



Watershed Academies

An Interactive Qualifying Project

**An Interactive Qualifying Project
Submitted to the faculty of
Worcester Polytechnic Institute
in partial fulfillment of the Bachelor
of Science degree**

**Submitted by
Sydney Smith
Emily Frick**

**Submitted to
Mr. Rich Schrader and Mr. Carlos
Herrera, River Source
and
Professors Zoe Eddy and Thomas
Balistrieri**

**Date submitted
December 8, 2021**

This report represents the work of one or more WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on the web without editorial or peer review.





Acknowledgements

River Source

We would like to thank Rich Schrader and Carlos Herrera of River Source for sponsoring this project and for their guidance.

Advisors

We would like to thank Professor Zoe Eddy and Professor Thomas Balistrieri for advising us and helping make our project the best it can be.

Interviewees

We would like to thank Luis Torres, Arnold Herrera, and Steve Harris for sharing their knowledge and stories with us.

The May Center for Learning

We would like to thank Corrie Shapiro, her class, and The May Center for Learning for completing a trial run of our project and giving feedback.

Worcester Polytechnic Institute

We would like to thank WPI for providing the resources necessary for completing our project and the wonderful opportunity to travel.



Authorship



We both worked equally on all parts of this report, from the writing, to the formatting, to the research.



Table of Contents

Acknowledgments.....	i
Authorship.....	ii
Table of Contents.....	iii
Table of Figures.....	iv
Abstract.....	vi
Executive Summary.....	vii
Our Story.....	x
Introduction.....	1
Who We Are.....	3
Our Sponsor.....	5
Issues.....	8
Our Goals.....	9
Timeline.....	11
Interviews.....	12
Steve Harris.....	13
Luis Torres.....	15
Arnold Herrera.....	17

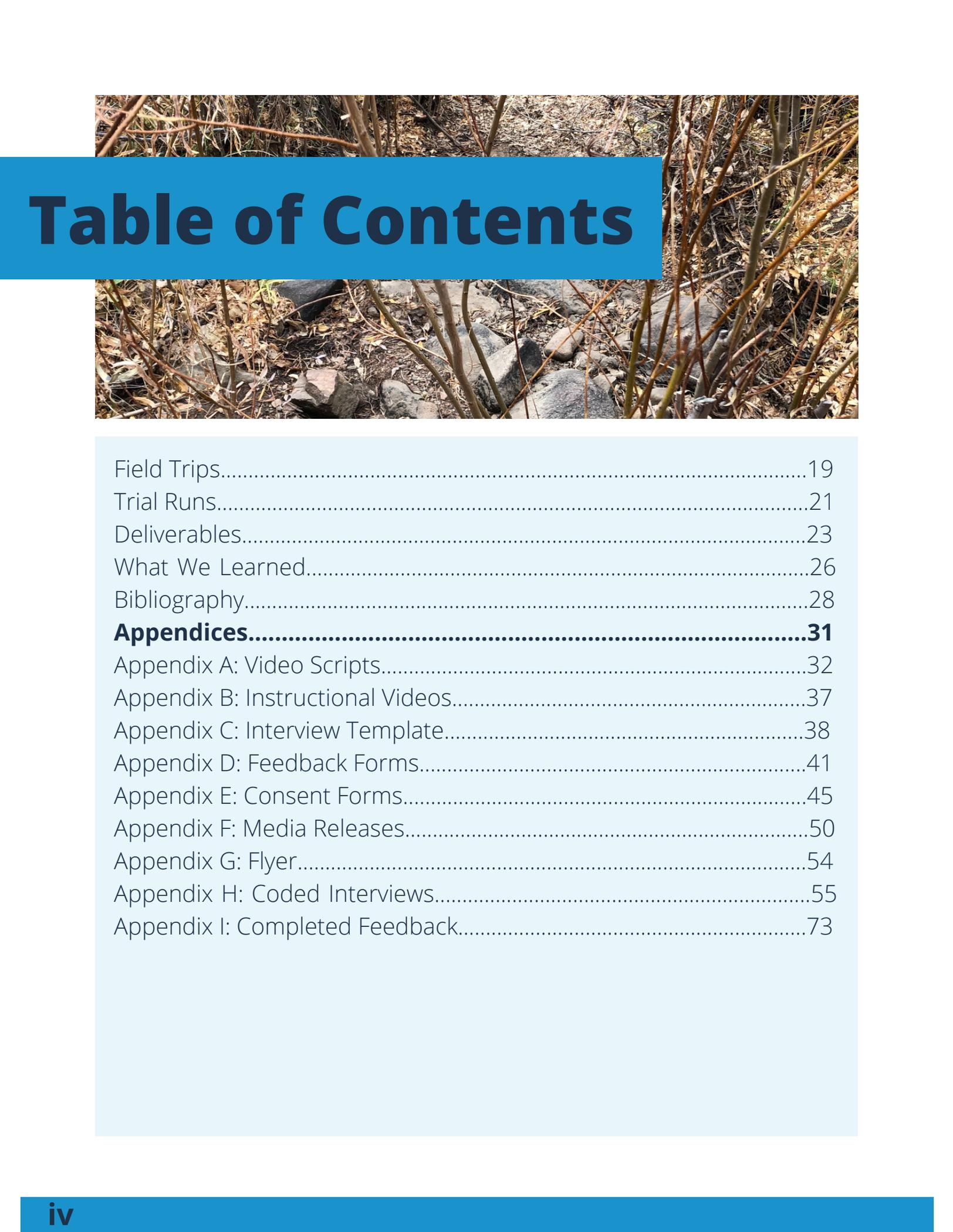


Table of Contents

Field Trips.....	19
Trial Runs.....	21
Deliverables.....	23
What We Learned.....	26
Bibliography.....	28
Appendices.....	31
Appendix A: Video Scripts.....	32
Appendix B: Instructional Videos.....	37
Appendix C: Interview Template.....	38
Appendix D: Feedback Forms.....	41
Appendix E: Consent Forms.....	45
Appendix F: Media Releases.....	50
Appendix G: Flyer.....	54
Appendix H: Coded Interviews.....	55
Appendix I: Completed Feedback.....	73



Table of Figures

Figure 1: <i>Interview Template</i>	23
Figure 2: <i>Active Listening</i>	24
Figure 3: <i>Consent & Ethics</i>	24
Figure 4: <i>Respect</i>	25
Figure 5: <i>Interview Examples</i>	25

Abstract

The purpose of our project is to create an Elder Interview Process that will bridge the intergenerational knowledge gap and teach students about watersheds. Our first step was to create an interview template for the students. The interview template would consist of guiding questions to help them conduct an interview. We tested this template by conducting our own interviews with elders around the Santa Fe area. Our second step was to create instructional videos for the students to watch. These videos would teach the students how to conduct appropriate interviews, with topics such as respect, consent & ethics, and active listening. After gathering data about conducting interviews, we scripted and recorded four videos. Then, we conducted a trial run with a group of students to test our assignment. We used their feedback to make adjustments to our final product. The Elder Interview Assignment consists of an interview template and four instructional videos, which were presented to our sponsor, River Source, at the end of our time in Santa Fe.



Executive Summary

How is the quality and quantity of water affected by its relationship with the surrounding communities? This is a question that we decided to explore. In the Fall of 2021, we travelled to Santa Fe, New Mexico from Worcester, Massachusetts. Being from the East coast, we have had a very different relationship with water than the people of Santa Fe. Although there are also droughts happening on the East Coast, they are not as catastrophic as here in Santa Fe. In both our hometowns, Moravia, NY and Uxbridge, MA, there are beautiful waterfalls that flow into clean, clear, strong rivers. Water is plentiful on the East Coast. We have come to notice that is not the case here in Santa Fe. As we have been travelling around the area- on our own and with our sponsor, River Source- we have observed a serious lack of water. Santa Fe had the “lowest [precipitation] measured since that [rainwater] gage was installed in 2006” (City of Santa Fe, New Mexico, 2020). The 2020 drought was not unusual, seeing as “drought is a normal recurrent feature in the arid southwest” (City of Santa Fe, New Mexico, 2018). There are dried river beds, polluted watersheds, and a lack of rain. In short, water in Santa Fe is a precious resource that demands protection. Luis Torres perfectly sums up how we can best protect the watershed: by educating youth. “What is the passage from the Bible? ‘A child shall lead us’... I believe that wholeheartedly” (Torres, 2021). In light of the local and regional crisis, our sponsor has determined that youth education is an effective way to increase community water knowledge and build



Executive Summary

CONTINUED

intergenerational relationships. The best way to educate youth about the watershed is to bridge the intergenerational gap by having them talk to elders in their community. The elders in Santa Fe remember what the rivers were like before they were polluted and dried up. It is important for students to hear their stories of the rivers and learn from them. Our project is a pilot program built on these goals. We have worked to engage community elders--people who hold historical knowledge about waterways--with younger generations.

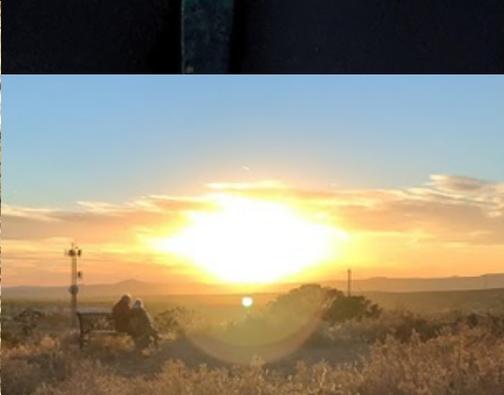
Our solution to these problems is to create an elder interview template for our sponsor. They will then implement the template in many local schools. Essentially, this project will teach the children how to respectfully interview an elder in their life. An elder, in this context is a person older than the student interviewer, but preferably someone the age of a grandparent. We have multiple deliverables to present to River Source at the end of our project. The first deliverable we will provide is the elder interview document. It will have twelve guiding questions to help the students start a conversation with their elder. The second deliverable will consist of a few, short instructional videos that will help prepare the students for the interview. Examples of the video topics are ones about active listening, consent & ethics, and respect.



Executive Summary

CONTINUED

Our deliverables serve multiple purposes. The first purpose of our interview template and instructional videos is to blend natural and social sciences for students. The blend of sciences is something that will continue to become more relevant as the students get older. The second purpose is to bridge the intergenerational knowledge gap. The interview process affords elders the opportunity to share their knowledge and experiences with students. The third purpose is to find an engaging way for students to learn about the watershed. Instead of reading about it in a textbook, they will be learning about it through stories from elders during interviews. The fourth purpose of this project is to empower students to protect their watersheds. We hope that the elders' stories inspire the students to take better care of their watersheds.



Our Story



Introduction

Travelling to Santa Fe for the first time ever has been truly amazing. Many aspects of Santa Fe differ greatly from the East Coast. For instance, learning about the water in Santa Fe was a very large culture shock. We are both from the East Coast and attend university in Massachusetts, where water is plentiful. The average precipitation for Boston, Massachusetts is about 3 - 4 inches per month, which is 36 - 48 inches per year (Weather Averages Boston, Massachusetts, 2021). The average precipitation for Santa Fe, New Mexico is about 14 inches of rain per year (Weather Averages Santa Fe, New Mexico, 2021). In Massachusetts there are many large bodies of water: rivers, lakes, streams, the Atlantic Ocean, etc. In New Mexico, we have gone hiking several times and seen numerous dried-up riverbeds. There has not been much water to see here. The lack of water is a major problem in Santa Fe. This issue has really made us more aware of how important water conservation is. Our sponsor, River Source, also understands that water conservation is very important. River Source works with schools to educate students about water by taking them on field trips to different watersheds, such as small rivers and streams, in the area. These small rivers and streams are not what they once were. They have become smaller and more polluted, which has caused a lot of changes in the ecosystems that rely on them. On their field trips with River Source, the students identify aquatic species that live in the water. In polluted watersheds, they only find species that are known to be resistant to pollution and can live in polluted environments. The more sensitive species are more difficult to find because they cannot survive in these

conditions. A lack of clean water is a huge issue in Santa Fe that affects people, animals, and plants. We are working with River Source to create a solution that will mitigate this problem. Our solution is to create an assignment that will allow students to learn about watershed health from elders. Once we had created our initial interview template, we were able to test it ourselves by interviewing three elders. We learned valuable information and stories from these three interviews and know that students will also learn a lot from conducting their own interviews. The final step in our process was to receive feedback from the students about the assignment. So, we set up a trial run with a group of students we first met during a field trip. We provided them with the interview template and two instructional videos. We asked them to fill out an anonymous feedback form and return it to us. This form would tell us how engaging and easy to understand the assignment was. We also gave their teacher a feedback form, which asked how easily the assignment fit with her curriculum. Their feedback will be helpful in the future to making necessary adjustment to the assignment.

