projects

### 1. Donnelly Boat Dock Retaining Wall

Latitude/Longitude: -116.049224 x 44.720688

This project was on the Cascade Reservoir near a popular boat ramp. A failing retaining wall on a high sandy embankment was eroding into the reservoir (Figure 2). Aside from water quality impacts to the lake, the City of Donnelly was concerned about public safety. Valley SWCD, the City of Donnelly and Idaho SWCC collaborated to install a new rock retaining wall.

The old block wall was removed, and the sandy slope was excavated to 45 percent slope. The new retaining wall (Figure 3) was comprised of large granite boulders ranging in size from 24-48". The new wall is approximately 180' long by 6' tall. The City of Donnelly planted 104 willow stems using Valley SWCD's jet stinger. The willows were planted to minimize erosion from the retaining wall and wave action of the lake (Figure 4). However, after a summer of use, the willow stems were missing or disturbed. The City of Donnelly worked with the ISWCC to harvest and plant willow clumps in the project area in the fall of 2018 (Figure 4).

The project has an estimated sediment load reduction of 22.5 tons, 30.5 lbs. of phosphorus and 61.1 lbs. of nitrogen.

Table 4. Project 1 Costs

<i>Description</i>	<i>Extent/Unit</i>	<i>Total Cost</i>	<i>\$319 Funding</i>	<i>Match</i>
South Retaining Wall Demo and Construction	1 Each	\$18,805.00	\$11,283.00	\$7,522.00
East Retaining Wall Demo and Construction	1 Each	\$12,450.00	\$7,470.00	\$4,980.00
Additional Boulders	1 Each	\$1,794.00	\$1,076.40	\$717.60
Remove Upper Wall	1 Each	\$665.00	\$399.00	\$266.00
	<b>Totals</b>	<b>\$33,714.00</b>	<b>\$20,228.40</b>	<b>\$13,485.60</b>



Figure 2. Old Retaining Wall



Figure 3. Newly Constructed Retaining Wall





Figure 4. Willow Clump Plantings

## 2. McCall Riverfront Project

Latitude/Longitude: -116.107358 x 44.892804

This project is located on the North Fork Payette River approximately 2.75 miles downstream of Payette Lake. The stream banks are between 10 and 30' high and actively eroding. Willow plantings and seven rock barbs were installed to treat erosion on 486 feet of stream bank. Rock barbs are intended to control erosion for 2-6 years while willow plantings establish. Proper installation of the barbs will cause sedimentation above the barbs and small scours downstream from them. According to Bill Lillibridge, Engineer, Idaho Soil and Water Conservation Commission (ISWCC), past implementation efforts show that rock barbs increase near-shore sediment deposition and pool formation.

Sediment load reductions are estimated at 160 tons sediment, 160 lbs. phosphorus, and 321 lbs. of nitrogen per year.

Table 5. Project 2 Costs

<i>Description</i>	<i>Extent/Unit</i>	<i>Total Cost</i>	<i>\$319 Funding</i>	<i>Match</i>
Erosion Control Turbidity Curtain	1 Each	\$3,250.00	\$1,950.00	\$1,300.00
Barb Installation Embankment Riprap	1 Each	\$34,175.00	\$20,505.00	\$13,670.00
Willow Plantings	1 Each	\$1,840.00	\$1,104.00	\$736.00
Cut Top Bank Sort and Stockpile Riprap	1 Each	\$12,416.00	\$7,449.60	\$4,966.40
	<b>Totals</b>	<b>\$55,681.00</b>	<b>\$31,008.60</b>	<b>\$20,672.40</b>



Figure 5. Streambank before





Figure 6. Installed Rock Barbs



Figure 7. Installed Rock Barbs

### 3. Strand Project

Latitude/Longitude: -116.026958 x 44.508505

The “Strand”, or Cascade River Walk, is a 2.2 mile trail that runs along the North Fork of the Payette River below Cascade Reservoir. At its midpoint, an eddy and 300’ of a high sandy bank on a sharp corner on a side channel, was actively eroding and threatening a portion of the trail, as well as contributing excess sediment to the river. The Valley SWCD worked with the City of Cascade to address the problem. Many design scenarios were presented in this project, but due to permitting and other issues it was decided to use a version of beaver dam analogs and heavy willow planting.

