

Stewards Building Wetland Habitats

A project sponsored by
the New Mexico Department of Game and Fish
FINAL REPORT
for 2015 Contract Year



Submitted by



for



*Share
with
Wildlife*

Contract 15-516-0000-00045

Introduction

Stewards Building Wetland Habitat creates community support for wetlands by cultivating young adult stewards of beavers and the wildlife that rely on the wetlands created by beaver. Students conduct wetland habitat monitoring and stewardship activities such as assessing beaver habitat conditions, identifying potential areas for new beaver colonies, and implementing non-lethal deterrents to unwanted beaver activity. This report summarizes the progress of the development of *Beavers Building Habitat* as managed, staffed, and evaluated by River Source during the 2015 contract year.

The vision for *Stewards Building Wetland Habitat* is to build widespread community support for wetland stewardship and restoration that focuses on Species of Greatest Conservation Need. Beavers are keystone wetland species that increase wetland habitat for species such as the Meadow Jumping Mouse (*Zapus hudsonius luteus*). To accomplish this vision, it is necessary to provide examples of the benefits of beaver and identify non-lethal methods to deal with beaver in places where their activities are less tolerable. River Source led interactive classroom presentations and field activities for five (5) schools including 153 youth and 8 adults representing 48 hours of direct contact time. Classroom presentations taught a general overview of wetlands, the importance of wetlands to SGCN species, ways to protect and manage wetlands, how to identify beaver signs, benefits of beavers and their habitat, potential conflicts between humans and beavers, and practical solutions to resolve those conflicts. River Source worked with students in three watersheds. Table 1 provides a synopsis of the activities.

Table 1. *Stewards Building Wetland Habitat* Schools and Monitoring Locations

<i>School</i>	<i>Watershed</i>	<i>Monitoring and Field Activities</i>
Santa Fe Indian School	Santa Fe River below Wastewater Treatment Plant	4 th year of mapping wetland areas created by beaver activity; Identified and wrapped trees to prevent cutting; Measured streamflow and water quality above and below wetlands created by beaver dam complex.
Mora High School	Mora River	Surveyed wetlands and beaver activity at the Mora River Wildlife Refuge in fall 2015; Finished map in fall 2015.
Walatowa Charter School	Jemez River	Measured water chemistry, benthic macroinvertebrates, and stream discharge; Monitored riparian and wetland health indicators and cuttings by beaver; Mapped dam locations
Cochiti School	Lower Santa Fe River on Cochiti Pueblo	Measured water chemistry, benthic macroinvertebrates, and stream discharge; Identified and wrapped cottonwood trees to prevent cutting.
Santa Fe Community College	Upper Canyon of Santa Fe River	Measured water chemistry and wetlands health and taught mapping basics about for monitoring beaver sign.

Project Activities Connecting Kids to Wetlands and Wildlife Habitat

Curriculum Development

In the spring of 2015 River Source wrote a curriculum guide for the Stewards Building Wetlands Project that includes three unique lessons including hand-outs, presentation materials and teacher guides. The curriculum provides an alignment of the activities with the New Mexico Science Standards and Benchmarks.

The curriculum offers:

1. In-class presentation on the importance of wetland functions and the wildlife habitat they create and an introduction to the field experience
2. Wetland Habitat field lesson including guidance and forms for assessing beaver sign & habitat, measuring water quality, identifying benthic macroinvertebrates as indicators of wetland health.
3. In-class activity on turning wetlands data into action for students to take the information they gathered and make presentations to their community to inspire action for protecting wetlands.

The curriculum is attached as Appendix 1 to this report.

Engaging Stewards in Building Wetland Habitat

From May to November 2015 River Source engaged middle and high school students in learning why wetlands are critical for wildlife, water quality and water supplies.