“...I go into the mountains all the time...I see the difference. Tremendous, tremendous difference in the impact that humanity has had...The impact of humanity on the watersheds is just tremendous. And we have not been good stewards. We have been lousy stewards.” - Luis Torres



Who Are We

We have decided to each choose an interview question from our template to demonstrate the basic idea of our project and introduce ourselves.

Emily

Which watershed is most important to you?

I am from Uxbridge, Massachusetts, which is a relatively small town. When I was a kid, my family and I went to church every Sunday morning. On our way to church we pass through the center of town, where there is a beautiful waterfall. The water rushes down and flows into a large river. It's one of the most beautiful parts of the town, and I love seeing it when I drive past. It's really important to me because it reminds me of when I was kid. That river is also very stunning when it freezes over in the winter. We always drive past it on the way to buy our Christmas tree each December. My favorite time of year to see it, though, is in the spring. The waterfall is one of the first signs every year that winter is over. It's really amazing to see it half frozen with a little water trickling down into the river.

Sydney

What is your fondest memory of the watershed?

I am from Moravia, NY, which is a small town near Syracuse. The watershed I have the most memories from is the Adirondacks in Northern NY, specifically Raquette Lake. My family has been spending a week each summer at Raquette Lake for the past 50 summers, and I have been going ever since I was born. I have hundreds of memories from the lake, even ones that I don't remember and have been told as stories. But probably one of my favorite memories was when I was about 14. We had always seen ducks and loved feeding them Cheerios before we knew it was bad to feed them to the ducks. One day, a mama duck and 5 of her ducklings swam up to the dock I were on. I was so excited and ran back to the cabin to grab the Cheerios. When I got back the ducks were luckily still there and I started feeding them. Then I had the brilliant idea to sit down, put my feet in the water and drop Cheerios on my feet. And to my surprise, the ducklings swam onto my feet to eat the Cheerios! I was so happy, that I kept doing it for about 5 minutes. Eventually, I got brave enough to lift my feet out of the water and straighten my legs so the ducklings were out of the water. I then put a trail of Cheerios up my leg, and the duckling followed the path and walked up my leg. I was so overloaded with cuteness and excitement that I did it for what felt like hours. One little duckling was even daring enough to climb up all the way to my belly and nibble a Cheerio out of my belly button while I was laying down. I will always remember the feeling of their little feet climbing up my legs. Unfortunately, we don't see ducks very often anymore at Raquette Lake.

"You know, without water, we're not gonna live...You have to have the right water, the proper water. We're affected at my home because of Los Alamos. We're downriver...I don't know how much contamination there is in the lake...they used to do water studies... but you'd never hear about the findings." - Arnold Herrera

Our Sponsor



River Source

Rich Schrader, pictured on the left, is the director of the community outreach program, River Source. He works with Carlos Herrera, pictured on the right, who is the director of operations at River Source. River Source is looking to raise awareness and appreciation of the watershed by educating the local youth. Rich and Carlos work with students in the community on field trips to local watersheds. Both Rich and Carlos are fantastic educators. The students were always very excited to learn from them. The goal of these field trips was to teach the students about the importance of watershed health and conservation. Their hope is to have a lasting impact on the students and the watershed.

We have asked our sponsors to also answer questions from our interview template. We wanted to give them the opportunity to speak about themselves and their feelings around the watershed, as experts.

Rich

When I think of the watershed, how has it changed?

I see the watershed turned into an area that is much more covered and impervious to water infiltration which makes me think the watershed has become much more broken up and disconnected to soil and people. I see the moist bottoms of arroyos and rivers also becoming more disconnected from the neighboring banks than in the past, so that water in running channels is more often speeding up and cutting as it narrows rather than spreading out and slowing down to recharge soils. As the megadrought expands, I see people wanting to reconnect to water sources and they are often looking for practical ways to do that, but often the directions/roadmaps for taking action seem unclear, uncharted, or less traveled. I see people finding opportunities for paid and volunteer work to regrow or sustain watershed resilience as it becomes apparent that we have lots of good practices to implement but often it just needs to be seeded and grown as a practice and investment in our future.

“...10 - 15 years ago these ATVs started coming around...those things go all over the creeks and across the river...that's the biggest impact...From my experience, those things making crossings...if you make a crossing into a creek where there wasn't a crossing before when it rains...it's gonna make an arroyo. And so then you get more silt in the river.” - Luis Torres

Carlos

Tell me the story of the pollution of the watershed?

Well my interest in water quality came from this very question. Growing up I saw the impacts the Cochiti Dam had on the Cochiti reservation and I always wondered, if what people did upstream affects water quality for the Cochiti people who use the water? Another driving question as I got older became what impacts did Los Alamos have on water quality? In order to answer these questions I decided to study Environmental Science to understand the way that pollution moves through the environment. Through my time in college and working now in the environmental field I was able to answer these questions to find that indeed pollution from upstream can affect water quality and indeed Los Alamos has had a major impact on the river. Many sources of pollution are present along the Rio Grande river such as sediment from eroded upper watersheds, to waste water from Espanola, to the scariest in my mind the radioactive nuclides that we know are present in the river due to the mismanagement of nuclear waste and other releases due to catastrophic wildfires that burned out contaminated areas. This question in short has helped me become who I am and continues to drive my life mission to leave our environment better for the next generation.



Issues

As we mentioned previously, these issues are very serious. We are working with River Source and students to address the problem. Before we came to Santa Fe, we didn't have much practical knowledge about the area, just what we had learned from research. This was a little daunting, not knowing what we were walking into. However, once we arrived and became acclimated to the social norms of Santa Fe, we felt better. We became even more comfortable after we had been here a few weeks and had built relationships with some locals. In the process of getting acclimated to Santa Fe, we also learned more about the city and the people that live here. Once we began talking with locals, and becoming familiar with them, we learned something very interesting.

We learned about a major problem, the intergenerational knowledge gap that exists between kids and elders. Rich, Carlos, and some of the people we interviewed all felt the same way: kids are too involved in technology and elders are dying before they can pass down their knowledge to the kids. After hearing this multiple times in our research, we knew that this was an important issue that we wanted to tackle in our project.

Another important facet of the project was the education of kids with regards to the natural and social sciences. We wanted to give them an alternative method of learning about something so important. As Luis Torres said, children are the future, and we need to teach them how to lead and be educated about the problems we are facing. We hope our project will address these issues and guide the students and citizens of Santa Fe towards a brighter future.



Our Goals

The purpose of our project is to provide students with an assignment that will address the gaps we have observed. The gaps we are addressing are the intergenerational knowledge divide and student education outside the classroom. The intergenerational knowledge divide is a lack of communication between the students and elders in families and communities. Adults with whom we spoke perceived the technological era that we live in today as a factor that has greatly widened this gap; kids would rather live in a virtual world than experience the world right in front of them. The divide effects the Indigenous community heavily because of the tradition of oral storytelling that is so vital to the continuation of tribe or pueblo knowledge. It is important to have students learn about watersheds and stories outside the traditional classroom. We are also aiming to help the teachers that will be using our deliverables to connect the social sciences with the natural sciences. We want our assignment

What is the Intergenerational Knowledge Gap?

The intergenerational knowledge divide is a lack of communication between the students and elders in families and communities. We have two quotes from our sponsor, Carlos Herrera and his father, Arnold Herrera that perfectly summarize this idea. "For me, Drum Making was not only working with that drum, but it was a good family event and the opportunity to pass along the culture."-Arnold Herrera. "This was my opportunity as I was growing up, to have that precise opportunity that the interview is doing is to bridge that culture gap, to bridge that gap between younger generations and the older generations"
- Carlos Herrera

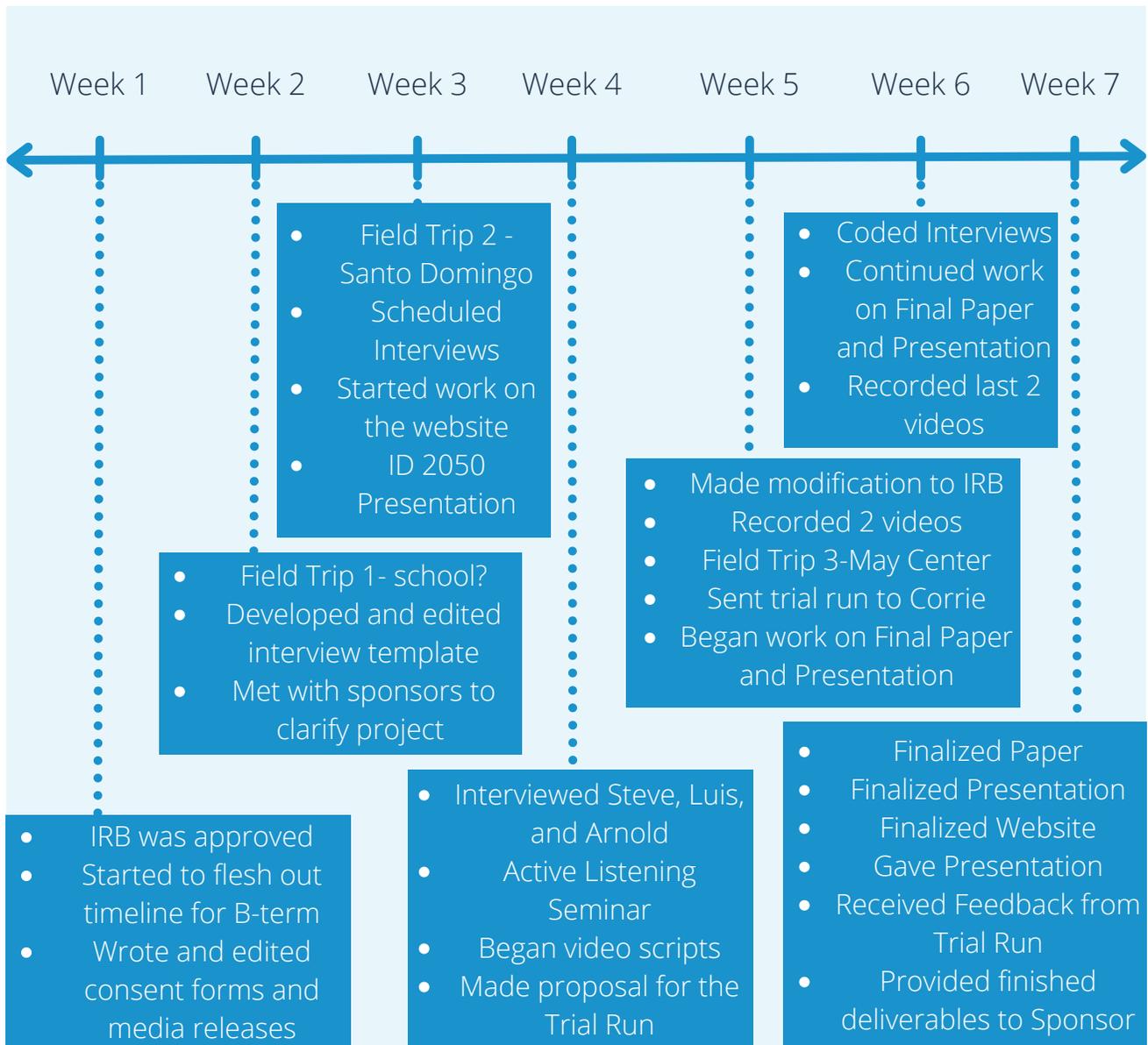
to be fun and engaging, so the students can enjoy the work they are doing. This will hopefully help them to enjoy learning and retain the information better.