Several days of willow plantings were done over three years by various volunteers. Over 450 volunteer hours were provided by the Cascade High Students Environmental Science juniors and seniors, Idaho Fish and Game staff and volunteers, MOSS, Trout Unlimited, the Valley SWCD Board and ISWCC. About 4500 willows were harvested and planted in the bank using a jet stinger or weaved into the willow barbs. 246 five gallon coyote willows from a local nursery were also planted.

A gravel access ramp to the river for foot traffic was also installed to help minimize human caused erosion on the stream banks.

Sediment reduction from the streambank protection practices is estimated at 5.62 tons.

#### Total Costs:

Supplies: \$7614.83

#### Match:

Idaho Fish and Game - \$2,350

Teachers/Students - \$4,380

Trout Unlimited - \$150

U of I MOSS - \$1200

Other Volunteers - \$200

4500 Willow Stems - \$9000

Signage - \$2271.00

Total Project Match - \$19,551.00





Figure 8. Working on the Strand



Figure 9. Beaver Dam Barbs





Figure 10. Signage at the Strand Project

#### 4. West Mountain Watershed/Silver Creek Project

Latitude/Longitude: -116.135617 x 44.545156

Cascade Reservoir Watershed 5 Year Review (February 2018) identifies West Mountain tributaries to Cascade Reservoir as impaired for excess nutrient load (TP). Unimproved roads adjacent to Cascade Lake have been identified in the Cascade Reservoir Watershed TMDL and Implementation Plan for the Cascade Reservoir as a source for sediment and phosphorus.

This project was with the Valley County Road Department. They replaced culverts and made road drainage improvements in the Silver Creek area which will reduce sediment input into the lake. Load Reductions from this project are estimated at 110 tons sediment, 175 lbs. phosphorus, and 351 lbs. nitrogen.

Table 6. Project 4 Costs

<i>Description</i>	<i>Extent/Unit</i>	<i>Total Cost</i>	<i>\$319 Funding</i>	<i>Match</i>
Drainage Improvements	1 Mile	\$62,846.20	\$35,000.00	\$27,846.20
	<b>Totals</b>	<b>\$62,846.20</b>	<b>\$35,000.00</b>	<b>\$27,846.20</b>

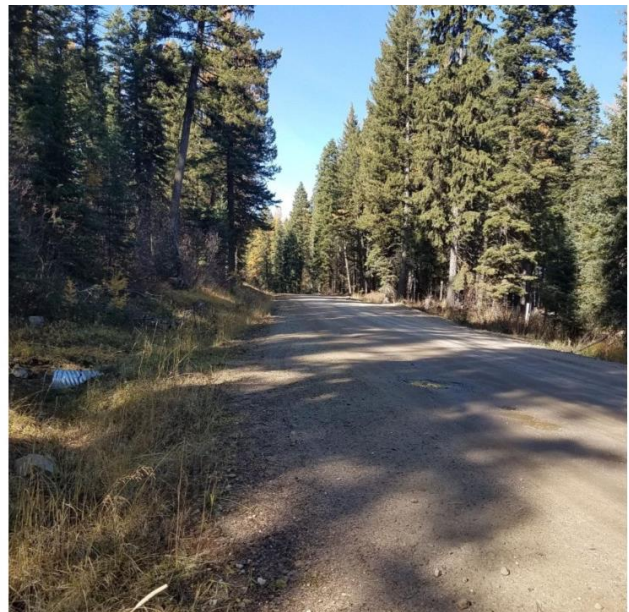


Figure 11. After photos of drainage improvements.



## 5. American Legion Storm Water Improvement

Latitude/Longitude: -116.038039 x 44.512462

The American Legion in Cascade was required to modify part of their parking lot and wanted to do stormwater improvements at the same time. The Valley SWCD partnered on this project and was able to provide cost share on the stormwater components, including a sand/grease interceptor. The improvements will minimize the storm water runoff to the North Fork Payette River.