Table 2: Project activities (make column for class and field sessions)

Date	School	Youth	Adults	Location & Event type
5/5/2015	Walatowa High School	28	2	1 class session, 1 field day at Jemez River
5/26/2015	Cochiti School 7th grade	12	1	1 class session, 1 field day at Santa Fe River on Cochiti Pueblo
7/16/2015	Santa Fe Community College	14	1	1 class session, 1 field day at Santa Fe River in Upper Canyon
9/24/2015	Mora High	39	1	2 class sessions at Mora High
9/25/2015	Santa Fe Indian School (SFIS)	8	1	1 classroom session at SFIS
9/30/2015	SFIS	8	1	1 field session at Santa Fe River
10/20/2015	Walatowa High School	21	2	1 class session at Walatowa High
10/21/2015	Walatowa High School	16	2	2 field sessions at Jemez River
10/26/2015	Cochiti School 7th & 8th grade	28	2	1 class session, 1 field day at Santa Fe River on Cochiti Pueblo
10/26/2015	SFIS	10	1	1 field session at Santa Fe River
11/5/2015	Mora High	40	1	1 field session at Mora River
People contacted at unique events		224	15	<i>8 classroom, 9 field sessions</i>
Different people contacted at unique events		153	8	

For a view of a map of the locations of activities go to <http://watershedwiser.org/projects/beavers-building-habitat-project> and <http://watershedwiser.org/santa-fe-river-cochiti-pueblo-fish-hatchery>. We provide the GPS locations of these monitoring sites in decimal degrees WGS 84.

Table 3: Monitoring locations

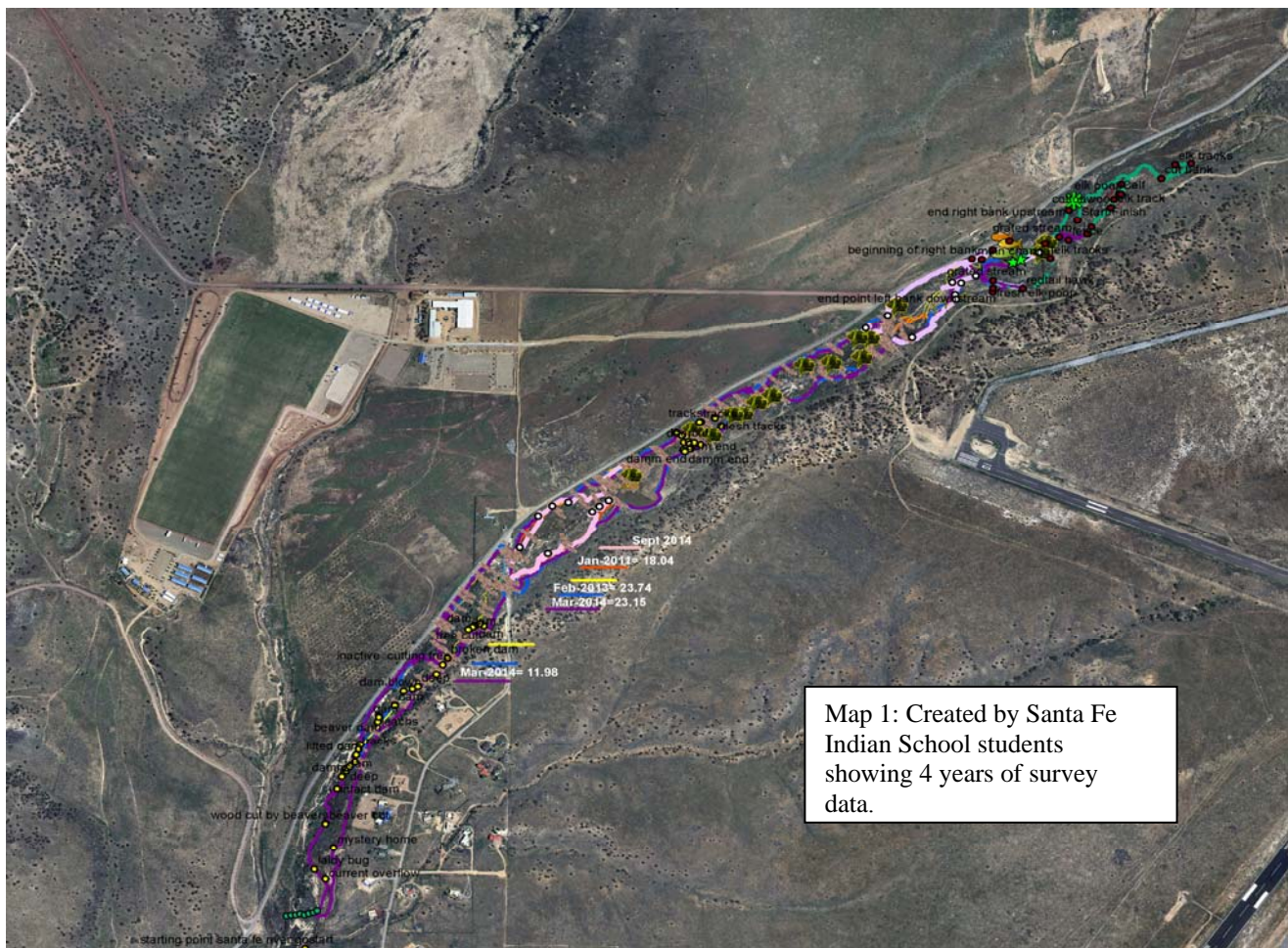
Location	Latitude & Longitude
Jemez River on Jemez Pueblo	35.720978 -106.731679
Santa Fe River - by Calle Debra	35.61822 -106.112008
Santa Fe River on Cochiti Pueblo	35.587846 -106.304467
Mora River at Mora River national Wildlife Refuge	35.842913 -105.051385