There are two goals that our deliverables need to address. The first goal is to educate the students about the watershed. The second goal is to bridge the intergenerational knowledge gap between the students and elders in their community, such as their grandparents. Our deliverable is a take-home assignment for students that our sponsor will be able to provide to teachers. The main part of the assignment is an interview template. This template will have guiding questions, instructions, and definitions for the student to use during the interview. Students will need to use this template to ask an elder about the history of a watershed. The elder doesn't need to talk about a watershed in Santa Fe. They can talk about any watershed that is familiar to them. The student will learn about how the watershed has changed over time and how that change has affected the ecosystem. This will also be a great opportunity for elders, such as grandparents, to share their stories and feel respected. Accompanying the interview template will be four short, instructional videos teaching students how to conduct an appropriate interview. The videos will address a range of topics: respect, consent, ethics, and active listening.

“...learn how to reconnect with the elders...So how do you slow down and start listening to the elders?...you've got all these different conflicts...so many variables...”

- Arnold Herrera

Timeline





Interviews

In order to test the interview template we had created, we conducted three interviews with elders from around the Santa Fe area. The three interviews were all set up by our sponsor, who knows each of the men we interviewed. Using our template, we asked them to share their knowledge and stories about watersheds. Each of the men we interviewed has a different cultural background and are experts regarding watersheds in the Santa Fe area. All three interviews were very unique and informative. We learned a lot- not just about the watershed- but also about how to converse with people in a professional setting. Talking with these three men demonstrated how much there is to learn.

Our purpose for conducting these interviews was to make sure that the guiding questions in our template would lead to meaningful answers during the student interviews. We also had a second set of questions for the interviews we conducted. Our second set of questions was about respect and how the elders expected the students to conduct the interviews. The answers we received from these questions were very helpful for determining the content of our instructional videos.

The purpose of the interviews for the students is to learn about the watersheds from an elder. This will teach them about water conservation and bridge the intergenerational knowledge gap.

Steve Harris

Our first interview was with Steve Harris. He was born in Oklahoma, raised in Texas, and came to Santa Fe in the 1970's. He is most familiar with the Rio Chama and has loved it ever since coming to New Mexico. Steve founded his own non-profit, the Rio Grande Restoration, in 1992. Through working at his non-profit, Steve has discovered that the main problems in the regional watersheds are non-point source pollution and erosion. Steve still remains active in the environmental justice community today.

Steve Harris



“You need everybody who's using the resource [water] to be aware that it needs restoring, which is a challenge. Which is why River Source exists, I think, is to educate the coming generations.” - Steve Harris

Sydney's Caption: Steve was our first interview and I really appreciated how patient he was with us, and how much wisdom he had to share. He has led his own non-profit, the Rio Grande Restoration since 1992, and has done many incredible things to help the environment, and specifically the Rio Grande and Rio Chama rivers. With Steve's answers, were able to elevate the interview template and make the process smoother and more appropriate for students.

Emily's Caption: It was really interesting to hear Steve talk about all the different dimensions that are affected by the health of watersheds. Of course if a watershed is not healthy, then the water quality will be poor. There are other aspects of the surrounding habitat that are affected, too. The health of a watershed affects the plants, soil, and animals that rely on it to survive. The more sensitive plants and animals may disappear if the watershed cannot sustain a habitat to support them. So, by taking care of the watersheds, people are taking care of more than just the water.

Luis Torres

Luis Torres did not intend to remain in San Pedro for long when he originally moved here. He moved to San Pedro, New Mexico thirty-five years ago, in 1985. It was amazing to talk to Luis and hear his stories from his time living in New Mexico. Luis worked with the Forest Service, so he's worked a lot with the environment in the area. It was also great to hear that he puts so much faith in children. Luis told us that he has always believed that educating kids is important for the future. The future is in their hands after all.

Luis Torres



**“I think the only thing that is going to protect our environment- not just our watershed, but our environment- is gonna be the education of young people.”
- Luis Torres**

Sydney’s Caption: Luis had some great stories to tell us, and they were all so interesting. It was very touching to see him get so passionate and emotional when talking about how the youth are the solution to climate change. He was also very helpful when we asked about how to make the interview more respectful. He made many good points about how children aren't inclined to be rude, but we need to prepare them "such that it's meaningful to them, not just an assignment/mimicking adults" (Torres, 2021).

Emily’s Caption: I found it really interesting to learn about Luis’s fondest memory of watershed. The memory Luis shared was of the summer he met Tweed Roosevelt and how they became friends. The night they met, they were both working as forest rangers and listened to the democratic convention of 1960 on a transistor radio. The impact we have on one another is amazing. It was easy to tell how excited Luis was to share this story with us and how much it meant to him.

Arnold Herrera

Arnold Herrera is a drum maker from the Cochiti Pueblo. We have been working closely with his son, Carlos Herrera, who is one of our sponsors. It was great to sit down and learn from them about the watershed and drum making. Arnold and Carlos shared a lot of personal stories about their family with us. Drum making is a way for them to connect to their community, culture, and environment. Arnold imposed on us the need to have a respect for the environment; that's what keeps you connected to it.

Arnold Herrera



"To me, the kids are the ones that suffer. They're not learning...about water and everything else [from their parents or grandparents]." - Arnold Herrera

Sydney's Caption: Arnold's interview was probably the most unconventional, but in a good way. At the beginning of the interview we talked about our watershed questions. For the second half of the interview, Arnold taught us a little bit about the work he does: Drum making. He showed us and taught us about how to make a drum. He also said something that really resonated with me. He said "For me, Drum Making was not only working with that drum, but it was a good family event and the opportunity to pass along the [Cochiti] culture" (A. Herrera, 2021)

Emily's Caption: It was really amazing to hear about how important the environment is for the Native American culture. Taking care of the environment is so critical. A story that really stood out to me was about how when you harvest anything, like juniper, you only take what you need. People up in Santa Fe are burning juniper bushes to make room for golf courses, which is really bad. Juniper is important for the Native culture. It's the number one wood used for bread making. If people don't take care of your environment, then the environment can't take care of the people.



Field Trips

Another facet of our project that helped us develop the interview template was attending field trips. We attended three River Source field trips in which local students participated. These field trips took us to local schools and watersheds. We were able to interact with students ranging from 5th grade to 7th grade. When we were out with the kids, we were able to gauge their interest level in River Source's activities. To our excitement, they really enjoyed the activities and were eager to be involved. We could tell one of the main reasons that the students were so excited to participate was because they could be outside. It was a nice break from the monotony of the classroom. This gave us hope for our interview template, as it is an assignment to be completed outside the classroom. It would also give them some creative freedom, which we observed many students were excited about when we worked with them.

The first field trip we went on was with the Santa Fe School for the Arts and Sciences, where we were with 7th graders. The students paired off to make different observations about the river. Some students took water samples, and others observed the aquatic species. We trekked through the brush with two students and Rich to collect samples of aquatic species. We stopped at two different points on the river; one where the water was stagnant, and one where the water was flowing. After collecting many

“The analogy that I use is, it’s just like a ditch or a pipeline, you know, if it’s in bad repair then you’ve gotta get in there and fix it. And in this case, the river is in bad repair.” - Steve Harris

species from the river, we helped the students separate and identify the different species that we found. There were no sensitive species found in this river, which means it is heavily polluted. As we learned from Rich, sensitive species cannot survive in polluted ecosystems.

The second field trip we went on was with the Santo Domingo Pueblo school, with a group of fifth graders. We went to their school to help Rich and Carlos teach the kids about surveying the land. Their goal was to survey the land where there could be an outdoor classroom in the future. The students collected a lot of data. We helped the students gather different plants from the area, measure the elevations (where there were hills or valleys or flat land), and make maps of the area. The students also got to see Carlos fly the drone that day. He used the drone to take pictures of the area, so they could see the best place to set up an outdoor classroom.

The last field trip we attended while in Santa Fe was with a class of 6th and 7th graders from the May Center for Learning. On this trip, we went to the Santa Fe River, by the Dale Ball Trails. We participated in similar activities as we did on the first trip, such as testing the water, and observing the aquatic species present. It was interesting to see that the students found sensitive species in the water on this field trip. Sensitive species are found only in ecosystems, such as the Santa Fe River, that are not heavily polluted. They are the first species to disappear when there is heavy pollution because they cannot survive. All three of these field trips were incredible experiences. Not only did we learn a lot of valuable information for our project on these trips, but also about the health of the watersheds in Santa Fe.



Trial Run

The final step in our project was to test the assignment with a group of students. We wanted input from a demographic that would be using the assignment. We started with the elders who would be on the receiving end of the interviews, and the next logical step was to get feedback from the interviewers. Student feedback was invaluable because this assignment is designed for students to use.

We gave the prototype of the Elder Interview assignment to a class, taught by Corrie Shapiro at the May Center for Learning in Santa Fe, NM. We met Corrie and Trudy Moon from the May Center when we attended our third field trip with River Source. They were very enthusiastic when we told them about our project. We provided them with a sample of the assignment that will be part of our final deliverables to River Source. The sample included two instructional videos, the interview questions, a survey for the kids to take after completing the assignment, and a survey for the teacher.

The students anonymously filled out a survey, which had questions about how well they understood and enjoyed the assignment. We also gave their teacher a survey, which had questions about how well the assignment fit into her curriculum. We hoped that this feedback would greatly help us to improve the interface.

“I think the last time I saw a rushing river was probably about 1988 when I was working at Cochiti Lake...that year, good snow...one lake turned into two lakes.” -

Arnold Herrera

We received 15 feedback forms from Corrie Shapiro on December 7th, 2021. We analyzed and categorized each form. While looking through the forms, we were able to see three main trends: 11 out of 15 students did interview a grandparent, 13 out of 15 students agreed or strongly agreed that the interview process was enjoyable, and the majority of students gave critical and constructive feedback. We are grateful for all the feedback, and are excited that the majority of the students enjoyed the assignment. This gives us hope that our assignment will be well received with many other groups of students. Thanks to the help of Corrie and her class, we will be able to pass along these recommendations to River Source for implementation in future projects.

All of the feedback that we received was anonymous and can be found in Appendix I.

"Good to the other stutends [students] but I was bored but good so thank you."

"I think that this was a very fun and simpol [simple] way to do an interview so I really like this. You could add a Kahoot to help us really get it."

"How you could inprov [improve] is not sounding like you are reading off a script."

"I think that you could involve the students in the videos and that the interview of ice cream could have been more on topic. Add a Kahoot please."

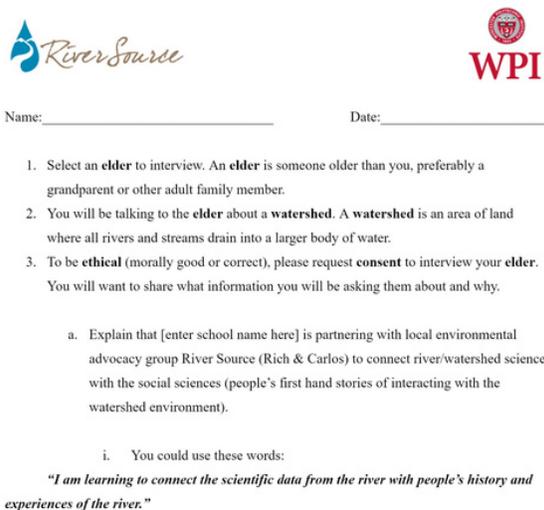
"In the Active Listening you had a exaple [example] it would be cool if you do it [for] consent and ethics. Thank you."

Deliverables

The deliverables that we gave to River Source include an interview template and four instructional videos. The interview template contains guiding questions for the students to use during their Elder Interview. The instructional videos teach students about how to appropriately conduct interviews. The videos cover a range of topics, including respect, active listening, consent, and ethics. We hope that with these deliverables the students will learn about the watershed through stories from their elders, which will help bridge the intergenerational gap.

Figure 1

Interview Template



Name: _____ Date: _____

1. Select an **elder** to interview. An **elder** is someone older than you, preferably a grandparent or other adult family member.
2. You will be talking to the **elder** about a **watershed**. A **watershed** is an area of land where all rivers and streams drain into a larger body of water.
3. To be **ethical** (morally good or correct), please request **consent** to interview your **elder**. You will want to share what information you will be asking them about and why.
 - a. Explain that [enter school name here] is partnering with local environmental advocacy group River Source (Rich & Carlos) to connect river/watershed science with the social sciences (people's first hand stories of interacting with the watershed environment).
 - i. You could use these words:
"I am learning to connect the scientific data from the river with people's history and experiences of the river."