Table 7. Project 5 Costs

<i>Description</i>	<i>Extent/Unit</i>	<i>Total Cost</i>	<i>\$319 Funding</i>	<i>Match</i>
Catch Basin	1 Each	\$1,179.57	\$707.74	\$471.83
Storm Drain Pipe	80 Feet	\$2,512.00	\$1,507.20	\$1,007.80
Sand and Grease Interceptor	1 Each	\$3,411.61	\$2,046.97	\$1,364.64
Soft Spot Repair	1 Each	\$3,631.80	\$2,179.08	\$1,452.72
	<b>Totals</b>	<b>\$10,734.98</b>	<b>\$6,440.99</b>	<b>\$4,293.99</b>



Figure 12. Installation of and Completion of Grease Interceptor

## 6. Mud Creek Offsite Water Demonstration Project

Latitude/Longitude: -116.113688 x 44.772906

The Donnelly 5<sup>th</sup> grade class is very involved in water quality projects within their community. One of their recent projects involved a stream exclusion study where the students hypothesized that cattle would prefer to drink out of a water trough rather than a creek. The Valley SWCD was able to provide funding for the ram pumps for this experiment. The ISWCC engineer met with the students to discuss ram pump design for local animal watering systems. He gave them an overview of the design parameters and evaluated existing supplies. Once the class had assembled the pump, he assisted with troubleshooting and testing of their design. After the study was complete, the 5<sup>th</sup> graders invited local ranchers into their classroom to listen to their findings.



Figure 13. Students experimenting with off-site watering

## **Tours/Outreach/Press**

Several public education and outreach events have been performed during this project. The Valley SWCD sends out newsletters which include project updates and information. Their newsletter reaches 1050 landowners in Valley County. Projects are also highlighted on the District's website ([www.valleyswcd.org](http://www.valleyswcd.org)) and their Facebook page @ValleySoilWater.

There were several press articles highlighting their 319 projects as well. The Star News, a local newspaper in McCall, has featured the Strand project in two articles, Appendices C and D. The ISWCC has a newsletter, "Conservation the Idaho Way", which featured the Donnelly Boat Docks and the Strand Project, Appendices A and B.

Each year, Valley SWCD highlights projects at the Legislative Display Day at the Capitol in February and at the Valley County Fair. They also made presentations on their projects to the McCall Chamber of Commerce, Valley County and the Valley County Weed Department.

There is also extensive outreach with students in all of Valley County, teaching lifelong water quality stewardship. Cascade Elementary students and Cascade High School students participated on the Strand project. Valley SWCD helped to sponsor the Cascade High School Science class Envirothon team, who also worked on the strand project. Students from McCall High School helped to plant willows at the McCall River Front project. The Donnelly Elementary students not only put together the offsite water study (project 6), they continuously monitor water quality in Boulder Creek.



# Conservation the Idaho Way

ISSUE SIXTY-SEVEN

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JANUARY 2019

H A P P Y   N E W   Y E A R !



## VALLEY SWCD INSTALLS NEW ROCK RETAINING WALL VIA LAKE CASCADE PARTNERSHIP PROJECT

By Steve Stuebner

In the summer of 2018, Bill Lillibridge, a staff engineer for the Conservation Commission, assisted the Valley Soil and Water Conservation District (Valley SWCD) with refurbishing a retaining wall next to a popular boat ramp on Lake Cascade, known as the Donnelly Boat Ramp.

A high sandy embankment next to the Donnelly Boat Ramp had been eroding into the lake as the previous retaining wall had fallen into disrepair. The old retaining wall fell apart for several reasons – people had been removing some anchor rock from the embankment to use in their own landscaping projects, and other parts of the anchor rock had been removed from the soil wall to prop up fishing poles at the water's edge, officials said.

The City of Donnelly was concerned about the safety aspects of the boat ramp and the soil slumping into the reservoir. Valley SWCD saw an opportunity to partner with the City of Donnelly to rebuild the wall in a professional manner with proper materials and stop the erosion. But they needed an engineer to design the wall and take care of the permitting work. Enter Bill Lillibridge.

"The retaining wall had been an issue for a while. The City of Donnelly was worried about public safety, and the Valley SWCD was concerned about the erosion," Lillibridge said.

Fortunately, Valley SWCD had a Section 319 water quality grant from the Idaho Department of Environmental Quality and the Environmental Protection Agency to cover the costs of the project, while the

City of Donnelly chipped in to provide local matching funds. Lillibridge's engineering work also counted toward the match.

"It was a good project, I'm glad we did it," said Cami Hedges, City Clerk for Donnelly. "We are very happy how it turned out. The whole look of it is so much improved from what it was."