Student Maps and Data Findings at Specific Locations

The following is a summary of education and research work done in each watershed.

1. Santa Fe River near La Cieneguilla

River Source directed mapping work by students from the Santa Fe Indian School during 2 field sessions in the fall 2015 to assess the health of the wetland areas on the Santa Fe River and identify locations of beaver dams and cutting. Due to time constraints of the students and the extremely dense vegetation, the wetlands created by the beavers was not completely mapped. Students noticed that many of the trees wrapped with chicken wire had not been cut down by beavers. The students wrapped additional cottonwood trees with chicken wire on Santa Fe City land.



Santa Fe County installed pond elevation levelers to reduce the inundation of soils around the road crossing at Calle Debra. These levelers appear to be working although at least one of them has been washed out by a large flood in 2015. Groundwater data collected by students shows a slight decrease in the elevation of the groundwater table across the floodplain.

2. Santa Fe River on Cochiti Pueblo

Cochiti School students assessed riparian vegetation health, measured streamflow and water quality, and mapped wetland areas during two separate field trips, one in May 2015 and the other in October 2015. The students also collected and identified benthic macroinvertebrate insects. The teachers, Vania Meetze and Gerald Tafoya, involved both the 7th and 8th grade classes. The students also learned how to identify native trees in comparison to non-native trees and protected several cottonwoods from being cut down by beavers that are still occupying the area. Cochiti Pueblo staff accompanied the May field trip and are using the map data to track trends in wetlands and beaver populations.



Bottom left: Cochiti students identify and sort benthic macroinvertebrate insects.

Bottom right: Carlos Herrera describes how to use GPS technology to map wetland.



3. Jemez Watershed

River Source led three field trips with students from Walatowa Charter School, one in May 2015 and two in October 2015. The first trip was to assess wetland health indicators and observe beaver sign upstream of Jemez Pueblo next to the Forest Service visitor center and the gas station. The second and third trips involved conducting riparian surveys, measuring water quality (streamflow, pH, TDS, temperature, and turbidity) and mapping active and inactive beaver signs near Owl Springs Road on the Pueblo.