"It's complicated." Steve Harris's comment when we asked him what his feelings were about the state of the watershed.

Note. This interview template was designed with two purposes. The first purpose is to educate the students about the watershed. The second purpose is to bridge the intergenerational gap by having the students talk to elders.

Figure 2

Active Listening



Note. The “Active Listening” video was created to teach the students how to deeply listen by observing the body language & spoken cues of the elder they are interviewing. This shows the elder that the student is listening and cares about what the elder is saying.

Figure 3

Consent & Ethics



Note. The “Consent & Ethics” video was created to teach the students what consent and ethics are, as well as why they are so important. This will teach the students good practices and techniques in consent and ethics for the future.

Figure 4

Respect



Note. The “Respect” video was created to teach the students how to appropriately conduct interviews. It addresses the importance of listening and asking appropriate questions. The information for this video was gathered from our interviews with elders.

Figure 5

Interview Examples



Note. The “Interview Examples” video was created to show the students an example of how not to conduct an interview followed by an example encompassing all the tactics from the other videos we created (active listening, respect, consent, & ethics).



What We Learned

Emily

I have learned a lot while being here in Santa Fe. The most interesting skill I acquired is conducting interviews appropriately. Learning about active listening and then using it during our interviews led to amazing results. Active listening helped guide me through the interview, whereas without it, there would have been awkward silences because I wouldn't have known what to say. My presentation skills have also improved quite a lot since coming to Santa Fe. I'm really grateful that I had the opportunity to improve my presentation skills. It was great to hear constructive criticism, so I could learn and adjust how I present our project. Writing a professional paper is another skill that has greatly improved recently. Since starting at WPI, I have not written many professional papers other than lab reports. My writing skills needed some improvement, and writing this report was a great opportunity for that. I am really proud of all the skills that I have gained and improved upon.

Since coming to Santa Fe, I have learned a lot about watersheds and the different struggles that communities in this part of the country have with water. In Massachusetts, water is not an issue. It rains very often, and there are almost never any droughts. In New Mexico, there is hardly any water. We have seen many dried riverbeds while hiking. The watersheds we have seen on field trips with our sponsor have been polluted. Fresh, clean water is a huge problem in Santa Fe that I was not aware of before coming here. Seeing it has really changed my perspective

on water and made me more aware of how precious it is. I have also learned a lot about the Indigenous community. One of our sponsors, Carlos Herrera, is from the Cochiti Pueblo. We have learned a lot from talking with him and his dad, Arnold Herrera. They have taught us so much about their culture, like the importance of drummaking.

Sydney

Coming to Santa Fe has been one of the greatest experiences of my life. I learned many things personally and academically. I learned how to be professional, how to conduct interviews, how to code interviews and how to be conscious and courteous of other people's culture. We wanted to teach the students who use our template about ethics & consent, active listening and respect. But in order to teach about these topics, we had to learn how to do them ourselves. Our advisors gave us a lesson on active listening, which helped us greatly to conduct our interviews but also make a video teaching the students what active listening looks and sounds like. We were very aware of all the consent forms and media releases that we needed signed in order to be as ethical as possible. I also learned from Rich and Carlos how to meaningfully interact with the students. I have worked with kids at summer camps and as a substitute teacher before, with little formal training. But I feel I learned so much from watching both of them interact with the kids and teach while being engaging and holding their attention. I also learned a lot about teamwork and navigating conflict within a group setting, and I think what I have learned about it will set me up for success in the future.

As I mentioned before, not only did I grow academically, but personally and socially as well. During my time in Santa Fe, I made a point to try as many new things as possible, including foods, drinks, hiking destinations and museums. I really wanted to learn as much about the culture here as possible. I tried to spend at least one day each week either hiking, or exploring Santa Fe or going to a new restaurant. Some incredible things happened while I was in Santa Fe that I feel very fortunate to have experienced. I got to see it rain (which I am told is a rare occurrence), I saw the Lunar Eclipse with some classmates, I saw beautiful vistas on the Dale Ball Trails, and made new friends from school and from Santa Fe. I feel so fortunate to have had this opportunity, and I wouldn't trade it for anything.

Bibliography

Black, P. E. (1997). Watershed Functions¹. *JAWRA Journal of the American Water Resources Association*, 33(1), 1–11.
<https://doi.org/10.1111/j.1752-1688.1997.tb04077.x>

Carle, M. V., Halpin, P. N., & Stow, C. A. (2005). Patterns of Watershed Urbanization and Impacts on Water Quality¹. *JAWRA Journal of the American Water Resources Association*, 41(3), 693–708.
<https://doi.org/10.1111/j.1752-1688.2005.tb03764.x>

City of Santa Fe, New Mexico. (2018). City of Santa Fe: 2018 annual water report.
https://www.santafenm.gov/document_center/document/12500

City of Santa Fe, New Mexico. (2020). City of Santa Fe water: 2020 annual report.
https://www.santafenm.gov/document_center/document/12926

Fine, G. A. (2015). Participant Observation. In J. D. Wright (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* (Second Edition) (pp. 530–534). Elsevier. <https://doi.org/10.1016/B978-0-08-097086-8.44041-9>

Harris, Steve. Elder Interview. personal communication. November 8, 2021.

Herrera, Arnold. Cochiti Pueblo. Elder interview. personal communication. November 9, 2021.

Herrera, Carlos. Cochiti Pueblo. Elder Interview. personal communication. November 9, 2021.

Bibliography

Lintern, A., McPhillips, L., Winfrey, B., Duncan, J., & Grady, C. (2020). Best Management Practices for Diffuse Nutrient Pollution: Wicked Problems across Urban and Agricultural Watersheds. *Environmental Science & Technology*, 54(15), 9159–9174. <https://doi.org/10.1021/acs.est.9b07511>

Moltz, H. L. N., Lopes, V. L., Rast, W., & Ventura, S. J. (2010). Hydrologic-economic analysis of best management practices for sediment control in the Santa Fe watershed, New Mexico. *Journal of Hydrologic Engineering*, 15(4), 308–317. [https://doi.org/10.1061/\(ASCE\)HE.1943-5584.0000187](https://doi.org/10.1061/(ASCE)HE.1943-5584.0000187)

Moltz, H. L. N., Smith, C. L., Lopes, V. L., & Rast, W. (2013). Sediment control and social inequality in the Santa Fe river watershed, New Mexico: A case study of organizations. *European Water*, 42, 51–64.

Mustonen, T., Feodoroff, P., & Sevettijärvi, (with the Skolt Sámi Fishermen of. (2018). Skolt Sámi and Atlantic Salmon Collaborative Management of Näätämö Watershed, Finland as a Case of Indigenous Evaluation and Knowledge in the Eurasian Arctic. *New Directions for Evaluation*, 2018(159), 107–119. <https://doi.org/10.1002/ev.20334>

Renard, K. G., & Nichols, M. H. (2003). History of small watershed research in non-forested watersheds in Arizona and New Mexico. *Proc. 1st Interagency Conf. on Research in the Watersheds*, Edited by KG Renard, S. McElroy, W. Gburek, E. Canfield, and RL Scott, 296–301. <https://www.tucson.ars.ag.gov/unit/Publications/pdffiles/1558.pdf>

River Source. (n.d.-a). Our Mission. Our Mission. Retrieved September 30, 2021, from <https://riversource.net/about-us/>

River Source. (n.d.-b). RiverSource Learning Center. RiverSource Learning Center. Retrieved October 1, 2021, from <https://learn.riversource.net/>

Bibliography

River Source. (n.d.-c). Watershed Watch Community Science. Watershed Watch Community Science. Retrieved October 30, 2021, from learn.riversource.net/courses/watershed-watch-community-science/

River Source. (n.d.-d). Youth For a Secure Water & Climate Future. Youth For a Secure Water & Climate Future. Retrieved September 30, 2021, from riversource.net/programs/youth-for-a-safe-water-future/

Schrader, R. (n.d.). About River Source. River Source. Retrieved October 5, 2021, from <https://riversource.net/>

Sihombing, R. S. M. (2019). The Role of The Indigenous Knowledge System of The Community Dayak In Water Management Kahayan River: Review of Local Wisdom Perspective. Iapa Proceedings Conference, 341–350. <https://doi.org/10.30589/proceedings.2018.208>

Thompson, K.-L., Lantz, T., & Ban, N. (2020). A review of Indigenous knowledge and participation in environmental monitoring. *Ecology and Society*, 25(2). <https://doi.org/10.5751/ES-11503-250210>

Torres, Luis. Elder Interview. personal communication. November 9, 2021.

Weather averages Boston, Massachusetts. (2021). U.S. Climate Data. <https://www.usclimatedata.com/climate/boston/massachusetts/united-states/usma0601>

Weather averages Santa Fe, New Mexico. (2021). U.S. Climate Data. <https://www.usclimatedata.com/climate/santa-fe/new-mexico/united-states/usnm0292>

Withgott, J. H., & Laposata, M. (2019). *Essential environment: The science behind the stories* (6th ed.). Pearson.



Appendices





Appendix A: Video Scripts

Consent & Ethics Script

S: Today we are going to teach you about consent and ethics.

E: When you're conducting interviews, you need consent. Informed consent is a freely given agreement. So, for example, before you interview anyone, you need to ask them if they agree to be interviewed. This is important because it gives them all the information on why you are interviewing them & the choice to be interviewed or not.

S: We want you to understand that consent can be given or taken away by the interviewee at any time with no penalty or judgement.

E: You need informed consent to be ethical. It is also important to be ethical when conducting interviews....

S: Ethics are moral principles that help you decide right from wrong. It's important because you want the person you're interviewing to feel comfortable and respected. To be ethical you need to be honest, fair, responsible, and honorable. You need to make sure you are asking appropriate questions and being respectful of the person you are interviewing.

E: We hope this video helped you learn how to use consent & be ethical students.

Active Listening Script

E: Learned about active listening phrase

S: Active listening is careful listening & observation of body language & spoken cues.

E: But, how do I do that?

S: By paraphrasing and reflecting.

Paraphrasing is repeating back to them the important info they just told you.

Reflecting is to think carefully about what they just told you

E: But why is that important

S: Because it's showing them that you were listening.

E: I'm still a little confused

S: Here's an (goofy) example

**S: Did you notice how they observed each other's emotions? And actions?
And what they said?
That's what active listening is!**

E: I get it now!

Respect Script

S: In today's video, we are going to be teaching you about respect. What it looks like and what it sounds like.

E: Being respectful doesn't necessarily mean you need to be super formal. The interview can still be like a casual conversation.

S: It's important to respect each elder's experiences. You can do this by valuing their thoughts & feelings. This is something we talk more about in the active listening video. Even if what the elder says doesn't seem to directly help you, there is still value in what they're saying. It could help someone else.

E: Listening is a really important part of being respectful. Don't interrupt. But it's ok to ask questions if you don't understand something or if something's interesting.

S: Make sure your questions are appropriate and not rude. For example, don't ask someone "why do you smell funny?". And if you think something you said has upset them, just move on to the next question.

E: Make sure at the end of every interview, you thank the person for sharing their stories and experiences with you.

Interview Examples Script

E: Now that you've watched all the other videos, and learned some new skills, we are going to show you two examples of interviews.

S: One will be a good interview where the student used all (the skills), and a bad interview where the student was rude and the interviewee felt uncomfortable and disrespected.

E: We are going to show you the first interview now, and you see if you can tell if it was the good interview or the bad interview.

Example of Bad Interview

S: Which interview do you think that one was? Good or bad?.....

E: Right, that was the bad one!

S: Did you notice when the student walked in, they were chewing gum very loudly, clicked the pen a lot, and sat very unprofessionally. They also didn't introduce themselves.

E: They didn't really care about the answers or how the interviewee felt and didn't act very friendly. The student also was looking off into space, which is rude. It was inappropriate of the student to pressure the interviewee into answering the question about her favorite pet when she was uncomfortable.

S: Those things were wrong because they made the whole experience uncomfortable for all parties. And the student didn't practice any of the skills from the other videos, such as active listening, respect or consent.

E: Now let's see a good interview

Example of Good Interview

S: Wasn't that interview so much better? It was more conversational and both people looked comfortable and like they were having fun.