The project eliminated 332 tons of sediment flowing into Lake Cascade per year, 532 pounds of phosphorous and 35 pounds of nitrogen.

"It was a really great project, and a great benefit to the City of Donnelly and the boaters who use the boat ramp," added Durena Farr, District Manager for Valley SWCD.

Farr commended Lillibridge for assisting with the project engineering. He has assisted Valley SWCD with a number of conservation projects on Lake Cascade along the North Fork of the Payette River in recent years. "He's been an amazing resource for our district," she said.

The Conservation Commission provides engineering services for conservation projects throughout the state. Idaho's soil and water conservation districts need to apply to reserve those services in a timely manner each year, because their services are in high demand, and there's quite a bit of competition for them.

"Bill is kept pretty busy during field season and that's the way he likes it. His work ethic, knowledge, and skillset make him a valuable part of the Commission team. He's very popular with districts in North and Central Idaho," said Teri Murrison, administrator for the Commission.

Farr was glad to see a water quality and safety issue get resolved on the banks of Lake Cascade.

But when the lake was closed to public use on Sept. 7 because of public health issues related to a blue-green algae



Prior to the project, this sandy embankment contributed significant amounts of sediment to Lake Cascade.

bloom, it was a signal that much more needs to be done to address sediment and phosphorus issues in and around Lake Cascade, she said.

It was the first time since the mid-1990s that the lake had to be closed to public use because of an algae bloom.

"We had a bad algae bloom," she said.

"It's a wake-up call that we need to do more to control sources of sediment and phosphorus in the lake."

The algae bloom was caused by a "perfect storm of hot weather, drawdowns, and a heavy rainstorm that flushed sediment from fields and tributaries into the low water reservoir," she said.

Valley SWCD has another Section 319 grant to address sediment and phosphorus sources in the coming years, Farr said. "We will meet in March to see where we might want to focus our resources. I want to coordinate with the Idaho DEQ and Bureau of Reclamation on where the hot spots are that contribute to the algae bloom," she said.

Lake Cascade is the fourth-largest reservoir in the state of Idaho with a surface area of 47 square miles. At full pool, it's 20 miles long, five miles wide, and it has 110 miles of shoreline. The popular lake receives more than 200,000 visitors per year; many of them come to Lake Cascade State Park. Multiple campgrounds ring the lake as part of the state park and an U.S. Forest Service land. The lake also is popular for sport fishing in the summer and ice fishing in the winter. Kokanee, big rainbow trout, perch, small-mouth bass and coho salmon all can be caught in the lake.

Valley SWCD has worked on many phosphorus and sediment issues over the last 25 years. For example, after a water quality plan was crafted for the lake in 1995, phosphorus levels were reduced by 57



A blue-green algae bloom caused Lake Cascade to be closed last fall. Photo taken near Crown Point.





Highly toxic, blue green algae blooms are the result of unmitigated nutrient-impaired waters

percent over the next eight years.

In more recent times, Valley SWCD has worked on conservation projects on Willow Creek, Boulder Creek, Gold Fork and the North Fork of the Payette River. Other projects stabilized the banks of Lake Cascade in key areas and the North Fork Payette River below Lake Cascade Dam.

Ongoing issues include:

Septic tank runoff from private cabins on the west side of the lake

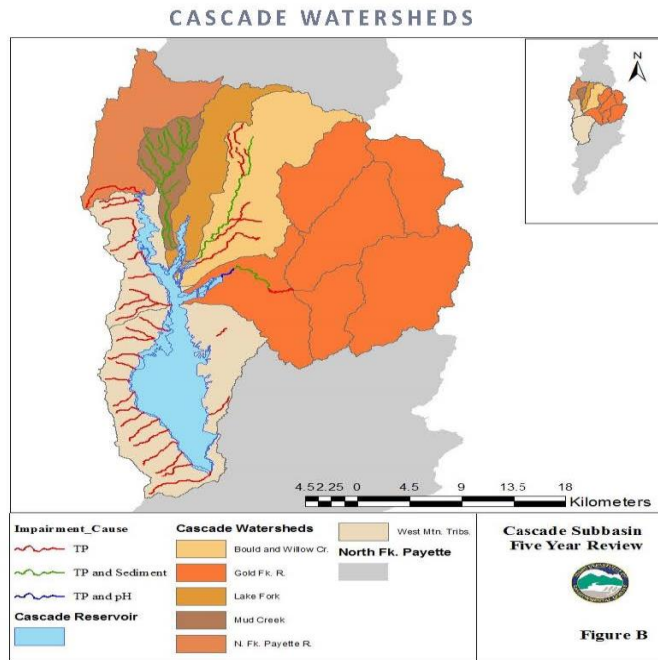
Septic runoff from pit toilets in Lake Cascade campgrounds