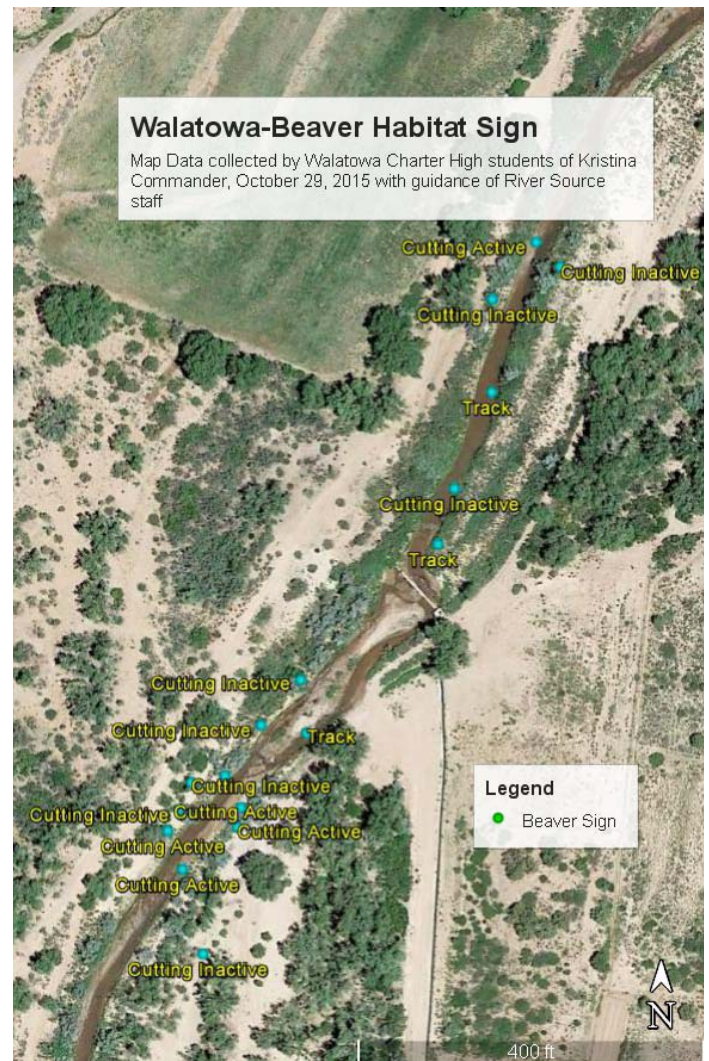
The Jemez River has several large floods during the summer of 2015 which has led to the recruitment of many young cottonwoods on the river terraces. There are dense willow stands and multiple ages of cottonwood trees. The students found several signs of active cuttings by beavers but very little dam building activity. However, the lack of beaver dams indicates that the beavers may be occupying bank dens rather than building dams. Or if dams begin to be built they are likely quickly torn down by people and the beavers are removed lethally.

The students acknowledged in conversations that there are benefits for wetlands and wildlife from beaver. But they also indicated that most adults want to get rid of them when they are found on the Pueblo.



Above: Walatowa High School student uses a GPS to mark a point where a cottonwood had been cut by a beaver (October 2015).

Right: Map 3 shows the Jemez River beaver sign on Jemez Pueblo.



3. Mora River at Rio Mora Natl. Wildlife Refuge

River Source worked with Mora High School in the fall 2015 with a survey of the Rio Mora National Wildlife Refuge in partnership with Shantini Ramakrishnan who is a staff biologist on the Refuge. In September the students participated in a classroom presentation on the values and functions of wetlands. In November we led a field trip to the Refuge to assess riparian area health, map beaver habitat sign, and gather water quality data.

We observed less beaver sign than in past years. Many of the dams we observed in the past had been damaged by the floods or completely washed away. Ms. Ramakrishnan said that several very large floods ran during the 2015 summer. These large floods may have destroyed several of the dams. In addition, the flow of the Mora River was higher than in past years which caused students to walk approximately 200 meters of the upper terrace of the river rather than wade the entire length of the river. Since these sections were very short the high flows do not offer a good explanation the few beaver sign. The high flows during the summer are a more likely explanation for the students observing fewer beaver sign.