E: So, make sure you practice all the skills from the videos, like active listening and being respectful, during your interviews.

S: And try your best to make meaningful connections with the people you interview.



Appendix B: Instructional Videos

Consent & Ethics

<https://drive.google.com/file/d/1RYk4nvKOMx04vF3F1Xs0EEGnQ5N47joT/view?usp=sharing>

Active Listening

https://drive.google.com/file/d/1rEP3xyPAWDzIJ_ulTLWhqda50oWle0xl/view?usp=sharing

Respect Video

<https://drive.google.com/file/d/1HVOntSeVDrajfQP0UnoAouoRthBRu4e/view?usp=sharing>

Interview Examples Video

https://drive.google.com/file/d/1pCWitkc3xtZvw9ExINK4l3GBI8ON_Yu1/view?usp=sharing



Appendix C: Interview Template

Student Name: _____ Date: _____

1. Select an elder to interview. An elder is someone older than you, preferably a grandparent or other adult family member.
2. You will be talking to the elder about a watershed. A watershed is an area of land where all rivers and streams drain into a larger body of water.
3. To be ethical (morally good or correct), please request consent to interview your elder. You will want to share what information you will be asking them about and why.
 - a. Explain that May Center is partnering with local environmental advocacy group RiverSource (Rich & Carlos from our day at the river) and Worcester Polytechnic Institute (college students Sydney & Emily from our day at the river) to connect river/watershed science with the social sciences (people's first-hand stories of interacting with the watershed environment).

i. You could use these words:

"I am learning to connect the scientific data from the river with people's history and experiences of the river."

i. Show your elder a list of the questions you will ask them (on the form).

a. Ask for your elder's consent by using words like these:

“May I have your consent to interview you and record notes about what you tell me about your experiences in a watershed environment to share with my class, RiverSource, and Worcester Polytechnic Institute?”

4. Conduct your interview, using these guiding questions and your knowledge from the instructional videos to interview an elder that you know about the watershed.

5. You may write answers in the space provided as you conduct your interview. You may also record the interview to refer back to the conversation.

6. When your interview is over, thank your elder for sharing their stories with you!

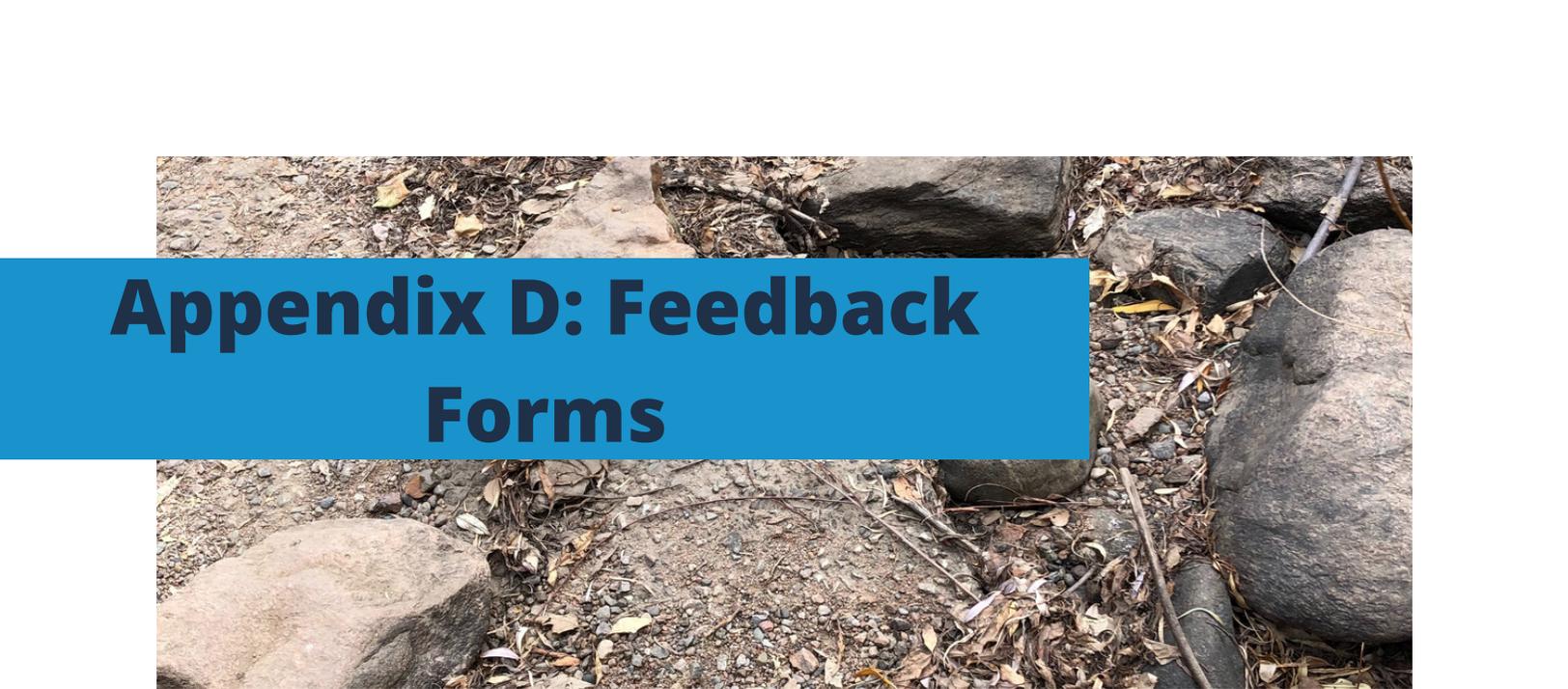
Student Name: _____ **Date:** _____

Elder Name (person being interviewed): _____

____ Gives consent ____ Does not give consent

Relationship to Student: _____

1. For the sake of the interview, could you tell us what year you were born?
2. Where did you live when you were in your early teens?
3. Which watershed is most important to you?
4. When you think of the watershed, how has it changed since you were younger?
5. What is your fondest memory of the watershed?
6. What plants and animals relied on the watershed when you were a teenager?
7. Describe the watershed now?
8. What are your feelings about the watershed?
9. Tell me the story of the pollution of the watershed?
10. Why would they do that? And destroy something that was so beautiful?
11. What do you think needs to be done to protect the watershed?
12. Is there anything you want to tell us that we didn't ask about?



Appendix D: Feedback Forms

Elder Interview Survey

Please give us some feedback on what you thought of the interview process and instructional videos.

1. What is your relationship to the person you interviewed (ex. Mother, Father, Grandmother, Grandfather, Aunt, Uncle, family friend, etc.)

2. Was the interview process enjoyable?

1 2 3 4 5
Strongly Disagree Disagree Neutral Agree Strongly Agree

3. How long did the interview take?

4. How many of the guiding questions did you ask?

5. How many questions did you ask that weren't a guiding question?

6. Did you take notes during the interview?

- Yes
- No
- Other: _____

7. Did you watch the instructional videos?

- Yes
- No
- Some
- Other: _____

8. Do you think the videos helped you conduct the interview better?

- Yes
- No
- Kind of
- Other: _____

9. Were the videos engaging?

- Yes
- No
- Kind of
- Other: _____

10. Which video did you like better?

- Active Listening
- Consent & Ethics
- Other: _____

11. Do you have any suggestions to make the interview template or videos better?

Teacher Feedback-Elder Interview Survey

We would greatly appreciate if you could take a few minutes to fill out this short survey.

1. Do you think this assignment was beneficial to the students? In what way was it beneficial?

2. Was it easy for you to assign this project (ex. needed little to no in-class instructions)?

- Yes
- No
- Kind of
- Other: _____

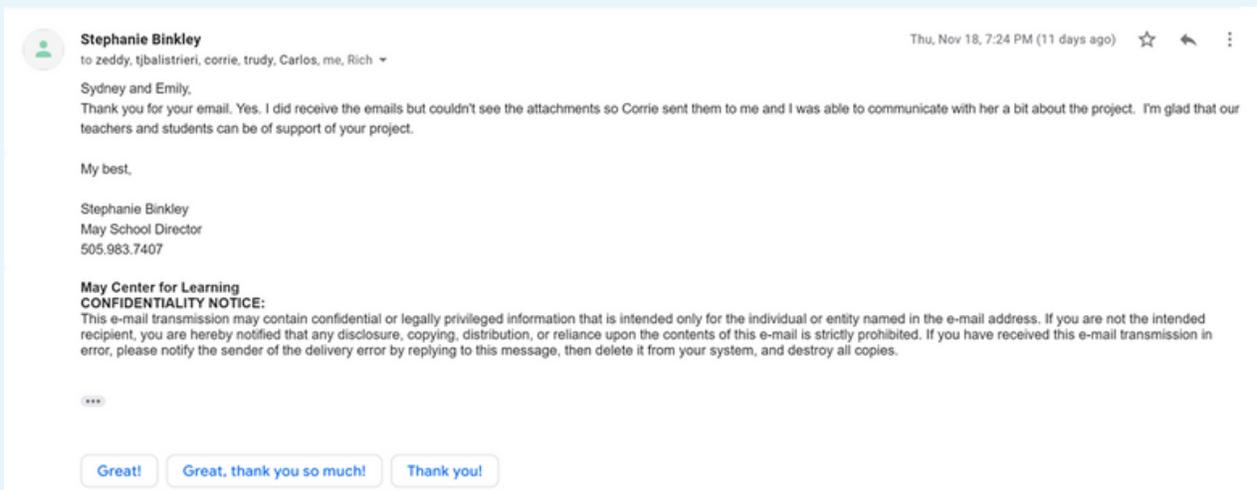
3. How many students completed the assignment? And how many students are in the class?

4. Did this supplement any material you already use in your classroom, and if yes, please tell us what material.

5. Do you have any feedback for us that could help make this project better in any way?

Appendix E: Consent Forms

Proof of Acknowledgement from the May Center



Consent Form

Informed Consent Agreement for Participation in a Research Study

Investigator: Sydney Smith (spsmith@wpi.edu) and Emily Frick (edfrick@wpi.edu)

Contact Information: sf21.river@gmail.com

Title of Research Study: Watershed Academies

Sponsor: River Source

Introduction: You are being asked to participate in a research study. Before you agree, however, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

Purpose of the study: The overall purpose of this interview is so that we can understand the requirements of a respectful interview. We will be using this information to create a guideline that will be distributed to students to use when they interview elders themselves. We will also be asking the students' questions about the watershed. This will help us determine if they are good, open-ended questions that will give the students a variety of answers.

Procedures to be followed: The interview will begin with us asking some questions about what a respectful interview is to you. Next, if you consent, we will test the interview questions that a student might ask you. Lastly, if you have any feedback, that would be appreciated. You only need to participate as long as you are comfortable. The length of time that we ask you to participate will be only the interview. However, if you wish to be included in further steps of the process, (such as being interviewed by the students) please let us know.

Risks to study participants: There is a small risk that some of the questions we ask during this interview may unintentionally bring up trauma.

Benefits to research participants and others: This process will benefit future interviewees of students because the students will know how to conduct an interview respectfully. This will help the students because it will allow us to provide them with the information, they need in order to conduct a respectful interview.

Compensation or treatment in the event of injury: This research does not involve more than minimal risk of injury or harm. As a result, we do not expect any medical treatment or consequences of direct risk or harm. Consequently, there will be no compensated medical treatment or any other forms of compensation. You do not give up any of your legal rights by signing this statement.

Record keeping and confidentiality: Records of your participation in this study will be held confidential so far as permitted by law. However, the study investigators, the sponsor (River Source) or its designee and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you unless you wish to be identified. The interviews will be audio or video recorded. The recording will be transferred and stored in an online folder that is only accessible by the study investigators and River Source. Once they are stored, only the people with access to the folder will be able to see the audio or video file unless it is published. No identifiable information will be published in order to maintain confidentiality. The video and audio collected from this interview will be edited and made public on the internet. You have the right to review any statement(s) you make before they are published. The information that will be published are the answers given for the interview questions asked. For more information about this research or about the rights of research participants, or in case of research-related injury, contact:

WPI Watershed Academies Team, Email: sf21.river@gmail.com

IRB Manager: Ruth McKeogh, Tel. 508-831-6699, Email: irb@wpi.edu

Human Protection Administrator: Gabriel Johnson, Tel. 508-831-4989, Email: gjohnson@wpi.edu

River Source, Tel. 505-660-7928, Email: riversource1@gmail.com

Significant new findings or information, developed during the course of the research, may alter the subject's willingness to participate in the study. Any such findings will be promptly communicated to all research participants.