Sediment issues in the Gold Fork river drainage

Sediment runoff from cattle ranching around the lake

Phosphorous flows from the McCall Sewage Treatment Plant coming down the North Fork of the Payette River and flowing into Lake Cascade

“We will hold several community meetings to set priorities for projects,” Farr said.



Chase Cusack, watershed coordinator for Idaho DEQ in the SW region, said the previous conservation work around the reservoir has helped, but more needs to be done.

"There's always cyanobacteria in the water, and the sediment is often times nutrient-rich," Cusack said. "These bacteria have adapted to utilize the nutrients from the sediments before rising to the surface to photosynthesize. That is when we see these algal blooms."

One of the big concerns that occurred last summer is that the bacteria and nutrients got flushed down the North Fork of the Payette River below Cascade Dam by heavy rain during the time when the reservoir was closed to public use.

"That causes concern," Cusack said.

Property owners around the lake have been calling Idaho DEQ and Valley SWCD to show support for learning more about the problems and issues and crafting solutions, Cusack and Farr said.

"We need to do more sampling and monitoring," Cusack said.

Going back to the retaining-wall project, Lillibridge said he was approached by Valley SWCD to provide assistance with the design, engineering and permitting.

The new retaining wall was designed to be about 180 feet long and about six feet tall, Lillibridge said. They removed the old cinder blocks that were being used to hold the soil back, and excavated the sandy slope to a 45 percent slope. The contractor, Falvey's Earth Work in McCall, put down a filter layer of gravel against the soil, and then built the retaining wall with large rock 24-48 inches in diameter.

The City of Donnelly's public works employees placed willow cuttings inside the rocks to help prevent sediment flow from the wall. The City of Donnelly also took care of demolishing the old wall. Both of



Newly planted willows should help reduce the flow of sediment to the Lake.

those activities helped with the project match, Farr said. And the City of Donnelly also provided a cash match to make the project work.

The partnership between the Conservation Commission, Valley SWCD and the City of Donnelly made it possible to tackle a project that a small community couldn't necessarily afford to do on its own, Farr said.

"I think it turned out great," Lillibridge said. "That's going to be a much better long-term solution for preventing sediment from running off that slope next to the boat ramp. On a larger scale, we still have much to do to improve Lake Cascade water quality, but I think the Conservation Commission will do what it can to serve as a partner in that endeavor." □

*Steve Stuebner writes about conservation success stories regularly for Conservation the Idaho Way.*

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## TEENS PARTNER WITH LOCAL CONSERVATION DISTRICT ON STREAM BANK RESTORATION PROJECT

*By Steve Stuebner*

Ten juniors and seniors from Cascade High School helped out the Valley Soil and Water Conservation District this spring by working on a project that will improve fish habitat and create shade to decrease water temperature in the North Fork of the Payette River in the town of Cascade. But the project also has benefits for streambank-stabilization as more stream-restoration work is planned immediately downstream from the project this coming fall.

The Cascade High environmental science students worked for about five hours,

planting approximately 1,500 willow cuttings along 650 feet of the North Fork streambank next to "The Strand," a pedestrian trail next to the river. The project is downstream from the popular Kelly's Whitewater Park in Cascade. The kids used four water-jet stingers on loan from the Idaho Department of Fish and Game to plant the willow stems.

"The stingers are a big long pole with hydraulic pressure," said Cheyenne Jedry, Cascade High School environmental science teacher. "You pull the trigger, and the water digs a hole for you."

Four IDFG employees helped the kids with the planting project, in addition to providing the stingers.

"We really enjoyed the project as educational experience about working with the community," Jedry said. "It's a great example to set for the students about giving back."