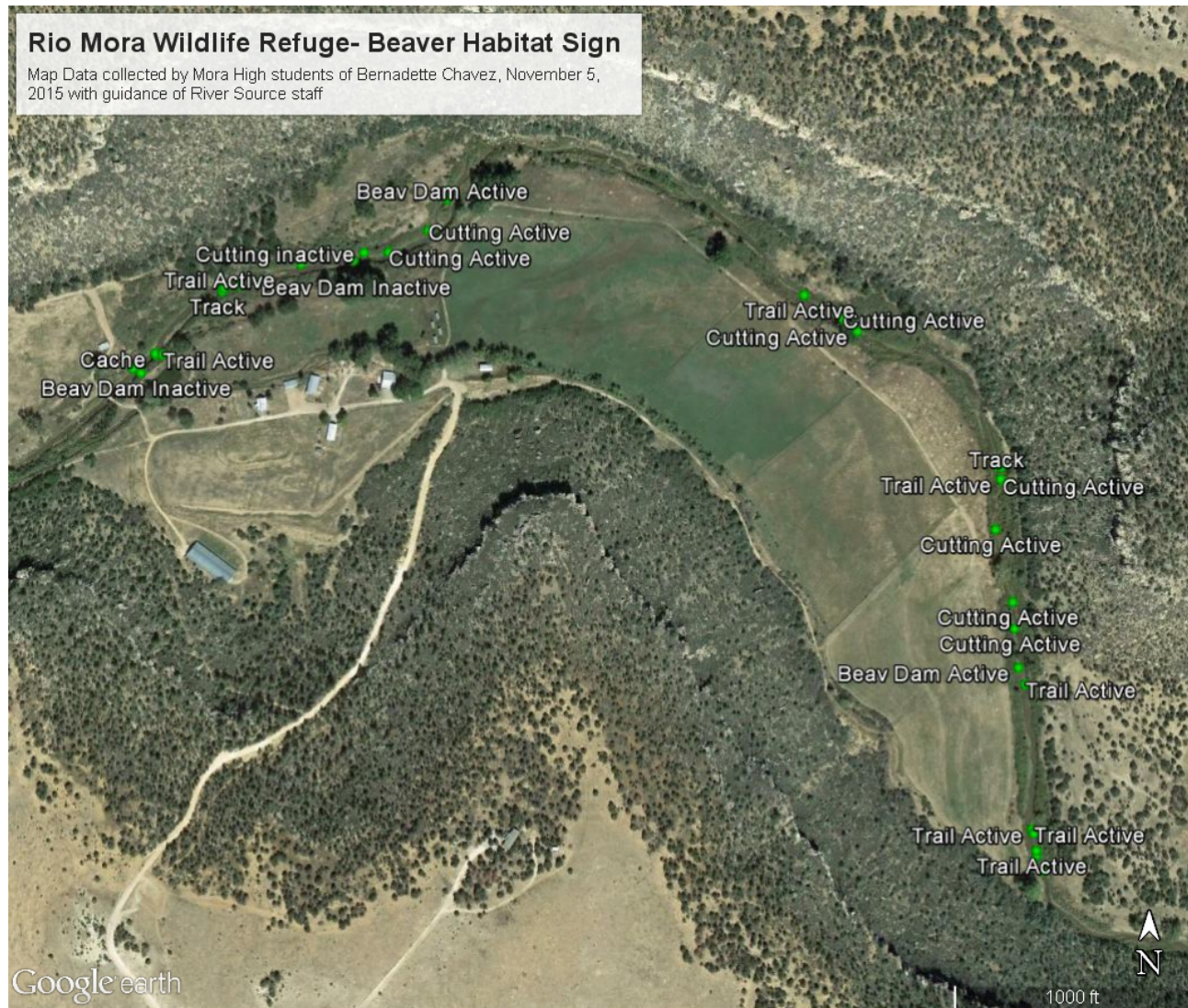
Mora students participate during interactive session



Mora students observe bank vegetation cover and look for sign of beaver on the Rio Mora.