Should a participant wish to withdraw from the study at any time, the following procedures should be followed: The participant needs to contact River Source (contact info is listed above). Any information or data recorded during the research session or previous research sessions will be securely destroyed. Any data that may be used to identify the participant(s) will also be securely destroyed. You may decide to stop participating in the research at any time without penalty or any loss of benefits to which you may otherwise be entitled.

Special Exceptions: Under certain circumstances, an IRB may approve a consent procedure which differs from some of the elements of informed consent set forth above. Before doing so, however, the IRB must make findings regarding the research justification for different procedures (i.e. a waiver of some of the informed consent requirements must be necessary for the research to be "practicably carried out.") The IRB must also find that the research involves "no more than minimal risk to the subjects." Other requirements are found at 45 C.F.R. §46.116.

Your participation in this research is voluntary. Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit. By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

_____ Date: _____
Study Participant Signature

Study Participant Name (Please print)

_____ Date: _____
Signature of Person who explained this study

Elder Interview Proposal

To Whom It May Concern,

Hello! We are college students from Worcester Polytechnic Institute (WPI) in Massachusetts. We are working with River Source to create an Elder Interview Template in order to teach the students how to conduct a respectful interview and analyze the results.

What We Would Need From You: This would be a take home assignment, with only 10-15 minutes needed in-class time for a survey. We would just need you to distribute on Canvas or Google Classroom (or whatever learning platform you use): a backpack flyer, two short instructional YouTube videos (created by us), the interview template, a survey document.

What We Would Need From the Students: Students will need to watch two short instructional videos and conduct an interview with an elder in their life. An elder is someone older than the student, at least in their twenties (or older if possible). If students are unable to interview an elder, they can interview an older sibling or friend instead. Then, they will fill out a short survey in class after the assignment is completed. They will also need to bring home a backpack flyer to inform their parents/guardians what they are participating in.

Why This is Important: We want to teach the kids how to conduct respectful interviews with elders. The interview will supplement their knowledge of the natural sciences by learning about the history of the local watershed outside of school. We hope that this will teach them how to understand the connection between the natural sciences and social science.

Thank you for your time and consideration. If you have any questions, please don't hesitate to reach out to us at sf21.river@gmail.com. We sincerely hope to work with you!

Sydney Smith & Emily Frick



Appendix F: Media Releases

Our Media Release

We are a team of undergraduate students from Worcester Polytechnic Institute (WPI) in the United States. We are participating in a project to collect experiences and perceptions of the history of the watershed in Santa Fe. If you are willing to participate in this project, please read and note your preferences on this form. The final results will be made public. If you wish to see the final publication, please contact us, the WPI Watershed Academies Team, at sf21.river@gmail.com .

Do we have your permission to audio record an interview?

Yes | No

Do we have your permission to video record an interview?

Yes | No

Will you allow us to use your words and image for use on public website platforms?

Yes | No

I understand that these interviews will be published at WPI for educational purposes and made available to the public. Images and film clips may also be shared to social media platforms including Instagram and other outlets designed to amplify the experiences of Santa Fe's watershed history.

Sign:

Print:

Date:

River Source's Media Release

River Source: Acknowledgment And Assumption Of Risks and Responsibility Release And Indemnity Agreement (Adult and child participants)

INTRODUCTION

Please read this entire Acknowledgment and Assumption of Risks & Release and Indemnity Agreement (hereafter 'Document') carefully before signing. All participants 12 yrs. of age or older must sign this Document. For participants under 18 yrs. of age (hereafter sometimes 'minor' or 'child'), one or both parent/s or legal guardian/s (hereafter collectively 'parent/s') must also sign and parent/s may print the name (instead of a signature) for those participants under 12 yrs. of age. In consideration of the services of River Source, and its officers, directors, employees, representatives, agents, volunteers, independent contractors and all other persons or entities associated with it, I (participant and parent/s of a minor participant) acknowledge and agree as follows:

ACKNOWLEDGMENT AND ASSUMPTION OF RISKS AND RESPONSIBILITY

River Source educational activities may include, but are not limited to: hiking; nature walks; wildlife viewing; handling animals and light tools, and other outdoor activities (collectively referred to in this Document as 'activities'). Participants may engage in these activities independently or as conducted by River Source staff or contractors. I acknowledge that the inherent and other risks, hazards and dangers of these activities can cause injury, property damage, illness, mental or emotional trauma, paralysis, disability or death to participant or others. During both supervised and unsupervised activities, all participants share in the responsibility for their own safety and agree to follow all River Source rules and policies. Participant is voluntarily participating with knowledge of the risks and taking responsibility for mitigating risk. Therefore, participant (and parent/s of minors) assumes and accepts full responsibility for the inherent and other risks (both known and unknown) of these activities and for any injury, damage, death or other loss suffered by participant (and parent/s of minors), resulting from those risks and/or resulting from participant's negligence or other misconduct.

River Source's Media Release

RELEASE AND INDEMNITY AGREEMENT

This Release and Indemnity Agreement contains a surrender of certain legal rights. Certain state and federal agencies (including the National Park Service and some regions of the U.S. Forest Service) restrict service providers, including River Source, from seeking releases of liability for negligence, for injuries or other losses occurring while operating under permit or concession on those federal lands. Therefore, except to the extent a court determines these federal restrictions are enforceable against River Source as a matter of law, I (adult participant or parent/s for themselves and for and on behalf of their participating minor child) agree as follows:

1) to release and agree not to sue River Source and its fiscal sponsor, Partners in Education Foundation for the Santa Fe Public Schools, hereafter Partners with respect to any and all claims, liabilities, suits or expenses (including attorneys' fees and costs) (hereafter collectively 'claim' or 'claim/s') for any injury, damage, death or other loss in any way connected with my/my child's enrollment or participation in these activities or use of River Source equipment, facilities or premises. I understand that in signing this Document, I, my child and anyone acting on my or my child's behalf, surrender all rights to make a claim against River Source and Partners as a result of any injury, damage, death or other loss suffered by me or my child;

2) to defend and indemnify ('indemnify' meaning protect by reimbursement or payment) River Source and Partners with respect to any and all claim/s brought by or on behalf of me, my child, spouse or other family member, a co-participant or any other person for any injury, damage, death or other loss in any way connected with my/my child's enrollment or participation in these activities or use of equipment, facilities or premises. This Release and Indemnity Agreement includes claim/s resulting from River Source's negligence (but not its willful or wanton misconduct), and includes claim/s for personal injury or wrongful death (including claim/s related to emergency or medical response, assessment or treatment), property damage, breach of contract or any other claim.

PHOTO RELEASE

Photos taken on field trips are helpful tools to show River Source supporters the important work that is being conducted by local students in local watersheds. These supporters are responsible for continued funding of watershed monitoring projects by students and play a vital role in providing outdoor education opportunities for New Mexico schools. By signing this release form you will enable River Source to use photos taken in the field to continue to promote watershed education in the State of New Mexico. Therefore, I authorize River Source to use my or my child's photo or image in any manner for advertising, display, audiovisual, electronic or other use.

River Source's Media Release

CONCLUSION

This Document is intended to be interpreted and enforced to the fullest extent allowed by law. If any portion of this Document is deemed unlawful or unenforceable it shall not affect the remaining provisions, and the remaining provisions shall continue in full force and effect. Participant and parent/s of a minor participant agree: I have carefully read, understand and voluntarily sign this Document, and acknowledge that it shall be effective and binding upon me, my minor children, spouse and other family members and my heirs, executors, representatives and estate. *One or both parent/s must sign below for any participating minor (those under 18 yrs. of age).*

_____ Participant Signature (*parent/s may print name for those participants under 12 yrs. old*) Date Print Name Here
Parent 1 / Parent 2
Parent or Legal Guardian Signature Date Print name here / Parent or Legal Guardian
Signature Date Print name here

Appendix G: Flyer



Pictured above is the Beaver Pond at the Dale Ball Trails

If you have any questions, please don't hesitate to reach out to us at:
sf21.river@gmail.com



Elder Interview Activity

In collaboration with your child's teacher, River Source and WPI

Hello! We are students from Worcester Polytechnic Institute (WPI). We are working with River Source to create an Elder Interview Template to teach the students how to conduct a respectful interview with a person older than themselves.

Students will need to:

- Watch two short videos
- Conduct an interview with an elder in their life
 - An elder is someone older than the student, at least in their twenties. If students are unable to interview an elder, they can interview an older sibling or friend instead.
- Fill out a short, anonymous survey in class

Our goal is to:

- use this exercise to help us teach the kids how to conduct respectful interviews with elders
 - The interview will supplement their knowledge of the natural sciences by learning about the history of a watershed outside of school
- help us teach them how to understand the connection between the natural sciences and social science.



Appendix H: Coded Interviews

Steve Harris

1. Rio Chama is the watershed he is most connected to.
2. Reservoirs were created on the Chama, and it's highly regulated.
3. Tunnel bringing water from Colorado River Basin to the Chama - Negative impact
4. "People think about Rivers in terms of water"
5. But there's another dimension, (aquatic) habitat and sediments
6. Reservoirs capture water and sediment, but only release water, causing erosion, which affects where people have irrigated forever, the water channel is degrading.
7. Habitat degradation, and loosing water, which lowers the aquifer.
8. Area above reservoirs flood Irrigators are nervous that they are going to lose some or all of their water rights, especially with climate change.
9. "The analogy that I use is, it's just like a ditch or a pipeline, you know, if it's in bad repair then you've gotta get in there and fix it. And in this case, the river is in bad repair." 9:00
10. Not much baseline data from the pre-dam era for plants and animals
11. Not many amphibians found in the Chama, and only two species there now-a-days and much less frequent, and some have gone missing
12. Farming vs the environment, but it needs to be done collaboratively to be effective.

13. **Fondest memory: first time he went to Rio Chama, camping by the river in mid-june, woke up with frost on his sleeping bag, and realizing that it was a lot different than where he was used to, and he has done it probably 100 times.**
14. **upper elevations turn into alpines from desert**
15. **Pollution in the Rio Chama, the clean water act requires states to monitor the pollution.**
16. **Chama tributaries are losing water clarity, water quantity, regularity, prolonging drought, bad stuff in the soil as well, which is caused by a long history of overgrazing.**
17. **Problems "here" are related to non-point source pollution and erosion.**
18. **Used to be great grasslands, and they didn't realize how thin the soil was.**
19. **Nonprofits and the state are really trying to restore the grasslands, which is helping, but it's a centuries long effort**
20. **"You need everybody who's using the resource to be aware that it needs restoring, which is a challenge. Which is why River Source exists, I think, is to educate the coming generations." 19:00**
21. **A problem happens when you introduce a species that has no natural predator.**
22. **Rio Grande Restoration (nonprofit) 1992, grant to send Rich around Rio Grande Basin and found 12 projects to do, and now every community has projects with little to no federal funding.**
23. **"It's complicated" 26:30**
24. **Haven't had many devastating fires in awhile, which seems like good news, more needs to be done obviously.**
25. **Practices of cattle grazing, tough discussion because it's partially cultural, (mostly Hispanics) and they don't like to be told what to do, especially by environmentalists.**
26. **Water for you, water for me, water for the animals**
27. **Relationship between agriculture and recreation**

Respect questions

1. Liked the conversation style
2. Young children get some clack
3. Don't be super formal, more conversational
4. Respect is very important though
5. Be thanked, honored, respecting their experience
6. People don't value knowledge or advice like they used to anymore, like elders
7. Electronic era has made stuff fall apart
8. Treat them like a person, with feelings and thoughts and value
9. Electronics might be daunting for elders, so be conscious
10. Trying to make kids comfortable
11. Two ends of the spectrum opinions are disregarded, and bringing the two together to elevate both
12. Put in the instructions about conflict (?)
13. Don't be defensive
14. Creating an instrument that gets meaningful results