Prior to working on the project, the students learned about hydraulics, streambank erosion and streambank-restoration techniques from Bill Lillibridge, an engineer for the Idaho Soil and Water

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Conservation Commission. Lillibridge is assisting Valley SWCD with a number of water-quality improvement measures as part of a new Section 319 grant that the district received from the Idaho Department of Environmental Quality.

“The kids really enjoyed Bill’s presentation,” Jedry said. “It also was cool for the kids to work side by side with people like Bill and the Fish and Game employees. It gives them an idea of what natural resources professionals do in the real world.”

Jedry’s environmental science students got so excited about natural resources this year that they ended up forming a team for the Idaho Envirothon natural resources education event in Challis. This was the first year that Cascade High has fielded a team for the Idaho Envirothon in quite some time, and the Valley SWCD was pleased to sponsor them, said Durena Farr, project manager for Valley SWCD.

“Our district sponsored the team, and their interest in participating came about because of the North Fork project,” Farr says. “These things tie together really well. We are creating future conservationists!”

After giving his presentation, Lillibridge went out to a private property location with several volunteers from the Valley SWCD and IDFG employees to collect the willow cuttings in the field. The next day, the group did the willow-planting project along with the Cascade High School students.

“We’re very happy to have Cheyenne on board,” Farr says. “She’s doing amazing things!”

Clint Kennedy, a former Cascade High science teacher, was very active with the Valley SWCD and other local natural resources agencies, but he is retired now. “Having Clint retired is difficult, but Cheyenne is doing some great projects. She helped the kids build a solar go-kart for a regional competition. She’s got a lot of things in the works,” Farr said.

On a broader level, the Valley SWCD has a number of projects planned around

Lake Cascade and on the North Fork of the Payette River to work on improving water quality as part of the new 319 grant. The total grant amount is about \$190,350, with \$76,350 in matching funds, she said.

Some of the projects planned include developing an off-site stock-watering project on private land, some culvert work along West Mountain Road on the west side of Lake Cascade, a new culvert in the Boulder Creek area near Lake Cascade, and more.

Improving water quality in Lake Cascade and in the North Fork of the Payette River drainage overall has been a long-term endeavor involving many projects over the years. Lake Cascade is the fourth-largest lake in the state of Idaho. At full pool, it’s 20 miles long, five miles wide, and it has 110 miles of shoreline. The popular lake receives more than 200,000 visitors per year. Multiple campgrounds ring the lake as part of Lake Cascade State Park. The lake also is popular for ice fishing in the winter and sport fishing in the summer. Kokanee, big rainbow trout, perch, small-mouth bass and coho salmon all can be caught in the lake.

In the early 1990s, a big algae bloom caused by low water levels, high phosphorous and hot weather raised concerns with the public and multiple public agencies. Improvement plans implemented beginning in 1995 lowered

the phosphorous levels by 37 percent. In 2003, phosphorous levels decreased by 57 percent from eight years previous because of multiple water quality improvement projects incorporating best management practices on roads, ranchlands and tributary streams.

Valley SWCD has continued to work on water-quality issues around the lake on an ongoing basis. As of 2009, total phosphorous levels were being stabilized, and according to Idaho DEQ, they continue to track close to the goal that was set by the TMDL plan for Lake Cascade — 25 micrograms per liter. The latest water quality report for Lake Cascade will show average total phosphorous levels of about 30 micrograms per liter, DEQ officials said.

The levels of chlorophyll A (algae) in Lake Cascade have been decreasing quite a bit over the last eight years, said Graham Freeman, watershed coordinator for the DEQ regional office in Boise. Last year, levels of chlorophyll A (algae), were averaging in the 1.78 ug/liter range, Freeman said. That’s down from levels that exceeded 10 ug/liter 10 years ago. “That’s a pretty good reduction,” Freeman said.

“Every little bit helps,” said Kay Coski, former district manager for Valley SWCD.

Those readings show that Lake Cascade is close to meeting the goals of the TMDL water quality improvement plan. “We’re always pleased to see those kinds of



Cascade High 2017 Envirothon Team

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trends take place where our partners and our agency work together on improving water quality to benefit public health and aquatic life," says Teri Murrison, administrator of the Conservation Commission.

On the North Fork of the Payette River, Lillibridge said the amount of erosion that occurs with granitic soils in the watershed is a challenge. "We're looking for some long-term solutions. The area is really sandy. In fact, Cascade is like a giant sandbox," he said. "There are many forces at work on top of a giant pile of sand that wants to shift with the currents of the river."