Ms. Ramakrishnan engaged the students in a lively discussion on what suggestions the students have regarding how to improve wetlands and beaver habitat. One student observed that lots of beaver trails were found between the River and a pond on the Refuge that had a very low water level. The students suggested that the elevation of the pond water might be very important in creating a safe habitat for the beaver. Ms. Ramakrishnan thought that was a good idea as the Refuge had allowed the pond dry up recently and it had only recently been refilled.

Map 4: Active and inactive beaver signs as of November 2015 on the Rio Mora National Wildlife Refuge near the main ranch houses.



4. Santa Fe River Canyon with Santa Fe Community College

River Source worked with Janie Chodosh and her Environmental Science class from Santa Fe Community College in the field at the Santa Fe Canyon Preserve after a classroom session at the Randall Davey Audubon Center on July 16th 2015. The students participated in a presentation to introduce key wetland concepts and learn how to use water quality monitoring equipment and GPS technology. Following the presentation Carlos Herrera led the students to the Santa Fe River where water chemistry and GPS mapping of the wetlands was taught. GPS mapping of beaver sign was performed near several large ponds on the Preserve. The students discovered existing wire wrapped trees, several old old cuttings and one beaver dam along with a few newer cuttings of willows. The students were excited to learn about wetlands and ways to protect them.

Program Evaluation

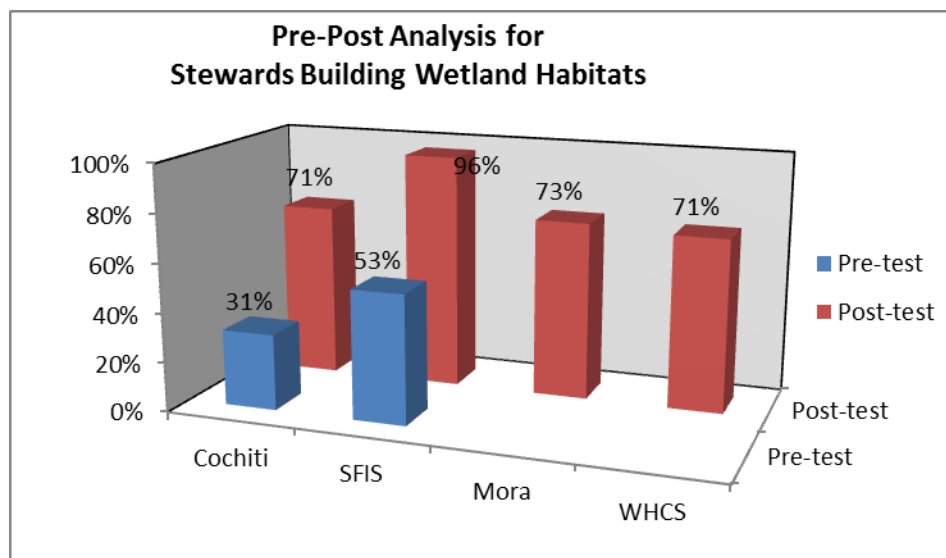
Student Pre- and Post-Test Results

The *Beavers Building Habitat* curriculum includes a pre- and post-test for students from Cochiti School, Walatowa Charter School, Santa Fe Indian School (SFIS), and Mora High School. We did not receive consistent administration of the test by the schools – 2 of the 4 teachers gave their students pre-test and post-tests.

All participating schools consistently showed an increase in appreciation of the value of wetlands and the role of beaver in creating wetlands. For the first time in the project at least all of the teachers gave their students the post test.

Table 4: Pre-post test results School	Average % correct answers	
	<i>Pre-test</i>	<i>Post-test</i>
Cochiti School (7 th and 8 th grade)	31%	71%
Santa Fe Indian School (High school)	53%	96%
Mora High School	Didn't administer	73%
Walatowa High Charter School	Didn't administer	71%

The SFIS students scored high on the pre-test and post-test compared to what students at other schools scored. This may be due to the fact that the teacher is passionate about protecting wetlands and organized several field trips with his student to do wetland habitat monitoring.



Cochiti Middle School students showed 40% improvement in their scores as result of their classroom and field experiences. Walatowa High and Mora High showed similar post-test results as the Cochiti students on average.