Luis Torres

- Don't use the word kids. Use students
- Born in 1940
- Did not always live in Santa Fe
- Mostly lived in northern New Mexico
 - Many different places
 - Currently in San Pedro
 - South end of Espanola
 - Longest of any other place
 - Since 1985, 35 years
 - Never intended to stay here
- Grew up in BlackLake, present day Angel Fire
 - Rural area
 - "Town" was Taos
 - Favorite place
 - Would live there if he could
- Most important watershed
 - Big & little
 - Little ones make up big ones
 - Owns rural land in a community just off the highway 84 toward Chamma
 - Works on a house there for 30 years
 - Watershed is very definable
 - Mountains drain into creek
 - cares a lot about it
 - Also cares about Rio Grande
 - Most of NM drains into Rio Grande watershed
 - Principle artery
- On board of directors for high country news
 - Publications organization
 - Cover western US
 - Colorado river is big river of western US
- Fondest memories
 - Spent entire life in mountains
 - Many memories
 - Summer of 1960

- Working for US forest service in Taos, NM
- Graduated high school in May 1959
- Summer of 1959 - summer of 1964 worked for forest service
- First 2 summers worked in highest mountains
- District ranger (Luis imitated him) called him the wrong name
 - Rode up to the blue lake cabin
 - Unloaded horses at trail edge & rowed up
 - Cabin was on the southeast side of Wheeler Peak (at the base)
- Sereek- high mountain lake that was from a glacier sitting there for eons
- Wanted to show Luis the cabin & lake (motive 1)
- 1 pm lunch & started back on different trail
- Check on Andreas (boss of trail cleaning crew)
 - Working nearby
- Dinner- arrived at where Andreas & crew were working
- There was Andreas, a Hispanic man, & a white kid (about 17 years old) on crew
- Kid was scrawny & laughing all the time & out of place in Hispanic setting
- Boss was Ed Ingstron (hadn't told Luis anything about the kid)
- The kid's name was Tweed Roosevelt
- During WW2, Ed's boss (George Proctor) was in the navy with one of Theodore Roosevelt's sons. They made a deal. Proctor was going to come back to NM & become a ranger. Roosevelt said "when my kid grows up, I'm going to send him to spend a summer with you to learn about the mountains". Sent him out, but nobody wanted him (they were all grown men working for families. Partnered Tweed with Luis.
- They all have dinner
- Roosevelts married an upstate New York family (the Tweeds)
 - Politician Boss Tweed
- That night John F Kennedy was nominated during Democratic Convention (mid June, maybe June 15th)
- Tweed had transistor radio (brand new, almost no one had one)
 - Hung it on a limb
- Stayed until 1am
- 4th or 5th vote that sealed the deal
- Then got back on the trail
- Boss Ed was known for doing things like that
 - Horseback at 1am

- Ed says better saddle up & get back at 1am when democratic convention is over
- Got on the trail
- In the mountains at night & see lights (of Santa Fe or Denver). Didn't know where they were
- Ed was in front, Luis in back. Single file. Ed's horse stopped. Told Luis to get off the horse & see where they were when the horse stopped. Luis worked his way up front. Hits the truck. 4 or 5 in the morning unloading horses at horse pasture
- Didn't keep up with Tweed. Thinks his life would be different if he'd kept up with Tweed. Became best friends that summer. Wishes he'd kept up with Tweed.
- Heard 2 things about Tweed: (1) in the 80's/90's doing exploring in upper regions of Amazon. Went places where there hadn't been a white man since his grandfather had been there. Thought of contacting him. Was doing work in Washington at the time (2) mentioned him to somebody a few years ago. They said he's the right hand man of Madaline Albrighton when she was secretary of state
- Luis was a student at university & took a class called geomorphology, which fascinated him
 - Always been interested in landforms
 - Struggled & distracted in most classes
 - Went back & studied some things
- How have watersheds changed since he was younger
 - Headwaters of rio Taos pueblo creek
 - Changed mostly politically (less so environmentally)
 - Was managed as forest service land (when Luis was forest service)
 - Aggressive & smart attorney took on the case in the 80's/90's for the pueblo of Taos & reclaimed the area for them. 50,000 acres
 - That land where he spent so much time was Native American land all along (all of its Native American land). They reclaimed it, so now it's privately owned by Taos pueblo

- **Forest service relations with pueblos**
 - Worked with Native American people
 - Did know about it
 - Doesn't really know about that now
 - The US government has not had good sense to be respectful of people who don't run the government. Abusive of Native people forever. Abusive of.. Poorer you are, the more you get abused. Give Native American people credit for their level of tolerance & level of caring. Overlooked a lot of abuse. History of AIM (Native American Activists). Activists here & there. By & large they have been amazingly tolerant of abuse.
 - Can't come to something specific
- **His daughter (50s) is a nurse practitioner. Likes flying in helicopters. Works in a helicopter**
 - Got a call the other day
 - Native American man from Taos Pueblo was in the mountains & started showing signs of a heart attack & went to get him & saw the bluest lake ever. Went back to where Luis had been 50 years ago. Got the guy from next to the lake
- **Describe a watershed recently & how it's changed**
 - Goes into mountains all the time
 - Less than a week ago
 - Sees the difference (tremendous)
 - Impact of humanity (from childhood & time with forest service)
 - Since he was 5-10 years old, he was already in woods with his dad
 - Woods have changed since then
 - Not faulting anyone right off
 - There is fault to be assigned but you must do it specifically
 - Impact of humanity on watershed is tremendous
 - Have not been good stewards
- **Differences in the plants & animals seen**
 - & sees things he never saw before too
 - Will see elk in woods now
 - If he wanted to harvest elk as a child, he'd have to ride a long distance on horseback
 - Get home at night, very tired
 - Big task
 - Overrun by elk
 - As a kid, going into woods early in morning, & there was an orchestra of birds (deafening)

- Now, hears a bird tweet & jumps (goes outside to look for it)
- Is the elk presence from something positive or negative that happened?
 - There's a place for elk (good animal)
 - But we are overrun. There's too many
 - Problem he thinks is the way they are managed by NM Game & Fish in every state is they want elk to be in big herds because they are a revenue stream & not for local people. Sell tags for people from Texas, etc to pleasure hunt (not for meat)
 - Mostly negative
 - Great to have herds of elk the way they were when Luis was a kid
- Did the elk impact the watershed or vice versa?
 - Elk have impacted watershed
 - Elk will go anywhere, wherever there is food
 - Eat peaches from front yard
 - Grandniece in Los Alamos. Visited & brought a jar of 6-8 peaches. They were great. He called her the next night to tell her & ask for more. She said yes but the deer have been eating them
 - Mule deer around here
 - White tailed back east
- Tell us about story of pollution
 - 10-15 years ago when ATVs started coming around (kept morphing)
 - Those things go all over creeks & rivers
 - Biggest impact that he's experienced
 - They make crossings into creeks
 - When it rains, it makes an arroyo, which adds silt into river
 - Arroyo- gulley
- What can be done to protect watersheds?
 - "The only thing that is going to protect our environment- not just our watershed, but our environment- is gonna be the education of young people."
 - When Greta thunberg & her contemporaries start kicking the shit out of the old men that have been destroying is when things will change. Won't change before that
 - Passage in the bible "a child shall lead us" "What is the passage in the Bible? 'A child shall lead us.' Then. It's not gonna happen otherwise. I believe that wholeheartedly"
 - Won't happen otherwise
 - Believes that wholeheartedly & forever
 - Ever since he & Tweed were riding horseback

- Places all hopes on young people
- Anything he wants to tell us?
 - Nothing comes to mind
 - Might have come up with something if he had anticipated the question
- What did he think of this interview?
 - Pleased because he likes interacting with young people
 - Has a sense that he wants to share experiences with others
 - If it's useful great, if not, maybe it'll be useful for someone else
 - He's lived a charmed, blessed life. Had lots of good experiences
 - Telling people about that may have some value somewhere, somehow
 - Also made mistakes, lots to learn
 - Mostly made mistakes, good for learning
 - Worked upwards of 50 years
- Respectful interview conducted by a child
 - Kids aren't likely to disrespect you (not inclined to)
 - Almost wrong question
 - Question of... trick is preparing the young interviewer such that it's meaningful to them, not just an assignment/mimicking adults
- How to prepare a child for an interview?
 - Whole idea of getting young people involved in interviews is kinda new
 - His schooling experience is 90% bs & a waste of time (particularly early years)
 - Figuring out how to teach
 - On the cusp. So many things are changing. Schooling will change dramatically
 - Pandemic taught us why are we sending kids to school every morning at 7 am?
 - Babysitting service
 - Has kids & grandkids
 - 20 yr old grandson in military
 - Luis raised him & his daughter (single parent, grandparent)
 - 3 other younger grandkids (11 & 8 (twins))
 - Sees a lot of what happens in family
 - Sees the kids a lot
 - Kids have been home during pandemic
- Someone comes to help them learn
 - Learns more from this person than school
 - Put on a dance for Luis (couldn't learn that in class) & go for walks in arroyo

- **Education is going to change**
 - **Go into woods to learn about arroyos (becomes more prevalent)**
 - **Rich is doing that**
- **Recreation is really big**
 - **Economy will change**
 - **% of people have enough income to recreate**
 - **Everyone he knew didn't recreate because they were working to make ends meet**
 - **Redistribute wealth, more people will be able to recreate**
 - **Will want to recreate in woods (more impact on watershed)**
- **Doesn't know what Rich is doing, but hopes it's good work**
- **What topics not covered should have been covered?**
 - **In a series (not just one interview). Go & say hi & go back 1 week, 1 month, 6 months later & talk again**
 - **Value will emerge as relationship develops**
- **Any topics not covered that we asked?**
 - **Nope, all good**
 - **There are things that shouldn't be asked though**
 - **How many beers did you have last night?**
 - **Give kids a heads up that there are some things to be aware of/questions not to ask**
- **Can never overemphasize that art of listening**
 - **Most people are bad listeners**
 - **Studied at highlander institute @ nomarker tennessee**
 - **60s/70s major figures in community change work**
 - **Brainchild of Miles Fortun**
 - **Center emphasizes listening a lot**
 - **Hard to learn to listen**
 - **Best if you pick it up as you grow up**
- **What do you see river source staff doing that's making a positive impact on communities & watersheds?**
 - **Doesn't know much about what rich does**
 - **Good to focus**
 - **Happens a lot with private nonprofits**
 - **Need to focus on funds**
 - **Don't focus because budget is driving actions**
 - **Ideal world, concentrate on developing a good model for student involvement in natural resources (or small aspect of that)**

- **Assume economy levels off. More people have a little better economy, so they'll want to recreate. So they'll go to the countryside. Need to teach people how to behave in the countryside. (No ATVs)**
- **Anything we didn't ask?**
- **If more time, we'd get to more questions**

Arnold Herrera (Part 1)

Carlos: the big goal of this to open communication between the students & elders in their community & put down the cell phones & other electronics
Collect stories to guide projects & management

Arnold: wants to get away from cell phones. Told by Grandpa that when you come of age, you come home & share your experiences. Need to get away from technology.

Rich: recent news from Santo Domingo. Malcolm Colleneto (?), Arnold knows him, is a cultural reservation officer who thinks this project is a great idea but wouldn't want any interviews recorded. Hired for plant identification. Not saying that interviews need to be recorded. The transmission of stories is good enough.

Zoe: make a big deal about formality. But just having a conversation is good

Arnold: people need to be able to converse. Carlos says 'I'll text you' & Arnold says 'I won't answer. Call me'. Technology is good when used the right way. My dad always said to remember moderation. Will probably repeat some of my dad's lessons because of the role of elder.

Arnold: Issue of water is you can see a lot of what's happening right now in Santa Fe. years ago friends in Northern New Mexico, in the Chamma area were afraid there was gonna be a big water war up there. Asked Carlos if he remembered going hunting. Maybe 10 years ago. Critical need & people realizing that in NM or even the greater area (the forest state area) there's a trend. Even my people in Chaco, if you go to Chaco national monument & see canyons 15-20 ft deep. We know during those times there's occupied during 1200 BC. now finding info that it was occupied in 800 BC. During those periods there was a lot more water & it shows. Somehow no one wants to wake up to what really happened. What's happening here in Santa Fe is gonna be a prime example of what can happen throughout the greater area because we're running short on water. Even home in Cochiti, we were looking for a willow. It was down to 2-3 ft. I'd never seen it that low. Go back to the way it used to be, farming. Last year we started farming. We saw the need to use the water. If we don't, the greater public will start taking more & more. Carlos told us the amount of water that Santa Fe uses from the Rio Grande, which is actually a little stream. 80-90% of the water Santa Fe uses comes from that river.