A TMDL plan was written in 2005 for the North Fork in hopes of reducing sediment in that reach. The TMDL set a suspended sediment target of 25 micrograms per liter as a seasonal average and a target of 80 percent bank stability, DEQ officials said. In 2012, a five-year review showed the bank stability was rated to be about 74 percent, slightly below the target, the latest data available.

Planting willows can be a great "stabilizer" to keep the streambanks intact, Lillibridge says. "The willows provide some nice shade, and the vegetation will bring in bugs and provide food for fish,"



*Bill Lillibridge explains the benefits of stabilizing streambanks with willows, to students at the river's edge.*

he says. "It's amazing the benefits you can get from putting the willow cuttings in the bank."

Below where the students planted the willows, Lillibridge is designing a longer-term solution on an eroding streambank that may need more robust treatment – some log revetments perhaps combined with some rock. The engineer is still working on the details.

In the upper part of the watershed, Farr worked with a number of partners to propose a grant project to build a vault toilet at the Boulder Lake Trailhead, one of the most popular trailheads in the McCall area. The Valley SWCD partnered with multiple agencies and also a Donnelly Elementary science class in the grant application.

The Idaho Department of Lands owns the land where the rest room would be built, so it stepped up to help with the project, along with the Valley County Road Department, Trout Unlimited and Idaho Fish and Game. The Forest Service did not have any funds to participate, Farr said.

"That was an important project because no one wanted to touch it, and we helped to facilitate a solution," she said. "It was really the Valley County Commissioners that stepped up to make this happen. They committed resources for annual maintenance, and it was key to have the Valley County Road Department commit to help us with site prep."

Students from Donnelly Elementary took a field trip to the Boulder Lake trailhead, and saw a lot of toilet paper strewn about because of the lack of facilities. Valley SWCD had been providing a temporary portable toilet at the location to help.

For example, a student named Kayla wrote, "We really need a real toilet at the Boulder Lake trailhead. The porta-potty reeks badly! It's not very sanitary in there. You can smell it from the creek. We need a real toilet. Please, please, please."

The grant for the toilet was still pending with the Idaho Department of Parks and



*Planning their willow planting*

Recreation at press time. But she is hoping that the multiple partners involved and relatively reasonable cost -- \$22,846 -- will make the grant competitive.

Overall, Farr is excited about the water-quality improvement work planned for the North Fork and Lake Cascade, but she's just as stoked about school kids getting involved in conservation work. "We're teaching kids to be stewards of the land – that's what this is all about!"

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*Steve Stuebner writes about water quality improvement projects on a regular basis for Conservation the Idaho Way.*



*Students using stingers to drill holes for planting*

Appendix C.



Photo by Durena Farr

**STREAMBANK FIRST AID - The Cascade High School Environmental Science class teamed up with the Valley Soil and Water Conservation District, Trout Unlimited, the Idaho Department of Fish and Game and the city of Cascade last week to stabilize the streambank on the North Fork of the Payette River along The Strand in Cascade. More than 1,500 willow trees were planted during the day by the volunteers, including students Wyatt Giltner and Mark Powell, shown in photo**

Originally Published May 18, 2017 in:



1000 First St. McCall, ID 83638 • (208) 634-2123 • starnews@frontier.com • www.mccallstarnews.com



Appendix D.



Photo for The Star-News by Melissa Shelby

**RESTORE THE STREAM** - From left, Cascade High School student Cody Moosman, McCall Outdoor Science School student Pat Ryan and Cascade teacher Cheyenne Jedry weave willows to control erosion near The Strand pathway along the North Fork of the Payette River in Cascade last week. The high school environmental and earth/space sciences classes joined with MOSS graduate students and volunteers from the Valley Soil and Water Conservation District in the project, which also included planting of willows to stabilize the stream bank. The MOSS students were taking part in a course in place-based education taught by Karla Eitel. MOSS is a program of the University of Idaho's College of Natural Resources.

Originally Published November 2, 2017 in:



1000 First St. McCall, ID 83638 • (208) 634-2123 • [starnews@frontier.com](mailto:starnews@frontier.com) • [www.mccallstarnews.com](http://www.mccallstarnews.com)