Arnold: When I used to work for the natural park service, people used to always ask about the different things the federal government used to write (study of nature). Was there trying to educate the public. If they'd listen to Natives, on how we took care of nature, that's the environmental impact on nature right there in a big way. But nobody listens until we are at the point where we are at

in Santa Fe.

Zoe: lots of students doing projects about water have been asking to go places where they can get pics of water. Not really. No rushing rivers.

Arnold: last time I saw a rushing river was about 1988, working at Cochiti lake. Good snow that year. 1 lake turned into 2.

Rich: the Santa Fe side got filled up

Arnold: they backed up all the way into the Santa Fe river because the water was so high. Carlos was 8 years old. People were looking for a beach.

Carlos: fishing was great during that year. Lots of vegetation created more habitats for fish. We would walk or get dropped off. More water means better water quality. I didn't make those connections until I went to the marina but they do exist. The lines still exist from where all the driftwood was from the floods. Can see the dead trees & things.

Arnold: It's impacted everything. A lot of animals that we used to see are not there. You can see the impact that some animals we didn't see before are coming down into the area around Cochiti because it's so dry up in the hills. When I was growing up, we never saw elk. We never saw deer. Now they are right along the river. Changes are at the higher levels, too. The way mother nature works. Air current follows a pattern. My grandfather always used to say there's a trail to follow. That has an effect on the ridges you can see 2-3 miles from the pueblo. Junipers are drying up. You can tell how the wind carries the water & what is happening. Cochiti Pueblo is at 5,200. A little ways up you can see the rain. Every time you see a drop, you look up for if a bird is flying over. It's been very dry at home. There was one period this summer, we were very thankful. We thought the pandemic would be extended, so we got more land from the pueblo council. Brought in corn, beans, chili, squash. All neighbors did well. That's the formality I grew up with. If a farmer does well, the pueblo does well because you share.

Arnold: Sharing is something my grandfather always used to say. Years ago he said, don't forget. When people were moving from the north, they survived because they helped each other. He said don't forget that. So I try to remember that. Different attitude toward material stuff, especially food. Critical.

Zoe: talking about food deserts with other groups. Because the Us government thinks of food as a material object that people own. Not a right people have.

Scott: where I'm from, every tribal owner is allowed 5 deer. That's a lot of meat. A few members say we'll process & pass it out for you if you have a deer. Every Saturday, they pass out deer to elders in the community.

Carlos: A lot of those areas are dealing with overpopulation of white tails too.

Arnold: I remember before refrigeration. I always share with my son, the older people are pretty smart, very creative. They had to be in order to survive. They knew when they got a deer, they would cut it & dry it & later on put it over the fire. Anything like that. Down at the farm, for example, some of it happened after the Spanish got here. They had other foods we didn't have at the time. I remember, my mom used to can peaches. Let them dry in the sun, then put them in well ventilated containers. Over the winter months, you always had something. How well we reap what we know. Your ancestors coming from the East, same thing.

Zoe: We still exist. We're still here

Arnold: definitely. Without water, no one lives. Proper water has affected my home because we're down river. To me, I don't know how much contamination there is in the lake. We're down river. When I was working there, they used to do water studies of sediment but you'd never hear the findings. One thing we know is there are 2 places in our area that are high of cancer: Los Alamos & Cochiti. Some friends said they were dumping contamination in Cochiti mason, so he quit. Cochiti mason, they used to just take their trucks & dump over there. Cochiti mason is like a bowl that goes down into 2 canyons. One on the southwest and Cochiti. Then they join & go down where there used to be an orchard & almost to the river. That affect & the shortage.

Arnold: I don't know what's going to happen. I remember years ago, when my home we were talking about info from the state trying to entice our people to use less water during a dry summer. They said in the meeting to cut back on water. I was working for army core of engineers at the time & told them don't cut back on water. They are measuring how much your using. When you want more water, they will say no because you don't need it. So use it.

Rich: Santa Fe has gone through big droughts. They say save water & even cut it off to the parks. People in our community say no & water the trees. A question of priorities. But they allowed development. Save water for who/what? Our system creates perverse incentives. Burn junipers in hills to make room for golf course. Perverse incentive is use it or lose it. I think tribal thinking is we're holding water but it's not just for us, it's for all these other things. Instead of for golf courses. Golf courses you can restore. Can't restore pavement as easily.

Arnold: In some areas, juniper dries up. There's so many ceremonies. Everything tastes better over a fire. What happens when there's so little of the juniper? It's the number one wood used by my people for bread making. Need to go other places to get it.

Zoe: see that with white sage right now. Its all about priorities. Who's needs get prioritized? Tribal needs aren't seen as real needs compared to an amazon company.

Carlos: Then the tradition of teaching about harvest isn't followed. Like harvesting willow for baskets. Selectively harvest only what you need. Not for profit.

Arnold: When I was growing up, with the junipers, you only took from the outside & save the middle. Leave the branches. Didn't have all different ways to roast chili. Out on horseback, if you see juniper branches, you pick them up & use them to make a fire to roast the chilis. Seemed like lots of work but you survived. They would tie a bunch & dry it. Ventilate it so it doesn't spoil.

Arnold: That's gonna be a real challenge for the community (protecting the watershed). Modern tech is emphasized for young people. Emphasis is on tech for getting a better job. Forget about tradition & community. Especially before the pandemic, we sit on the street working on drums & the bus stops & the kids get out & it sounds like Santa Fe. no Cochiti language. Some of the courtesy we had, like passing someone & acknowledging them. You don't see that.

Tremendous changes in young kids. 15 ft away & don't know we're there. I come to the conclusion, there parents are in the mid fifties, so if the kids are like that, what are the parents like? Its the result of years ago when I was working at an art school, I was outreach for the president. One of my partners did a survey about language retention in the pueblos. & 30-35 years ago, at my home, fluency retention for 35 & younger, you didn't really know it. & some other places, some were even worse off. As years pass some of this (kids & language) is because of those years. Big changes. Need to get serious. I have to do something. I don't know what. I don't know what will happen.

Arnold: Someone once said to me when your generation goes, I don't know what's going to happen. One of our most knowledgeable friends that passed a month or 2 ago. I don't know what will help us wake up.

Rich: so you're saying we all need to wake up.

Arnold: I remember when I was in park service, they talked about the melting pot. I changed it to melting mud. It happened on Staten island. Land in mud & become American, at loss of your culture (British). Domineering group in city, there was prejudice against smaller groups. That was happening back there. I think on some level it was & is still happening (all english speaking). You have to to get by. Not long ago, we were talking & I didn't understand something. Don't understand everything in English because I'm thinking in my Native language. I'm still learning. Big changes.

Zoe: language learning. How to be an Ojibwe person. Need to speak the language because it's so important to the culture. Kids don't have any elders left to teach them the language though. The tribe is doing a good job, though. Colleges give courses like that though so any random person can learn.

Scott: Wake up is connected to culture.

Arnold: Important to talk about how to reconnect with the elders. The tech is getting kids away from that. How do you slow down & listen to elders? Some young people say grandparents aren't teaching because grandparents are at casino. Different conflicts & variables.

Zoe: I don't think you know how much older generations worry about your generation & generations younger than you.

Emily: I see it with my cousins.

Sydney: that's the point of this interview. To put down the phone & talk to your grandparents & learn.

Arnold: back then there were less things to get them away from grandparents. Lots of changes to the way we live now (modern conveniences) I think gets economically based. The family is changing. When I was working with youth, what the change? Trying to develop a program to help kids 3-5pm when the parents aren't home. What are they learning then? When I was growing up, there were less conveniences (like cars, walmart). We were isolated. Now kids just have too many handouts. Back then, we were lucky to get a quarter on sunday. A whole pop & bag of chips for a nickel. I remember when my dad got a truck, we got gas for 28 cents a gallon. More focussed on working with your family. With mine, there was some injury, the kids understand the whole family works together (like farming). At the field at 4:30. At 10 it gets hot, so you work inside. 4 pm back to the farm. Some people now would call it hard times. I think I see it a different way. It taught us good work ethic. I can't sit still. Gotta do something. Totally different environment.

Zoe: We've been thinking of these interviews as a kid & elder. What about kids in communities who don't have older role models?

Arnold: where we live now. The plaza is where everyone used to be. Hardly anyone there now. Pueblo has moved west. No community anymore. Different culture there. Biggest change. What convenience lead to that? Parents. Tv. 2 cars. Etc. What happens to the family? Both parents work. What happens to the kids? No time for kids. 3-6pm, they get in trouble because of no guidance. They aren't learning. Can't just talk about 1 thing. Gotta take care of the river.

Carlos: when i was a troubled teen, I fell back on my teachings from my dad. Helped give me an understanding of the importance of water. Those were my biggest questions at school. What are the impacts? Now I can see those impacts right now. Someone asked the other day, do I have hope for the environment? It's hard when I see the impacts & people's inability to recognize the situation. To be able to find a way to do something about it instead of saying it's happening & buying a prius. It's about action. Reducing carbon footprint with a car but also not watering your green lawn every day. Not just changing mentality but also the connection between all these different things. If people can still recognize their connection to the resources in the water. Then the resources can take care of you. Like we're in a long race. Don't know where we'll be 30-60 years from now. When does the human race reach the carrying capacity? Mother Nature says she's sick of us to remove some of the impacts we're having on the land. We need to be aware of our impacts. We can't force others to change. We can change within ourselves & find like minded people to help us. The drums from my dad helped me stay grounded to myself. Connections of drums helps us stay connected to culture & resources. How can we carry on our culture without the resources we depend on?

Scott: I'm from a place of water. Lakes everywhere. We have to have monthly rallies because Canada wants a gas pipe through a lake. It'll eventually break. People still have to fight even when there is water.

Arnold Herrera (Part 2)

1. Gets excited to have people use more water
2. The Crows were listening
3. Having an understanding of who you are, and what your place is within the watershed
4. Drummaking is the main connection with the resources and communities
5. "You got educated, what are you gonna do now?"
6. He took over his dad's business of drum making
7. Did I learn enough?
8. Drum is like a catalyst
9. Dance is their prayer
10. "Believing without seeing"
11. Aspen wood for drums
12. Have to know the life span of the materials, when is a good
13. Were the ones that clean up the forest floors, to prevent fires
14. Go out and give that log a chance to live, for a different purpose
15. A drum isn't just a drum
16. "For me, Drum Making was not only working with that drum, but it was a good family event and the opportunity to pass along the culture." Arnold 24:30
17. "This was my opportunity as I was growing up, to have that precise opportunity that the interview is doing is to bridge that culture gap, to bridge that gap between younger generations and the older generations" Carlos 25-26 maybe pull another quote.
18. This info is important to pass down
19. The way to fix something isnt to sweep it under the rug, its to attack it with the facts
20. "Wow" Arnold
21. "We pray for everyone, we don't discriminate" Arnold 32:00
22. 1998 smithsonian



Appendix I: Completed Feedback

Teacher Feedback

Do you think this assignment was beneficial to the students? In what way was it beneficial?

Yes. The assignment gave students a chance to connect with an elder in their lives and to think about water in a personally meaningful way.

Was it easy for you to assign this project (ex. needed little to no in-class instructions)?

Kind of.

How many students completed the assignment? And how many students are in the class?

15 out of 16 (the one who didn't complete it has been out of school since it was assigned)

Did this supplement any material you already use in your classroom, and if yes, please tell us what material.

I felt the assignment reinforced social skills and an understanding of informed consent in a real world way. We use Second Step for social-emotional skills training and practice.

Do you have any feedback for us that could help make this project better in any way?

I would offer teachers the version with lines on the interview form and also the one without the lines for typing directly into from student notes. I would suggest offering that first page I put together where the concepts of informed consent are discussed and phrases are modeled for the student to use when asking for consent.

Can we mention how you helped us in our published project submitted to WPI?

Yes.

Student Feedback

https://drive.google.com/drive/folders/1WpE9EX50T-mcBiPT35k9aYpgGX_XX9c0?usp=sharing